# Lab Products & Services
# Product Catalogue

![sartorius]

turning science into solutions

## A Profile of Sartorius

The Sartorius Group is a leading international laboratory and process technology provider covering the segments of Bioprocess Solutions, Lab Products & Services and Industrial Weighing. Founded in 1870, the Goettingen-based company currently employs more than 5,000 persons. The major areas of activity of its Bioprocess Solutions segment cover filtration, fluid management, fermentation, cell cultivation and purification, and focus on production processes in the biopharmaceutical industry. The Lab Products & Services segment primarily manufactures laboratory instruments and consumables. Industrial Weighing concentrates on weighing, monitoring and control applications in the manufacturing processes of the food, chemical and pharma sectors.

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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Services

## arium® comfort II –
## Best Technology without Compromise

*Available soon*

### Applications
- HPLC
- GC-MS, AAS, ICP-MS
- Ion chromatography
- TOC-Analysis
- Photometry
- Microbiological media and reagents
- Solutions for chemical analysis and synthesis
- Histology
- ELISA, RIA
- Buffer an pH-solutions
- Feed water for laboratory devices, such as autoclaves, glassware washers, humidifiers, water baths etc.

### Summary
Sartorius offers the compact, environmentally friendly, reliable, and easy-to-use arium® comfort II for producing ASTM Type 1 ultrapure water and Type 2 pure water as an all in one system. The system contains the latest EDI technology and a unique cartridge for producing the highest level of ultrapure water quality. Unlike conventional water systems, the arium® comfort II optimizes water consumption using the integrated iJust controlled by intelligent software. The unique touch display with intuitive menu navigation ensures the utmost ease of use.

### Description
The arium® comfort II, fitted with high performance ion replacement resins, delivers up to 120 l/h of high-quality ultrapure water that even exceeds the requirements of the ASTM Type 1 specifications. The integrated UV lamp (185|254 nm) reduces the content of microorganisms and TOC to a minimum. The integrated TOC Monitor continually measures and provides the actual values of the TOC content. Developed specially for the arium® comfort, it provides the highest measurement accuracy in the range from 1 to 300 ppb.

The arium® comfort II also provides up to 10 l/h of consistently high-quality Type 2 pure water. This water, which is stored in arium® bagtank systems, was desalted electro-chemically using state-of-the-art EDI technology. Upstream RO modules with low-energy TFC reverse osmosis membranes and a pre-treatment cartridge ensure the highest ion retention rates for optimized water yields. Both qualities of water are virtually microorganism-free when a Sartopore® 2 150 end filter is used.

### Features
- **Reliable**
  TOC content < 2 ppb for reproducible results
- **Visible**
  current TOC readings can be read directly on the display
- **Consistently high quality Type 2 water**
  state-of-the-art EDI technology
- **Optimized Water Consumption**
  automatic with iJust
- **Easy to Use**
  glass touch display with intuitive menu navigation
- **Flexible**
  adaptable to every laboratory requirement thanks to flexible display positioning and water dispensing
- **Space-saving**
  compact design means little space is needed

| Technical Specifications | arium® comfort II | arium® comfort II |
|---|---|---|
| Water purification methods | Adsorption by spherical activated carbon, catalyst, reverse osmosis, softening, electrodeionization, deionization, UV radiation, optional final particle and sterile filtration | |
| Dimensions (W × H × D) [cm] | 43.5 × 50.1 × 47.6 | |
| Empty weight [kg] | 28 | |
| Operating weight [kg] | 36 | |
| Operating temperature [°C] | 2–35 at max. 80% rel. humidity | |
| Storage temperature [°C] | 5–45 at max. 80% rel. humidity | |
| Data output | SD card slot, RS232 interface | |

**Product Water Quality**

| | | |
|---|---|---|
| Type of water | ASTM Type 1 | Type 2 |
| Output | 120 l/h | ≤ 10 l/h [6] |
| Water dispensing flow rate | up to 2 l/min | ≤ 3 l/min [4] |
| Volume controlled output | 2 l/min in 100 ml, 1 l or 5 l steps, depending on total dispense between 0,1 l and 60 l [4] | – |
| Volume accuracy | 3% in the range of 0.25 l and 60 l [5] | – |
| Typical conductivity | – | < 0.2 µS/cm compensated to 25 °C [5] |
| Typical resistivity | – | > 5 MΩ × cm compensated to 25 °C [5] |
| Typical TOC content | – | < 50 ppb [3] |
| Conductivity | 0.055 µS/cm compensated to 25 °C [1] | – |
| Resistivity | 18.2 MΩ × cm compensated to 25 °C [1] | – |
| TOC content | < 2 ppb [3] | – |
| Microorganism content | < 1 CFU/1,000 ml [2] | < 1 CFU/1,000 ml [2] |
| Particle content | < 1/ml [2] | < 1/ml [2] |
| Typical Ion retention | – | up to 98% |
| Retention of dissolved organic substances (MW > 300 Dalton) | – | > 99% |
| Particle & microorganism retention | – | > 99% |

| Feed Water Quality | Exclusively potable water acc. to the drinking water guidelines of the USA, the European Union, or Japan. |
|---|---|
| Input pressure | 2.0–6.9 bar, recomm. > 2 bar |
| Temperature | 2–30 °C |
| Specific conductivity | < 1,500 µS/cm compensated to 25 °C |
| TOC content | < 1,000 ppb |
| Max. permanent hardness (max. $CaCO_3$) | 360 ppm |
| Free chlorine | < 4 ppm |
| Iron (total Fe content) | < 0.1 ppm |
| Manganese | < 0.05 ppm |
| Aluminum | < 0.05 ppm |
| $CO_2$ dissolved | ≤ 40 ppm |
| Fouling Index (SDI) | < 5 |
| Turbidity | < 1 NTU |
| pH value | 4-10 |

[1] measured value output is adjustable to 25 °C compensated or non-compensated
[2] when using a Sartopore® 2 150 end filter
[3] determined with municipal water (Goettingen), TOC < 1,000 ppb

[4] depending on the arium® bagtank design, hydrostatic pressure, connected accessories and end filter
[5] depending on the quality of the feed water ($CO_2 \leq 40$ ppm) and temperature
[6] depending on the feed water pressure, temperature, and condition of the RO Modules

# Order Information

**arium® comfort II systems with iJust function, electrodeionization technology combined with deionization for producing ASTM Type 1 ultrapure water and Type 2 pure water, including TOC Monitor**
Scope of supply: 1 arium® comfort II, 2 RO modules (reverse osmosis), 1 EDI Stack and connector set

| Order No. | Description |
| --- | --- |
| H2O-II-2-TOC-T | arium® comfort II Bench-Top system in compact design for every laboratory bench, incl. TOC Monitor |
| H2O-II-2-TOC-B | arium® comfort II Wall-Mounted system, space-saving with integrated wall bracket, incl. TOC Monitor |
| H2O-II-2-TOC-D | arium® comfort II Built-In system, space-saving in every laboratory cabinet, including wall-mounting kit for the display-dispense unit, incl. TOC Monitor |

| Consumables | |
| --- | --- |
| H2O-CPF | arium® comfort Pretreatment Cartridge, qty. 2 units |
| 613CPM4--------V | arium® RO-Modules, qty. 2 units |
| H2O-CSO | arium® Softener, qty. 1 unit |
| H2O-CCS | RO-Module Cleaning Set, qty. 1 unit |
| H2O-CBS-20 | arium® bag 20 l for arium bagtank 20 l, qty. 2 units |
| H2O-CBS-50 | arium® bag 50 l for arium bagtank 50 l and 100 l, qty. 2 units |
| H2O-C-PACK | arium® comfort DI-Cartridge, qty. 2 units |
| 5441307H4--CE--B | Sterile-grade Sartopore® 2 150 Capsule, 0,2 µm pore size, qty. 5 units |
| 611CEL1 | arium UV Lamp (185\|254 nm), qty. 1 unit |

| Accessories | |
| --- | --- |
| H2O-AOV-20 | arium® bagtank 20 l, without pump, qty. 1 unit |
| H2O-AOV-50 | arium® bagtank 50 l, with pump, 240 VAC, 50 Hz, qty. 1 unit |
| H2O-AOV-50-US | arium® bagtank 50 l, with pump, 115 VAC, 60 Hz, qty. 1 unit |
| H2O-AOV-100 | arium® bagtank 100 l, with pump, 240 VAC, 50 Hz, qty. 1 unit |
| H2O-AOV-100-US | arium® bagtank 100 l, with pump, 115 VAC, 60 Hz, qty. 1 unit |
| H2O-ADP-20 | Pump arium® bagtank 20 l, 230 VAC, 50 Hz, qty. 1 unit |
| H2O-ADP-20-US | Pump arium® bagtank 20 l, 110 VAC, 50 Hz, qty. 1 unit |
| H2O-ATR | Rollers for arium® bagtanks, universal fit, incl. fittings, qty. 4 units |
| 611APR1 | arium® printer, qty. 1 unit |
| 610AWG1 | arium® Water Guard, qty. 1 unit |
| 613-AMDG1 | arium® Dispense Gun inclusive height-adjustable Stand for connection to arium® bagtanks, qty. 1 unit |
| 613-AMDG2 | arium® Dispense Gun inclusive wall mounting kit for connection to arium® bagtanks, qty. 1 unit |
| H2Opro-AMDG1 | arium® Dispense Gun inclusive height-adjustable Stand, qty. 1 unit |
| H2Opro-AMDG2 | arium® Dispense Gun inclusive wall mounting kit, qty. 1 unit |
| H2Opro-ADM1 | arium® Multifunction Stand, height-adjustable, inclusive Display mounting kit, for connection to arium® Built-In systems, qty. 1 unit |
| H2O-AFS1 | arium® Foot Switch, qty. 1 unit |

## arium® comfort I –
## Space-saving Twin Technology

**Applications**
- HPLC
- GC-MS, AAS, ICP-MS
- Ion chromatography
- TOC-Analysis
- Photometry
- Buffer an pH-solutions
- Feed water for laboratory devices, such as autoclaves, glassware washers etc.

**Summary**
Sartorius presents the compact, environmentally friendly, reliable, and easy-to-use arium® comfort I for producing ASTM Type 1 ultrapure water and Type 3 pure water combined in a single system. The system contains state-of-the-art reverse osmosis technology, and a unique cartridge specially for the production of the highest quality ultrapure water. Compared to conventional water systems, the arium® comfort I optimizes water consumption using the integrated iJust control unit. This unique touch display with intuitive menu navigation ensures the utmost ease of use.

**Description**
The arium® comfort I, fitted with high performance ion replacement resins, delivers up to 120 l/h of high-quality ultrapure water that even exceeds the requirements of the ASTM Type 1 specifications. The integrated UV lamp (185|254 nm) reduces the content of microorganisms and TOC to a minimum. The integrated TOC Monitor continually measures and provides the actual values of the TOC content. Developed specially for the arium® comfort, it provides the highest measurement accuracy in the range from 1 to 300 ppb.

The arium® comfort I also provides up to 16 l/h of consistently high quality Type 3 pure water. The feed water was deionized by RO modules with low-energy TFC reverse osmosis membranes and stored in arium® bagtank systems which can hold up to 100 l. The continuous permeation backflush function thoroughly cleans the surface of the membrane, effectively preventing fouling.

Upstream spherical catalytic effective activated carbon and a special catalyst remove oxidation agents, heavy metal ions and particles from the feed water even at low temperatures and with high PH values.

Both qualities of water are virtually microorganism-free when a Sartopore® 2 150 end filter is used.

**Features**

**Reliable**
TOC content < 2 ppb for reproducible results

**Visible**
current TOC readings can be read directly on the display

**Safe**
SD card slot supports the documentation process

**Optimized Water Consumption**
automatic with iJust

**Easy to use**
glass touch display with intuitive menu navigation

**Flexible**
adaptable to every laboratory requirement thanks to flexible display positioning and water dispensing

**Space-saving**
compact design means little space is needed

| Technical Specifications | arium® comfort I | arium® comfort I |
|---|---|---|
| Water purification methods | Adsorption by spherical activated carbon, catalyst, reverse osmosis, deionization, UV radiation, optional final particle and sterile filtration | |
| Dimensions (W × H × D) [cm] | 43.5 × 50.1 × 47.6 | |
| Empty weight [kg] | 23 | |
| Operating weight [kg] | 31 | |
| Power supply | 100–240 VAC (± 10 %); 50–60 Hz, 130 VA (max.) | |
| Operating temperature [°C] | 2–35 at max. 80 % rel. humidity | |
| Storage temperature [°C] | 5–45 at max. 80 % rel. humidity | |
| Data output | SD card slot, RS232 interface | |

**Product Water Quality**

| | arium® comfort I | arium® comfort I |
|---|---|---|
| Type of water | ASTM Type 1 | Type 3 |
| Output | 120 l/h | 16 l/h [6] |
| Water dispensing flow rate | up to 2 l/min | ≤ 3 l/min [4] |
| Volume controlled output | 2 l/min in 100 ml, 1 l or 5 l steps, depending on total dispense between 0,1 l and 60 l [4] | - |
| Volume accuracy | 3 % in the range of 0.25 l and 60 l [5] | - |
| Typical conductivity | – | < 20 µS/cm [5] |
| Typical resistivity | – | < 0.05 MΩ × cm [5] |
| Conductivity | 0.055 µS/cm compensated to 25 °C [1] | – |
| Resistivity | 18.2 MΩ × cm compensated to 25 °C [1] | – |
| TOC content | < 2 ppb [3] | – |
| Microorganism content | < 1 CFU/1,000 ml [2] | < 1 CFU/1,000 ml [2] |
| Particle content | < 1/ml [2] | < 1/ml [2] |
| Typical Ion retention | – | up to 98% |
| Retention of dissolved organic substances (MW > 300 Dalton) | – | > 99 % |
| Particle and microorganism retention | – | > 99 % |

**Feed Water Quality** — Exclusively potable water acc. to the drinking water guidelines of the USA, the European Union, or Japan.

| | |
|---|---|
| Input pressure | 0.5–6.9 bar, recomm. > 2 bar |
| Temperature | 2–30 °C |
| Specific conductivity | < 1,500 µS/cm compensated to 25 °C |
| TOC content | < 2,000 ppb |
| Max. permanent hardness (max. CaCO$_3$) | 360 ppm |
| Free chlorine | < 4 ppm |
| Iron (total Fe content) | < 0.1 ppm |
| Fouling Index (SDI) | < 5 |
| Turbidity | < 1 NTU |
| pH value | 4-10 |

[1] measured value output is adjustable to 25 °C compensated or non-compensated
[2] when using a Sartopore® 2 150 end filter
[3] determined with municipal water (Goettingen), TOC < 1,000 ppb
[4] depending on the arium® bagtank design, hydrostatic pressure, connected accessories and end filter
[5] under constant operating conditions
[6] depending on the feed water pressure, temperature, and condition of the RO Modules

# Order Information

**arium® comfort I systems with iJust function, reverse osmosis system combined with deionization for producing ASTM Type 1 ultrapure water and Type 3 pure water, including TOC Monitor**
Scope of supply: 1 arium® comfort I, 2 RO modules (reverse osmosis)

| Order No. | Description |
| --- | --- |
| H2O-I-2-TOC-T | arium® comfort I Bench-Top system in compact design for every laboratory bench, incl. TOC Monitor |
| H2O-I-2-TOC-B | arium® comfort I Wall-Mounted system, space-saving with integrated wall bracket, incl. TOC Monitor |
| H2O-I-2-TOC-D | arium® comfort I Built-In system, space-saving in every laboratory cabinet, including wall-mounting kit for the display-dispense unit, incl. TOC Monitor |

**Consumables**

| | |
| --- | --- |
| H2O-CPF | arium comfort Pretreatment Cartridge, qty. 2 units |
| 613CPM4--------V | arium® RO-Modules, qty. 2 units |
| H2O-CCS | RO-Module Cleaning Set, qty. 1 unit |
| H2O-CBS-20 | arium® bag 20 l for arium bagtank 20 l, qty. 2 units |
| H2O-CBS-50 | arium® bag 50 l for arium bagtank 50 l and 100 l, qty. 2 units |
| H2O-C-PACK | arium® comfort DI-Cartridge, qty. 2 units |
| 5441307H4--CE--B | Sterile-grade Sartopore® 2 150 Capsule, 0.2 µm pore size, qty. 5 units |
| 611CEL1 | arium UV Lamp (185|254 nm), qty. 1 unit |

**Accessories**

| | |
| --- | --- |
| H2O-AOV-20 | arium® bagtank 20 l, without pump, qty. 1 unit |
| H2O-AOV-50 | arium® bagtank 50 l, with pump, 240 VAC, 50 Hz, qty. 1 unit |
| H2O-AOV-50-US | arium® bagtank 50 l, with pump, 115 VAC, 60 Hz, qty. 1 unit |
| H2O-AOV-100 | arium® bagtank 100 l, with pump, 240 VAC, 50 Hz, qty. 1 unit |
| H2O-AOV-100-US | arium® bagtank 100 l, with pump, 115 VAC, 60 Hz, qty. 1 unit |
| H2O-ADP-20 | Pump arium® bagtank 20 l, 230 VAC, 50 Hz, qty. 1 unit |
| H2O-ADP-20-US | Pump arium® bagtank 20 l, 110 VAC, 50 Hz, qty. 1 unit |
| H2O-ATR | Rollers for arium® bagtanks, universal fit, incl. fittings, qty. 4 units |
| 611APR1 | arium® printer, qty. 1 unit |
| 610AWG1 | arium® Water Guard, qty. 1 unit |
| 613-AMDG1 | arium® Dispense Gun inclusive height-adjustable Stand for connection to arium® bagtanks, qty. 1 unit |
| 613-AMDG2 | arium® Dispense Gun inclusive wall mounting kit for connection to arium® bagtanks, qty. 1 unit |
| H2Opro-AMDG1 | arium® Dispense Gun inclusive height-adjustable Stand, qty. 1 unit |
| H2Opro-AMDG2 | arium® Dispense Gun inclusive wall mounting kit, qty. 1 unit |
| H2Opro-ADM1 | arium® Multifunction Stand, height-adjustable, inclusive Display mounting kit, for connection to arium® Built-In systems, qty. 1 unit |
| H2O-AFS1 | arium® Foot Switch, qty. 1 unit |

## arium® pro Ultrapure Water Systems
## Application-orientated and Flexible to Meet the Highest Demands

**Summary**
The arium® pro series offers a flexible and modular system which, compared to conventional devices, demonstrates excellent cost efficiency. Fitted with module components specially tailored to its application, every arium® pro delivers the desired level of ultrapure water quality. The space-saving installation of the device as bench-top, wall mounted or built-in integrates it perfectly into your workstation in any laboratory.

All systems meet and exceed the ASTM Type 1 water quality standards and ensure the best reproducible results in their class. Up to 120 l of consistently high-quality ultrapure water with a conductivity of 0.055 μS/cm ($\hat{=}$ 18.2 MΩ × cm) can be dispensed each hour.

The ultrapure water is virtually microorganism-free when a Sartopore® 2 150 end filter is used.

The patented Sartorius technology, long service life, and low maintenance requirement distinguish the arium® pro systems as easy-to-use, efficient and reliable Type 1 ultrapure water systems.

**Features**
- **Modular**
  Selection of five systems specially tailored to their application
- **Flexible**
  Adaptable to every laboratory requirement thanks to flexible display positioning and the water dispensing
- **Easy to use**
  Glass touch display with intuitive menu navigation
- **Safe**
  SD card slot supports the documentation process

**arium® pro DI**

**Standard Applications**
- AAS, ICP-MS
- Ion chromatography
- Preparation of reagents
- Photometry

**Description**
The arium® pro DI is a highly efficient water treatment system and the ultrapure water quality exceeds the ASTM Type 1 quality standard. The Elemental Kit cartridge kit contains both purification steps with the same technology. Optimized cartridge materials reliably remove organic and inorganic substances. The Top-Down Flow technology provides ideal purification kinetics and prevents the cleaning media from mixing. arium® pro DI delivers ultrapure water which exceeds even the ASTM Type 1 quality standard. This consistent level of high-quality water ensures optimal reproducibility of your results.

The arium® pro is the more affordable alternative to the arium® pro DI systems. It features only the most important functions and produces ultrapure water without compromising ease of use. Fitted also with the Elemental Kit cartridge kit, organic and inorganic substances are removed reliably thanks to the Top-Down Flow technology and optimized materials. The TOC content of the ultrapure water is just ≤ 5 ppb.

**arium® pro UV**

**Chemical–Analytical Applications**
- HPLC
- GC-MS, AAS, ICP-MS
- Ion chromatography
- TOC-Analysis
- Photometry

**Description**
The integral component of the arium pro UV system is the horizontally arranged UV lamp (185|254 nm). The UV lamp uses two different wavelengths to prevent microbiological growth and reliably remove organic substances.

The optional TOC Monitor continually measures and provides the actual TOC content values. Developed specially for the arium® pro, it provides the highest measurement accuracy in the range from 1 to 300 ppb.

The Analytical Kit cartridge kit, contains both purification steps: the pre-treatment and the secondary treatment of the water. The Top-Down Flow technology provides ideal purification kinetics and prevents the cleaning media from mixing. Optimized cartridge materials, such as highly effective activated carbon and highly efficient ion exchange resins, reliably remove organic and inorganic substances.

| Technical Specifications | arium® pro DI l arium pro | arium® pro UV |
|---|---|---|
| Water purification methods | Adsorption by spherical activated carbon, deionization, optional final particle and sterile filtration | |
| Dimensions (W × H × D) [cm] | 35.0 × 49.2 × 45.1 | |
| Empty weight [kg] | 17–19, depending on system type | |
| Operating weight [kg] | 27–29, depending on system type | |
| Power supply | 100–240 VAC (± 10 %); 50–60 Hz, 130 VA (max.) | |
| Operating temperature [°C] | 2–35 at max. 80 % rel. humidity | |
| Storage temperature [°C] | 5–45 at max. 80 % rel. humidity | |
| Data output | SD card slot [6], RS232 interface | |

**Product Water Quality**

| | arium® pro DI l arium pro | arium® pro UV |
|---|---|---|
| Type of water | ASTM Type 1 | ASTM Type 1 |
| Output | 120 l/h | 120 l/h |
| Water dispensing flow rate | 0.1–2 l/min. adjustable | 0.1–2 l/min. adjustable |
| Volume controlled output | 2 l/min in 100 ml, 1 l or 5 l steps, depending on total dispense between 0.1 l and 60 l [4] | 2 l/min in 100 ml, 1 l or 5 l steps, depending on total dispense between 0,1 l and 60 l [4] |
| Volume accuracy | 3 % in the range of 0.25 l and 60 l [5] | 3 % in the range of 0.25 l and 60 l [5] |
| Conductivity | 0.055 µS/cm compensated to 25 °C [1] | 0.055 µS/cm compensated to 25 °C [1] |
| Resistivity | 18.2 MΩ × cm compensated to 25 °C [1] | 18.2 MΩ × cm compensated to 25 °C [1] |
| TOC content | ≤ 5 ppb [3] | < 2 ppb [3] |
| Microorganism content | < 1 CFU/1,000 ml [2] | < 1 CFU/1,000 ml [2] |
| Particle content | < 1/ml [2] | < 1/ml [2] |
| Pyrogen content (Endotoxins) | – | – |
| RNase content | – | – |
| DNase content | – | – |

| Feed Water Quality | Water purified by reverse osmosis, destillation or Deionisation. [7] |
|---|---|
| Input pressure | 0–6.9 bar, recomm. > 2 bar |
| Temperature | 2–30 °C |
| Specific conductivity | < 100 µS/cm kcompensated to 25 °C |
| TOC content | < 50 ppb |
| Turbidity | < 1 NTU |
| pH value | 4-10 |

[1] measured value output is adjustable to 25 °C compensated or non-compensated
[2] when using a Sartopore® 2 150 end filter
[3] Feed water < 50 ppb TOC content
[4] at 2 bar pressure, depending on the connected accessories and end filter
[5] under constant operating conditions

[6] not applicable for arium pro
[7] To operate arium pro with non-treated drinking water the Universal Kit could be used in most cases. In order to verify the specifications of your feed water, please contact the Sartorius Application Support.

# Order Information

**arium® pro DI and pro deionization systems for producing ASTM Type 1 ultrapure water**
Scope of supply: 1 arium® pro

| Specifications | arium® pro DI |
| --- | --- |
| **Order No.** | **Description** |
| H2Opro-DI-T | arium® pro DI Bench-Top system in compact design for every laboratory bench, for standard ultrapure water applications |
| H2Opro-DI-B | arium® pro DI Wall-Mounted system, space-saving with integrated wall bracket, for standard ultrapure water applications |
| H2Opro-DI-D | arium® pro DI Bench-Top system in compact design for every laboratory table, including wall-mounting kit for the display-dispense unit, for standard ultrapure water applications |
| H2Obasic-T | arium® pro Bench-Top system in compact design for every laboratory table, for standard ultrapure water applications |
| H2Obasic-B | arium® pro Wall-Mounted system, space-saving with integrated wall bracket, for standard ultrapure water applications |

**arium® pro UV deionization systems for producing ASTM Type 1 ultrapure water**
Scope of supply: 1 arium® pro with UV lamp  (185│254 nm)

| Specifications | arium® pro UV |
| --- | --- |
| **Order No.** | **Description** |
| H2Opro-UV-T | arium® pro DI Bench-Top system in compact design for every laboratory table, including UV lamp for chemical-analytical ultrapure water applications such as chromatography |
| H2Opro-UV-B | arium® pro UV Wall-Mounted system, space-saving with integrated wall bracket, including UV lamp for chemical-analytical ultrapure water applications such as chromatography |
| H2Opro-UV-D | arium® pro UV Built-In system, space-saving in every laboratory cabinet, including wall-mounting kit for the display-dispense unit, including UV lamp for chemical-analytical ultrapure water applications such as chromatography, including TOC Monitor |
| H2Opro-UV-T-TOC | arium® pro DI Bench-Top system in compact design for every laboratory table, including UV lamp for chemical-analytical ultrapure water applications such as chromatography, including TOC Monitor |
| H2Opro-UV-B-TOC | arium® pro VF Wall-Mounted system, space-saving with integrated wall bracket, including UV lamp for chemical-analytical ultrapure water applications such as chromatography, including TOC Monitor |
| H2Opro-UV-D-TOC | arium® pro UV Built-In system, space-saving in every laboratory cabinet, including wall-mounting kit for the display-dispense unit, including UV lamp for chemical-analytical ultrapure water applications such as chromatography |

## arium® pro UF

### Biological Applications
- AAS, ICP-MS
- Ion chromatography
- Electrophoresis
- Endotoxin-Analysis
- Immunocytochemistry
- Nutrient media for cell culture
- Production of monoclonal antibodies
- Photometry

### Description
arium® pro UF provides consistently high-quality ultrapure water with a TOC content ≤ 5 ppb.

A hollow-fiber ultrafilter downstream uses cross-flow technology to reliably remove bacterial endotoxins, microorganisms, and particles, as well as DNases and RNases from the ultrapure water. The arium® UF system's ultrafilter is developed and produced in accordance with a certified quality assurance system. Together with the optimized cartridge materials, they ensure the reproducible results of your biological applications.

The Top-Down Flow technology of the Bio-logical Kit cartridge kit provides ideal purification kinetics and prevents the cleaning media from mixing. Highly effective activated carbon in the pre-treatment of the water and highly efficient ion exchange resins, reliably remove organic and inorganic substances.

## arium® pro VF

### Chemical–Analytical, Biological, and Standard Applications
- HPLC
- GC-MS, AAS, ICP-MS,
- Ion chromatography
- TOC-Analysis
- PCR
- Electrophoresis
- Endotoxin-Analysis
- Immunocytochemistry
- Nutrient media for cell culture
- Production of monoclonal antibodies
- Photometry

### Description
The high-end device of the arium® pro systems. Combined with the Analytical Kit cartridge kit, the arium® pro VF delivers constantly high-quality ultrapure water free from pyrogens, RNases, and DNases and with the lowest TOC content.

Fitted with the cartridge kit, organic and inorganic substances are removed reliably thanks to the Top-Down Flow technology and optimized materials.

The integrated horizontal UV lamp (185|254 nm) reduces the content of micro-organisms and TOC to a minimum. The optional TOC Monitor continually measures and provides the actual TOC content values. Developed specially for the arium® pro, it provides the highest measurement accuracy in the range from 1 to 300 ppb.

The integrated hollow-fiber ultrafilter uses cross-flow technology to reliably remove bacterial endotoxins, microorganisms, and particles, as well as DNases and RNases from the ultrapure water.

| Technical Specifications | arium® pro UF | arium® pro VF |
|---|---|---|
| Water purification methods | Adsorption by spherical activated carbon, deionization, optional final particle and sterile filtration | |
| Dimensions (W × H × D) [cm] | 35.0 × 49.2 × 45.1 | |
| Empty weight [kg] | 17–19, depending on system type | |
| Operating weight [kg] | 27–29, depending on system type | |
| Power supply | 100–240 VAC (± 10%); 50–60 Hz, 130 VA (max.) | |
| Operating temperature [°C] | 2–35 at max. 80% rel. humidity | |
| Storage temperature [°C] | 5–45 at max. 80% rel. humidity | |
| Data output | SD card slot[6], RS232 interface | |

| Product Water Quality | arium® pro UF | arium® pro VF |
|---|---|---|
| Type of water | ASTM Type 1 | ASTM Type 1 |
| Output | 120 l/h | 120 l/h |
| Water dispensing flow rate | 0.1–2 l/min. adjustable | 0.1–2 l/min. adjustable |
| Volume controlled output | 1.7 l/min in 100 ml, 1 l or 5 l steps, depending on total dispense between 0,1 l and 60 l [4] | 1.7 l/min in 100 ml, 1 l or 5 l steps, depending on total dispense between 0,1 l and 60 l [4] |
| Volume accuracy | 3 % in the range of 0.25 l and 60 l [5] | 3 % in the range of 0.25 l and 60 l [5] |
| Conductivity | 0.055 µS/cm compensated to 25 °C [1] | 0.055 µS/cm compensated to 25 °C [1] |
| Resistivity | 18.2 MΩ × cm compensated to 25 °C (1) [1] | 18.2 MΩ × cm compensated to 25 °C [1] |
| TOC content | ≤ 5 ppb [3] | < 2 ppb [3] |
| Microorganism content | < 1 CFU/1,000 ml [2] | < 1 CFU/1,000 ml [2] |
| Particle content | < 1/ml [2] | < 1/ml [2] |
| Endotoxins | < 0.001 EU/ml (pyrogen-free) | < 0.001 EU/ml (pyrogen-free) |
| RNase content | < 0.004 ng/ml (RNase-free) | < 0.004 ng/ml (RNase-free) |
| DNase content | < 0.024 pg/µl (DNase-free) | < 0.024 pg/µl (DNase-free) |

| Feed Water Quality | Water purified by reverse osmosis, distillation or Deionization.[7] |
|---|---|
| Input pressure | 0–6.9 bar, recomm. > 2 bar |
| Temperature | 2–30 °C |
| Specific conductivity | < 100 µS/cm compensated to 25 °C |
| TOC content | < 50 ppb |
| Turbidity | < 1 NTU |
| pH value | 4-10 |

[1] measured value output is adjustable to 25 °C compensated or non-compensated
[2] when using a Sartopore® 2 150 end filter
[3] Feed water < 50 ppb TOC content
[4] at 2 bar pressure, depending on the connected accessories and end filter
[5] under constant operating conditions

[6] not applicable for arium pro
[7] To operate arium pro with non-treated drinking water the Universal Kit could be used in most cases. In order to verify the specifications of your feed water, please contact the Sartorius Application Support.

# Order Information

**arium® pro UF deionization systems for producing ASTM Type 1 ultrapure water.** Scope of supply: 1 arium® pro with Ultrafilter

| Specifications | arium® pro UF |
| --- | --- |
| **Order No.** | **Description** |
| H2Opro-UF-T | arium® pro UF Bench-Top system in compact design for every laboratory table, including Ultrafilter for biological ultrapure water applications such as cell cultivation |
| H2Opro-UF-B | arium® pro UF Wall-Mounted system, space-saving with integrated wall bracket, including Ultrafilter for biological ultrapure water applications such as cell cultivation |
| H2Opro-UF-D | arium® pro UF Bench-Top system, space-saving in every laboratory cabinet, including wall-mounting kit for the display-dispense unit, including Ultrafilter for biological ultrapure water applications such as cell cultivation |

**arium® pro UF deionization systems for producing ASTM Type 1 ultrapure water.**
Scope of supply: 1 arium® pro with UV lamp (185|254 nm) and Ultrafilter

| Specifications | arium® pro VF |
| --- | --- |
| **Order No.** | **Description** |
| H2Opro-VF-T | arium® pro VF Bench-Top system in compact design for every laboratory table, including UV lamp and Ultrafilter for biological, chemical-analytical, and standard ultrapure water applications such as cell cultivation and chromatography |
| H2Opro-VF-B | arium® pro VF Wall-Mounted system, space-saving with integrated wall bracket, including UV lamp and Ultrafilter for biological, chemical-analytical, and standard ultrapure water applications such as cell cultivation and chromatography |
| H2Opro-VF-D | arium® pro VF Built-In system, space-saving in every laboratory cabinet, including UV lamp and Ultrafilter for biological, chemical-analytical, and standard ultrapure water applications such as cell cultivation and chromatography |
| H2Opro-VF-T-TOC | arium® pro VF Bench-Top system in compact design for every laboratory table, including UV lamp and Ultrafilter for biological, chemical-analytical, and standard ultrapure water applications, such as cell cultivation and chromatography, including TOC Monitor |
| H2Opro-VF-B-TOC | arium® pro VF Wall-Mounted system, space-saving with integrated wall bracket, including UV lamp and Ultrafilter for biological, chemical-analytical, and standard ultrapure water applications such as cell cultivation and chromatography, including TOC Monitor |
| H2Opro-VF-D-TOC | arium® pro VF Built-In system, space-saving in every laboratory cabinet, including UV lamp and Ultrafilter for biological, chemical-analytical, and standard ultrapure water applications such as cell cultivation and chromatography, including TOC Monitor |

| **Consumables** | |
| --- | --- |
| H2Opro-A-PACK | Analytical Kit, arium® pro Cartridge Kit for biological, chemical-analytical and standard ultrapure water applications, qty. 1 unit |
| H2Opro-B-PACK | Biological Kit, arium® pro Cartridge Kit for biological ultrapure water applications, qty. 1 unit |
| H2Opro-E-PACK | Elemental Kit, arium® pro Cartridge Kit for standard ultrapure water applications, qty. 1 unit |
| H2Opro-U-PACK | Universal Kit, arium® pro Cartridge Kit for non-treated feed water*, qty. 1 unit |
| 5441307H4--CE--B | Sterile-grade Sartopore® 2 150 Capsule, 0.2 µm pore size, qty. 5 units |
| 611CDU5 | arium® Ultrafilter, qty. 1 unit |
| 611CEL1 | arium® UV Lamp (185|254 nm), qty. 1 unit |
| 611CDS2 | arium® Biofilm Sanitization Syringes, 50 ml pre-filled in syringes, qty. 2 units |
| 611CDS6 | arium® Biofilm Sanitization Syringes, 50 ml pre-filled in syringes, qty. 6 units |

| **Accessories** | |
| --- | --- |
| H2Opro-AMDG1 | arium® Dispense Gun inclusive height-adjustable Stand, qty. 1 unit |
| H2Opro-AMDG2 | arium® Dispense Gun inclusive wall mounting kit, qty. 1 unit |
| H2Opro-ADM1 | arium® Multifunction Stand, height-adjustable, inclusive Display mounting kit, for connection to arium® Built-In systems, qty. 1 unit |
| 611APR1 | arium® printer, qty. 1 unit |
| H2O-AFS1 | arium® Foot Switch, qty. 1 unit |
| 610AWG1 | arium® Water Guard, qty. 1 unit |
| H2O-ALS1 | arium® Level Sensor, qty. 1 unit |

*) To operate arium® pro with non-treated drinking water the Universal Kit could be used in most cases. In order to verify the specifications of your feed water, please contact the Sartorius Application Support.

# arium® advance EDI
## Ultimate Reliable Electrodeionization

**Available soon**

### Applications
- Microbiological media & reagents
- Solutions for chemical analysis and synthesis
- Histology
- ELISA, RIA
- Buffer and pH-solutions
- Feed water for various laboratory devices, such as autoclaves, glassware washers etc.

### Summary
The arium® advance EDI provides ASTM Type 2 water of the highest quality. The innovative iJust automatically optimizes water consumption and ensures the conscientious use of our environmental resources. In contrast to conventional water purification systems, the unique touch display with intuitive menu navigation makes it extremely easy to use.

### Description
arium® advance EDI delivers up to 10 l/h of consistently high-quality water. The pure water could be stored in arium® bagtank systems which can hold up to 100 l and is virtually microorganism-free if a Sartopore® 2 150 end filter is used.

An integral component of this pure water system is the EDI stack, which additionally desalinates the feed water electro-chemically. Upstream RO modules with low-energy TFC reverse osmosis membranes ensure the highest ion retention rates for optimized water yields. The membrane surfaces are continually cleaned by means of permeate backflush. The pre-treatment cartridge set with spherical, catalytic effective activated carbon, a catalyst, and a depth filter removes oxidation agents, heavy metal ions, and particles from the feed water even at low temperatures and with high pH values.

The patented cartridge design, long service life, and low maintenance requirement distinguish the arium® advance EDI as an easy-to-use, efficient, and reliable Type 2 pure water system.

### Features
- **Consistently high quality Type 2 water**
  State-of-the-art EDI technology
- **Optimized water consumption**
  Automatic with iJust
- **Easy-to-use**
  Unique glass display with touch function

| Technical Specifications | arium® advance EDI |
|---|---|
| Water purification methods | Particle filtration, adsorption by spherical activated carbon, catalyst, reverse osmosis, softening, Electrodeionization, optional final particle and sterile filtration |
| Dimensions (W × H × D) [cm] | 35.0 × 50.1 × 45.1 |
| Empty weight [kg] | 19 |
| Operating weight [kg] | 26 |
| Power supply | 100–240 VAC (± 10%); 50–60 Hz, 130 VA (max.) |
| Operating temperature [°C] | 2–35 at max. 80% rel. humidity |
| Storage temperature [°C] | 5–45 at max. 80% rel. humidity |

**Product Water Quality**

| | |
|---|---|
| Type of water | Type 2 |
| Output | ≤ 10 l/h [3] |
| Water dispensing flow rate | ≤ 3 l/h [5] |
| Typical conductivity | < 0.2 µS/cm compensated to 25 °C [1] |
| Typical resistivity | > 5 MΩ × cm compensated to 25°C [1] |
| Typical TOC content | < 50 ppb [4] |
| Microorganism content | < 1 CFU/1,000 ml [2] |
| Particle content | < 1/ml [2] |
| Typical Ion retention | up to 98% |
| Retention of dissolved organic substances (MW > 300 Dalton) | > 99 % |
| Particle and microorganism retention | > 99 % |

| Feed Water Quality | Exclusively potable water acc. to the drinking water guidelines of the USA, the European Union, or Japan [7] |
|---|---|
| Input pressure | 2.0–6.9 bar, recomm. > 2 bar |
| Temperature | 2–30 °C |
| Specific conductivity | < 1,500 µS/cm compensated to 25 °C |
| TOC content | < 1.000 ppb |
| Max. permanent hardness (max. $CaCO_3$) | 360 ppm |
| Free chlorine | 4 ppm |
| Iron (total Fe content) | < 0.1 ppm |
| Manganese | < 0.05 ppm (MP) |
| Aluminum | < 0.05 ppm (MP) |
| $CO_2$ dissolved | ≤ 40 ppm |
| Fouling Index (SDI) | < 5 |
| Turbidity | < 1 NTU |
| pH value | 4–10 |

[1] depending on the quality of the feed water ($CO_2$ ≤ 40 ppm) and temperature
[2] when using a Sartopore® 2 150 end filter
[3] depending on the feed water pressure, temperature, and condition of the RO Modules

[4] determined with municipal water (Goettingen), TOC < 1,000 ppb
[5] depending on the arium® bagtank design, hydrostatic pressure, connected accessories and end filter

# Order Information

**arium® advance EDI electrodeionization systems with iJust function for producing Type 2 pure water**
Scope of supply: 1 arium® advance EDI, 2 RO modules (reverse osmosis), 1 EDI Stack

| Specifications | arium® advance EDI |
|---|---|

| Order No. | Description |
|---|---|
| H2O-EDI-2-T | arium® advance EDI Bench-Top system in a compact design for every laboratory |
| H2O-EDI-2-B | arium® advance EDI Wall-Mounted system, space-saving with integrated wall bracket |

**Consumables**

| | |
|---|---|
| 613CPF05-------V | arium® RO-Pretreatment Cartridge Set, qty. 2 units |
| 613CPM4--------V | arium® RO-Modules, qty. 2 units |
| H2O-CSO | arium® Softener, qty. 1 unit |
| H2O-CCS | RO-Module Cleaning Set, qty. 1 unit |
| H2O-CBS-20 | arium® bag 20 l for arium® bagtank 20 l, qty. 2 units |
| H2O-CBS-50 | arium® bag 50 l for arium® bagtank 50 l and 100 l, qty. 2 units |
| 5441307H4--CE--B | Sterile-grade Sartopore® 2 150 Capsule, 0.2 µm pore size, qty. 5 units |

**Accessories**

| | |
|---|---|
| H2O-AOV-20 | arium® bagtank 20 l, without pump, qty. 1 unit |
| H2O-AOV-50 | arium® bagtank 50 l, with pump, 240 VAC, 50 Hz, qty. 1 unit |
| H2O-AOV-50-US | arium® bagtank 50 l, with pump, 115 VAC, 60 Hz, qty. 1 unit |
| H2O-AOV-100 | arium® bagtank 100 l, with pump, 240 VAC, 50 Hz, qty. 1 unit |
| H2O-AOV-100-US | arium® bagtank 100 l, with pump, 115 VAC, 60 Hz, qty. 1 unit |
| H2O-ADP-20 | Pump arium® bagtank 20 l, 230 VAC, 50 Hz, qty. 1 unit |
| H2O-ADP-20-US | Pump arium® bagtank 20 l, 110 VAC, 50 Hz, qty. 1 unit |
| H2O-ATR | Rollers for arium® bagtanks, universal fit, incl. fittings, qty. 4 units |
| 610AWG1 | arium® Water Guard, qty. 1 unit |
| 613-AMDG1 | arium® Dispense Gun inclusive height-adjustable Stand for connection to arium® bagtanks, qty. 1 unit |
| 613-AMDG2 | arium® Dispense Gun inclusive wall mounting kit for connection to arium® bagtanks, qty. 1 unit |

## arium® advance RO
## Environmentally Friendly Reverse Osmosis

### Applications
- Buffer and pH-solutions
- Feed water for various laboratory devices, such as autoclaves, glassware washers, humidifiers, water baths etc.

### Summary
The arium® advance RO provides Type 3 water of the highest quality. The innovative iJust automatically optimizes water consumption and ensures the conscientious use of our environmental resources. In contrast to conventional water purification systems, the unique touch display with intuitive menu navigation makes it extremely easy to use.

### Description
arium® advance RO delivers consistently high-quality water at up to 16 l/h. The pure water is virtually microorganism-free if a Sartopore® 2 150 end filter is used and is stored in arium® bagtank systems which can hold up to 100 l.

Spherical catalytic effective activated carbon, a catalyst, and a depth filter combined in the pre-treatment cartridge kit remove oxidation agents, heavy metal ions, and particles from the feed water even at low temperatures and with high pH values. The RO modules fitted with low-energy TFC reverse osmosis membranes carry out the highest ion retention rates. The continuous permeation backflush function thoroughly cleans the surface of the membrane, effectively preventing fouling.

The patented cartridge design, long service life, and low maintenance requirement distinguish the arium® advance RO as an easy-to-use, efficient, and reliable Type 3 pure water system.

### Features
- **Optimized water consumption**
  Automatic with iJust
- **Easy-to-use**
  Unique glass display with touch function
- **Easy handling**
  Intuitive menu navigation

| Technical Specifications | arium® advance RO |
|---|---|
| Water purification methods | Particle filtration, adsorption by spherical activated carbon, catalyst, reverse osmosis, optional final particle and sterile filtration |
| Dimensions (W × H × D) [cm] | 35.0 × 50.1 × 45.1 |
| Empty weight [kg] | 15 |
| Operating weight [kg] | 22 |
| Power supply | 100–240 VAC (± 10%); 50–60 Hz, 130 VA (max.) |
| Operating temperature [°C] | 2–35 at max. 80% rel. humidity |
| Storage temperature [°C] | 5–45 at max. 80% rel. humidity |

**Product Water Quality**

| | |
|---|---|
| Type of water | Type 3 |
| Output | 16 l/h [3] |
| Water dispensing flow rate | ≤ 3 l/min [4] |
| Typical conductivity | < 20 μS/cm [1] |
| Typical resistivity | < 0.05 MΩ × cm [1] |
| Microorganism content | < 1 CFU/1,000 ml [2] |
| Particle content | < 1/ml (2) |
| Typical Ion retention | up to 98% |
| Retention of dissolved organic substances (MW > 300 Dalton) | > 99 % |
| Particle and microorganism retention | > 99 % |

**Feed Water Quality**

| | |
|---|---|
| | Exclusively potable water acc. to the drinking water guidelines of the USA, the European Union, or Japan. |
| Input pressure | 0.5–6.9 bar, recomm. > 2 bar |
| Temperature | 2–30 °C |
| Specific conductivity | < 1,500 μS/cm compensated to 25 °C |
| TOC content | < 2.000 ppb |
| Max. permanent hardness (max. $CaCO_3$) | 360 ppm |
| Free chlorine | 4 ppm |
| Iron (total Fe content) | < 0.1 ppm |
| Fouling Index (SDI) | < 5 |
| Turbidity | <1 NTU |
| pH value | 4–10 |

[1] depending on the quality of the feed water ($CO_2$ ≤ 40ppm) and temperature
[2] when using a Sartopore® 2 150 end filter

[3] depending on the feed water pressure, temperature, and condition of the RO Modules
[4] depending on the arium® bagtank design, hydrostatic pressure, connected accessories and end filter

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## Order Information

**arium® advance RO reverse osmosis systems with iJust function for producing Type 3 pure water;** Scope of supply: 1 arium® advance, 2 RO modules (reverse osmosis)

| Specifications | arium® advance RO |
|---|---|

| Order No. | Description |
|---|---|
| H2O-RO-2-T | arium® advance RO Bench-Top system in a compact design for every laboratory |
| H2O-RO-2-B | arium® advance RO Wall-Mounted system, space-saving with integrated wall bracket |

**Consumables**

| | |
|---|---|
| 613CPF05-------V | arium® RO-Pretreatment Cartridge Set, qty. 2 units |
| 613CPM4--------V | arium® RO-Modules, qty. 2 units |
| H2O-CCS | RO-Module Cleaning Set, qty. 1 unit |
| H2O-CBS-20 | arium® bag 20 l for arium bagtank 20 l, qty. 2 units |
| H2O-CBS-50 | arium® bag 50 l for arium bagtank 50 l and 100 l, qty. 2 units |
| 5441307H4--CE--B | Sterile-grade Sartopore® 2 150 Capsule, 0.2 µm pore size, qty. 5 units |

**Accessories**

| | |
|---|---|
| H2O-AOV-20 | arium® bagtank 20 l, without pump, qty. 1 unit |
| H2O-AOV-50 | arium® bagtank 50 l, with pump, 240 VAC, 50 Hz, qty. 1 unit |
| H2O-AOV-50-US | arium® bagtank 50 l, with pump, 115 VAC, 60 Hz, qty. 1 unit |
| H2O-AOV-100 | arium® bagtank 100 l, with pump, 240 VAC, 50 Hz, qty. 1 unit |
| H2O-AOV-100-US | arium® bagtank 100 l, with pump, 115 VAC, 60 Hz, qty. 1 unit |
| H2O-ADP-20 | Pump arium® bagtank 20 l, 230 VAC, 50 Hz, qty. 1 unit |
| H2O-ADP-20-US | Pump arium® bagtank 20 l, 110 VAC, 50 Hz, qty. 1 unit |
| H2O-ATR | Rollers for arium® bagtanks, universal fit, incl. fittings, qty. 4 units |
| 610AWG1 | arium® Water Guard, qty. 1 unit |
| 613-AMDG1 | arium® Dispense Gun inclusive height-adjustable Stand for connection to arium® bagtanks, qty. 1 unit |
| 613-AMDG2 | arium® Dispense Gun inclusive wall mounting kit for connection to arium® bagtanks, qty. 1 unit |

# arium® bagtanks

**Summary**
The storage of the purified product water takes place in the innovative closed arium® bagtank system. The high-quality, prepared pure water is securely protected from secondary contaminations.

The Sartorius single-use bagtank system retains high water quality over a long period of time and guarantees for sustainable, reproducible results. Unlike other typical water tanks, the arium® bag protects the users, in that cleaning processes with dangerous chemicals are avoided.

**Description**
arium® bagtanks are housings that are equipped with arium® bags. The arium® bagtanks are available in 20 l, 50 l, and 100 l volumes. Their space-saving design is adaptable to any laboratory environment, and the optional rollers make this an extremely flexible system. Integrated pumps are a standard component of the 50 l and 100 l bagtanks. An optional additional pump is available to also obtain a flow rate of up to 3 l/m in a 20 l bagtank.

**Features**
- **Constantly high water quality**
  Vent filter with integrated check valve provides secure protection against $CO_2$-contaminations and prevents decreasing water quality
- **Mobility**
  Highly flexible due to optional available 4 rollers
- **Time-saving**
  Easy and quick replacement of the arium® bags
- **Operator safety**
  Prevention of sanitization chemicals

**Water Dispensing Flow Rate at 3 bar Pump Pressure**

| | |
|---|---|
| with pump, without accessories | up to 3.0 l/min [3] |
| with pump and dispense gun, without sterile-grade filter | up to 2.5 l/min [3] |
| with pump, dispense gun and sterile-grade filter | up to 2.0 l/min [3] |
| without pump, without accessories | up to 1.5 l/min [4] |

[1]  bagtank 20 is not suitable for use with glassware washers or dispense guns
[2]  bagtank 20 is supplied without pump, pump optionally available
[3]  Only applies for bagtank 20 with the use of the optionally available pump
[4]  Value only applies for bagtank 20 dispensing site at the same height or lower than the tank connection

| Technical Specifications | Materials |
| --- | --- |
| arium® bagtank | Stainless steel\|plastics |
| arium® bag | S71 Film |
| Tubing | PE\|silicone |

**Dimensions, without Rollers and Wall Brackets (W × H × D) [cm]**

| | |
| --- | --- |
| bagtank 20[1] | 80.8 × 16.6 × 43.7 |
| bagtank 50 | 85.2 × 25.4 × 58.7 |
| bagtank 100 | 85.2 × 51.4 × 58.7 |
| arium bag 20 l | 86.5 × 43.0 |
| arium bag 50 l | 90.0 × 58.1 |

**Empty Weight without arium® bag\|Operating Weight with Filled arium® bag [kg]**

| | |
| --- | --- |
| bagtank 20[1] | 19\|40 |
| bagtank 50 | 33\|84 |
| bagtank 100 | 47\|148 |

**Number of Bags per Tank**

| | |
| --- | --- |
| bagtank 20[1] | 1 × 20 liter |
| bagtank 50 | 1 × 50 liter |
| bagtank 100 | 2 × 50 liter |
| Power supply | 240 VAC (± 10%), 50 Hz, 120 VA (max.)[2] |
| Power supply, US versions | 115 VAC (± 10%), 60 Hz, 170 VA (max.)[2] |
| Operating temperature | 2 °C–35 °C at max. 80% relative humidity |
| Storage temperature | 5 °C–45 °C at max. 80% relative humidity |
| Water connection input | 1 × $^3/_8$" PLC Quick Coupling |

**Water Connection Output**

| | |
| --- | --- |
| bagtank 20[1] | 1 × $^3/_8$" PLC Quick Coupling |
| bagtank 50, bagtank 100 | 2 × $^3/_8$" PLC Quick Coupling |

| | |
| --- | --- |
| **Intended Use** | System type: arium® comfort I and comfort II, arium® advance RO and advance EDI |

| Order Number | Description |
| --- | --- |
| H2O-AOV-20 | arium® bagtank 20 l, without pump, qty. 1 unit |
| H2O-AOV-50 | arium® bagtank 50 l, with pump 240 VAC 50 Hz, qty. 1 unit |
| H2O-AOV-50-US | arium® bagtank 50 l, with pump 115 VAC 60 Hz, qty. 1 unit |
| H2O-AOV-100 | arium® bagtank 100 l, with pump 240 VAC 50 Hz, qty. 1 unit |
| H2O-AOV-100-US | arium® bagtank 100 l, with pump 115 VAC 60 Hz, qty. 1 unit |
| H2O-AD-20 | arium pump® bagtank 20 l, 230 VAC 50 Hz, qty. 1 unit |
| H2O-AD-20-US | arium pump® bagtank 20 l, 110 VAC 50 Hz, qty. 1 unit |
| H2O-ATR | Rollers for arium bagtanks, universal fit, incl. fittings, qty. 4 units |
| H2O-CBS-20 | arium® 20 l bag for arium® 20 l bagtank, qty. 2 units |
| H2O-CBS-50 | arium® 50 l bag for arium® 50 l and 100 l bagtank, qty. 2 units |

# Cubis®. Definition of a New Class

Cubis® was developed for users who expect the best possible performance from a lab balance series 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 now has the option of configuring their lab balance to suit their own individual require-ments. Every Cubis® represents an uncom-promising implementation of the individual's requirement profile.

### Safe and Easy Operation with Q-Guide
The Q-Guide user interface eliminates the need for the user to carry out time-consuming tasks. The Q-Guide concept also features 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
- 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 LC 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 autom atically 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 first laboratory balance, the Cubis® with Q-Pan significantly counteracts any 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 labora-tory hoods. And the Q-Grip accessory is 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 fatigue-free. 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 thorough 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).







25
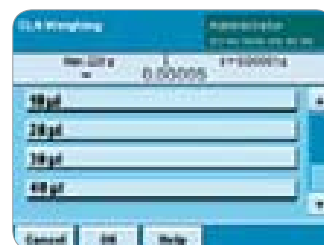
Please use the adjacent fields to enter the selection relating to the icon.

Select the display and control unit and enter it in the field symbolized by the icon above.

| 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)<br>■ RS-232C accessory interface, 25-pin (integrated into weighing module)<br>■ Ethernet (integrated into display and control unit)<br>■ Various data protocols available (can also be connected to software designed for external manufacturers) | | ■ USB (integrated into weighing module)<br>■ R-S232C accessory interface, 25-pin (integrated into weighing module) |
| SD card reader | Integrated as standard into display and control unit | Integrated as standard into display and control unit | – |
| 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 symbolized by the icon in the fill-in form on page 26.

| | 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 |
| **3.6P** | 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 (1) | 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 symbolized by the icon in the fill-in form on page 26.

| | 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]** |
|---|---|---|---|---|---|---|---|---|---|
| **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 "Ø" or "1" in the field symbolized by the icon in the fill-in box on page 26.

| | |
|---|---|
| Ø | 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 symbolized by the icon in the fill-in box on page 26.

| | |
|---|---|
| Ø Ø | Standard certificate of conformity to specifications |
| TR | Like Ø, 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 symbolized by the icon in the fill-in box on page 26.

| | |
|---|---|
| DO | No draft shield. Please always enter this identifier for weighing module with 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 | RS-232 interface, 25-pin |
| IB | Bluetooth® interface |
| IP | RS-232 interface, 9-pin, incl. PS|2 interface |

## Premium Microbalance ME36S
## Highest Precision – Even for the Smallest Sample Quantities

Design 3

**This premium microbalance meets the most stringent requirements when it's necessary to achieve measurement results quickly and with exceptional accuracy**
These 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 allowable minimum sample quantity in accordance with 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 RS-232C data interface.

### Specifications

| Model | 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

The Sartorius CPA is setting standards in terms of engineering, quality and features. If you want to avoid taking risks when you invest in a new balance, the new CPA is the best choice you can make.

Whether your samples must be weighed precisely 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 incredibly 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 semimicrobalances 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 RS-232C 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.
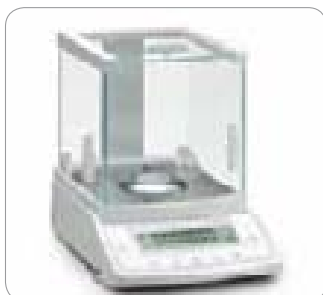
Design 1



Design 2



Design 3

**Specifications**

| Model | Read–ability [mg] | Weighing Capacity [g] | Repeat–ability [≤ ± mg] | Linearity [≤ ± mg] | Response Time (average) [≤ s] | Weighing Pan [mm] | Design |
|---|---|---|---|---|---|---|---|
| **Microbalances** | | | | | | | |
| CPA26P | 0.002\|0.01 | 5\|21 | 0.004 | 0.008 | 10 | ∅ 50 | 1 |
| **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* | 2 |
| **Analytical Balances** | | | | | | | |
| CPA324S | 0.1 | 320 | 0.2 | 0.3 | 3 | ∅ 80* | 3 |
| CPA224S | 0.1 | 220 | 0.1 | 0.2 | 2 | ∅ 80* | 3 |
| CPA124S | 0.1 | 120 | 0.1 | 0.2 | 2 | ∅ 80* | 3 |
| CPA64 | 0.1 | 64 | 0.1 | 0.2 | 2 | ∅ 80* | 3 |

* Triangular weighing pan shape.    ∅ = Diameter of the inner circle.

**Specifications**

| Model | Read–ability [g] | Weighing Capacity [g] | Repeat–ability [≤ ± g] | Linearity [≤ ± g] | Response Time average [≤ s] | Weighing Pan [mm] | Design |
|---|---|---|---|---|---|---|---|
| **Precision Balances** | | | | | | | |
| CPA1003S** | 0.001 | 1,000 | 0.001 | 0.002 | 2 | ∅ 110* | 4 |
| CPA623S | 0.001 | 620 | 0.001 | 0.002 | 1.5 | ∅ 110* | 5 |
| CPA1003P** | 0.001\|0.01 | 500\|1,000 | 0.001\|0.01 | 0.002\|0.02 | 2 | ∅ 110* | 4 |
| CPA423S | 0.001 | 420 | 0.001 | 0.002 | 1.5 | ∅ 110* | 5 |
| CPA323S | 0.001 | 320 | 0.001 | 0.002 | 1.5 | ∅ 110* | 5 |
| CPA223S | 0.001 | 220 | 0.001 | 0.002 | 1.5 | ∅ 110* | 5 |
| CPA6202S | 0.01 | 6,200 | 0.01 | 0.02 | 1.5 | 190 × 204 | 6 |
| CPA5202S-DS** | 0.01 | 5,200 | 0.01 | 0.02 | 1.5 | ∅ 130 | 7 |
| CPA4202S | 0.01 | 4,200 | 0.01 | 0.02 | 1.5 | 190 × 204 | 6 |
| CPA3202S | 0.01 | 3,200 | 0.01 | 0.02 | 1.5 | 190 × 204 | 6 |
| CPA2202S | 0.01 | 2,200 | 0.01 | 0.02 | 1.5 | 190 × 204 | 6 |
| CPA2202S-DS** | 0.01 | 2,200 | 0.01 | 0.02 | 1.5 | ∅ 130 | 7 |
| 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 | 6 |
| CPA34001S | 0.1 | 34,000 | 0.1 | 0.2 | 2 | 400 × 300 | 8 |
| CPA16001S | 0.1 | 16,000 | 0.1 | 0.2 | 2 | 400 × 300 | 8 |
| CPA12001S | 0.1 | 12,000 | 0.1 | 0.2 | 2 | 400 × 300 | 8 |
| CPA10001 | 0.1 | 10,000 | 0.1 | 0.2 | 1 | 190 × 204 | 6 |
| CPA8201 | 0.1 | 8,200 | 0.1 | 0.2 | 1 | 190 × 204 | 6 |
| 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 | 8 |
| CPA5201 | 0.1 | 5,200 | 0.1 | 0.2 | 1 | 190 × 204 | 6 |
| CPA34000 | 1 | 34,000 | 0.5 | 1 | 1.5 | 400 × 300 | 8 |

\* 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 4


Design 5


Design 6


Design 7


Design 8

## 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.
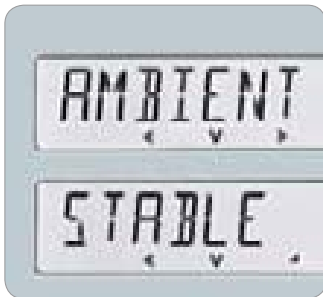
The monolithic weighing system, only available from Sartorius worldwide, offers unique prerequisites for permanently high measurement accuracy and reliability.

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 RS-232C 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.
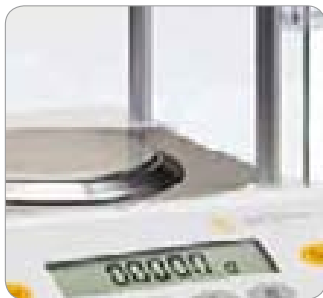
### Built-in Application Software
Talent series balances offer various application programs as standard features to make routine work easy: weighing in percent, net-total formulation, weigh averaging|dynamic weighing, counting and mass unit conversion.

### RS-232C Data Interface
Each model comes standard with a bidirectional RS-232C 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 | Read–ability [mg] | Weighing Capacity [g] | Repeat–ability [≤ ± 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
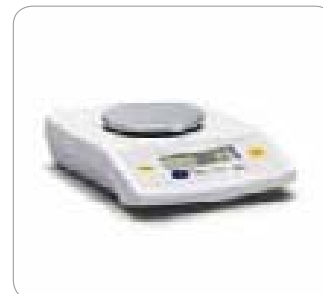


Design 3



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 transmission (only in combination with YDO01MS-B or IB option) | YDP10BT-0CE |
| **Color Ribbon** for YDP10-0CE and YDP10BT-OCE | 6906918 |
| **Paper Rolls** for printer YDP10-0CE; 5 rolls of 50 m each | 6906937 |
| **Bluetooth® Data Interface** for wireless connection of data printer YDP10BT | YDO01MS-B |
| **RS-232C Data Interface**, 9-pin including PS\|2 for connecting a PC or keyboard | YDO01MS-P |
| **RS-232C Data Interface,** 25-pin for connecting 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 ex works (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 |
| **RS-232C 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 |

**Displays and Input\|Output Elements**

| | |
|---|---|
| **MSA Control unit with color TFT graphic display and touch screen** | **YAC01MSA** |
| **MSE Display Unit** with backlit LCD and tactile keys | YAC01MSE |
| **MSU Control Unit** with backlit b\|w graphic display and tactile navigation keys | YAC01MSU |
| **Barcode Scanner** 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, character 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<br>Consists of moisture trap and all required adapters | YCP04MS |
| **Pipette Calibration Kit** (hardware) for microbalance weighing modules 6.6S and 3.6P<br>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.<br>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** Ø 75 mm, for ultramicrobalance or microbalance models<br>(weighing modules 6.6S, 2.7S; only in combination with DF draft shield) | VF2562 |
| **Filter Weighing Pan** Ø 90 mm, for ultramicrobalance or microbalance models<br>(weighing modules 6.6S, 2.7S; only in combination 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 on weighing modules with a readability < 1 mg | YDK01MS |
| **Density Determination Kit** for solids and liquids on weighing modules with a readability of 1 mg | YDK02MS |
| **Q-Grip**, flexible holder for weigh-in containers and filters up to 120 mm diameter<br>(replaces 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 weighing pan; replaces 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 x 32 Ð 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 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 x 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, i**nc. 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** <br> for discharging electrostatically charged samples | YSTP01 |
| **T–connector** for connection of 2 peripheral devices | YTC01 |
| **RS–232C│USB Connection Cable**, <br> for connection to a PC via USB interface; length 1.5 m | YCC01-USBM2 |
| **RS–232C Connection Cable**, <br> for connection to a PC with 25-pin COM interface; length approx. 2 m | 7357312 |
| **RS–232C Connection Cable**, <br> for connection to a PC with 9-pin COM interface; length approx. 2 m | 7357314 |
| **Standard Operating Procedure (SOP)** | YSL01D |
| **3–Segment Control Display**, red – green – red, <br> for plus│minus weighings, inc. T-connector | YRD11Z |

## Accessories for ME Models and SE2

| | |
|---|---|
| **Battery Set**, external with optical charge control display <br> for SE2, ME5 and all ME models | YRB05Z |
| **Antistatic Weighing Pan** for electrostatically charged samples <br> for ME235S, ME235P, ME254S, ME414S, ME415S and ME614S for ME5 | YWP01ME <br> YWP01MC |
| **Density Determination Kit** <br> for ME235S, ME235P, ME254S, ME414S, ME415S and ME614S | YDK01 |
| **Storage Plate**, for acclimatization of materials to be weighed, <br> 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-connector for all ME models and SE2 | YPE01RC |
| **Barcode Scanner,** for all ME models and SE2 (YCC01-0024M01 required) | YBR02FC |
| **Cable with T-Connector,** for connection of the barcode scanner | YCC01-0024M01 |
| **Bluetooth® RS–232C Adapter** with external antenna <br> (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, CPA34001S, CPA34001P, CPA34000 — 69EA0040

**Bluetooth®-RS-232C 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.

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## Safety Weighing Cabinet SWC
## Safe Weighing of Toxic and Powdery Substances

Safety in weighing toxic, powdery substances and the accuracy of weighing-in are requirements that have become inseparably linked in modern laboratory environments.

Sartorius safety weighing stations, consisting of the safety weighing cabinet SWC and Cubis® lab balance, are 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 ensures both – maximum user protection and validated weighing results.

The application-oriented performance features of Cubis lab balances make the entire system even more safe and reliable:

- 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 by motorization.
- With the optional infrared sensor YHS01MS, the draft shield can be opened touch-free and the balance 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 DI draft shield, not only are electrostatic influences on the weighing results reduced. The "stubborn" behavior of the sample during handling with a spatula is reduced and contamination due to spilt samples prevented.
- With the YFH01MS sample holder, you ensure the best ergonomics for weighing-in under the encumbered conditions in the cabinet.
- Thanks to the YWP03MS grid weighing pan, 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:

| Model | Size (W × D × H) [mm] |
| --- | --- |
| SWC900 | 890 × 750 × 510 |
| SWC1200 | 1230 × 750 × 510 |
| SWC900T | 890 × 750 × 770 |
| SWC1200T | 1230 × 750 × 770 |

All models consist of:
Safety weighing cabinet with a separate HEPA H14 filter unit, data logging alarm, lighting unit, waste disposal system, air flow smoke test kit and anti-static cleaning wipes.8

| 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

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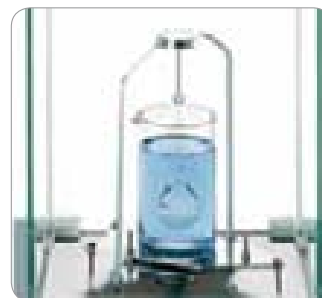
# Electrostatics





Static electricity can block the entire workflow 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 by the Pipette Tracker software. 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 RS-232 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 (RS-232) to a PC (USB)



GPC65-CW



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 |
| Speedcal | Up to 12 channel calibration system Further details on request | | 0.01 mg–12 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 Kits, 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.
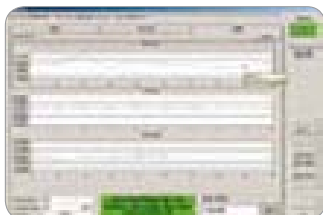

Pipette Tracker pipette calibration software

### 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. |


Cubis®

### 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® with VF988

| 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 |

\* 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 thermo-gravimetric 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.
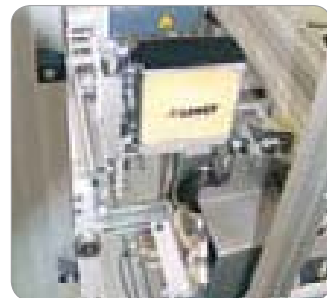
| Weighing Capacity [g] | Readability [mg] | Models | | | |
|---|---|---|---|---|---|
| | | Individual components without CE marks | | Encapsulated components with CE mark | |
| | | | With built in calibration weight | Explosion-protected | With built in calibration weight |
| 20 | 0.001 | | | | WZA26-NC |
| 20 | 0.01 | | | | WZA25-NC |
| 50 | 0.1 | WZA54-L | | | |
| 60 | 0.1 | | | WZA64-X | |
| 210 | 0.01 | | WZA215-LC | | |
| 220 | 0.1 | WZA224-L | WZA224-LC | WZA224-N | WZA224-NC |
| 240 | 0.01 | | | | WZA245-NC |
| 520 | 1 | WZA523-L | | WZA523-N | WZA523-NC |
| 610 | 0.1 | | | | WZA614-NC |
| 620 | 1 | | | WZA623-X | |
| 1,200 | 1 | | | WZA1203-N | WZA1203-NC |
| 6,200 | 10 | | | WZA6202-X | |
| 8,200 | 10 | WZA8202-L | | WZA8202-N | WZA8202-NC |

**Examples of Order Number Combinations**

| WZA523-L | Weighing cell consists of individual components without built-in calibration weight |
|---|---|
| WZA224-LC | Weighing cell consists of individual components with built-in calibration weight |
| WZA523-N | Weighing cell consists of encapsulated components without built-in calibration weight |

For more information on our weighing systems, visit our website:
www.sartorius.com

## The Right Equipment for Any Application

Foods, chemical|pharmaceutical products, building materials or animal feed - you name it, 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 the manufacturing process. Here, the most diverse requirements on speed, resolution of the values measured and 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 compact analyzers are designed for routine operation in production and applications involving incoming inspection. They feature the resolution of an analytical balance, and are ideal for research and development. Sartorius offers a custom solution for nearly every requirement. A wide selection of infrared heat sources, such as a halogen lamp, CQR quartz glass heater and ceramic heating element, allows 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 sample heating method. It takes just 40–120 seconds to vaporize the water out of the sample. Under normal pressure conditions, the temperature of the escaping water vapor measures slightly over 100 °C during the heating process. 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 you 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 cornerstone of this new Sartorius product line is the LMA300P modular system that consists of a control and evaluation unit and a resonator module where the sample's moisture 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 transmitted 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 in a characteristic way. 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 new NIR spectroscopy product line at is based on the PMD500. It can be used to determine moisture content as well as other variables 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 flexibility 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 measurements. 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
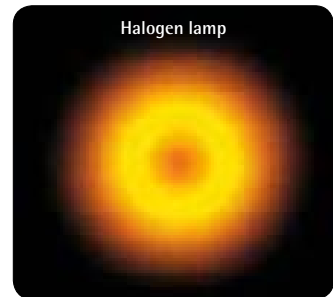


Ceramic heating element
CQR quartzglass heater

57

## Sartorius MA100. Analytical Precision, Combined with Flexibility and Dynamics

**As Accurate as an Analytical Balance**

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 saved as a drying routine. Optimization of operating parameters doesn't get any faster than this.

The Sartorius MA100 features a built-in weighing system with 0.1-mg resolution and thus the highest degree of accuracy possible for infra-red moisture analysis to help you master every task, no matter how sophisticated.

**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. The sample chamber base plate is removable to enable you to 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 ℃* (*depends on the heat source) | 40–180/220 ℃* (* depends on the heat source) |
| ▪ Ceramic IR 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 | | 3 × 0.1–999 min. | 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) | | | |
| Access to the sample chamber | | | |
| ▪ Via hinged flip-up cover | ● | | ● |
| ▪ Via motorized cover | | ● | |

| | MA35 | MA100 | MA150 |
|---|---|---|---|
| DLG Signum 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 |

# 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 pcs. | 6906940 | 6906940 | 6906940 |
| ■ Soft quality with high suction force, 200 pcs. | 6906941 | 6906941 | 6906941 |
| Panel replacement set (conversion kit) Aluminum panel for replacing glass panels to meet FDA│HACCP regulations | YDS05MA | YDS03MA | YDS04MA |
| SartoCollect, Software for communication between moisture analyzer and PC (connecting cable must be ordered separately) | YSC02 | YSC02 | YSC02 |
| Carrying case | | | YDB05MA |
| Data printer | | | |
| ■ Integratable | | YDP01MA | |
| ■ External | YDP03-0CE | YDP03-0CE | YDP03-0CE |
| Ink ribbon cartridge for data printer | 6906918 | 6906918 | 6906918 |
| Paper rolls for data printer, | | | |
| ■ 5 rolls, 50 m each | 6906937 | 6906937 | 6906937 |
| External calibration weight | | | |
| ■ 100 g (E2) DKD Certificate | | | YCW5128-02 |
| ■ 30 g ± 0.3 mg DKD Certificate | YSS43-02 | | |
| ■ 50 g (E2) DKD Certificate | | YCW4528-02 | |
| Temperature adjustment set | YTM01MA | YTM03MA | YTM03MA |
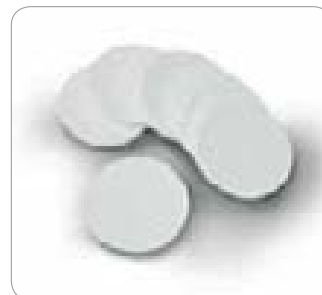
## Sartorius LMA200PM
## Speed Meets Analytical Precision

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 devices. A typical measurement takes around 40–120 seconds on the LMA200PM. 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 load 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 endpoint. 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<br>▪ User-defined as loss of weight\|time:<br>  1–50 mg\|1–99 sec.<br>  0.1–9.9 %\|1–99 sec.<br>▪ 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<br>▪ The report can be printed by the built-in therminal printer |
| Operator guidance features | ▪ Menu-driven, alphanumeric dialogue text (English, French, German, Italian and Spanish selectable)<br>▪ 5 pre-programmed function keys |
| Data interfaces | ▪ 1 × RS-232 port for PC<br>▪ 1 × Ethernet port |
| 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 |
| 5 rolls of printer paper, each 20 m long | 69M30100 |

## 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-pH$_{Meter}$ 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 ° ...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 |
| RS-232C 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│ <br> ± 1 > │1,000│ | ± 0.2 < │1,000│ <br> ± 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** <br> pH electrodes with: <br> ◻ 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** <br> ◻ 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®** <br> ... for unique, 100% traceable documentation of calibration for any pH electrodes <br> 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 | – | – | $1.00 \times 10^{-9} … 9.99 \times 10^{9}$ | |
| 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 [Ω × 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
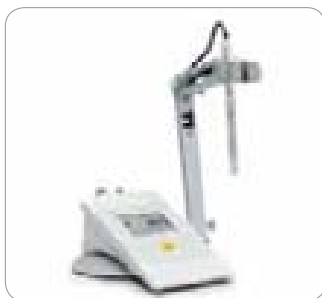
**Basic Meter –**
**A Strong Basis Featuring Sartorius Quality**
Four keys do it all!

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

**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 |

**Specifications**

| pH Measurement | Basic Meter PB–11 |
|----------------|-------------------|
| Measuring range | –1.99 … 19.99 |
| Calibration points, max. number | 3 |

**mV Measurement**

| | |
|---|---|
| Measuring range [mV] | –1,800 … +1,800 |

**Temperature Measurement**

| | |
|---|---|
| Measuring range [°C] | –5 … +105 |
| Input for pH combination electrodes | BNC |
| Protection class | – |
| Power supply | AC adapter |
| Dimensions [mm] | 230 × 120 × 80 |
| Weight [g] | 1,390 |

## 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 |

## 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 |

## 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 |
|---|---|---|---|
| 9\| | PY-T01 | Temperature measurement and automatic temperature compensation – for use withall electrodes, without built-in temperature sensor | Stainless steel body, 4.7 mm diameter, 120 mm length |

## 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 °C (KCl 0.0001 mol/l), 500 ml | PY-Y10 |
| 0.147 mS/cm ± 1.0% at 25 °C, (KCl 0.001 mol/l), 500 ml | PY-Y11 |
| 1.413 mS/cm ± 1.0% at 25 °C, (KCl 0.01 mol/l), 500 ml | PY-Y12 |
| 12.88 mS/cm ± 1.0% at 25 °C, (KCl 0.1 mol/l), 500 ml | PY-Y13 |

**Equipment Qualification – IQ│OQ│PQ**

| | |
|---|---|
| Qualification (IQ│OQ) pH Meter | 8407pH |
| For each additional parameter | 8407Para |

# 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 | 0.1 μg | ≤ 0.2 μg | R 39–104 positions |
|  | 1,002 g | 1 μg | ≤ 2 μg | 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 | 0.02 mg | A 4 positions |
| CCE10000S-L | 10.05 kg | 0.1 mg | 0.05 mg | A 4 positions |
| CCE20000S-L | 20.05 kg | 0.1 mg | 0.1 mg | A 4 positions |
| CCE50001S-L | 51 kg | 1 mg | 2 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 | 0.015 |
| **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 | 2,100.000 | 1,000 | 5,000 |
| CCS3000K | 3,010.000 | 10,000 | 10,000 |

* Repeatability is the standard deviation "s"; it is calculated from 5 ABA cycles, after eliminating drift.

## Accessories for Mass Determination

### Density Determination

| | Model | Max. Load | Readability | Typical Repeatability |
|---|---|---|---|---|
| Volume comparator with 2 load alternators | VD1005│VL1005 | 1,100 g | 10 µg | ≤ 20 µg |
| 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 *[1] | YDR200SIC | | | |
| E1 set of 1 g up to 1 kg weights with PTB density certificate (stackable) as a density reference and substitution weight | YCS31-612-09 | | | |
| Table for VD1005 and VL1005 | YWT20C | | | |
| Thermostat for VD1005 and VL1005 | YVT01C | | | |

### Analysis of Magnetic Properties

| | Model | Max. Load | Readability | Typical Repeatability |
|---|---|---|---|---|
| Susceptometer for weights up to class E1 | YSZ02C | 50 kg | 1 µg | 5 µg |
| Susceptometer for weights up to class E2 | YSZ01C | 50 kg | 10 µg | 10 µg |
| Calibration kit for susceptometer | YSZ01RMC | | | |
| Susceptibility reference (1 kg) | YSZ01RSC | | | |
| Permeability indicator | YAW61 | | | |

### Software for Highly Accurate Mass Determination

| | Model |
|---|---|
| Basic module | YSN03C |
| Network module | YSN03NC |
| ScalesMass module | YSN03LC |
| ScalesDesk module | YSN03PC |
| ScalesPrinter module | YSN03DC |
| Class E module | YSN03EC |
| Class F module | YSN03FC |
| Module for a climate measuring station | YSN03CC |
| Module for manual comparators | YSN03BC |
| Module for automatic mass comparators | YSN03AC |
| Module for mass comparison | YSN03MC |
| Module for robot systems | YSN03RC |

### Compact Software Solution for Mass Determination

| | |
|---|---|
| EasyMassCal | YPR02C |

### Climate Station & Date Logger

| | |
|---|---|
| Precision climate station & date logger for a laboratory up to class E1 | YCM16C |
| Air temperature sensor 1/3 DIN | YCM16T |
| Air temperature sensor 1/10 DIN | YCM20T |
| Air humidity & temperature sensor | YCM16H |
| Air pressure sensor | YCM16P |

### Draft Shields

| | |
|---|---|
| for CCE6 | YDS20C |
| for CCE1004│CCE2004│CCE5004│CCE5003│CCE36│CCE66│CCE106│CCE605│CCE1005│CCE10K3 | YDS24C |
| for CCE10000S-L│CCE10000U-L│CCE20000S-L | YDS01C |
| for CCE40K3│CCE60K3│CCE60K2 | YDS05C |
| for CCI60K2 | YDS62C |
| for CCI100K2│CCI300K | YDS64C |

# 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.

**Unambiguousness|Traceability**
For unique classification, Sartorius weights are laser marked with a 3-digit marking in accordance with the international OIML-R111 recommendations. Sartorius weights are therefore uniquely identifiable for their entire life cycles.

Sartorius **reference weights** and **reference weight sets** are the first choice for primary mass standards. They feature a first-class finish with a high gloss polished, corrosion stable surface. The quality of the reference weights exceeds the requirements of the international OIML-R111 recommendation.

Sartorius **test weights** and **test weight sets** are high-quality working standards for everyday use. These weights are made of high-quality material with a polished or finely turned surface and also meet the international OIML-R111 recommendation in shape, material, and markings.

They are therefore suitable for legal and general metrological applications in research and industry.

**DAkkS Certificate**
Sartorius reference weights are DAkkS calibrated; certificates are supplied free of charge*. Test, special, and custom weights are available with or without DAkkS certification.

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 DAkkS Partner for Mass Units**
Sartorius is a DAkkS calibration laboratory for weights, electronic laboratory balances and industrial scales. Sartorius calibration laboratories have been inspected and accredited for compliance with the regulations of the german calibration service, DAkkS, concerning mass units and meet the DIN EN ISO IEC 17025 international standard for test laboratories.

**Recalibration for All Weights, Manufacturers and Shapes**
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 DAkkS calibration certificates for all weights ranging from 1 mg up 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 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. A weight value of 2,000 g is selected.

Weighing Steps

$$n = \frac{max[mg]}{d\,[mg]}$$

n = resolution of your weighing steps
max = weighing capacity of your instrument
d = readability of your instrument

* or E2, DAkkS-calibrated

Class acc. to OIML-R1111
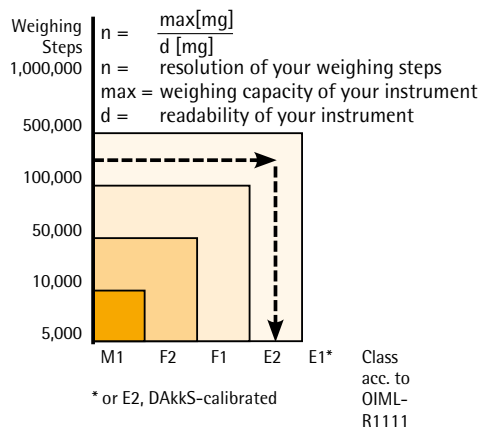
* Weights with DAkkS certificate issued to Sartorius for classes E2, F1, F2 up to 50 kg

# Composition of the Weight Sets



Reference weight sets



Service case



Test weight set

● 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

# Reference Weight Sets (YCS)

**Features of Sartorius Reference Weight Sets**

The reference weights contained in Sartorius reference weight sets have the same features and properties as the individual weights in the corresponding maximum permissible errors. Sartorius reference 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, E2 and F1 weight sets come with wire weights up to 500 mg.

Class F2 and M1 weight sets come with leaf weights up to 500 mg.

| Nominal Mass | E1 | E2 | F1 |
|---|---|---|---|
| From 1 mg to 5 g | YCS011-351-00* | YCS011-352-00* | |
| From 1 mg to 100 g | YCS011-511-00* | YCS011-512-00* | YCS01-513-00* |
| From 1 mg to 200 g | YCS011-521-00* | YCS011-522-00* | YCS01-523-00* |
| From 1 mg to 1 kg | YCS011-611-00* | YCS011-612-00* | YCS01-613-00* |
| From 1 mg to 5 kg | YCS011-651-00* | YCS011-652-00* | YCS01-653-00* |
| From 1 g to 1 kg | YCS31-611-00* | YCS31-612-00* | YCS31-613-00* |
| From 1 g to 5 kg | YCS31-651-00* | YCS31-652-00* | YCS31-653-00* |
| From 1 g to 10 kg | YCS31-711-00* | YCS31-712-00* | YCS31-713-00* |

| Nominal Mass | F2 | M1 |
|---|---|---|
| From 1 mg to 100 g | YCS01-514-00* | YCS01-515-00* |
| From 1 mg to 200 g | YCS01-524-00* | YCS01-525-00* |
| From 1 mg to 1 kg | YCS01-614-00* | YCS01-615-00* |
| From 1 mg to 5 kg | YCS01-654-00* | YCS01-655-00* |
| From 1 g to 1 kg | YCS31-614-00* | YCS31-615-00* |
| From 1 g to 5 kg | YCS31-654-00* | YCS31-655-00* |
| From 1 g to 10 kg | YCS31-714-00* | YCS31-715-00* |

| Service Weight Set | E2 | F1 |
|---|---|---|
| From 100 g to 5 kg | YSS5128-6528-00* | |
| From 1 mg to 5 kg | YSS0121-353-00* | |
| From 1 g to 5 kg | | YSS3138-6538-00* |

* Weights with DAkkS certificate issued to Sartorius for classes E2, F1, F2 up to 50 kg; all other weights are supplied without a DAkkS certificate. For order numbers ending in -02 instead of -00, we supply the weights with a DAkkS certificate issued to the customer.

# mg Reference Weights (YCW)



Knob weights



Leaf weights



Wire weights

Class E1, E2 and F1 wire weights 1 mg up to 500 mg made of special steel, polished to a high gloss, non-magnetizable.
E1: density 8.0 g/cm$^3$
E2 and F1: density 7.95 g/cm$^3$

Class F2 and M1 (in weight sets) leaf weights polished to a high gloss, non-magnetizable.
1 mg up to 5 mg are made of aluminium, density 2.7 g/m$^3$.
10 mg up to 500 mg are made of nickel silver, density 8.7 g/m$^3$.

| Nominal Mass [mg] | Wire Weights Class E1 | Wire Weights Class E2 | Wire Weights Class F1 |
|---|---|---|---|
| 1 | YCW0111-00* | YCW0121-00* | YCW013-00* |
| 2 | YCW0211-00* | YCW0221-00* | YCW023-00* |
| 5 | YCW0511-00* | YCW0521-00* | YCW053-00* |
| 10 | YCW1111-00* | YCW1121-00* | YCW113-00* |
| 20 | YCW1211-00* | YCW1221-00* | YCW123-00* |
| 50 | YCW1511-00* | YCW1521-00* | YCW153-00* |
| 100 | YCW2111-00* | YCW2121-00* | YCW213-00* |
| 200 | YCW2211-00* | YCW2221-00* | YCW223-00* |
| 500 | YCW2511-00* | YCW2521-00* | YCW253-00* |

* Weights with DAkkS certificate issued to Sartorius for classes E2, F1, F2 up to 50 kg; all other weights are supplied without a DAkkS certificate. For order numbers ending in -02 instead of -00, we supply the weights with a DAkkS certificate issued to customer.

# Reference Weights (YCW)

Class E1, E2, F1 and F2 knob weights
1 g to 50 kg, and cylindrical weights 100 kg
to 1,000 kg, made of special steel high-gloss
polished finish, non-magnetizable, solid mass
up to class F1.
E1: density 8.0 g/cm³
E2, F1, F2: density 7.95 g/cm³

M1: 1–10 kg, brass|fine finished,
high-gloss polished finish
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


Cylindrical weights


Block 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 | YCW311-00* | YCW312-00* | YCW313-00* | YCW314-00* | | YCW316-00* |
| 2 g | YCW321-00* | YCW322-00* | YCW323-00* | YCW324-00* | | YCW326-00* |
| 5 g | YCW351-00* | YCW352-00* | YCW353-00* | YCW354-00* | | YCW356-00* |
| 10 g | YCW411-00* | YCW412-00* | YCW413-00* | YCW414-00* | | YCW416-00* |
| 20 g | YCW421-00* | YCW422-00* | YCW423-00* | YCW424-00* | | YCW426-00* |
| 50 g | YCW451-00* | YCW452-00* | YCW453-00* | YCW454-00* | | YCW456-00* |
| 100 g | YCW511-00* | YCW512-00* | YCW513-00* | YCW514-00* | | YCW516-00* |
| 200 g | YCW521-00* | YCW522-00* | YCW523-00* | YCW524-00* | | YCW526-00* |
| 500 g | YCW551-00* | YCW552-00* | YCW553-00* | YCW554-00* | | YCW556-00* |
| 1 kg | YCW611-00* | YCW612-00* | YCW613-00* | YCW614-00* | YCW615-00* | YCW616-00* |
| 2 kg | YCW621-00* | YCW622-00* | YCW623-00* | YCW624-00* | YCW625-00* | YCW626-00* |
| 5 kg | YCW651-00* | YCW652-00* | YCW653-00* | YCW654-00* | YCW655-00* | YCW656-00* |
| 10 kg | YCW711-00* | YCW712-00* | YCW713-00* | YCW714-00* | YCW715-00* | YCW716-00* |
| 20 kg | YCW721-00* | YCW722-00* | YCW723-00* | YCW724-00* | | |
| 50 kg | YCW751-00* | YCW752-00* | YCW753-00* | YCW754-00* | | |
| 100 kg** | | | YCW813-00* | YCW814-00* | | |
| 200 kg** | | | YCW823-00* | YCW824-00* | | |
| 500 kg** | | | YCW853-00* | YCW854-00* | | |
| 1,000 kg** | | | YCW913-00* | YCW914-00* | | |

| Nominal Mass | Block Weights [1] M1 | Block Weights [4] M1*** | Cylindrical kg [4] Weights M1 | Block Weights [4] M2*** |
|---|---|---|---|---|
| 5 kg | YCW6554-00* | YCW6559-00* | | |
| 10 kg | YCW7154-00* | YCW7159-00* | | |
| 20 kg | YCW7254-00* | YCW7259-00* | | |
| 50 kg | YCW7554-00* | YCW7559-00* | | |
| 100 kg | | YCW8159-00* | YCW8157-00* | YCW6569-00* |
| 200 kg*** | | YCW8259-00* | YCW8257-00* | YCW7169-00* |
| 500 kg*** | | YCW8559-00* | YCW8557-00* | YCW7269-00* |
| 1,000 kg*** | | YCW9159-00* | YCW9157-00* | YCW7569-00* |

**Material:**
[1] stainless steel, [2] brass fine finished, [3] brass, precision lathed surface,
[4] gray casting, painted black

* Weights with DAkkS certificate issued to Sartorius for classes E2, F1, F2 up to 50 kg; all other weights are supplied without a DAkkS certificate. For order numbers ending in –02 instead of –00, we supply the weights with a DAkkS certificate issued to the customer.
** Cylindrical weight with lug for crane, packed on palette
*** 200 kg to 1,000 kg cylindrical weight with lug for crane, stackable, packed on palette


Block weight, stainless steel


Block weight

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# Cylindrical Test Weights (YCW...8)



Test weights



Cylindrical weights

Cylindrical test weights are made of stainless steel, non-magnetizable, high-gloss polished, density 7.95 g/cm$^3$.
Cylindrical test weights are packed in a plastic screw box.

| 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* |

* The weights are supplied without a DAkkS certificate. For order numbers ending in -02 instead of -00*, we supply the weights with a DAkkS certificate issued to the customer.

## Test Weight Sets (YCS...AC...)

**Features of Sartorius Test Weight Sets**
The test weights contained in Sartorius test weight sets have the same features and properties as the individual weights in the corresponding maximum permissible errors. Sartorius test weight sets are supplied in a plastic case, along with gloves, forceps and brushes.

This plastic cases can be used in clean rooms. The weight sets come with leaf weights up to 500 mg.



Test weight set

| Nominal Mass | E2 | F1 | F2 | M1 |
|---|---|---|---|---|
| From 1 mg to 500 mg | YCS011-252-AC-00* | YCS01-253-AC-00* | YCS01-254-AC-00* | YCS01-255-AC-00* |
| From 1 mg to 100 g | | | | YCS01-515-AC-00* |
| From 1 mg to 200 g | | | | YCS01-525-AC-00* |
| From 1 mg to 1 kg | | | | YCS01-615-AC-00* |
| From 1 mg to 5 kg | | | | YCS01-655-AC-00* |
| From 1 g to 100 g | YCS31-512-AC-00* | YCS31-513-AC-00* | YCS31-514-AC-00* | |
| From 1 g to 200 g | YCS31-522-AC-00* | | | |
| From 1 g to 1 kg | YCS31-612-AC-00* | YCS31-613-AC-00* | YCS31-614-AC-00* | YCS31-615-AC-00* |
| From 1 g to 5 kg | YCS31-652-AC-00* | YCS31-653-AC-00* | YCS31-654-AC-00* | YCS31-655-AC-00* |
| From 1 g to 10 kg | | | | YCS31-715-AC-00* |

## mg Test Weights (YCW...AC...)

Class E2 leaf weights, 1 mg up to 5 mg are made of aluminum, density 2.7 g/cm$^3$.
10 mg up to 500 mg are made of nickel silver, density 8.7 g/cm$^3$.

| Nominal Mass | E2 |
|---|---|
| 1 mg | YCW0121-AC-00* |
| 2 mg | YCW0221-AC-00* |
| 5 mg | YCW0521-AC-00* |
| 10 mg | YCW1121-AC-00* |
| 20 mg | YCW1221-AC-00* |
| 50 mg | YCW1521-AC-00* |
| 100 mg | YCW2121-AC-00* |
| 200 mg | YCW2221-AC-00* |
| 500 mg | YCW2521-AC-00* |



Leaf weights 1 mg – 500 mg

* The weights are supplied without a DAkkS certificate. For order numbers ending in -02 instead of -00, we supply the weights with a DAkkS certificate issued to the customer.

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# Test Weights (YCW...AC...)



Plastic screw-top can



Knob weights

Class E2, F1 and F2 knob weights
1 g up to 10 kg are made of special steel, polished, non-magnetizable, density 7.95 g/cm$^3$.

Class M1 and M2 knob weights
1 kg up to 10 kg are made of brass fine finished, polished, density 8.4 g/cm$^3$.

Class F1, F2 and M1 knob weights from
10 g including adjustment chamber.

Class F1, F2 and M1 knob weights are packed in a plastic screw-box, 1 kg and up are including gloves.

Class M2 knob weights from 1 g up to 20 g are in a plastic case, from 50 g up to 2 kg are in a plastic box and from 5 kg up to 10 kg are in a wooden case.

| Nominal Mass | E2 | F1 | F2 |
|---|---|---|---|
| 1 g | YCW312-AC-00* | YCW313-AC-00* | YCW314-AC-00* |
| 2 g | YCW322-AC-00* | YCW323-AC-00* | YCW324-AC-00* |
| 5 g | YCW352-AC-00* | YCW353-AC-00* | YCW354-AC-00* |
| 10 g | YCW412-AC-00* | YCW413-AC-00* | YCW414-AC-00* |
| 20 g | YCW422-AC-00* | YCW423-AC-00* | YCW424-AC-00* |
| 50 g | YCW452-AC-00* | YCW453-AC-00* | YCW454-AC-00* |
| 100 g | YCW512-AC-00* | YCW513-AC-00* | YCW514-AC-00* |
| 200 g | YCW522-AC-00* | YCW523-AC-00* | YCW524-AC-00* |
| 500 g | YCW552-AC-00* | YCW553-AC-00* | YCW554-AC-00* |
| 1 kg | YCW612-AC-00* | YCW613-AC-00* | YCW614-AC-00* |
| 2 kg | YCW622-AC-00* | YCW623-AC-00* | YCW624-AC-00* |
| 5 kg | YCW652-AC-00* | YCW653-AC-00* | YCW654-AC-00* |
| 10 kg | YCW712-AC-00* | YCW713-AC-00* | YCW714-AC-00* |

| Nominal Mass | M1 | M2 |
|---|---|---|
| 1 g | YCW315-AC-00* | YCW316-AC-00* |
| 2 g | YCW325-AC-00* | YCW326-AC-00* |
| 5 g | YCW355-AC-00* | YCW356-AC-00* |
| 10 g | YCW415-AC-00* | YCW416-AC-00* |
| 20 g | YCW425-AC-00* | YCW426-AC-00* |
| 50 g | YCW455-AC-00* | YCW456-AC-00* |
| 100 g | YCW515-AC-00* | YCW516-AC-00* |
| 200 g | YCW525-AC-00* | YCW526-AC-00* |
| 500 g | YCW555-AC-00* | YCW556-AC-00* |
| 1 kg | YCW615-AC-00* | YCW616-AC-00* |
| 2 kg | YCW625-AC-00* | YCW626-AC-00* |
| 5 kg | YCW655-AC-00* | YCW656-AC-00* |
| 10 kg | YCW715-AC-00* | YCW716-AC-00* |

* The weights are supplied without a DAkkS certificate. For order numbers ending in -02 instead of -00, we supply the weights with a DAkkS certificate issued to the customer.

# Test Weights (YCW...AC...)

Class M1[2] block weights are made of special steel, polished, non-magnetizable, density 7.95 g/cm³.

Class M1 and M2[1] block weights and ton weights are made of cast iron, black lacquered.

| Nominal Mass | Block Weights [1] M1 | Block Weights [2] M1 | Block Weight [1] M2 |
|---|---|---|---|
| 5 kg | YCW6559-AC-00* | YCW6554-AC-00* | YCW6569-AC-00* |
| 10 kg | YCW7159-AC-00* | YCW7154-AC-00* | YCW7169-AC-00* |
| 20 kg | YCW7259-AC-00* | YCW7254-AC-00* | YCW7269-AC-00* |
| 50 kg | YCW7559-AC-00* | YCW7554-AC-00* | YCW7569-AC-00* |
| 100 kg | YCW8159-AC-00* | | |
| 200 kg | YCW9258-AC-00* | | |
| 500 kg | YCW9559-AC-00* | | |
| 1,000 kg | YCW9159-AC-00* | | |

| Nominal Mass | Ton kg Weight [1] M1 |
|---|---|
| 100 kg | YCW8157-AC-00* |
| 200 kg | YCW8257-AC-00* |
| 500 kg | YCW8557-AC-00* |
| 1,000 kg | YCW9157-AC-00* |

* The weights are supplied without a DAkkS certificate. For order numbers ending in -02 instead of -00, we supply the weights with a DAkkS certificate issued to the customer.



Block weights up to 50 kg



Block weights from 100 kg



Cylindrical kg weight

# Accessories for Weights (YAW)



Glas bell jar



Forceps



Weight forks



Handles for lifting weights
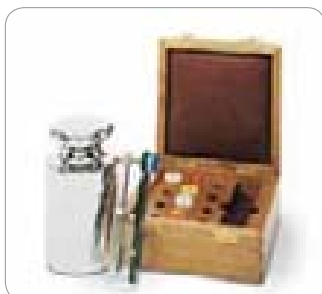


Permeability indicator



Susceptometer

**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.

| Accessories | | Order No. |
|---|---|---|
| Glass bell jar | for 1 mg – 5 g | YAW00 |
| with support plate | 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 | 115 mm for 1 mg – 5 g | YAW31 |
| silicone-coated tips | 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-box for | for 50 g weights | YAW50GL |
| individual weights* with | for 100 g weights | YAW100GL |
| closedpore insert; | for 200 g weights | YAW200GL |
| also suitable for clean rooms | 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

## Low Adsorption Cellulose Acetate Membrane Filters, Type 111, for the Filtration of Aqueous Solutions
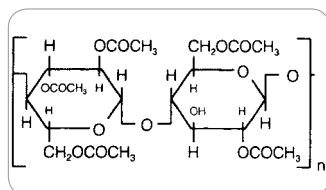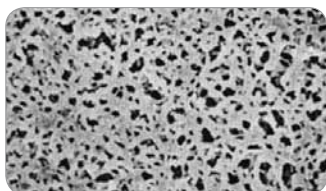


Cellulose acetate membranes combine high flow rates and thermal stability with very low adsorption characteristics, and are therefore excellently suited for use in pressure filtration devices. The 0.2 µm membrane is the filter of choice for sterile filtration of aqueous solutions, such as nutrient media, 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<br>for 0.2 µm > 2.9 when measured with an automatic integrity tester,<br>for 0.45 µm = 1.9 bar\|190 kPa\|27.5 psi,<br>for 0.65 µm = 1.3 bar\|130 kPa\|18.9 psi,<br>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<br>at $\Delta p$ = 1 bar \|100 kPa\|14.5 psi:<br>24 ml/min for 0.2 µm,<br>69 ml/min for 0.45 µm, 130 ml/min for 0.65 µm,<br>200 ml/min for 0.8 µm pore size |
| Material | Cellulose acetate |
| Sterilization | By autoclaving at 121 °C or 134 °C with $\gamma$-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
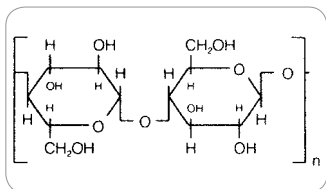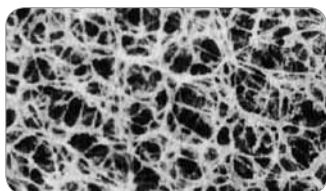




These solvent-resistant, hydrophilic membrane filters are excellently suited for their major application, particle removal from solvents.

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 128) 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 196. |
| 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<br>18407-013 N | 0.45 µm, pack of 100<br>0.2 µm, pack of 100 |
| 25 mm diameter | 18407-025 N | 0.2 µm, pack of 100 |
| 47 mm diameter | 18406-047 N<br>18407-047 N | 0.45 µm, pack of 100<br>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<br>18407-142 G<br>18407-142 N | 0.45 µm, pack of 25<br>0.2 µm, pack of 25<br>0.2 µm, pack of 100 |
| 293 mm diameter | 18406-293 G<br>18407-293 G | 0.45 µm, pack of 25<br>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.
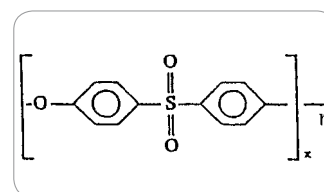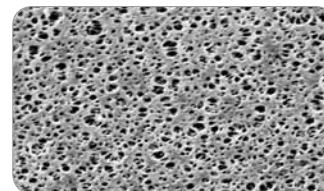
**Typical Performance for Polyethersulfone Membrane Filters**

| | |
|---|---|
| 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<br>0.2 µm = 3.2 bar\|320 kPa\|46 psi<br>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 $\Delta$p = 1 bar\|100 kPa\|14.5 psi:<br>0.1 µm – >7 ml/min.<br>0.2 µm – >28 ml/min.<br>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 | 0.1 µm, pack of 100 |
| | 15407--25----MIN | 0.2 µm, pack of 100 |
| | 15406--25------N | 0.45 µm, pack of 100 |
| 47 mm diameter | 15458--47------N | 0.1 µm, pack of 100 |
| | 15407--47----MIN | 0.2 µm, pack of 100 |
| | 15406--47------N | 0.45 µm, pack of 100 |
| 50 mm diameter | 15458--50------N | 0.1 µm, pack of 100 |
| | 15407--50----MIN | 0.2 µm, pack of 100 |
| | 15406--50------N | 0.45 µm, pack of 100 |

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

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

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

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





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

## Typical Performance for Cellulose Nitrate (Ester) Membrane Filters

| | |
|---|---|
| Adsorption | See diagram |
| Bubble point acc. DIN 58355 | Wetted with water, minimum values:<br>0.3 bar│30 kPa│4.35 psi for 8 μm pore size, 11301<br>0.5 bar│50 kPa│7.25 psi for 5 μm pore size, 11342<br>0.6 bar│60 kPa│8.7 psi for 3 μm pore size, 11302<br>1.0 bar│100 kPa│14.5 psi for 1.2 μm pore size, 11303<br>1.4 bar│140 kPa│20.3 psi for 0.8 μm pore size, 11304<br>2.0 bar│200 kPa│29 psi for 0.65 μm pore size, 11305<br>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:<br>750 ml/min for 8 μm pore size, 11301<br>570 ml/min for 5 μm pore size, 11342<br>430 ml/min for 3 μm pore size, 11302<br>320 ml/min for 1.2 μm pore size, 11303<br>200 ml/min for 0.8 μm pore size, 11304<br>130 ml/min for 0.65 μm pore size , 11305<br>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
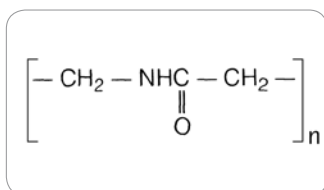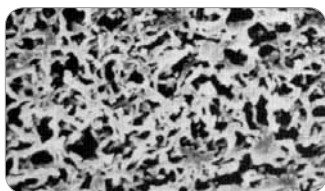




Polyamide membrane filters are hydrophilic and chemically resistant to alkaline solutions and organic solvents. They are therefore recommended for particle-removing filtration of water, aqueous solutions and solvents for analytical determination such as HPLC, as well as for the sterile filtration of 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 92, are recommended.

### Typical Performance for Polyamide Membrane Filters

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

### Order Numbers for Polyamide Membrane Filters, Type 250

| | | |
|---|---|---|
| 13 mm diameters | 25006-013 N | 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.
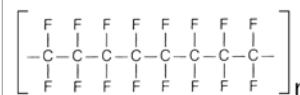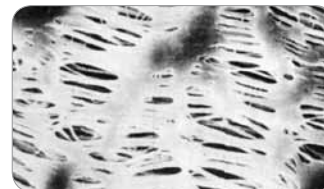




**Typical Performance for PTFE Membrane Filters**

| | |
|---|---|
| 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 $\Delta$p = 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.
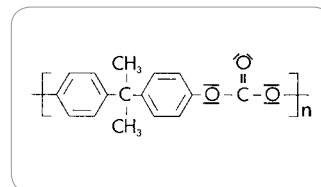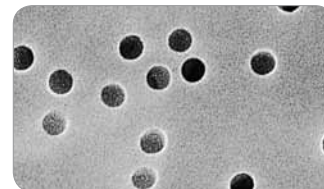
**Typical Performance for Polycarbonate Membrane Filters**

| | |
|---|---|
| Bubble point acc. DIN 58355 | Minimum value<br>0.2 µm > 4 bar/58 psi<br>0.4 µm > 2.2 bar/32 psi |
| Chemical compatibility | See table page 196 |
| Extractables | Low |
| Flow rate for water | > 10 ml/min/cm² for 0.2 µm<br>> 30 ml/min/cm² for 0.4 µm |
| Porosity | <15% |
| Material | Polycarbonate |
| Sterilization | By autoclaving at 121 ℃ |
| Thermal stability | Max. temperature 140 ℃ |

**Order Numbers for Polycarbonate Membrane Filters, Type 230**

| | | |
|---|---|---|
| 25 mm diameter | 23007-25 N<br>23006-25 N | 0.2 µm, pack of 100<br>0.4 µm, pack of 100 |
| 47 mm diameter | 23007-47 N<br>23006-47 N | 0.2 µm, pack of 100<br>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 $\Delta p$ = 1 bar│100 kPa│14.5 psi, 320 ml/min/cm$^2$ for 13400 |
| Materials | 13400, glass fiber with acrylic latex binder. |
| Sterilization | By dry heat, at 180 °C or by autoclaving at 121 °C or 134 °C. |
| Thermal stability | 220 °C for 13400 |
| Thickness | Ca. 0.55 mm for 13400 |

## Order Numbers

| a) Type 13400, Standard Glass Fiber Filters | 13400-013 S | 13 mm, pack of 200 |
|---|---|---|
| | 13400-042 Q | 42 mm, pack of 500 |
| | 13400-044 Q | 44 mm, pack of 500 |
| | 13400-047 Q | 47 mm, pack of 500 |
| | 13400-050 Q | 50 mm, pack of 500 |
| | 13400-100 K | 100 mm, pack of 50 |
| | 13400-120 K | 120 mm, pack of 50 |
| | 13400-124 K | 124 mm, pack of 50 |
| | 13400-127 K | 127 mm, pack of 50 |
| | 13400-130 K | 130 mm, pack of 50 |
| | 13400-142 K | 142 mm, pack of 50 |
| | 13400-150 K | 150 mm, pack of 50 |
| | 13400-257 K | 257 mm, pack of 50 |
| | 13400-260 K | 260 mm, pack of 50 |
| | 13400-279 K | 279 mm, pack of 50 |
| | 13400-293 K | 293 mm, pack of 50 |
| b) Type 13430, Extra Thick Glass Fiber Filters | 13430-127 K | 127 mm, pack of 50 |
| | 13430-130 K | 130 mm, pack of 50 |
| | 13430-142 K | 142 mm, pack of 50 |
| | 13430-257 K | 257 mm, pack of 50 |
| | 13430-279 K | 279 mm, pack of 50 |
| | 13430-293 K | 293 mm, pack of 50 |
| c) Type 13440, Binder-free Glass Fiber Filters | 13440-042 Q | 42 mm, pack of 500 |
| | 13440-044 Q | 44 mm, pack of 500 |
| | 13440-047 Q | 47 mm, pack of 500 |
| | 13440-050 Q | 50 mm, pack of 500 |
| | 13440-130 K | 130 mm, pack of 50 |

# 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.

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## 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.

## 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 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® Syringe Filter Selection Guide

## Sample Composition

**Sample Volumes**

### Aqueous

| All Aqueous Solutions ■ Buffers, Protein Analysis | All Aqueous Solutions ■ Tissue Culture Media |
|---|---|
| SFCA Surfactant Free Cellulose Acetat | PES Polyethersulfone |



4 mm ∅ for up to 1 ml – ∅ 0.1-1 ml

### Solvents

| Hydrophilic ■ Aqueous\|Solvent Mixtures\|Solvents | Hydrophilic ■ Solvent Mixtures\|Solvents | Hydrophobic ■ Solvents\|Gases\|Acids\|Bases |
|---|---|---|
| RC Regenerated Cellulose | NY Polyamide, Nylon | PTFE Polytetrafluorethylene |



15 mm ∅ for up to 15 ml – ∅ 0.5-15 ml

## Pore Sizes

### Sterilization

| 0.1 µm | Small Bacteria Mycoplasma Colloids > 0.1 |
|---|---|
| 0.2 µm | UHPLC, etc. (Columns < 3µm Particles) Bacteria |

### Sample Preparation｜Clarification｜Particle Removal

| 0.45 µm | HPLC, etc. (Columns < 3 µm Particles) Particles |
|---|---|
| 0.65 µm | Particles Yeast Cells |
| 0.8 µm | Particles Yeast Cells |
| 1.2 µm | Particles Yeast Cells Platelets |
| 5 µm | Large Particles Rubber Grit Cells |



25-28 mm for up to 100 ml – 5-100 ml

### Prefiltration

| GF (Glass Fibre) | Glass Prefilter Glass + Membrane Highly Particle-laden Samples |
|---|---|

## Applications

| Type of Filtration | 1st Choice | Rec. Alternatives |
|---|---|---|
| HPLC ■ UHPLC ■ LCMS ■ IC ■ GC - Sample Preparation | RC | PTFE\|NY |
| Undiluted Organic Solvents | RC\|PTFE | NY |
| Protein Analysis ■ Samples with Biomolecules ■ Buffers | SFCA | RC\|PES |
| Tissue Culture Media | PES | SCFA\|RC |
| Highly Particle-laden Samples ■ Organic Solvents | GF\|NY | – |
| Highly Particle-laden Samples ■ Aqueous Solutions | GF\|SFCA | GF\|NY |

■ pH 1-14: PTFE\|GF
■ pH 3-14: RC\|NY\|PTFE\|GF
■ pH 3-12: RC\|PES\|NY\|PTFE\|GF
■ pH 4-8: SFCA\|RC\|PES\|NY\|PTFE\|GF*

*Compatibility tested with a contact time of 24 hours at 20 °C

# Sample Preparation for Analytics – HPLC│UHPLC│LCMS│IC│GC









Male Spike



Male Luer Slip



4 mm packages are color-coded

## Reliable Removal of Particles and Microorganisms from Liquids to Protect your Columns and Instruments

Elimination of particles from your samples prior to HPLC or other chromatographic analysis is essential in order to maintain the integrity of your chromatography column and to maximize its operating life. Minisart® syringe filters consist of a PP housing and membrane components featuring maximum chemical compatibility and minimum extractables to ensure excellent results.

## Minisart® Features

- 15 mm and 25 mm with pore size and type of membrane identified
- 4 mm with color-coded package
- Low adsorption of analytes
- Maximum chemical compatibility
- Minimum extractables or leachables
- Superior flow rate
- Low hold-up volumes
- 100% integrity tested
- Bidirectional use
- Certified quality

## Key Specifications

| Diameter [mm] | Pore Size [µm] | Membranes | Housing | Connector Outlet | Hold–up Volume [µl**] | Filter Area [cm²] |
|---|---|---|---|---|---|---|
| 25 | 0.2│0.45 | RC│PTFE│NY | PP* | Male Luer Slip | 100–200 | 4.8 |
| 15 | 0.2│0.45 | RC│PTFE│NY | PP* | Male Luer Slip│ Male Spike | 30–100 | 1.7 |
| 4 | 0.2│0.45 | RC│PTFE | PP* | Male Luer Slip | 5–10 | 0.07 |
| GF Prefilter | 1.2+0.2│0.45 | GF+NY | PP* | Male Luer Slip | 250–500 | 4.8 |

*PP = Polypropylene **Hold-up volume after air purge. Volumes can vary depending on membrane and liquid used.

## Specifications for Minisart® RC, Minisart® SRP, Minisart® NY, 4mm, 15 mm and 25 mm Membrane Diameter

| | |
|---|---|
| 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 | 121 °C, 30 min (autoclave) |
| Bubble point | Min value with water (Minisart® RC) ≥ 3.2 bar/≥ 47 psi (0.2 µm), ≥ 2.0 bar/≥ 29 psi (0.45 µm) Min value with isopropanol (Minisart® SRP) ≥ 1.4 bar/≥ 20 psi (0.2 µm), ≥ 0.9 bar/≥ 13 psi (0.45 µm) Min value with water (Minisart® NY) ≥ 3.0 bar/≥ 44 psi (0.2 µm), ≥ 2.0 bar/≥ 29 psi (0.45 µm) |
| Flow rate, 4 mm | **Typical values for water at xp = 3 bar** 0.5 ml/min (0.2 µm), 1.5 ml/min (0.45 µm), Minisart® RC **Typical values for methanol at xp = 1 bar** 1.5 ml/min (0.2 µm), 3.0 ml/min (0.45 µm), Minisart® RC; 4.5 ml/min (0.45 µm), Minisart ® SRP **Typical values for air at xp = 1 bar** 60 ml/min (0.45 µm), Minisart® SRP |
| Flow rate, 15 mm | **Typical values for water at xp = 1 bar** 10 ml/min (0.2 µm), 30 ml/min (0.45 µm), Minisart® RC; 20 ml/min (0.2 µm), 40 ml/min (0.45 µm), Minisart® NY **Typical values for methanol at xp = 1 bar** 55 ml/min (0.2 µm), 105 ml/min (0.45 µm), Minisart® RC; 55 ml/min (0.2 µm), 150 ml/min (0.45 µm), Minisart ® SRP **Typical values for air at xp = 1 bar** 0.5 l/min (0.2 µm), 1.1 l/min (0.45 µm), Minisart® SRP |
| Flow rate, 25 mm | **Typical values for water at xp = 1 bar** 60 ml/min (0.2 µm), 100 ml/min (0.45 µm), Minisart® RC; 75 ml/min (0.2 µm), 130 ml/min (0.45 µm), Minisart® NY **Typical values for methanol at xp = 1 bar** 160 ml/min (0.2 µm), 325 ml/min (0.45 µm), Minisart® RC; 160 ml/min (0.2 µm), 260 ml/min (0.45 µm), Minisart ® SRP **Typical values for air at xp = 1 bar** 1.2 l/min (0.2 µm), 1.8 l/min (0.45 µm), Minisart® SRP |
| Water penetration point | **Minisart® SRP (hydrophobic PTFE)** 4.0 bar (0.2 µm) or 3.0 bar (0.45 µm) |

**HPLC Certification\***

Methanol



Acetronitrile
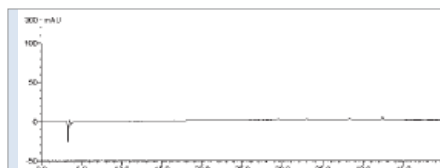


Filtrate Methanol



Filtrate Acetronitrile



**Methanol|Filtrate Methanol:**
Channel: UV_VIS_2      Run Time [min.]: 58.00
Wavelength: 214         Injection Volume: 100.0
Bandwidth: 1

**Acetonitrile|Filtrate Acetonitrile:**
Channel: UV_VIS_4      Run Time [min.]: 58.00
Wavelength: 280         Injection Volume: 100.0
Bandwidth: 1

\*Minisart® used with methanol|water and acetonitrile|water did not show any artifacts or interference peaks in the range of 200–300 nm.

# Minisart® Syringe Filters – Sample Preparation Chromatography

**Ordering Information Minisart® RC (Regenerated Cellulose)**

| Ø [mm] | Membrane | Housing | Pore Size [μm] | Connector Outlet | Color\|Printing | Sterile* | Qty\|Pk | Order Number |
|---|---|---|---|---|---|---|---|---|
| 25 | RC | PP | 0.2 | Male Luer Slip | White, Printed | No | 50 | 17764--------ACK |
| 25 | RC | PP | 0.2 | Male Luer Slip | White, Printed | No | 50 | 17764----------K |
| 25 | RC | PP | 0.2 | Male Luer Slip | White, Printed | No | 200 | 17764----------S |
| 25 | RC | PP | 0.2 | Male Luer Slip | White, Printed | No | 500 | 17764----------Q |
| 25 | RC | PP | 0.45 | Male Luer Slip | White, Printed | No | 50 | 17765----------K |
| 25 | RC | PP | 0.45 | Male Luer Slip | White, Printed | No | 200 | 17765----------S |
| 25 | RC | PP | 0.45 | Male Luer Slip | White, Printed | No | 500 | 17765----------Q |
| 15 | RC | PP | 0.2 | Male Luer Slip | White, Printed | Yes | 50 | 17761--------ACK |
| 15 | RC | PP | 0.2 | Male Luer Slip | White, Printed | No | 50 | 17761----------K |
| 15 | RC | PP | 0.2 | Male Luer Slip | White, Printed | No | 500 | 17761----------Q |
| 15 | RC | PP | 0.2 | Male Luer Slip | White, Printed | No | 1000 | 17761----------R |
| 15 | RC | PP | 0.45 | Male Luer Slip | White, Printed | No | 50 | 17762----------K |
| 15 | RC | PP | 0.45 | Male Luer Slip | White, Printed | No | 500 | 17762----------Q |
| 4 | RC | PP | 0.2 | Male Luer Slip | Blue Tray | No | 50 | 17821----------K |
| 4 | RC | PP | 0.2 | Male Luer Slip | Blue Tray | No | 500 | 17821----------Q |
| 4 | RC | PP | 0.45 | Male Luer Slip | Yellow Tray | No | 50 | 17822----------K |
| 4 | RC | PP | 0.45 | Male Luer Slip | Yellow Tray | No | 500 | 17822----------Q |

**Ordering Information Minisart® SRP (Hydrophobic PTFE)**

| Ø [mm] | Membrane | Housing | Pore Size [μm] | Connector Outlet | Color\|Printing | Sterile* | Qty\|Pk | Order Number |
|---|---|---|---|---|---|---|---|---|
| 25 | PTFE | PP | 0.2 | Male Luer Slip | White, Printed | Yes | 50 | 17575--------ACK |
| 25 | PTFE | PP | 0.2 | Male Luer Slip | White, Printed | No | 50 | 17575----------K |
| 25 | PTFE | PP | 0.2 | Male Luer Slip | White, Printed | No | 200 | 17575----------S |
| 25 | PTFE | PP | 0.2 | Male Luer Slip | White, Printed | No | 500 | 17575----------Q |
| 25 | PTFE | PP | 0.45 | Male Luer Slip | White, Printed | No | 50 | 17576----------K |
| 25 | PTFE | PP | 0.45 | Male Luer Slip | White, Printed | No | 200 | 17576----------S |
| 25 | PTFE | PP | 0.45 | Male Luer Slip | White, Printed | No | 500 | 17576----------Q |
| 15 | PTFE | PP | 0.2 | Male Spike | White, Printed | No | 50 | 17558----------K |
| 15 | PTFE | PP | 0.2 | Male Spike | White, Printed | No | 500 | 17558----------Q |
| 15 | PTFE | PP | 0.2 | Male Luer Slip | White, Printed | Yes | 50 | 17573--------ACK |
| 15 | PTFE | PP | 0.2 | Male Luer Slip | White, Printed | No | 50 | 17573----------K |
| 15 | PTFE | PP | 0.2 | Male Luer Slip | White, Printed | No | 500 | 17573----------Q |
| 15 | PTFE | PP | 0.45 | Male Spike | White, Printed | No | 50 | 17559----------K |
| 15 | PTFE | PP | 0.45 | Male Spike | White, Printed | No | 500 | 17559----------Q |
| 15 | PTFE | PP | 0.45 | Male Luer Slip | White, Printed | No | 50 | 17574----------K |
| 15 | PTFE | PP | 0.45 | Male Luer Slip | White, Printed | No | 500 | 17574----------Q |
| 4 | PTFE | PP | 0.2 | Male Luer Slip | Blue Tray | No | 500 | 17844----------Q |
| 4 | PTFE | PP | 0.45 | Male Luer Slip | Yellow Tray | No | 50 | 17820----------K |
| 4 | PTFE | PP | 0.45 | Male Luer Slip | Yellow Tray | No | 500 | 17820----------Q |

**Ordering Information Minisart® NY (Nylon) & NY25 Plus (Glass Fiber 1.2 µm + Nylon)**

| Ø [mm] | Membrane | Housing | Pore Size [µm] | Connector Outlet | Color\|Printing | Sterile* | Qty\|Pk | Order Number |
|---|---|---|---|---|---|---|---|---|
| 25 | Nylon | PP | 0.2 | Male Luer Slip | White, Printed | Yes | 50 | 17845--------ACK |
| 25 | Nylon | PP | 0.2 | Male Luer Slip | White, Printed | No | 500 | 17845----------Q |
| 25 | Nylon | PP | 0.2 | Male Luer Slip | White, Printed | No | 1000 | 17845----------R |
| 25 | Nylon | PP | 0.45 | Male Luer Slip | White, Printed | Yes | 50 | 17846--------ACK |
| 25 | Nylon | PP | 0.45 | Male Luer Slip | White, Printed | No | 500 | 17846----------Q |
| 25 | Nylon | PP | 0.45 | Male Luer Slip | White, Printed | No | 1000 | 17846----------R |
| 15 | Nylon | PP | 0.2 | Male Luer Slip | White, Printed | No | 50 | 1776B----------K |
| 15 | Nylon | PP | 0.2 | Male Luer Slip | White, Printed | No | 500 | 1776B----------Q |
| 15 | Nylon | PP | 0.45 | Male Luer Slip | White, Printed | No | 50 | 1776C----------K |
| 15 | Nylon | PP | 0.45 | Male Luer Slip | White, Printed | No | 500 | 1776C----------Q |
| 25 | Nylon+GF | PP | 0.2 | Male Luer Slip | White, Printed | No | 50 | 1784B----------K |

*Sterile Minisarts are individually packaged. If not stated otherwise, Minisarts have been sterilized by ethylene oxide.
 Minisarts NOT presterilized: RC, PTFE and Nylon can be sterilized by autoclaving at 121°C for 30 min/or by using ethylene oxide (EO).

# Filtration of Aqueous Liquids – Clarification | Sterilization

**Filtration is the optimal method for clarification and sterilization of liquids**
For clarification and sterilization of liquids, filtration is the optimal method. It removes all microorganisms and particles reliably, without any effects on the ingredients, due to adsorption or decomposition. For optimal results Minisart® filters made of MBS housing provide high flow rates and lowest adsorption characteristics. The MBS housing is color-coded for an easy pore size identification.

**Minisart® Features**
- Pore size + membrane color-coded
- Lowest adsorption
- Superior flow rate
- High total throughput
- Low hold-up volume
- Particulate-free
- Minimum extractables
- 100% integrity tested
- PVC-free
- Choice of presterilized or non-sterile units
- Gamma irradiated or EO sterilized
- Fully validated, certified quality
- Bidirectional use

## Key Specifications

| Diameter [mm] | Pore Size [µm] | Membranes | Housing | Connector Outlet | Hold-up Volume [µl**] | Filter Area [cm²] |
|---|---|---|---|---|---|---|
| 28 | 0.1 | PES | MBS* | Male Luer Lock | 100–150 | 6.2 |
| 28 | 0.2 | SFCA\|PES | MBS* | Male Luer Lock\| Male Luer Slip | 100–150 | 6.2 |
| 28 | 0.45 | SFCA\|PES | MBS* | Male Luer Lock\| Male Luer Slip | 100–150 | 6.2 |
| 28 | 0.65 | SFCA | MBS* | Male Luer Slip | 100–150 | 6.2 |
| 28 | 0.8 | SFCA | MBS* | Male Luer Lock | 100–150 | 6.2 |
| 28 | 1.2 | SFCA | MBS* | Male Luer Lock | 100–150 | 6.2 |
| 28 | 5 | SFCA | MBS* | Male Luer Lock | 100–150 | 6.2 |
| GF Prefilter | 1.2+0.2\|0.45 | GF+SFCA | MBS* | Male Luer Lock | 230 | 6.2 |
| GF Prefilter | 1.2 | GF | MBS* | Male Luer Lock\| Male Luer Slip | 200 | 6.2 |

*MBS = Methacrylate butadiene styrene polymerizate
**Hold-up volume after air purge. Volumes can vary depending on membrane and liquid used.

## Minisart® Syringe Filters for Rapid Clarification and Sterilization of Liquids

### Specifications for Minisarts® High Flow, Minisart® NML, Minisart ® NML Plus

| | |
|---|---|
| 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 5 bar\|73 psi (0.1 µm), 3.2 bar\|46 psi (0.2 µm), 2.0 bar\|29 psi (0.45 µm), 1.3 bar\|19 psi (0.65 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 xp = 1 bar\|100 kPa\|14.5 psi, 30 ml\|min (0.1 µm), 60 ml\|min (0.2 µm), 160 ml\|min (0.45 µm), 250 ml (0.65 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 | Dark-red (0.1 mm), blue (0.2 µm), yellow (0.45 µm), pink (0.65 µm), green (0.8 µm), red (1.2 µm), brown (5 µm), opaque (Minisart® GF) |
| Cytotoxicity | Detectably no inhibition with MRC-5 (human lung cells) |

## Sartorius Advantage: Water Flow at 1 bar|15 psi ml/min
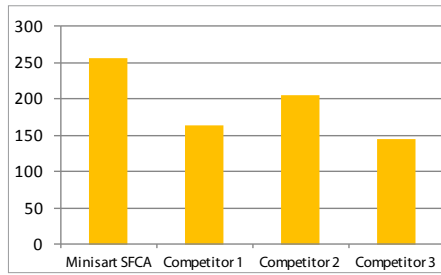


0.45 µm SFCA membrane compared with CA
(Cellulose Acetate) or similar hydrophilic membranes
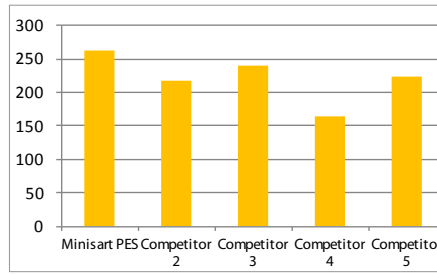


0.45 µm PES membrane compared with other PES
membranes

**Minisart® NML with SFCA**



| 0.2 | 0.45 | 0.65 | 0.8 | 1.2 | 5.0 |

**Minisart® High Flow with PES**
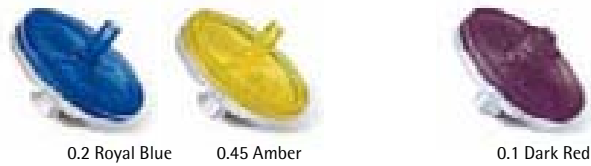


0.2 Royal Blue    0.45 Amber    0.1 Dark Red

**Ordering Information Minisart® High Flow (PES – Polyethersulfone)**

| Ø [mm] | Membrane | Housing | Pore Size [µm] | Connector Outlet | Color | Sterile* | Qty\|Pk | Order Number |
|---|---|---|---|---|---|---|---|---|
| 28 | PES | MBS | 0.1 | Male Luer Lock | Dark Red | Yes | 50 | 16553----------K |
| 28 | PES | MBS | 0.2 | Male Luer Lock | Royal Blue | Yes# | 50 | 16532--------GUK |
| 28 | PES | MBS | 0.2 | Male Luer Lock | Royal Blue | Yes | 50 | 16532----------K |
| 28 | PES | MBS | 0.2 | Male Luer Slip | Royal Blue | Yes | 50 | 16541----------K |
| 28 | PES | MBS | 0.2 | Male Luer Lock | Royal Blue | No | 500 | 16532----------Q |
| 28 | PES | MBS | 0.2 | Male Luer Slip | Royal Blue | No | 500 | 16541----------Q |
| 28 | PES | MBS | 0.45 | Male Luer Lock | Amber | Yes | 50 | 16537----------K |
| 28 | PES | MBS | 0.45 | Male Luer Lock | Amber | No | 500 | 16537----------Q |
| 28 | PES | MBS | 0.45 | Male Luer Slip | Amber | Yes# | 50 | 16533--------GUK |
| 28 | PES | MBS | 0.45 | Male Luer Slip | Amber | Yes | 50 | 16533----------K |
| 28 | PES | MBS | 0.45 | Male Luer Slip | Amber | No | 500 | 16533----------Q |

**Ordering Information Minisart® NML (SFCA – Surfactant-free Cellulose Acetate)**

| Ø [mm] | Membrane | Housing | Pore Size [µm] | Connector Outlet | Color | Sterile* | Qty\|Pk | Order Number |
|---|---|---|---|---|---|---|---|---|
| 28 | SFCA | MBS | 0.2 | Male Luer Lock | Blue | Yes | 50 | 16534----------K |
| 28 | SFCA | MBS | 0.2 | Male Luer Lock | Blue | Yes# | 50 | 16534--------GUK |
| 28 | SFCA | MBS | 0.2 | Male Luer Lock | Blue | No | 500 | 16534----------Q |
| 28 | SFCA | MBS | 0.2 | Male Luer Slip | Blue | Yes | 50 | 17597----------K |
| 28 | SFCA | MBS | 0.2 | Male Luer Slip | Blue | No | 500 | 17597----------Q |
| 28 | SFCA | MBS | 0.45 | Male Luer Lock | Yellow | Yes | 50 | 16555----------K |
| 28 | SFCA | MBS | 0.45 | Male Luer Lock | Yellow | Yes# | 50 | 16555--------GUK |
| 28 | SFCA | MBS | 0.45 | Male Luer Lock | Yellow | No | 500 | 16555----------Q |
| 28 | SFCA | MBS | 0.45 | Male Luer Slip | Yellow | Yes | 50 | 17598----------K |
| 28 | SFCA | MBS | 0.45 | Male Luer Slip | Yellow | No | 500 | 17598----------Q |
| 28 | SFCA | MBS | 0.65 | Male Luer Slip | Pink | Yes | 50 | 16569----------K |
| 28 | SFCA | MBS | 0.8 | Male Luer Lock | Green | Yes | 50 | 16592----------K |
| 28 | SFCA | MBS | 0.8 | Male Luer Lock | Green | Yes# | 50 | 16592--------GUK |
| 28 | SFCA | MBS | 0.8 | Male Luer Lock | Green | No | 500 | 16592----------Q |
| 28 | SFCA | MBS | 1.2 | Male Luer Lock | Red | Yes | 50 | 17593----------K |
| 28 | SFCA | MBS | 1.2 | Male Luer Lock | Red | No | 500 | 17593----------Q |
| 28 | SFCA | MBS | 5 | Male Luer Lock | Brown | Yes | 50 | 17594----------K |
| 28 | SFCA | MBS | 5 | Male Luer Lock | Brown | No | 500 | 17594----------Q |

**Ordering Information Minisart® NML Plus (Glass Fiber 1.2 µm + SFCA)**

| Ø [mm] | Membrane | Housing | Pore Size [µm] | Connector Outlet | Color | Sterile* | Qty\|Pk | Order Number |
|---|---|---|---|---|---|---|---|---|
| 28 | GF+SFCA | MBS | 0.2 | Male Luer Lock | Blue | Yes | 50 | 17823----------K |
| 28 | GF+SFCA | MBS | 0.2 | Male Luer Lock | Blue | No | 500 | 17823----------Q |
| 28 | GF+SFCA | MBS | 0.45 | Male Luer Lock | Yellow | Yes | 50 | 17829----------K |
| 28 | GF+SFCA | MBS | 0.45 | Male Luer Lock | Yellow | No | 500 | 17829----------Q |
| 28 | GF+SFCA | MBS | 1.2 | Male Luer Lock | Red | No | 500 | 17825----------Q |
| 28 | GF | MBS | 1.2 | Male Luer Lock | White | No | 50 | 17824----------K |
| 28 | GF | MBS | 1.2 | Male Luer Lock | White | No | 500 | 17824----------Q |
| 28 | GF | MBS | 1.2 | Male Luer Slip | White | No | 500 | 17856----------Q |

*Sterilized Minisarts are individually packaged. If not stated otherwise, Minisarts are sterilized by ethylene oxide.
 #-Mark indicates sterilization by gamma irradiation.
 Minisarts NOT presterilized: PES, SFCA, GF+SFCA and GF can be sterilized by ethylene oxide or gamma irradiation.

Would you like to filter solvents, acids or bases?
Do you need to filter small volumes?
Would you like to use PP housings and other membranes?

■ Please see Minisart® RC, Minisart® NY or Minisart® SRP
 for the highest chemical compatibility; also available in 4 mm or 15 mm; see pages 107, 110 and 111.

# Medical Use & Venting – Special Applications

**Make your choice from a broad range of pore sizes, materials and formats**
Minisart® syringe filters are available in a broad range of pore sizes. They are ideal for clarification of liquids laden with particles, e.g. for preparation of pharmaceuticals or infusion solutions. For sterilization and removal of particles from air and other gases, syringe filters are optimal for sterile venting of containers, bioreactors, fermenters and tubing systems in medical devices. Many Minisart® syringe filters have the CE mark of conformity and are available in a wide choice of membranes, connectors and housing materials.

**Minisart® Features**
- Certified quality
- Fully validated
- 100% integrity tested
- Integrity testable before or after use
- Low adsorption
- Minimum extractables
- Particulate-free
- PVC-free
- Presterilized or non-sterile
- Gamma irradiated or EO sterilized
- CE-marked types
- Various inlet connectors
- Various outlet connectors
- Bidirectional

## Key Specifications

| Diameter [mm] | Pore Size [μm] | Membranes | Housing | Connector Outlet | Hold–up Volume [μl***] | Filter Area [cm²] |
|---|---|---|---|---|---|---|
| 28 | 0.2\|0.45 | SFCA | MBS* | Male Luer Lock\| Male Luer Slip | 100-150 | 6.2 |
| 28 | 5 | SFCA | MBS* | Male Luer Lock | 100-150 | 6.2 |
| 28 | 0.1 | PES | MBS* | Male Luer Lock | 100-150 | 6.2 |
| 26 | 0.2\|1.0 | PTFE | MBS* | Male Luer Lock\| Male Luer Slip | 100-150 | 6.2 |
| 26 | 0.45 | Dome + PTFE | MBS* | Male Luer Slip (inlet and outlet) | 100-150 | 6.2 |
| 25 | 0.2 | PTFE | PP** | Male Luer Slip\| Tube Connection | 100-200 | 4.8 |
| 15 | 0.2 | PTFE | MBS* | Male Luer Slip\| Slip + Needle | 100 | 1.7 |

\* MBS = Methacrylate butadiene styrene polymerizate
\*\* PP = Polypropylene
\*\*\* Hold–up volume after air purge. Volumes can vary depending on membrane and liquid used.

**CE–labeled Minisart® in many configurations**

**Ordering Information**

**Minisart® NML (SFCA – Cellulose Acetate)   Aqueous Filtration**

| Diameter [mm] | Membrane | Housing | Pore Size [µm] | Connector Outlet | Color | Sterile* | Qty\|Pk | Order Number | Marked? |
|---|---|---|---|---|---|---|---|---|---|
| 28 | SFCA | MBS | 0.2 | Male Luer Lock | Blue | Yes | 50 | 16534----------K | CE-marked |
| 28 | SFCA | MBS | 0.2 | Male Luer Lock | Blue | Yes# | 50 | 16534--------GUK | CE-marked |
| 28 | SFCA | MBS | 0.2 | Male Luer Lock | Blue | No | 500 | 16534----------Q | CE-marked |
| 28 | SFCA | MBS | 0.2 | Male Luer Slip | Blue | Yes | 50 | 17597----------K | CE-marked |
| 28 | SFCA | MBS | 0.2 | Male Luer Slip | Blue | No | 500 | 17597----------Q | CE-marked |
| 28 | SFCA | MBS | 0.45 | Male Luer Lock | Yellow | Yes | 50 | 16555----------K | CE-marked |
| 28 | SFCA | MBS | 0.45 | Male Luer Lock | Yellow | Yes# | 50 | 16555--------GUK | CE-marked |
| 28 | SFCA | MBS | 0.45 | Male Luer Lock | Yellow | No | 500 | 16555----------Q | CE-marked |
| 28 | SFCA | MBS | 0.45 | Male Luer Slip | Yellow | Yes | 50 | 17598----------K | CE-marked |
| 28 | SFCA | MBS | 0.45 | Male Luer Slip | Yellow | No | 500 | 17598----------Q | CE-marked |
| 28 | SFCA | MBS | 5 | Male Luer Lock | Brown | Yes | 50 | 17594----------K | |

**Minisart® Opthalsart (SCFA – Cellulose Acetate)   Aqueous Filtration**

| Diameter [mm] | Membrane | Housing | Pore Size [µm] | Connector Outlet | Color | Sterile* | Qty\|Pk | Order Number | Marked? |
|---|---|---|---|---|---|---|---|---|---|
| 28 | Opthalsart | MBS | 0.2 | Male Luer Slip | Pink | Yes | 50 | 17528----------K | CE-marked |

**Minisart® High Flow (PES – Polyethersulfoneᵇ)   Aqueous Filtration**

| Diameter [mm] | Membrane | Housing | Pore Size [µm] | Connector Outlet | Color | Sterile* | Qty\|Pk | Order Number | Marked? |
|---|---|---|---|---|---|---|---|---|---|
| 28 | PES | MBS | 0.1 | Male Luer Lock | Dark Red | Yes | 50 | 16553----------K | |

**Minisart® Air (Hydrophobic PTFE)   Venting**

| Diameter [mm] | Membrane | Housing | Pore Size [µm] | Connector Outlet | Color | Sterile* | Qty\|Pk | Order Number | Marked? |
|---|---|---|---|---|---|---|---|---|---|
| 15 | PTFE | MBS | 0.2 | Male Luer Slip | Yellow | No | 500 | 1751A----------Q | |
| 15 | PTFE | MBS | 0.2 | Male Luer Slip  + | Yellow | Yes# | 50 | 16596--------HNK | |

*Sterilized Minisarts are single-packed. If not stated differently, Minisarts are sterilized by Ethylene Oxide. #-Mark indicates sterilization by Gamma irradiation
Not pre-sterilized Minisarts: SFCA could be sterilized by Ethylene Oxide|Gamma irradiation • PTFE could be sterilized by Ethylene Oxide
ᵃ Connector Inlet: Male Luer Slip (all other Minisarts have Female Luer Lock  inlets)  • ᵇ Tube Connectors, inlet and outlet, 5 mm diameter

**Ordering Information**

**Minisart® HY (Hydrophobic PTFE) CE-marked   Venting & Gas Filtration**

| Diameter [mm] | Membrane | Housing | Pore Size [µm] | Connector Outlet | Color | Sterile* | Qty\|Pk | Order Number | Marked? |
|---|---|---|---|---|---|---|---|---|---|
| 26 | PTFE | MBS | 0.2 | Male Luer Lock | clear | Yes | 50 | 16596--------HYK | CE-marked |
| 26 | PTFE | MBS | 0.2 | Male Luer Lock | clear | No | 500 | 16596--------HYQ | CE-marked |
| 26 | PTFE | MBS | 0.2 | Male Luer Locka | clear | No | 500 | 16599--------HYQ | CE-marked |
| 26 | PTFE | MBS | 0.2 | Male Luer Slip | clear | No | 500 | 17595--------HYQ | |
| 26 | PTFE | MBS | 0.2 | Tube Connectorsa | clear | No | 500 | 40078----------Q | |
| 26 | PTFE | MBS | 1 | Male Luer Lock | clear | No | 500 | 1659A--------HYQ | |
| 26 | PTFE | MBS | 1 | Male Luer Slipa | clear | No | 500 | 1659B--------HYQ | |

**Minisart® Acticosart with Dome Reservoire + Hydrophobic PTFE   Venting & Ultracleaning of Gases**

| 26 | empty reser- | MBS | 0.45 | Tube Connectorsa | clear | No | 500 | 40080----------Q | |
|---|---|---|---|---|---|---|---|---|---|
| 26 | active carbon | MBS | 0.45 | Male Luer Slipa | blue | No | 500 | 17840----------Q | |

**Minisart® SRP  (Hydrophobic PTFE) CE-marked   Venting & Gas Filtration**

| 25 | PTFE | PP | 0.2 | Male Luer Slip | white | Yes | 50 | 17575--------ACK | CE-marked |
|---|---|---|---|---|---|---|---|---|---|

*Sterilized Minisarts® are single-packed. If not stated differently, Minisarts® are sterilized by Ethylene Oxide. #-Mark indicates sterilization by Gamma irradiation
Not pre-sterilized Minisarts®: SFCA could be sterilized by Ethylene Oxide|Gamma irradiation • PTFE could be sterilized by Ethylene Oxide
a Connector Inlet: Male Luer Slip (all other Minisarts® have Female Luer Lock  inlets)  • b Tube Connectors, inlet and outlet, 5 mm diameter

You need additional pore sizes ?
You would like to use other membranes?
– Please refer to Minisart® NML available in 0.65, 0.8, 1.2 µm pore sizes also available with PES membrane

You would like to filter solvents, acids or bases?
You want to filter small volumes?
You would like to use PP housing and other membranes?
– Please refer to Minisart® RC,  Minisart® NY or Minisart® SRP for highest chemical compatibility, also available in 15 and 4 mm ∅
  see also Minisart® Selection Guide

# 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 $\Delta p$ = 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
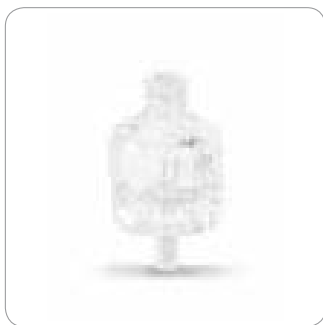
**Polycarbonate Holder
for Aqueous Solutions**
This inexpensive filter holder is made of clear, autoclavable polycarbonate and contains a silicone gasket for leak-proof sealing. It can be used at pressures of up to 7 bar by simply manually screwing it together.

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 $\Delta p$ = 1 bar│100 kPa│14.5 psi, With 0.2 μm membrane filter With 0.45 μm membrane filter | Approx. 18 ml/min 35 ml/min |
| Membrane filter | 35 ml/min with 0.45 μm membrane filter |
| Filtration area | 0.5 cm$^2$ |
| Materials | Polycarbonate top and bottom part, silicone gasket 10 × 14.9 mm (replacement part no. 6980569 for a pack of 10) |
| Max. operating pressure | 7 bar│700 kPa│101.57 psi |
| Membrane filter diameter | 13 mm |
| Sterilization | By autoclaving at 121 ℃ |
| 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 |

## 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

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 |
| Flow rate for water at $\Delta p$ = 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. 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 119.
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 $\Delta p$ = 1 bar│100 kPa│14.5 psi, With 0.2 µm membrane filter With 0.45 µm membrane filter | 70 ml/min 110 ml/min |
| Filtration area | 3 cm$^2$ |
| Materials | Polycarbonate top and bottom parts, silicone flat gasket 20 × 25 mm (replacement part no. 1EDS-D0053 for a pack of 10) |
| Max. operating pressure | 7 bar│700 kPa│101.5 psi |
| Membrane filter diameter | 25 mm |
| Sterilization | By autoclaving at 121 °C |
| Hold-up volume | Less than 0.3 ml after overcoming the bubble point (0.6 ml before) |

**Order Number for the 25 mm Polycarbonate Syringe Filter Holder**

| | |
|---|---|
| 16517E | Pack of 12 |

Recommended accessories are described on page 124.
Filters see page 92.

# 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.
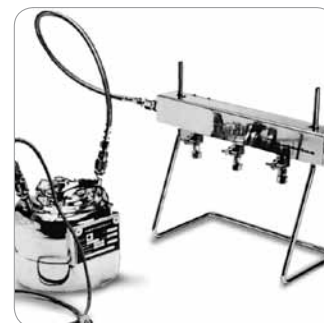
**Specifications for Ultrasart D20**

| | |
|---|---|
| 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 ×) |
| | 6986071 | Pressure spring (2 ×) |
| | 6986072 | Fixing spring (2 ×) |
| | 6986073 | Perbunan valve (2 ×) |
| Order Numbers for Disposable Syringes | 16644E | 5 ml volume, pack of 12 |
| | 16645E | 10 ml volume, pack of 12 |
| | 16646E | 20 ml volume, pack of 12 |
| | 16647E | 50 ml volume, pack of 12 |
| Order Numbers for Needles | 01324 | Stainless steel needle |
| | 01325 | Disposable needle |

# 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, 39 cm² filter area, 0.22 μm PES membrane Case with 12 units |
| 180C3---------E | 1000 ml, with receiver, 62 cm² filter area, 0.22 μm PES membrane Case with 12 units |
| 180C8---------E | 1000 ml, with receiver, 62 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, 39 cm² filter area, 0.22 μm PES membrane Case with 12 units |
| 180C6---------E | 1000 ml, 62 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

**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.



6980115
glas funnel
30 ml

6983008
small clamp

17149
screen support and
PTEE-ring

6980117
silicone
O-ring

6980116
glass base

17148
glass frit
and
PTEE-ring
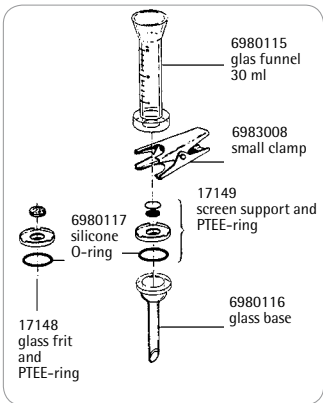
### Specifications

| | |
|---|---|
| Outlet spout | 12 mm $\varnothing$ |
| Parts and materials | Borosilicate glass funnel and base. PTFE\|glass filter support (type 16306) and PTFE\|stainless steel, coated with Teflon (type 16315) Silicone O-ring 25 × 3 mm Aluminium clamp |
| Chemical compatibility | As for glass, PTFE and silicone. The silicone O-ring can be replaced by a Viton O-ring, order no. 00118 |
| Flow rate for water at 90% vacuum | 50 ml/min with 0.2 µm 150 ml/min with 0.45 µm 500 ml/min with 0.8 µm membrane filter |
| Funnel capacity | 30 ml |
| Filtration area | 3 cm$^2$ |
| Suitable membrane filter diameter | 25 mm (or 24 mm) |
| Sterilization | By autoclaving (max. 134 °C) or by dry heat (max. 180 °C) |

### Order Numbers

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

Recommended accessories are described on page 131.
Replacement parts see diagram.

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

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

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

## Specifications for the 50 mm Glass Holder

| | |
|---|---|
| Outlet spouts | 15 mm outside diameter |
| Parts and materials | Borosilicate glass funnel and base. Anodised aluminium clamp. Silicone caoutchouc lid. PTFE\|glass filter support (type 16307) and PTFE\|stainless steel filter support, coated with Teflon (type 16316). Silicone O-ring 45 × 3 mm |
| Chemical compatibility | As for glass, PTFE and silicone (see page 196). 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 cm² |
| 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 131
.
Replacement parts see diagram.

6980121 lid

6980119 glass funnel, 250 ml

6983009 large clamp

6983007

6983006 glass frit

6983010 drain screen

17146 glass frit and PTFE ring with centre edge

6980123 silicone O-ring

17147 screen support and PTFE ring with centre edge

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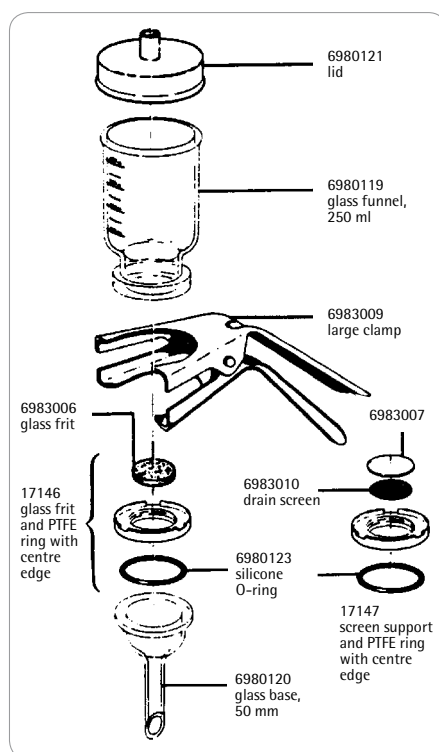
## All-glass Holder for Particle Removal from Solvents for Analytical Determinations



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 94 ), 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 ($45 \times 3$ 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 cm² |
| Max. operating pressure | Only for vacuum |
| Suitable membrane filter diameter | 50 mm (or 47 mm) |
| Sterilization (without connector) | By autoclaving (121 °C or 134 °C) or by dry heat (max. 180 °C). |

### Order Number for the All-glass Holder

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

Recommended accessories are described on page 131. For replacement parts, see diagram.



6980119 glass funnel

6983004 filter support with glass frit and O-ring

00124 Viton O-ring

6983003 connector with sealing

6983005 Viton sealing for connector

6983009 large clamp

6983002 glass base

6983001 vauumresistant glass flask
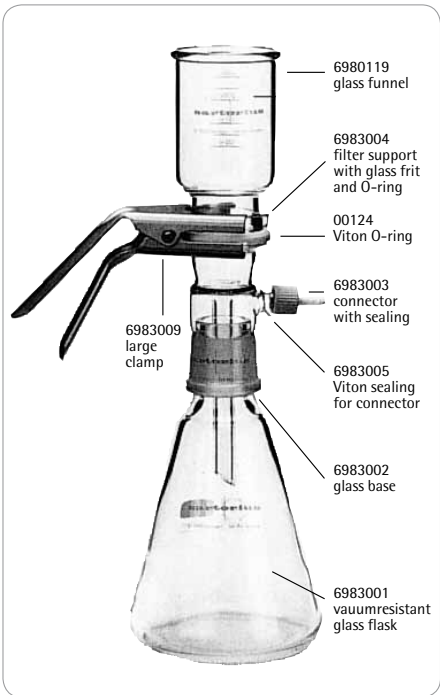
# Polycarbonate Holders for the Clarification or Sterile Filtration of up to about 200 ml Volumes of Aqueous Solutions

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 305
.





### Specifications for 47 mm Polycarbonat Holders

| | |
|---|---|
| Parts supplied | Type 16510, top part complete with lid, stopper for lid, plug and funnel, base part with hose nipple and filter holder, receiver flask with lid, all made of polycarbonate. Silicone O-rings for lid (80 × 3 mm), filter support (40 × 5 mm) and opening (14 × 2 mm). Polypropylene filter support. |
| Components | Type 16511, like 16510 but without receiver flask |
| Chemical compatibility | As for polycarbonate, polypropylene and silicone |
| Flow rate | For water at 90% vacuum, 200 ml/min with 0.2 µm, 700 ml/min with 0.45 µm, 2 l/min with 0.8 µm membrane filter. |
| Capacity | Top part and receiver flask, 250 ml |
| Filtration area | 12.5 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 131|170.

**Replacement Parts**

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

# Accessories for Vacuum Filter Holders

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

**Specifications**

| | |
|---|---|
| Max. vacuum | 90% (100 mbar, 76 torr) |
| Max. flow rate [l/min] | 20 |
| Wattage [W] | 80 |
| Weight [kg] | 4.5 |
| Dimensions [mm] | 203 × 145 × 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 × 250 × 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 G$^3$/$_4$ Female Thread**
Simple vacuum source. For connection
to a water tap with G$^3$/$_4$ 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 |
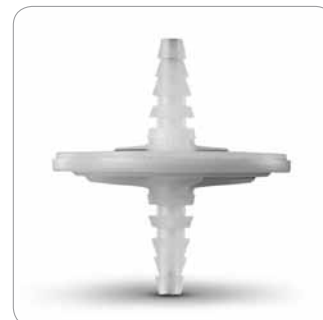
**Peristaltic Pump**

**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 °C to 40 °C |
| Storage temperature range | –40 °C to 70 °C |
| 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.
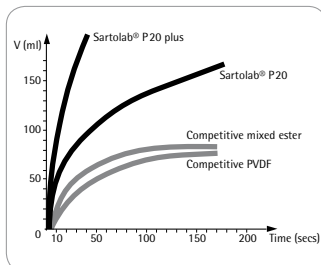


Top part: results with contaminated medium (DMEM + 10% FCS), at 1 bar differential pressure.

**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 $\Delta$p = 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 $\gamma$-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 170.
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)

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.


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

- ▉ Sartobran® 300
- ▉ Competitive product, 0.22 µm PVDF
- ▉ Competitive product, 0.2 µm polysulfone

### 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-B | ¼" Hose nipple inlet and outlet, pack of 5 |

Recommended accessories are described on page 170
.
Special data sheet available. Order no. SPK2027-e.

# Sartobran® P MidiCaps® for the Filtration of Protein Containing Solutions

Sartobran® P MidiCaps® are designed for maximum convenience and performance. They are complete filter units, ready-to-connect and to-use without prior cleaning. Although intended for Single-use, they can be autoclaved several times and are therefore 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
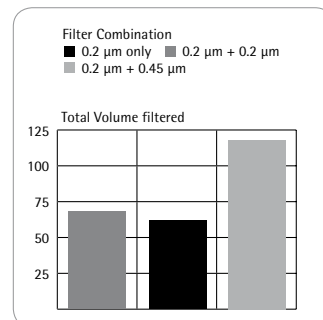
## Specifications for Sartobran® P Filter Units

| | |
|---|---|
| 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 196). |
| 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. |

**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

**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 Sartobran® P Mini Cartridges (pack of 5)**

| Pore Size | 0.05 m² Filter Area | 0.1 m² Filter Area | 0.2 m² Filter Area |
|---|---|---|---|
| 0.2 µm | 5231507H7------B | 5231507H8------B | 5231507H9------B |

## 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 cm$^2$ filtration area for Brevundimonas Diminuta, while the 0.2 µm rated filters typically provide a LVR of 6 per cm$^2$ 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
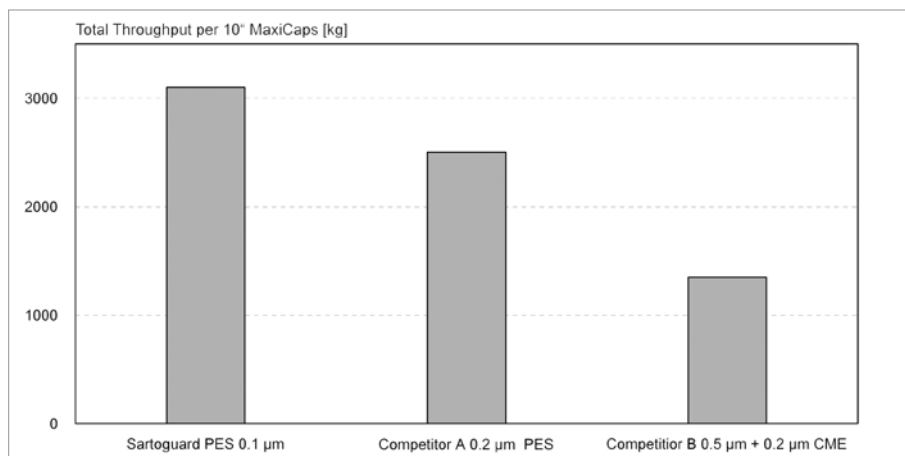


Soy Peptone Supplement Cell Culture Media
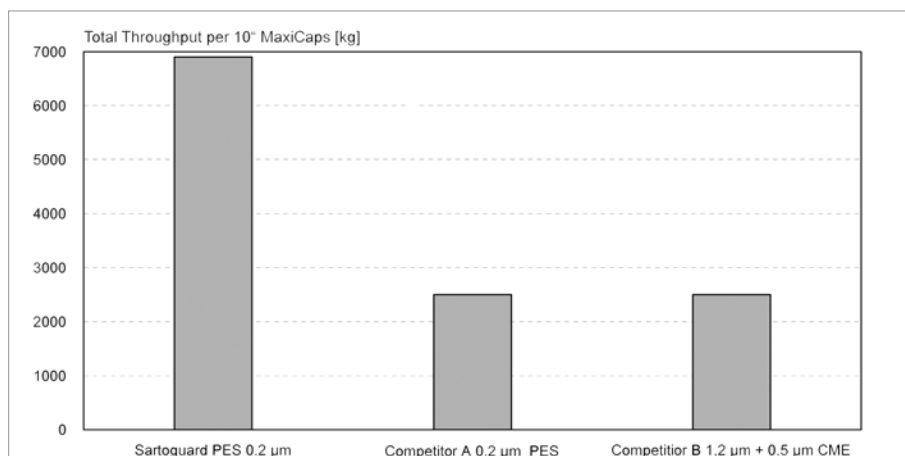


**Order Codes**

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

**= Connector Style
A= pack of 4
V= pack of 2
B= pack of 5

## 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]
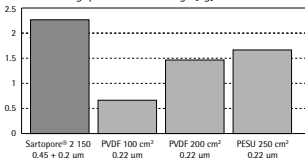


At 0.5 bar | 7.25 psi differential pressure

### 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 (pack of 5)

#### 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 (pack of 5)

#### 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 139. 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
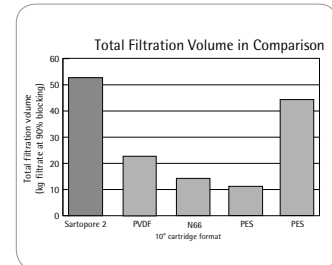
## Specifications for Sartopore® 2 Capsules

| | |
|---|---|
| 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 | $\Delta p$ = 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, pack of 4 |
| 5445306G8-**-A | 0.1 m² filter area, pack of 4 |
| 5445306G9-**-A | 0.2 m² filter area, pack of 4 |
| 5445306G0-**-V | 0.45 m² filter area, pack of 2 |

**Sartopore® 2 MidiCaps® with 0.2 µm Final Filter**

| | |
|---|---|
| 5445307H7-**-A | 0.05 m² filter area, pack of 4 |
| 5445307H8-**-A | 0.1 m² filter area, pack of 4 |
| 5445307H9-**-A | 0.2 m² filter area, pack of 4 |
| 5445307H0-**-V | 0.45 m² filter area, pack of 2 |

**Sartopore® 2 MidiCaps® with 0.1 µm Final Filter**

| | |
|---|---|
| 5445358K7-**-A | 0.05 m² filter area, pack of 4 |
| 5445358K8-**-A | 0.1 m² filter area, pack of 4 |
| 5445358K9-**-A | 0.2 m² filter area, pack of 4 |
| 5445358K0-**-V | 0.45 m² filter area, pack of 2 |

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

**Order Numbers for Sartopore® 2 Mini Cartridges (pack of 5)**

| Pore Size | 0.05 m²<br>Filter Area | 0.1 m²<br>Filter Area | 0.2 m²<br>Filter Area |
|---|---|---|---|
| 0.1 µm | 5441558K7------B | 5441558K8------B | 5441558K9------B |
| 0.2 µm | 5441507H7------B | 5441507H8------B | 5441507H9------B |
| 0.45 µm | 5441506G7------B | 5441506G8------B | 5441506G9------B |

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

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# 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 │ 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**
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
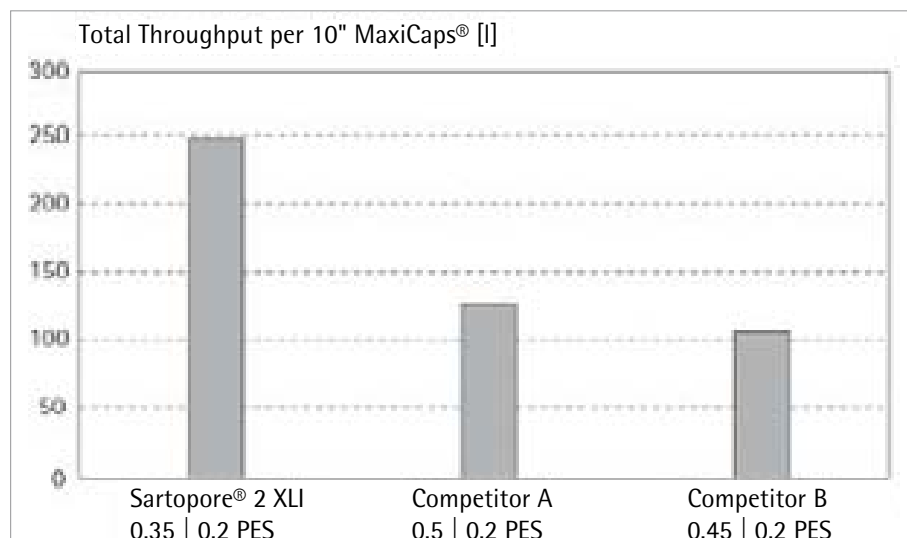


Ophthalmic Solution
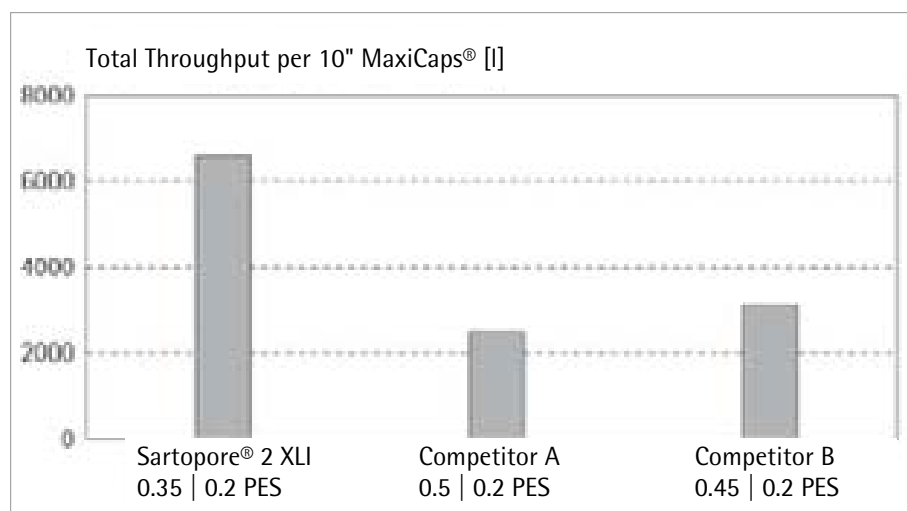


**Order Codes**

| | 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 |

**= Connector Style
A= pack of 4
V= pack of 2
B= pack of 5

## Sartopore® 2 XLG  0.2 µm
## Sterilizing Grade MidiCaps®



### Description
Sartopore® 2 XLG MidiCaps® are self contained filter units that are especially designed for sterilizing grade filtration in special applications 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 applications. 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 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 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 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 XLG MidiCaps® 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

#### 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 │ 72.5 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-e
                          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 |
|---|---|---|---|
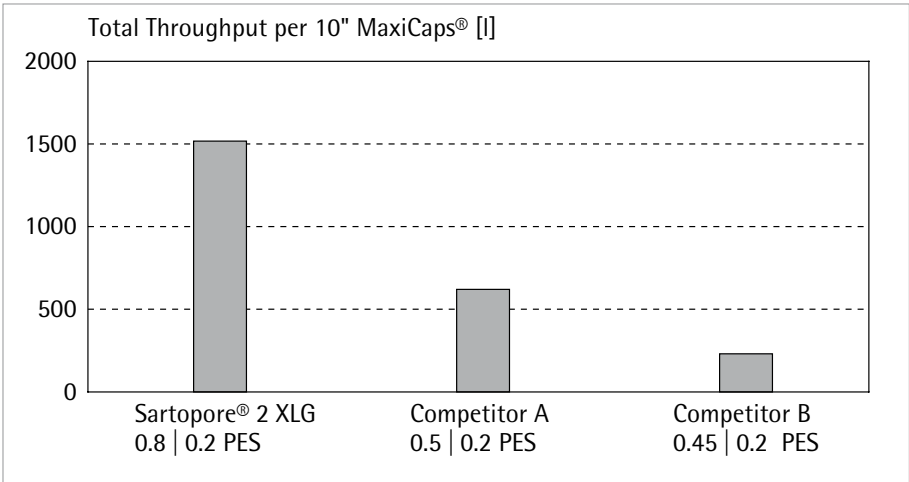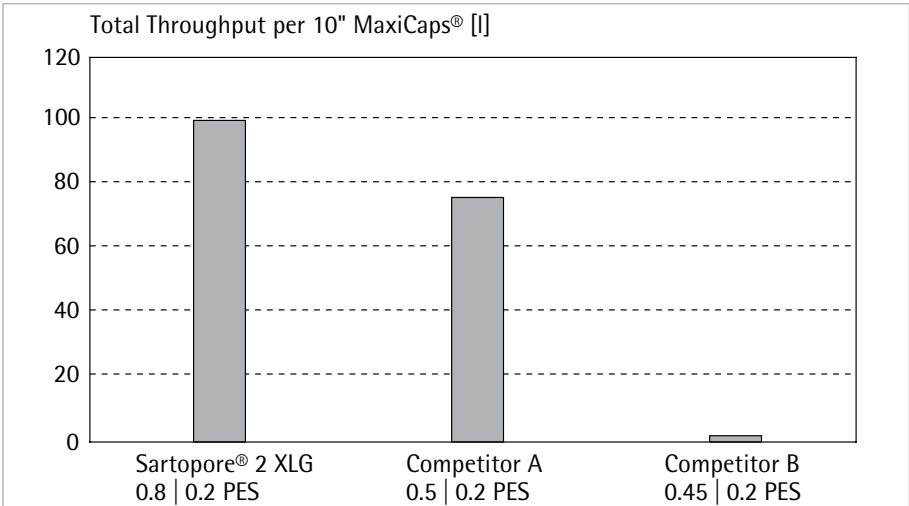
Antibody Concentration: 47.5 mg/ml

**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 |

**= Connector Style
A= pack of 4
V= pack of 2
B= pack of 5

# 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 Sartoclean® 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 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

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**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 |

# 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 micro-organisms 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
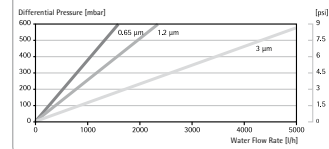


**Water Flow Rates**
for 0.2 m² Sartoclean® CA and Sartoclean® GF 0.8|0.65 μm

## 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 187 and page 189) |
| Flow rate* | Typical values for 0.2 m² mini cartridges for water at 0.5 bar\|50 kPa\|7.25 psi pressure: <br> Sartopure® PP2        39 l/min. (1.2 μm), 24 l/min. (0.65 μm) <br> Sartoclean® CA       41 l/min. (0.8 μm), 32 l/min. (0.65 μm) <br> 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 <br> Sartoclean® CA, Cellulose acetate membranes <br> 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 |
| 5591503P7------B | 1.2 µm, 0.05 m², pack of 5 |
| 5591503P8------B | 1.2 µm, 0.1 m², pack of 5 |
| 5591503P9------B | 1.2 µm, 0.2 m², pack of 5 |
| 5591502P7------B | 3.0 µm, 0.05 m², pack of 5 |
| 5591502P8------B | 3.0 µm, 0.1 m², pack of 5 |
| 5591502P9------B | 3.0 µm, 0.2 m², pack of 5 |
| 5591542P7------B | 5.0 µm, 0.05 m², pack of 5 |
| 5591542P8------B | 5.0 µm, 0.1 m², pack of 5 |
| 5591542P9------B | 5.0 µm, 0.2 m², pack of 5 |
| 5591501P7------B | 8.0 µm, 0.05 m², pack of 5 |
| 5591501P8------B | 8.0 µm, 0.1 m², pack of 5 |
| 5591501P9------B | 8.0 µm, 0.2 m², pack of 5 |
| 5591520P7------B | 20.0 µm, 0.05 m², pack of 5 |
| 5591520P8------B | 20.0 µm, 0.1 m², pack of 5 |
| 5591520P9------B | 20.0 µm, 0.2 m², pack of 5 |
| 5591550P7------B | 50.0 µm, 0.05 m², pack of 5 |
| 5591550P8------B | 50.0 µm, 0.1 m², pack of 5 |
| 5591550P9------B | 50.0 µm, 0.2 m², pack of 5 |

**Sartoclean® CA Membrane Filter Mini Cartridges**

| | |
|---|---|
| 5621507A7------B | 0.2 µm, 0.05 m², pack of 5 |
| 5621507A8------B | 0.2 µm, 0.1 m², pack of 5 |
| 5621507A9------B | 0.2 µm, 0.2 m², pack of 5 |
| 5621506A7------B | 0.45 µm, 0.05 m², pack of 5 |
| 5621506A8------B | 0.45 µm, 0.1 m², pack of 5 |
| 5621506A9------B | 0.45 µm, 0.2 m², pack of 5 |
| 5621505G7------B | 0.8\|0.65 µm, 0.05 m², pack of 5 |
| 5621505G8------B | 0.8\|0.65 µm, 0.1 m², pack of 5 |
| 5621505G9------B | 0.8\|0.65 µm, 0.2 m², pack of 5 |
| 5621504E7------B | 3.0\|0.8 µm, 0.05 m², pack of 5 |
| 5621504E8------B | 3.0\|0.8 µm, 0.1 m², pack of 5 |
| 5621504E9------B | 3.0\|0.8 µm, 0.2 m², pack of 5 |

**Sartoclean® GF Membrane Filter Mini Cartridges**

| | |
|---|---|
| 5601505G7------B | 0.8\|0.65 µm, 0.05 m², pack of 5 |
| 5601505G8------B | 0.8\|0.65 µm, 0.1 m², pack of 5 |
| 5601505G9------B | 0.8\|0.65 µm, 0.2 m², pack of 5 |
| 5601504E7------B | 3.0\|0.8 µm, 0.05 m², pack of 5 |
| 5601504E8------B | 3.0\|0.8 µm, 0.1 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

# 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 conta-mination 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 $\Delta p$ = 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 × 1 female thread |
| Materials | Polycarbonate top part, base part and hose nipple. Polypropylene filter support. Silicone O-ring (40 × 5 mm). |
| Max. operating pressure | 7 bar│700 kPa│101.5 psi |
| Suitable membrane filter diameter | 50 mm (prefilter, 40 mm) |
| Sterilization | By autoclaving at 121 °C The material withstands repeated cycles, provided aggressive cleaning agents are completely washed off and that the boiler water does not contain anti-corrosive or anti-scaling additives. |

### Order Number for the 50 mm Polycarbonate Filter Holder

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

Recommended accessories are described on page 170.
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 barrel, guaranteed leak-proof sealing of the hose nipple and the holder without sealing rings. Other connectors, available as accessories, fit the holder onto reducing valves or pumps with 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 $\Delta p$ = 1 bar│14.5 psi: 0.5 l/min with 0.2 μm, 1.0 l/min with 0.45 μm pore size |
| Weight | ca. 170 g |
| Materials | Stainless steel, except silicone O-ring (21 × 2 mm) and aluminium closing ring |
| Max. opperating pressure | 5 bar│500 kPa│72.5 psi |
| Suitable membrane filter | 25 mm, type 118 |
| Sterilization | By autoclaving (max. 134 °C) or by dry heat (max. 180 °C). |

## Order Number

| | |
|---|---|
| 16251 | Stainless steel holder for 25 mm ∅ membrane filter. |

Replacement parts are shown in the diagram.

# 47 mm Stainless Steel Filter Holder for In-line Filtration

**The 47 mm Filter Holder**
Tolerates pressure of up to 20 bar. The inlet-side valve is convenient for the intermittent run-off of waste water. Other connectors, available as accessories, fit the holder onto reducing valves or pumps with 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 × 1 |
| Filtration area | 13 cm$^2$ |
| Flow rate | For air at $\Delta p = 0.3$ 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 × 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). |



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

## Order Number

| | |
|---|---|
| 16254 | Stainless steel holder for 47 mm ⌀ membrane filter |

Replacement parts are shown in the diagram.

## Chemical–resistant PTFE Holders for the Filtration of Aggressive Liquids



### 47 mm Holder with 200 ml Capacity

The holder hinders the release trace elements into the filtrate and is resistant to almost all chemicals. The Viton O-ring in the top part allows easy hand tightening, but can be replaced by a PTFE O-ring, Order no. 17039). The 6 mm outlet nipple is an integral part of the base, the 10 mm inlet hose nipple can be replaced by a 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 $\Delta p$ = 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 × 1.5 male thread |
| Materials | Top part, barrel, base part, corrugated iron, hose nipples and filter support with 40 × 3.5 mm PTFE O-ring. Aluminium locking rings. 39 × 3.5 mm Viton O-ring (top part) |
| Max. operating pressure | 5 bar\|500 kPa\|72.5 psi |
| Suitable membrane filter diameter | 47 mm |
| Sterilization | By autoclaving (max 134 °C) or by dry heat (180 °C) |

### Order Number for the 47 mm, 200 ml PTFE Filter Holder

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

### Replacement Parts

| | |
|---|---|
| 6985000 | PTFE O-ring |
| 6985002 | Connector |
| 6985001 | Filter support |
| 6985011 | Viton O-ring |

**142 mm In-line PTFE Holder**
This filter holder is made completely of PTFE.
It is clamped between the two metal plates
of the holding frame. An alternative inlet
connector for the 13 mm hose nipple is the
$G^3/_8$ 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 $\Delta p$ = 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 × 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 $\Delta p$ = 1 bar\|100 kPa\|14.5 psi, 200 ml/min with 0.2 µm, 600 ml/min with 0.45 µm, 1.3 l/min with 0.8 µm pore size. |
| Filtration area | 13 cm$^2$ |
| Weight | 960 g |
| Threads for the connectors | M 12 × 1 female threads |
| Materials | Top part, barrel, base part, corrugated iron, closing ring, closure cap, back pressure screen and stainless steel hose nipples 1.4401 (AISI 316). PTFE-coated stainless steel filter support. Silicone O-rings, 41 × 2 mm (top part) and 42 × 3 mm (filter support). PTFE-sealing (cap). |
| Max. operating pressure | 10 bar\|1,000 kPa\|145 psi |
| Suitable membrane filter diameter | 47 mm (prefilter, 42 mm) |
| Sterilization | By autoclaving (max 134 °C) or by dry heat (180 °C). |



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
6980180 screen support
6980737 underdrain screen
6982006 base part
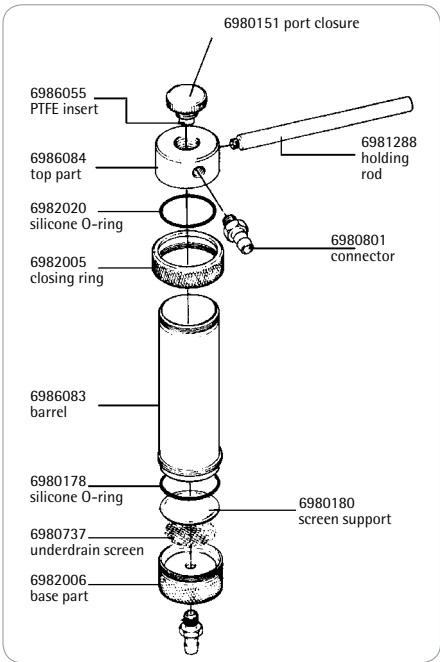
### Order Number for the 47 mm, 200 ml Stainless Steel Pressure Holder

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

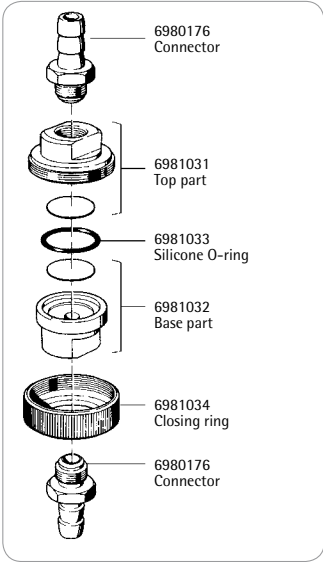Recommended accessories are described on page 170. Replacement parts are shown in the diagram.

# 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 $\Delta p$ = 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 × 1 female threads |
| Materials | Top part, base, corrugated iron, locking clamps, legs, locking cap and valve body made of stainless steel 1.4401 (AISI 316). PTFE-coated stainless steel filter support and back pressure screen. Silicone O-rings (130 × 4 mm) in the top part and the filter support. Viton valve O-rings (3 × 1.5 mm). PTFE sealing (valve and cap). |
| Max. operating pressure | 7 bar│700 kPa│101.5 psi |
| Suitable membrane filter diameter | 142 mm (prefilter, 130 mm) |
| Sterilization | By autoclaving (max 134 °C) or by dry heat (180 °C). |

## Order Number for the 142 mm, 2000 ml Stainless Steel Pressure Holder

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

Recommended accessories are described on page 170
. Replacement parts see diagram.



6986055 PTFE disc
6980801 connector
6980711 locking clamp
6982036 screw
6982001 silicone O-ring
6980656 PTFE flat gasket
6980717 Viton O-ring
6980722 valve
6982043 stainless steel leg
6980151 port closure
6982002 barrel
6982036 screw
6982001 silicone O-ring
6980707 back pressure screen
6980708 filter support
6980702 corrugated iron
6980801 connector
6982043 stainless steel leg
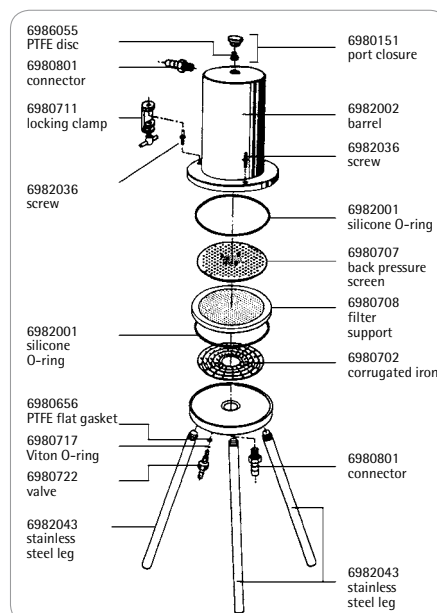
# 142 mm Stainless Steel Holder for the Filtration of up to about 50 Liter Volumes



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 $\Delta p$ = 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 × 1 female threads |
| Materials | Top part, base, corrugated iron, locking clamps, stainless steel legs and valve bodies 1.4401 (AISI 316). PTFE-coated stainless steel filter support and back pressure screen. Silicone O-rings (130 × 4 mm) in the top part and filter support. Viton valve O-rings (3 × 1.5 mm). PTFE flat gasket on valves. |
| Max. operating pressure | 7 bar\|700 kPa\|101.5 psi |
| Suitable membrane filter diameter | 142 mm (prefilter, 130 mm) |
| Sterilization | By autoclaving (max 134 °C) or by dry heat (180 °C). |



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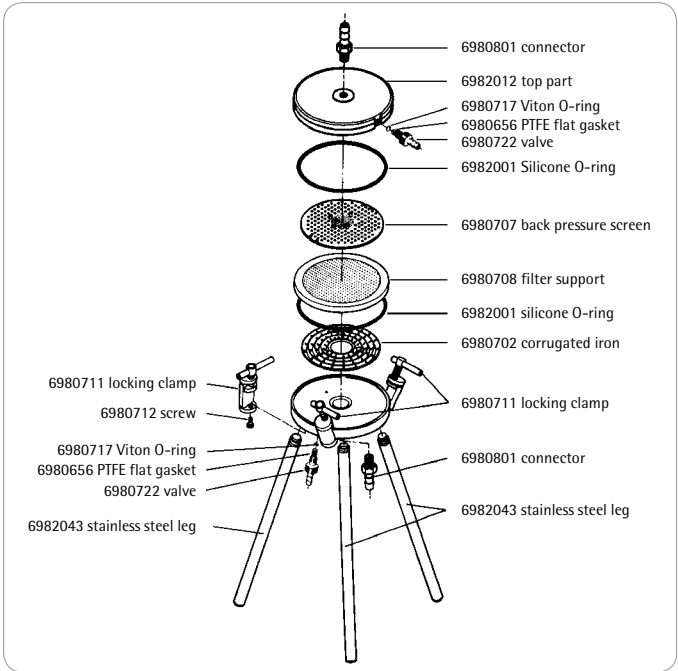
# GMP–complying 142 mm Stainless Steel Holder with Sanitary Flanges

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 $\Delta p$ = 1 bar│100 kPa│14.5 psi, 2 l/min with 0.2 µm, 4.5 l/min with 0.45 µm, 11 l/min with 0.8 µm pore size. |
| Filtration area | 130 cm$^2$ |
| Weight | 6 kg |
| Materials | Top part, base, corrugated iron, locking clamps, stainless steel legs and valve body 1.4401 (AISI 316). PTFE-coated stainless steel filter support and back pressure screen. Silicone O-rings (130 × 4 mm) in the top part and filter support. Viton valve O-rings (3 × 1.5 mm). PTFE flat gasket on valves. |
| Max. operating pressure | At 7 bar│700 kPa |
| Suitable membrane filter diameter | 142 mm (prefilter, 130 mm) |
| Sterilization | By autoclaving (max 134 °C) or by dry heat (180 °C). |

## Order Number for the 142 mm Sanitary Flange Holder

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

Recommended accessories are described on page 170. 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

167
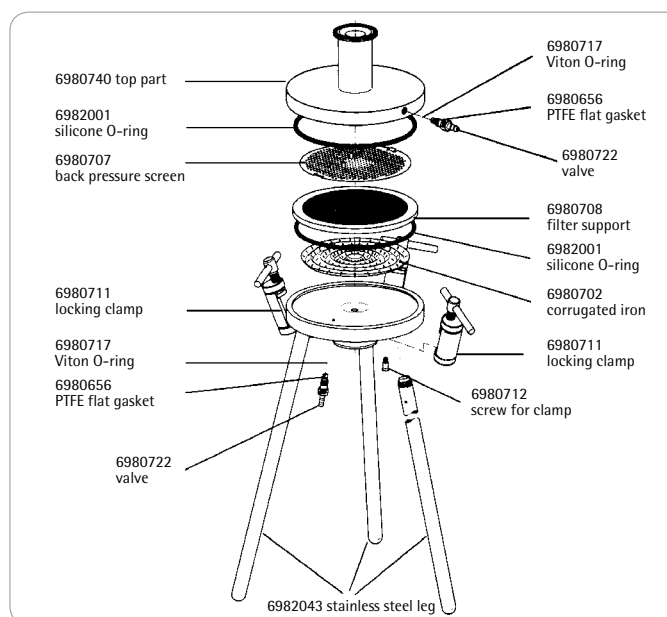
# GMP–complying 293 mm Stainless Steel Holder with Sanitary Flanges

The construction of this holder is the same as that of the 142 mm holder described on page 167, 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
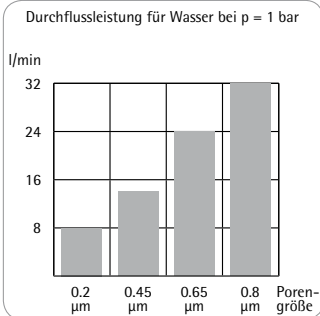
## Specifications for the 293 mm Sanitary Flange Holder

| | |
|---|---|
| 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 $\Delta p$ = 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 cm² |
| Weight | 20 kg |
| Materials | Top part, base, corrugated iron, locking clamps, stainless steel legs and valve body 1.4401 (AISI 316). PTFE-coated stainless steel filter support and back pressure screen. Silicone O-rings (280 × 4 mm) in the top part and filter support. Viton valve O-rings (3 × 1.5 mm). PTFE valve flat gasket |
| Max. operating pressure | 5 bar│500 kPa |
| Suitable membrane filter diameter | 293 mm (prefilter, 279 mm) |
| Sterilization | By autoclaving (max 134 °C) or by dry heat (180 °C) |
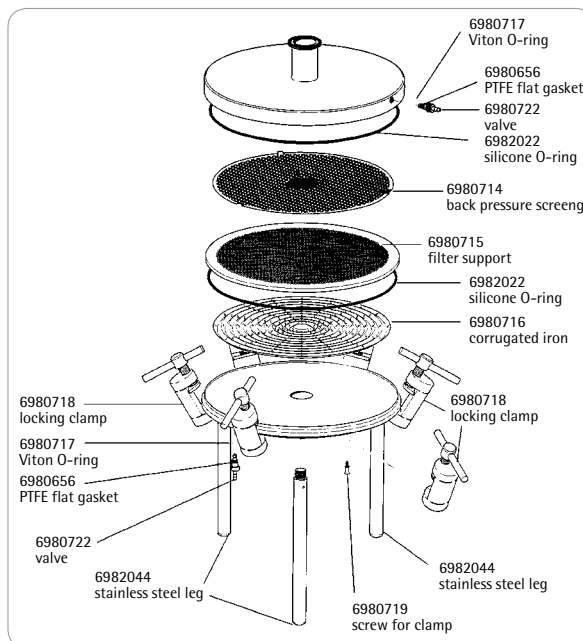
## Order Number for the 293 mm Sanitary Flange Filter Holder

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

Recommended accessories are described on page 170. 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 157.





**Quality Standards for the Modular System**

| Material | AISI 316 L |
|---|---|
| Surfaces | Interior: Ra < 0,5 μm<br>Exterior: Ra <1.6 μm |
| Temperature range | −10...+150 °C |
| Pressure range | −1...+10 bar<br>(1,000 kPa, −14.5 psi.. + 145.0 psi) |
| Adapter | Mini: 15<br>Standard: 25 |

**Specifications**

| Connectors | Triclamp 50.5 mm (Sanitary flange) |
|---|---|
| Width | ca. 172.5 mm |
| Surface roughness | Product touching areas < 0.5 μm |
| Materials | Stainless steel AISI 316L, silicone O-ring |
| Max. operating pressure | 10 bar│1,000 kPa│145.0 psi |
| Max. temperature | 150 °C |

**Order Number**

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

Special brochure available on request. Order no. SPG1501-e
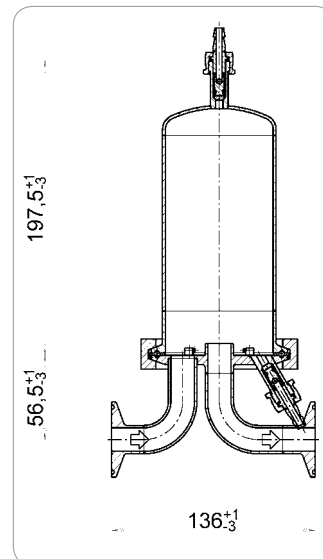
## Accessories for Pressure Filtration Units

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

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

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

### Recommended Accessories

**1. For 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 for Pressure**

| | |
|---|---|
| Weight [kg] | ca. 15 |
| Threads for connectors | G¼ female thread |
| Dimensions [cm] | 35 × 25 × 26 |
| Max. performance [l/min] | 55 |
| Max. ambient temp. | 40 ℃ |
| Power [W] | 250 |
| Protection | IP 44 |
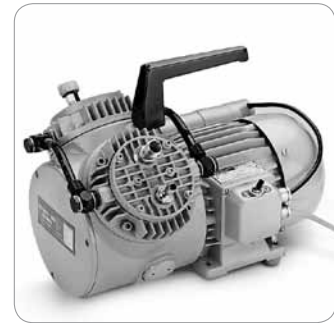
**Order Numbers for Membrane Pump for Pressure**

| | |
|---|---|
| 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)
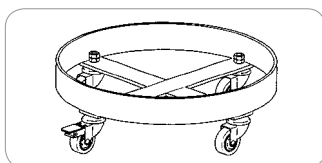
**Pressure Tank**

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 pharma-ceutical 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 | 17530 | 235 × 234 mm│3.9 kg│8.6 lbs |
|---|---|---|
| height × diameter│weight | 17531 | 360 × 234 mm│5.4 kg│11.9 lbs |
| | 17532 | 600 × 234 mm│8.2 kg│18.2 lbs |
| | 17533 | 705 × 300 mm│11.8 kg│26 lbs |
| | 17534 | 643 × 400 mm│15.2 kg│33.5 lbs |
| | 17535 | 802 × 400 mm│18.4 kg│40.5 lbs |
| | 17536 | 962 × 400 mm│21.7 kg│47.8 lbs |
| | | (opening, for all types, oval, length 98 mm, width 82 mm) |
| Maximal operating pressure | 7 bar│101.5 psi | for 17530, 17531, 17532. |
| | 5 bar│72.5 psi | for 17533. |
| | 3 bar│43.5 psi | for 17534. |
| | 2 bar│29 psi | for 17535, 17536 |
| Max. operating temperature | 95 °C | |

### Accessories

| 6985093 | Spanner, 17–19 mm (to fasten connectors) |
|---|---|
| 17636 | Trolley for 17533 |
| 17635 | Trolley for 17534, 17535 and 17536 |

### The Silicone O-Rings Supplied on Standard can be Replaced by the Following Viton or EPDM O-Rings

| 6986110 | Silicone O-ring (lid) |
|---|---|
| 6986132 | Silicone O-ring (tubes) |
| 6986111 | EPDM O-ring (lid) |
| 6986133 | EPDM O-ring (tubes) |
| 6980389 | Viton O-ring (lid) |
| 6980396 | Viton 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 ×) |
| For 17530, 17531, 17532 | 6980390 | Pressure gauge, 7 bar |
| | 6986112 | Outlet tube (17530) |
| | 6986113 | Outlet tube (17531) |
| | 6986114 | Outlet tube (17532) |
| | 6986130 | Lid with valve |
| For 17533 | 6980415 | Pressure gauge, 5 bar |
| | 6986115 | Outlet tube (17533) |
| | 6986129 | Lid with valve |
| For 17534 | 6986116 | Outlet tube (17534) |
| | 6986137 | Pressure gauge, 3 bar |
| | 6986138 | Lid with valve |
| For 17535, 17536 | 6986117 | Outlet tube (17535) |
| | 6986118 | Outlet tube (17536) |
| | 6986119 | Pressure gauge, 2 bar |
| | 6986131 | Lid with valve |

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

### With G³/₈ Connectors

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

Main advantage: easy cleaning.

Pressure hoses: have suitable density barrel connections.

Pressure pump: has a suitable density barrel connection.
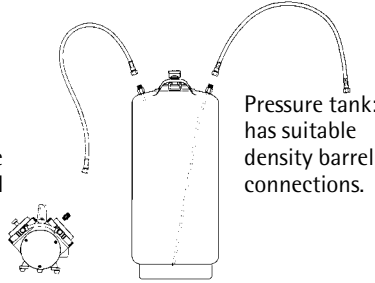
Pressure tank: has suitable density barrel connections.

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

### With Quick Connectors

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

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

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

Pressure pump: has a suitable density barrel connection.
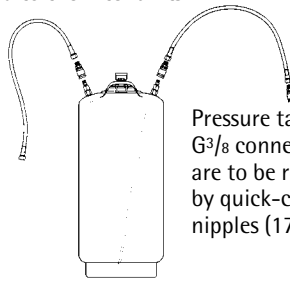
Pressure tank: G³/₈ connectors are to be replaced by quick-connect nipples (17170).

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

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

Pressure hoses: require tube clamps.

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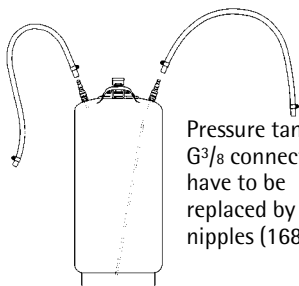
Pressure tank:
G3/8 connectors
have to be
replaced by hose
nipples (16863).

Sartolab® P20 units, Sartobran®
300 capsule, Sartobran® P
capsule Type 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 |
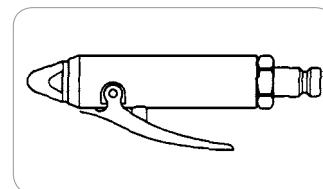
**Accessories for 6985128**

| | |
|---|---|
| 6980407 | Trigger valve for cleaning |

**Replacement Part for 6985128**

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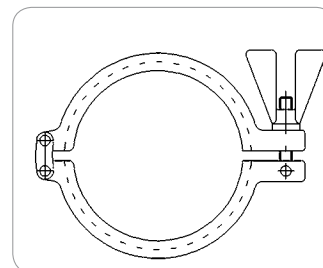
**Order Number for Flexible Pressure Hose**

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 × 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).
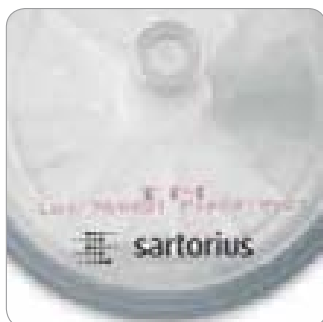
### Specifications for Midisart® 2000 Units

| | |
|---|---|
| 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 $\Delta p$ = 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 |
| 17805 UQN | 0.2 μm | PTFE | Hose Barb\|Hose Barb | 100* | 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 |

*= plastic bucket – the bucket with its smooth surface can be easily transferred into clean-room areas without risking particle release from the packaging material.

**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


Standard Hose Barb


Small Hose Barb


$1/8$" 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]
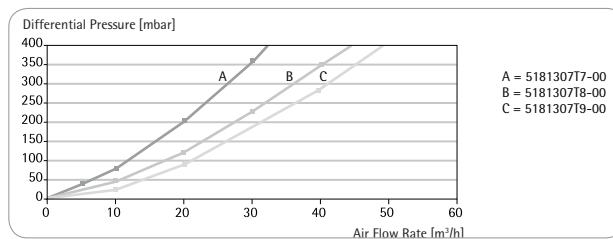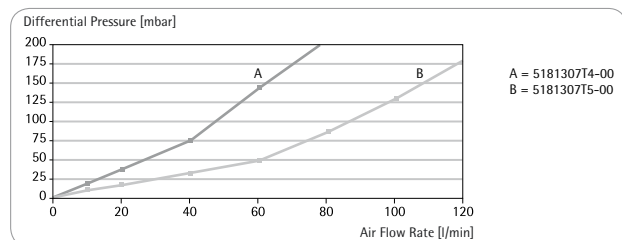
**Specifications for Sartofluor® MidiCaps®**

| | |
|---|---|
| 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:<br>1.5 bar│150 kPa│21.75 psi for 0.1 µm pore size<br>1.0 bar│100 kPa│14.5 psi for 0.2 µm pore size<br>0.6 bar│60 kPa│8.7 psi for 0.45 µm pore size |
| Chemical compatibility | See page 196 |
| Air flow rate | For 0.2 µm capsules see diagram on page 181 |
| 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-**-A | 0.1 ym, 0.05 m², pack of 4 |
| 5185358T8-**-A | 0.1 µm, 0.1 m², pack of 4 |
| 5185358T9-**-A | 0.1 µm, 0.2 m², pack of 4 |
| 5185307T7-**-A | 0.2 µm, 0.05 m², pack of 4 |
| 5185307T8-**-A | 0.2 µm, 0.1 m², pack of 4 |
| 5185307T9-**-A | 0.2 µm, 0.2 m², pack of 4 |
| 5185307T0-**-V | 0.2 µm, 0.45 m², pack of 2 |
| 5185306T7-**-A | 0.45 µm, 0.05 m², pack of 4 |
| 5185306T8-**-A | 0.45 µm, 0.1 m², pack of 4 |
| 5185306T9-**-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.
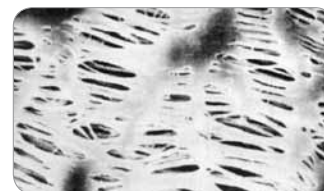
**Specifications for PTFE Membrane Filters**

| | |
|---|---|
| Adsorption | 8 µg/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 $\Delta p$ = 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 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 G$\frac{1}{4}$ connection threads with density
barrel guarantee leak-proof sealing of
the hose nipple and the holder without
sealing rings. Other connectors, available
as accessories, fit the holder onto reducing
valves or pumps with G$\frac{1}{4}$ female thread
(Order no. 01030) or G$\frac{3}{8}$ female thread
(01029), or onto pressure tanks with G$\frac{3}{8}$
male thread (00177).

**Specifications**

| | |
|---|---|
| Connectors | Hose nipples DN10 |
| Filtration area | 3 cm$^2$ |
| Flow rate | For air at $\Delta$p = 1 bar\|14.5 psi: 0.5 l/min with 0.2 µm, 1.0 l/min with 0.45 µm pore size |
| Weight | ca. 170 g |
| Materials | Stainless steel, except silicone O-ring (21 × 2 mm) and aluminium closing ring |
| Max. opperating pressure | 5 bar\|500 kPa\|72.5 psi |
| Suitable membrane filter | 25 mm, type 118 |
| Sterilization | By autoclaving (max. 134 °C) or by dry heat (max. 180 °C). |

**Order Number**

| | |
|---|---|
| 16251 | Stainless steel holder for 25 mm ∅ membrane filter. |

Replacement parts are shown in the diagram.

6980176
connector

6981031
top part

6981033
silicone O-ring

6981032
base part

6981034
closing ring

6980176
connector

# 47 mm Stainless Steel Filter Holder for In-line Filtration

**The 47 mm Filter Holder**
Tolerates pressure of up to 20 bar. The inlet side valve is convenient for the intermittent run-off of waste water. Other connectors, available as accessories, fit the holder onto reducing valves or pumps with G3/8 female thread (Order no. 17089), or onto pressure tanks with G3/8 male thread (17069) or on taps with G3/4 male thread (17068).

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 × 1 |
| Filtration area | 13 cm² |
| Flow rate | For air at $\Delta p$ = 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 × 3 mm), PTFE and Viton valve seals |
| Max. operating pressure | 20 bar│2,000 kPa│290 psi |
| Suitable membrane filter | 47 mm, type 118 |
| Sterilization | By autoclaving (max. 134 °C) or by dry heat (max. 180 °C). |

## Order Number

| | |
|---|---|
| 16254 | Stainless steel holder for 47 mm ∅ membrane filter. |

Replacement parts are shown in the diagram.

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

Sartofluor® mini cartridges are designed particularly for cases of sterile venting when the cGMP directives must be adhered to.

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

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

**Differential Pressure [mbar]**

A = 5181407T7
B = 5181507T7
C = 5181507T8
D = 5181507T9
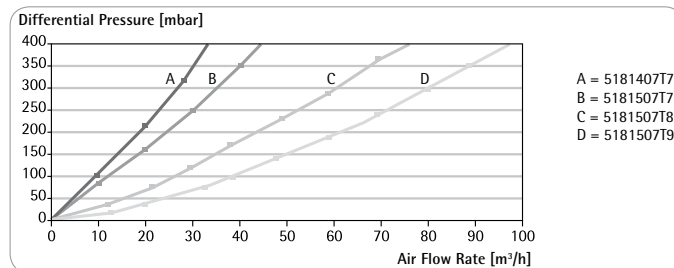
Air flow rates at atmosperic pressure Sartofluor® mini 0.2 µm,
Type 5181507T7, T8, T9, 5181407T7

Water Penetration Pressure (bar)

Sartofluor®    PVDF    PTFE    PTFE    PVDF
Alternative Products
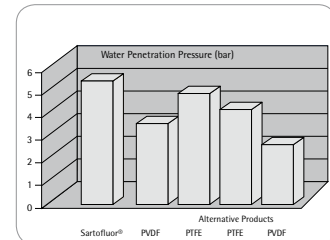
## Specifications for Sartofluor® Mini Cartridges

| | |
|---|---|
| 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. Δp = 0.5 bar\|7.25 psi |
| Water penetration pressure | Approx. 4.5 bar\|450 kPa\|65.2 psi for 0.2 µm pore size. |

Order numbers see next page.

**Order Numbers for Sartofluor® Mini Cartridges**

With 0.1 µm filter

| | |
|---|---|
| 5181558T7------B | 0.05 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

| | |
|---|---|
| 5181506T7------B | 0.05 m² filter area, pack of 5 |
| 5181506T8------B | 0.1 m² filter area, pack of 5 |
| 5181506T9------B | 0.2 m² filter area, pack of 5 |

Sartofluor® capsules see page 181.
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 169). The housing follows PED 97/23/EC.

Suitable filter cartridges on page 157.



**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 ℃ |

### 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 ℃ |



**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
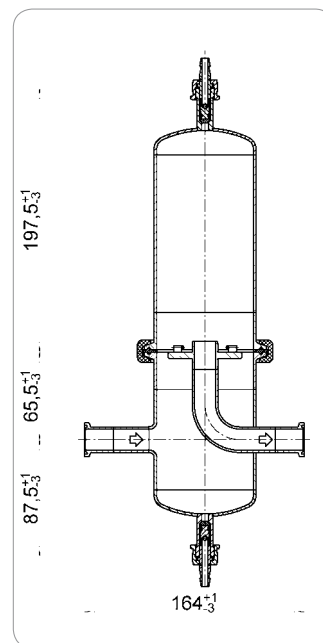
## Sartocon® Slice
## The Pilot–scale Crossflow System for Batches of 1 to 100 Liters
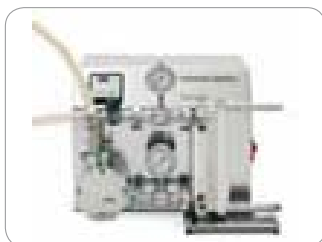
Sartocon® Slice cassettes are made of the same materials and construction and, therefore, the identical flow path length as the Sartocon® cassettes, used for larger-scale production. The scale-up and the scale-down is perfectly linear throughout the range of applications, from cell harvesting to protein 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 Information
Available Slice 200 types and order numbers

| Cut–Off|Pore Size | Hydrosart® 200 cm² Filter Area | Polyethersulfone 200 cm² Filter Area |
|---|---|---|
| 1 kD | | 3081460902E--SW* |
| 2 kD | 3081441902E--SW* | |
| 5 kD | 3081442902E--SW* | 3081462902E--SW* |
| 8 kD | | 3081463402E--SW* |
| 10 kD | 3081443902E--SW* | 3081463902E--SW* |
| 30 kD | 3081445902E--SW* | 3081465902E--SW* |
| 50 kD | | 3081465002E--SW* |
| 100 kD | 3081446802E--SW* | 3081466802E--SW* |
| 300 kD | | 3081467902E--SW* |
| 0.1 µm | | 3081545802W--SW* |
| 0.2 µm | 3081860702W--SW* | |
| 0.45 µm | 3081860602W--SW* | |

\* For grey silicone cassettes material number ends with "...--SG"

# 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)
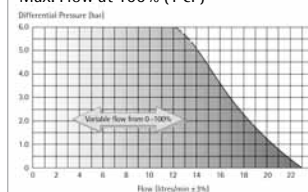
## Specifications

### 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 × W × H [mm] | 415 × 300 × 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.

## Ordering Information
Available Slice 200 types and order numbers

## 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. |



| Cut Off\|Pore Size | Hydrosart® 200 cm² Filter Area | Polyethersulfone 200 cm² Filter Area |
| --- | --- | --- |
| 1 kD | | 3081460902E--SW* |
| 2 kD | 3081441902E--SW* | |
| 5 kD | 3081442902E--SW* | 3081462902E--SW* |
| 8 kD | | 3081463402E--SW* |
| 10 kD | 3081443902E--SW* | 3081463902E--SW* |
| 30 kD | 3081445902E--SW* | 3081465902E--SW* |
| 50 kD | | 3081465002E--SW* |
| 100 kD | 3081446802E--SW* | 3081466802E--SW* |
| 300 kD | | 3081467902E--SW* |
| 0.1 µm | | 3081545802W--SW* |
| 0.2 µm | 3081860702W--SW* | |
| 0.45 µm | 3081860602W--SW* | |

* For grey silicone cassettes material number ends with "...--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 × W × H [mm] | 160 × 120 × 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 cm²) 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) |

# Chemical Compatibility
## 1. Filter Materials and Mini Cartridges

| Solvents | Cellulose Acetate 111 | Cellulose Nitrate 113 | Reg. Cellulose 184 | PTFE 118 | Poly-amide 250 | Glass Fiber 134 | Polycar-bonate 230 | Polyether-sulfone 154 | Sartobran® P Cartridge | Sartofluor® Cartridge |
|---|---|---|---|---|---|---|---|---|---|---|
| Acetone | – | – | • | • | – | • | ○ | – | – | E |
| Acetonitrile | ? | ? | • | • | – | ? | ? | • | ? | ? |
| Gasoline | • | • | • | • | • | • | • | • | V | – |
| Benzene | • | • | • | • | • | • | ? | • | – | – |
| Benzyl alcohol | ○ | ○ | • | • | • | • | ? | – | ○ | • |
| n–Butyl acetate | ○ | – | • | • | • | • | • | • | E | ? |
| n–Butanol | • | • | • | • | • | • | • | • | • | • |
| Cellosolve | • | – | • | • | ? | • | – | • | – | – |
| Chloroform | – | • | • | • | • | • | – | – | – | – |
| Cyclohexane | ○ | ○ | • | • | ? | • | • | – | ○ | V |
| Cyclohexanone | – | – | • | • | • | • | ? | ? | – | – |
| Diethylacetamide | – | – | • | • | • | • | ? | ? | – | ? |
| Diethyl ether | • | – | • | • | • | • | • | ? | – | – |
| Dimethyl formamide | – | – | ○ | • | ○ | • | – | ? | – | • |
| Dimethylsulfoxide | – | – | • | • | • | • | – | – | – | • |
| Dioxane | – | – | • | • | • | • | – | • | – | • |
| Ethanol, 98% | • | ○ | • | • | • | • | • | • | • | • |
| Ethyl acetate | – | – | • | • | • | • | ? | – | – | – |
| Ethylene glycol | • | ○ | • | • | ? | • | • | • | • | • |
| Formamide | ? | ? | ? | • | ? | • | – | ? | – | • |
| Glycerin | • | • | • | • | • | • | • | • | • | • |
| n–Heptane | • | • | • | • | ? | • | ? | ? | • | V |
| n–Hexane | • | • | • | • | • | • | • | ? | V | – |
| Isobutanol | ○ | ○ | • | • | • | • | • | ? | – | • |
| Isopropanol | • | ○ | • | • | • | • | • | • | • | • |
| Isopropyl acetate | ○ | – | • | • | ? | • | ? | • | – | • |
| Methanol, 98% | • | – | • | • | ? | • | • | • | • | • |
| Methyl acetate | – | – | • | • | • | • | ? | – | – | • |
| Methylene chloride | – | ○ | • | • | • | • | – | – | – | – |
| Methyl ethyl ketone | – | – | • | • | • | • | ? | – | – | • |
| Methyl isobutyl ketone | • | – | • | • | • | • | ? | ? | – | – |
| Monochlorobenzene | • | • | • | • | • | • | – | ? | V | V |
| Nitrobenzene | • | ○ | • | • | • | • | – | ? | – | – |
| n–Pentane | • | • | • | • | • | • | • | ? | V | V |
| 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** | | | | | | | | | |
| Acetic acid, 25% | • | • | • | • | • | • | • | • | – |
| Acetic acid, 96% | • | – | • | • | • | • | • | ? | – |
| Hydrofluoric acid, 25% | – | – | • | • | – | ○ | • | – | ○ |
| Hydrofluoric acid, 50% | – | – | • | • | – | ○ | • | – | ○ |
| Perchloric acid, 25% | • | ○ | • | • | – | • | • | – | • |
| Phosphoric acid, 25% | • | ○ | • | • | ○ | • | • | – | • |
| Phosphoric acid, 85% | • | ○ | • | • | ○ | • | • | – | • |
| Nitric acid, 25% | • | – | • | • | – | ○ | • | – | • |
| Nitric acid, 65% | • | – | – | • | – | – | • | – | • |
| Hydrochloric acid, 25% | • | ○ | • | • | – | ○ | • | – | • |
| Hydrochloric acid, 37% | • | – | • | • | – | • | • | – | • |
| Sulfuric acid, 25% | • | • | • | • | ○ | • | • | – | • |
| Sulfuric acid, 98% | • | – | – | • | – | – | • | – | • |
| Trichloroacetic acid, 25% | • | ○ | • | • | – | • | • | – | – |
| **Bases** | | | | | | | | | |
| Ammonium, 1N | • | – | • | • | • | • | • | – | – |
| Ammonium hydroxide, 25% | • | – | • | • | • | • | • | • | – |
| Potassium hydroxide, 32% | • | – | • | • | • | • | • | ○ | ○ |
| Sodium hydroxide, 32% | • | – | • | • | • | • | • | ○ | • |
| Sodium, 1N | • | – | • | • | • | • | • | • | • |
| **Aqueous Solutions** | | | | | | | | | |
| Formalin, 30% | • | • | • | • | • | • | • | ○ | • |
| Sodium hypochlorite, 5% | • | • | • | • | • | • | • | • | • |
| Hydrogen peroxide, 35% | • | • | • | • | • | • | • | • | • |

**Key to Symbols**

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

Contact time: 24 hours at 20 °C
Chemical compatibilities can be influenced by various factors.
Therefore, we recommend that you confirm compatibility with the
liquid you wish to filter by performing a trial filtration run before
you begin with actual filtration.

# 3. Ready–to–connect Filtration Units

| Solvents | Midisart® 2000 | Minisart® HY | Minisart® RC | Minisart® SRP | Minisart® 300 | 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      ○ = limited compatibility
– = not compatible      ? = not tested

Contact time: 24 hours at 20 °C
Chemical compatibilities can be influenced by various factors.
Therefore, we recommend that you confirm compatibility with the
liquid you wish to filter by performing a trial filtration run before
you begin with actual filtration.

# 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 |

# 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 cm² |
| | 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
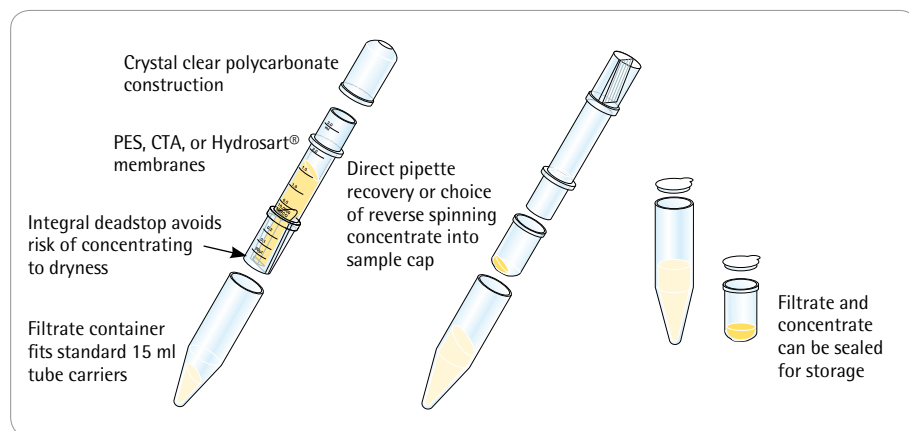
For more information, please ask for the filter papers brochure.

**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
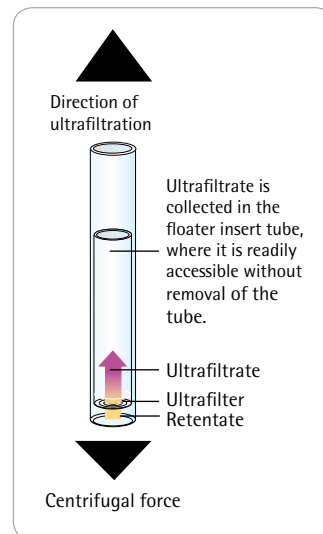
## Technical Specifications Centrisart® I

| | | |
|---|---|---|
| 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 cm² |
| | 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 × 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.
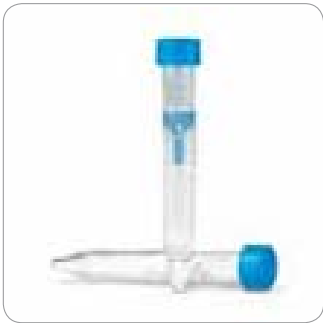
### Technical Specifications Vivaspin 6

| | | |
|---|---|---|
| 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 cm² |
| | 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<br>(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 ×. 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 cm$^2$ |
| | 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 × 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 × 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 cm$^2$ |
| | 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 × g

**or**

**stand in rack**

**then recover**
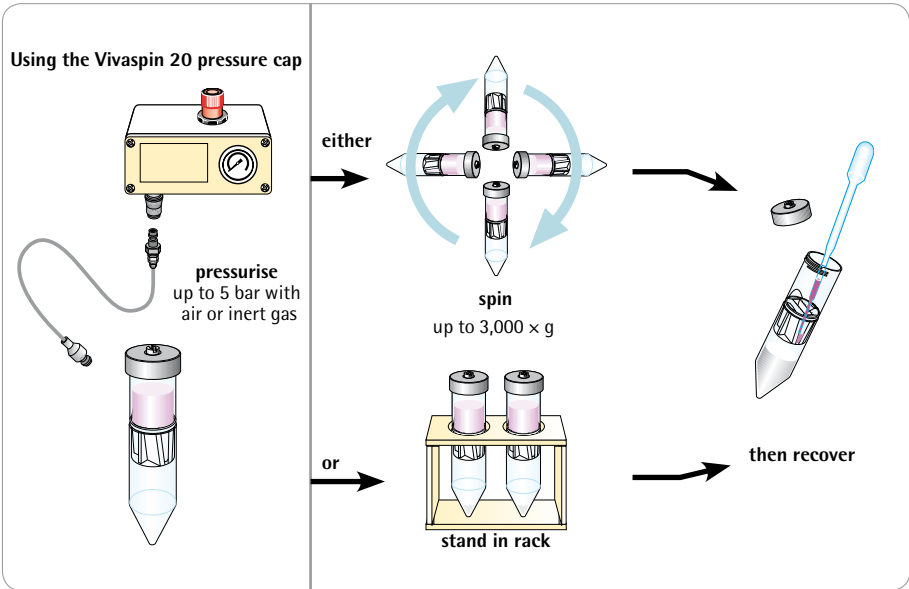
**Desalting with Vivaspin 20**
In this procedure following concentration, a diafiltration cup is filled with buffer and then spun one time to achieve 98% salt removal. This compares to the need for two spins to achieve the same result with the traditional refill and re-spin procedure.

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.
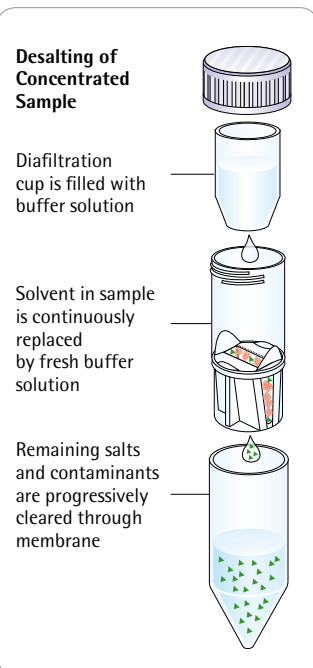
**Ordering Information**

| 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<br>(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 |

# Vivaspin® Turbo 15

**4–15 ml Samples**
Vivaspin® Turbo 15 allows fastest sample con-
centration with highest recoveries. This device
can handle up to 15 ml sample volume in
swing bucket rotors and 11 ml in fixed angle
rotors accepting 50 ml centrifuge tubes.

The Vivaspin® Turbo 15 optimised design,
the sleek internal profile, ensures maximum
process speeds right the way down to the last
few micro litres after > 100 fold concentra-
tion.

The UV joining technology allows for a
smooth joint transition between membrane
and plastic housing, allowing the collection
of the complete concentrated sample into the
unique pipette friendly dead stop pocket.



## Technical Specifications

| Materials | Body | Styrene butadiene copolymere |
|---|---|---|
| | Filtrate vessel | Polypropylene |
| | Concentrator cap | Polypropylene |
| | Membrane | Polyethersulfone (PES) |
| Dimensions | Total length (concentrator insert) | 77 mm |
| | Total length (in tube with cap) | 118 mm |
| | Diameter (concentrator insert) | 27 mm |
| | Active membrane area | 7.2 cm² |
| | Hold up volume of membrane | <10 µl |
| | Dead stop volume in swing out | 100 µl |
| | Dead stop volume in fixed angle | 60 µl |
| Concentrator capacity | Swing bucket rotor | 15 ml |
| | Fixed angle rotor (25°) | 11 ml |
| Maximum speed | 4000 × g | 4000 × g |
| Sterilization | ETO or 70% EtOH | |
| Removal of endotoxins (Depyrogenization) | Flushing with 1N NaOH | |

**Ordering Information**

| Vivaspin Turbo 15 Polyethersulfone | Pack Size | Prod.No. |
| --- | --- | --- |
| 3.000 | 12 | VS15T91 |
| 3.000 | 48 | VS15T92 |
| 5.000 | 12 | VS15T11 |
| 5.000 | 48 | VS15T12 |
| 10.000 | 12 | VS15T01 |
| 10.000 | 48 | VS15T02 |
| 30.000 | 12 | VS15T21 |
| 30.000 | 48 | VS15T22 |
| 50.000 | 12 | VS15T31 |
| 50.000 | 48 | VS15T32 |
| 100.000 | 12 | VS15T41 |
| 100.000 | 48 | VS15T42 |
| 300.000 | 12 | VS15T51 |
| 300.000 | 48 | VS15T52 |
| 1.000.000 | 12 | VS15T61 |
| 1.000.000 | 48 | VS15T62 |
| 30.000–100.000 | 12 | VS15TS1 |

# 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 × g |
| Materials of construction | Body | Polypropylene |
| | Membrane | Polyethersulphone |
| | Filtrate collection tube | Polypropylene |

## 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.
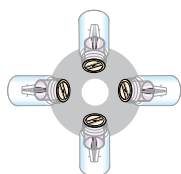
**Centrifuge**
- Process convenience
- Low shear, no foaming
- Less visual control
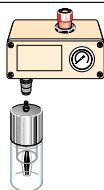
**Pressurise**
- Simplicity and highest process control
- Ideal for refrigerated use
- Slower concentrations

**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**

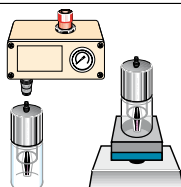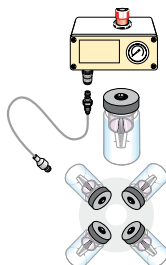| | | |
|---|---|---|
| Concentrator capacity | Swing bucket rotor | 70 ml |
| | Fixed angle rotor | 50 ml |
| | With pressure head | 70 ml |
| | With pressure-fuge head | 50 ml |
| Dimensions | Total length | 119 mm standard centrifugal |
| | | 185 mm with pressure head |
| | | 125 mm with pressure 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

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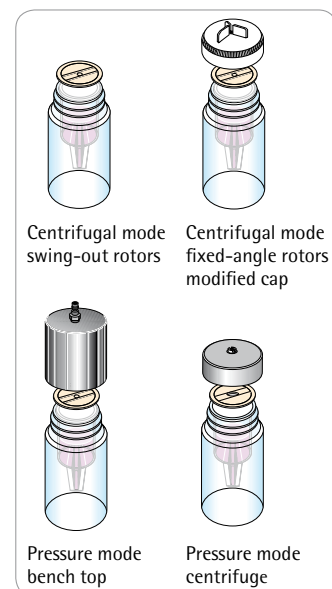
**Ordering Information**

| 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 × g to be used for even faster concentration.

**Vivacell 100 Utilizes:**
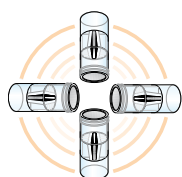- Pressure
- Centrifuge
- Pressure-shake

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 cm² |
| | 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

Twin vertical
membranes

Santoprene
seal

Graduations

Concen-
trator

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
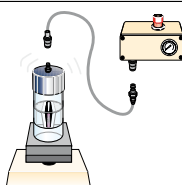


**Pressure–shake**
- Speed and process control
- Ideal for single samples

**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
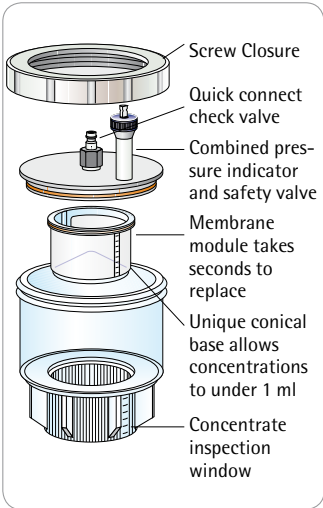
## 50–250 ml Samples

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.

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

## 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 cm$^2$ |
| | 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

## 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 cm$^2$ 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

**Multiple modules**

**Single module**

Filtrate vessel

Sample | diafiltration reservoir (VFA006)
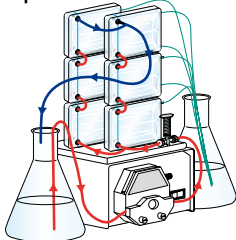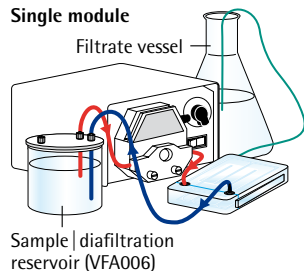
## Technical Specifications Vivaflow 50

| | | |
|---|---|---|
| Dimensions | Overall L × H × W | 107 × 84 × 25 mm |
| | Channel W × H | 15 × 0.3 mm |
| | Active membrane area | 50 cm$^2$ |
| | 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 |
| 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 × 1.6 mm) | VFA004 |
| Flow restrictor set (2 × 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 × 1 m size 16 PVC tubing with inlet fittings, 2 × 50 cm size 16 PVC tubing with 0.6 mm flow restrictors, 1 × 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**



Feed line · Pressure indicator · Waste · Feed reservoir · Sealed diafiltration reservoir · Pump head · Flow restrictor

### Technical Specifications Vivaflow 200

| Dimensions | | |
|---|---|---|
| | Overall L × H × W | 126 ×138 ×38 mm |
| | Channel W × H | 10 × 0.4 mm |
| | Active membrane area | 200 cm$^2$ |
| | 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 |
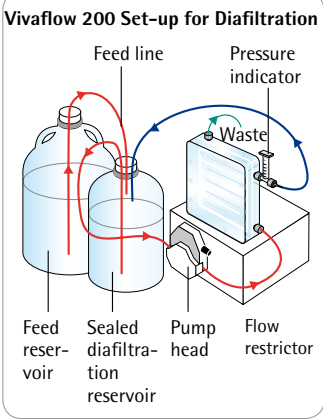
## Ordering Information

| 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 |
| 100,000 MWCO RC | 1 | VF20C4 |
| 5,000 MWCO Hydrosart® | 1 | VF20H1 |
| 10,000 MWCO Hydrosart® | 1 | VF20H0 |
| 30,000 MWCO Hydrosart® | 1 | VF20H2 |

### Vivaflow 200 Complete System Comprises

| | Pack Size | Prod. No. |
|---|---|---|
| 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 × 2.6 mm) | VFA003 |
| Size 16 pvc pump tubing and Luer fittings (3 m, 3.2 × 1.6 mm) | VFA004 |
| Y connector (size 15 to 2 × size 16) | VFA005 |
| Flow restrictor set (2 × 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 |

**Operation – Single Module**
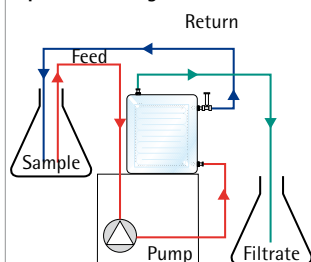


**Operation – Two Modules**
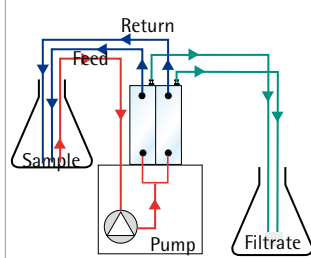
# Vivapore Solvent Absorption Concentrators



**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.
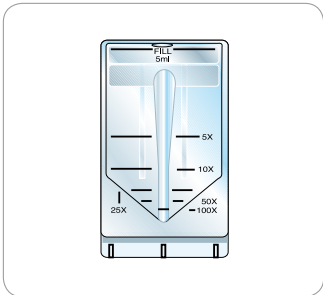


Vivapore 5
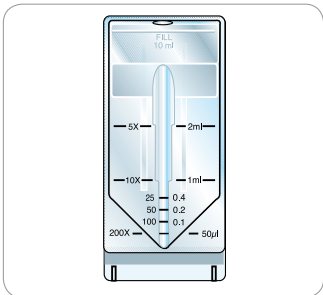


Vivapore 10|20

## Technical Specifications

|  | Vivapore 5 | Vivapore 10|20 |
|---|---|---|
| Membrane material | PES | PES |
| Membrane MWCO | 7,500 | 7,500 |
| Membrane surface area | 20 cm² | 28 cm² |
| 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 for Polyethersulfone Membrane Filters, Type 146**

| 25 mm diameter | 14629--25------D | 5,000 MWCO, pack of 10 |
| | 14639--25------D | 10,000 MWCO, pack of 10 |
| 47 mm diameter | 14609--47------D | 1,000 MWCO, pack of 10 |
| | 14629--47------D | 5,000 MWCO, pack of 10 |
| | 14639--47------D | 10,000 MWCO, pack of 10 |
| | 14659--47------D | 30,000 MWCO, pack of 10 |
| | 14650--47------D | 50,000 MWCO, pack of 10 |
| | 14668--47------D | 100,000 MWCO, pack of 10 |
| | 14679--47------D | 300,000 MWCO, pack of 10 |
| 63 mm diameter | 14629--63------D | 5,000 MWCO, pack of 10 |
| | 14639--63------D | 10,000 MWCO, pack of 10 |
| | 14659--63------D | 30,000 MWCO, pack of 10 |
| | 14668--63------D | 100,000 MWCO, pack of 10 |
| 76 mm diameter | 14629--76------D | 5,000 MWCO, pack of 10 |
| | 14639--76------D | 10,000 MWCO, pack of 10 |

**Order Numbers for Cellulose Triacetate Membrane Filters, Type 145**

| 43 mm diameter | 14549--43------D | 20,000 MWCO, pack of 10 |
| 47 mm diameter | 14529--47------D | 5,000 MWCO, pack of 10 |
| | 14539--47------D | 10,000 MWCO, pack of 10 |
| | 14549--47------D | 20,000 MWCO, pack of 10 |
| | 14549--47------N | 20,000 MWCO, pack of 100 |
| 50 mm diameter | 14539--50------D | 10,000 MWCO, pack of 10 |

**Order Numbers for Regenerated Cellulose Membrane Filters, Type 144**

| 25 mm diameter | 14429--25------D | 5,000 MWCO, pack of 10 |
| | 14439--25------D | 10,000 MWCO, pack of 10 |
| 47 mm diameter | 14429--47------D | 5,000 MWCO, pack of 10 |
| | 14439--47------D | 10,000 MWCO, pack of 10 |
| | 14459--47------D | 30,000 MWCO, pack of 10 |
| 63 mm diameter | 14429--63------D | 5,000 MWCO, pack of 10 |
| | 14439--63------D | 10,000 MWCO, pack of 10 |
| | 14459--63------D | 30,000 MWCO, pack of 10 |
| 76 mm diameter | 14429--76------D | 5,000 MWCO, pack of 10 |
| | 14439--76------D | 10,000 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 | VN01H2SETO |
| 50,000 MWCO | 4 | VN01H3SETO |
| 100,000 MWCO | 4 | VN01H4SETO |

| 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 cm² |
| | 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 | VN02H2SETO |
| 50,000 MWCO | 4 | VN02H3SETO |
| 100,000 MWCO | 4 | VN02H4SETO |

## Vivapure®
## Ion Exchange Protein Purification Products
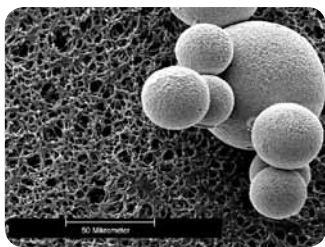


Chromatography gel beads (right) are shown on top of a membrane adsorber in this SEM picture. The membrane adsorber pores are over 50 × larger than bead pores.

**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 | Vivapure® LentiSELECT 40 | |
| VS-LVPQ500 | Vivapure® LentiSELECT 500 | |
| VS-LVPQ1000 | Vivapure® LentiSELECT 1000 | |
| 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 |

| Order No. | Vivapure® Mini Spin Columns | Spin Columns\|Centrifuge Tubes |
|---|---|---|
| VS-IX01SH24 | Vivapure® S Mini H | 24\|48 |
| VS-IX01QH24 | Vivapure® Q Mini H | 24\|48 |
| VS-IX01DH24 | Vivapure® D Mini H | 24\|48 |

| Order No. | Vivapure® Maxi Spin Columns | Spin Columns\|Centrifuge Tubes |
|---|---|---|
| VS-IX20SH08 | Vivapure® S Maxi H | 8\|16 |
| VS-IX20QH08 | Vivapure® Q Maxi H | 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®

Vivapure® Mini-400│500 µl
Binding capacities: 4 mg



Vivapure® Maxi-19│20 ml
Binding capacities: 60–80 mg

**Available Formats**

| Vivapure® IEX Products | Application |
|---|---|
| Vivapure® Mini Spin Columns | ■ Sample fractionation<br>■ Purification condition scouting<br>■ Small scale purification |
| Vivapure® Maxi Spin Columns | ■ Large scale sample fractionation<br>■ One step protein purification│concentration<br>■ Polishing of His-tagged protein |

**Membrane Availability**

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

**Performance Characteristics**

| Vivapure®<br>Spin<br>Columns | Protein<br>Binding<br>Capacity*<br>[mg] | Max. Volume per<br>Centrifuge Run<br>Using a Swing–Out<br>Rotor [ml] | Max. Volume per<br>Centrifuge Using<br>a Fixed Angle<br>Rotor Run [ml] |
|---|---|---|---|
| Vivapure® Mini H | 4 | 0.4 | |
| 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–IX01DH24 | Vivapure® D Mini H | 24 | 48 |
| VS–IX01QH24 | Vivapure® Q Mini H | 24 | 48 |
| VS–IX01SH24 | Vivapure® S Mini H | 24 | 48 |

| Prod. No. | Description | Spin Columns | Centrifuge Tubes |
| --- | --- | --- | --- |
| **Vivapure® Maxi Ion Exchange Spin Columns (up to 20 ml)** | | | |
| VS–IX20DH08 | Vivapure® D Maxi H | 8 | 16 |
| VS–IX20QH08 | Vivapure® Q Maxi H | 8 | 16 |
| VS–IX20SH08 | Vivapure® S Maxi H | 8 | 16 |

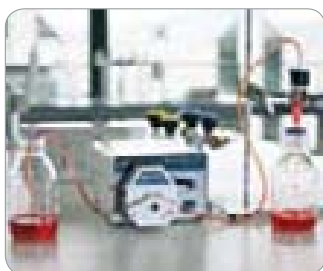# Vivapure® mini│maxiprep Protein A & G Spin Columns

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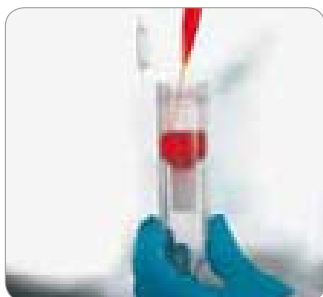
Large numbers of samples can be processed in parallel. The low hold-up volume ensures high solute recovery with minimal non-specific absorptive losses.

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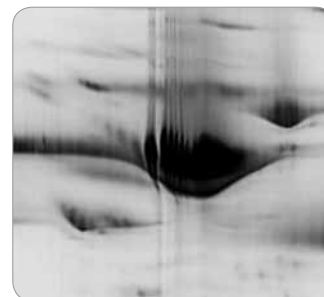
**The Vivapure® Advantage**
- Highly specific antibody fragment based albumin removal
- Protein G based IgG removal
- Priced for Single-use – no risk of contamination

## 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

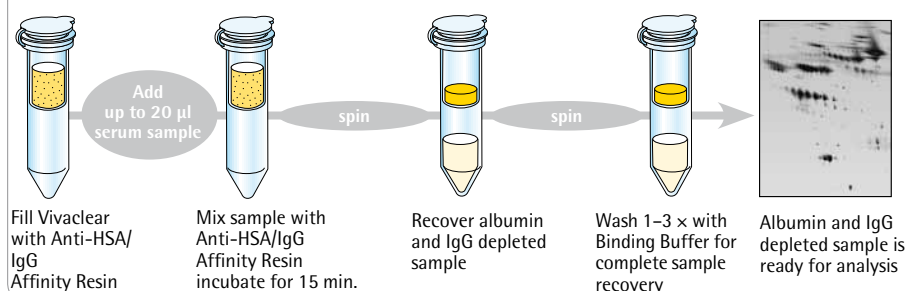| | |
|---|---|
| Anti-HSA Affinity Resin binding capacity (suspension containing 50% packed medium) | 2 mg/ml |
| Anti-HSA/IgG Affinity Resin binding capacity (suspension containing 50% packed medium) | 1.8 mg/ml albumin 0.6 mg/ml IgG |
| Clarification spin columns (Vivaclear) max. volume capacity |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

Before

After

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

Add up to 20 µl serum sample

spin

spin

Fill Vivaclear with Anti-HSA/IgG Affinity Resin

Mix sample with Anti-HSA/IgG Affinity Resin incubate for 15 min.

Recover albumin and IgG depleted sample

Wash 1–3 × with Binding Buffer for complete sample recovery

Albumin and IgG depleted sample is ready for analysis

# Adenovirus Purification with Vivapure® AdenoPACK Kits



AdenoPACK 20

**AdenoPACK 20|100|500**
The AdenoPACK adenovirus purification and concentration kits offer researchers who need to recover up to $3 \times 10^{13}$ 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 $1 \times 10^{11}$- $3 \times 10^{13}$ purified viral particles. For each sample volume, the most convenient handling method is offered for ultimate convenience.

## Purification Results from Preparations with Ad5 GFP-Constructs

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

** 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 ×) | 25 ml |
| Washing Buffer (10 ×) | 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 × 20 ml |
| Virus particles (VP) per ml | Typically up to $1 \times 10^{11} - 10^{12}$ |
| VP|IU | 50–100 |
| Processing time | Typically 1 hour |
| Endotoxin level | < 0.025 EU/ml |

**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

**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<br>1 × 200 ml |
| Virus particles (VP) per ml | Typically up to $1 \times 10^{13}$ |
| VP|IU | 20–50 |
| Processing time | Typically 2 hours |
| Endotoxin level | < 0.025 EU/ml |

Vivapure® AdenoPACK 500

**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 (10×) | 60 ml |
| Washing Buffer (10×) | 30 ml |
| Elution Buffer | 20 ml |
| Benzonase® 12.5 U/µl | 500 µl |
| Vivaspin 20 concentrator | 2 |
| Instructions | 1 each for Kit and Vivaspin |

* AdenoPACK 500 RT does not contain Benzonase®

**Technical Data**

**Kit Specifications**

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

# Lentivirus Purification with Vivapure® LentiSELECT Kits

## LentiSELECT 40│500│1000

The LentiSELECT lentivirus purification and concentration kits offer researchers who need to recover up to $5 \times 10^9$ 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.

Vivapure® LentiSELECT 40

## 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* | $4 \times 10^9$ | 50% | $8 \times 10^8$ |
| LentiSELECT 500│500 ml sample | 3 hours | 1 ml* | $3 \times 10^9$ | 35% | $2–5 \times 10^9$ |
| LentiSELECT 1000│1000 ml sample | 6 hours | 2 ml* | $5 \times 10^9$ | 35% | $1 \times 10^{10}$ |
| Ultracentrifugation│500 ml sample | 10–11 hours | 500 µl | $6 \times 10^9$ | 25% | $3 \times 10^9$ |

* 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 ×) | 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 × 40 ml |
| Infective particles (P) per ml | Typically up to $3 \times 10^9$ |
| VP│IU | 5–15 |
| Processing time | Typically 45 minutes |
| Endotoxin level | < 0.025 EU/ml |

Vivapure® LentiSELECT 500

**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 ×) | 30 ml |
| Washing buffer | 170 ml |
| Elution buffer | 30 ml |
| Vivaspin 20, 100 kDa MWCO | 2 |
| Operating manual | 1 each for Kit and Vivaspin |

**Technical Data**

**Kit Specifications**

| Sample size | 500 ml cell culture |
|---|---|
| Number of purifications | $1 \times 500$ ml |
| Infective particles (IP) per ml | Typically up to $2{-}5 \times 10^{9}$* |
| Processing time | Typically up to 3 hours |
| Endotoxin level | < 0.025 EU/ml |

\* 1 ml final elution sample



Vivapure® LentiSELECT 1000

**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 ×) | 30 ml |
| Washing buffer | 170 ml |
| Elution buffer | 60 ml |
| Vivaspin 20, 100 kDa MWCO | 2 |
| Operating manual | 1 each for Kit and Vivaspin |

**Technical Data**

**Kit Specifications**

| Sample size | 1000 ml cell culture |
|---|---|
| Number of purifications | $1 \times 1000$ ml |
| Infective particles (IP) per ml | Typically up to $4{-}5 \times 10^{9}$** |
| Processing time | Typically up to 6 hours |
| Endotoxin level | < 0.025 EU/ml |

\*\* 2 ml final elution sample

# Sartobind®
# The Pace Maker in Membrane Adsorber Technology

## Unique Macroporous Structure

Sartobind® Membrane Adsorbers display a macroporous 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 0.3 up to 16 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. In principle 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 exchangers
- Sartobind® Phenyl hydrophobic interaction chromatography
- 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

The Sartobind® Demo Kit demonstrates protein purification with equilibration, loading and elution in one minute
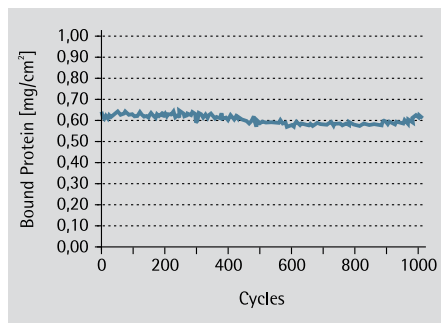
# ... for Robust Separations

**Sartobind® pico 0.08 ml**
This format keeps the bed height of large 4 mm capsules and allows for small scale trials with minute amount of protein samples.

The pico is the typical unit to start with membrane chromatography as it comes with ion exchangers Q (quaternary ammonium), S (sulfonic acid) and STIC PA (Salt tolerant Interaction Chromatography, primary amine), as well as HIC membrane with Phenyl ligand in the smallest available ready-to-use format.

**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, MA 75 with 4 mm and MA 100 with 1.4 mm .

**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).

**Chemical Compatibility**
The housing of Sartobind® pico 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® pico is used with a syringe, a pump or a liquid chromatography system



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.

255

**Technical Data Sartobind® Laboratory Scale Units**

| | pico | MA 15 | MA 75 | MA 100 | nano |
|---|---|---|---|---|---|
| Membrane material | | Stabilized reinforced cellulose | | | |
| Application for | | Purification, re-usable for production, re-usable | Purification, downscale | Purification, re-usable | Down-scale for biopharma production |
| Adsorption area [cm²] | 2.9 | 15 | 75 | 100 | 36\|110 |
| Bed height [mm] | 0.4 | 0.8 | 4.0 | 1.4 | 4\|8 |
| Bed volume* [ml] | 0.08 | 0.41 | 2.1 | 2.8 | 1\|3 |
| Membrane diameter [mm] | 5 | 25 | 25 | 50 | – |
| Housing material | Polypropylene | Polysulfone | Polysulfone | Polysulfone | Polypropylene |
| Inlet connector | Female Luer | Female Luer | Female Luer | Female Luer | Female Luer |
| Outlet connector | Female Luer | Male Luer | Male Luer | Male Luer | Female Luer |
| Typical dynamic protein binding capacity [mg/unit] (with lysouome for S, BSA for Q/PA/D) | 2.3/Q pico 4.0/PA pico 2.0/S pico | 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 |
| Recommended flow rate [ml/min] | 0.8–2.4 | 10–30 | 10–30 | 20–50 | 10–30\|5–15 |
| Void volume [ml] | 0.4 | 1.0 | 1.3 | 4.2 | 5 (1 ml)/4 (3 ml) |
| Maximum pressure [MPa] | 0.6 | 0.6 | 0.6 | 0.6 | 0.4 |
| pH stability of housing | 2–14 | 2–13 | 2–13 | 2–13 | 2–14 |
| Storage before use at | | Room temperature | | | |

**pH Stability for pico, MA15, 75, 100 and nano**

| | S | Q | D | PA | Phenyl |
|---|---|---|---|---|---|
| Short term | 3–14 | 2–14 | 2–14 | 2–14 | 2–14 |
| Long term | 4–13 | 2–12 | 2–12 | n.a.** | 3–13 |

MA units are supplied as non sterile

\* 1 ml membrane volume is equal to 36.4 cm² membrane area
\*\* single-use device, n.a.= not available

**Technical Data Sartobind® MA Affinity Units**

**Data Common for both 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 | – | Ni$^{2+}$, Co$^{2+}$, Cu$^{2+}$ or Zn$^{2+}$ |
| Flow rate at 0.1 MPa (1 bar|14.5 psi) | > 10 ml/min | > 10 ml/min |
| 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 °C | Dry at room temperature |

\* protected by patents of third parties

# Sartobind® 96-well Plates – High Throughput Screening with IEX and HIC Membrane Chromatography

To optimize biopharmaceutical development and reduce process development time lines, high throughput screening (HTS) with 96-well plates is commonly used.

Automated or manual optimization of chromatographic steps should be one of the standard procedures in purification. Membrane adsorbers in 96-well plate format in combination with a vacuum filtration unit or a centrifuge are ideal tools for rapid screening of purification conditions for target molecules.

The 96-well plate features a modular design of individual 8-strip units set into a 96-well holding frame. A silicone gasket seals the plate set-up of 12 individual 8-strip units for vacuum processing. The individual 8-strips can be processed with the Vac8 (VW08VAC01) or full plate set-up with the Vac96 vacuum manifold (VW96VAC01). Operation with a centrifuge does not require a gasket seal.

Sartobind® 96-well plates are available with four different membrane chemistries: Sartobind® STIC PA and Q anion exchangers, S cation exchanger and Sartobind® Phenyl as a hydrophobic interaction chromatography matrix.

**Applications**
Sartobind® plates are useful to optimize binding conditions of recombinant proteins (Mabs) and vaccine purification in Design of Experiments (DoE) studies.

Contaminant removal
- Host cell proteins
- DNA
- Endotoxins
- Viruses
- Aggregates

Bind & elute
- Viruses
- Large proteins

Screening parameters in flowthrough and bind & elute modes
- Buffer type
- Buffer composition
- pH
- Conductivity
- Concentration of target molecule

**Technical Data**

| | |
|---|---|
| Base membrane | Stabilized reinforced cellulose |
| Nominal pore size | > 3 µm |
| Bed height | 0.8 mm |
| Bed volume | 19 µl\|well |
| Adsorption area | 0.7 cm²\|well |

**Membrane Types and Ligands**

| | |
|---|---|
| Strong basic anion exchanger | Quaternary ammonium (Q) $R\text{-}CH_2\text{-}N^+(CH_3)_3$ |
| Salt tolerant anion exchanger | Primary amine (PA) |
| Strong acidic cation exchanger | Sulfonic acid (S) $R\text{-}CH_2\text{-}SO_3\text{-}$ |
| Hydrophobic interaction membrane | Phenyl |

| **Binding Capacity\*** | **[mg\|ml] and [mg\|well]** |
|---|---|
| Q | 29 \| 0.55 |
| PA | 50 \| 0.95 |
| S | 25 \| 0.48 |
| Phenyl | 14.5 \| 0.28 |

**Materials**

| | |
|---|---|
| 8-strip units | Polypropylene |
| Holding frame | Polystyrene |
| Collection plate | Polypropylene |

**Operation**

| | |
|---|---|
| With vacuum manifold or centrifuge | |
| Short term pH compatibility | Q: 2 – 14<br>PA: 2 – 14<br>S: 3 – 14<br>Phenyl: 2 – 14 |
| Chemical stability | Stable in common chromatography buffers, unstable to peroxide and other oxidizing or reactive reagents |

\* Reference proteins: Bovine serum albumin for Q and PA, lysozyme for S and bovine IgG for Phenyl

**Ordering Information**

| Article No. | Description | Quantity |
|---|---|---|
| 99IEXQ42GC-----V | Sartobind® Q 96-well plate, 2 units | 2 (24 × 8-strips) |
| 99IEXQ42GC-----D | Sartobind® Q 96-well plate, 10 units | 10 (120 × 8-strips) |
| 99STPA42GC-----V | Sartobind® STIC PA 96-well plate, 2 units | 2 (24 × 8-strips) |
| 99STPA42GC-----D | Sartobind® STIC PA 96-well plate, 10 units | 10 (120 × 8-strips) |
| 99IEXS42GC-----V | Sartobind® S 96-well plate, 2 units | 2 (24 × 8-strips) |
| 99IEXS42GC-----D | Sartobind® S 96-well plate, 10 units | 10 (120 × 8-strips) |
| 99HICP42GC-----V | Sartobind® Phenyl 96-well plate, 2 units | 2 (24 × 8-strips) |
| 99HICP42GC-----D | Sartobind® Phenyl 96-well plate, 10 units | 10 (120 × 8-strips) |

# Vacuum Manifold Systems


Vac 96 set-up


Vac 96


Vac 8


Vac 8-strip plate

**Vac 8 and Vac 96 Vacuum Manifold Systems**
The vacuum manifolds have been designed specifically for use with Sartobind® 96-well plates consisting of 8-strips.

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. 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 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

**Required Equipments for Vacuum Operation**
■ Vacuum manifold
■ Vacuum pump or vacuum source capable of applying vacuum up to 350 mbar
■ Liquid trap and reservoir

**Specifications for 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 × D × H [mm] | 144 × 102 × 71 |

| Ordering information | Description | Pack Size |
|---|---|---|
| VW96VAC01 | Vac 96 | 1 |
| VW96VAA02 | 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 Vac 96 | 1 |

**Specifications for 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 × D × H [mm] | 105 × 80 × 58 |

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

# 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, except pico |
| | Bed height | 4 mm |
| | Housing material | Polypropylene |
| Operation | Max. pressure | 0.4 MPa (4 bar\|58 psi) |
| | | 0.5 MPa (5 bar\|73 psi) Sartobind® STIC 5" |
| | | 0.6 MPa (6 bar\|87 psi) Sartobind® pico |

pico    nano    mini    5"    10"    20"    30"    mega

**Technical Data Sartobind® 4 mm Capsules**

| Order No. | Chemistry | Description Adapter Inlet and Outlet | Quantity | Protein Binding Capacity* [mg] | Recommended Flow Rate** [ml/min] |
|---|---|---|---|---|---|
| **Sartobind® nano** | | | | | |
| 92IEXQ42DD-11--D | Q | Luer female | 10 | 2.3 | 0.8–2.4 |
| 92IEXQ42DN-11 | Q | Luer female | 1 | 29 | 30 |
| 92IEXQ42DN-11--A | Q | Luer female | 4 | 29 | 30 |
| **Sartobind® mini** | | | | | |
| 92IEXQ42D4-OO--A | Q | Hose barb | 4 | 200 | 200 |
| 92IEXQ42D4-SS--A | Q | Sanitary flange | 4 | 200 | 200 |
| **Sartobind® nano** | | | | | |
| 92STPA42DD-11--D | PA | Luer female | 10 | 2.0 | 0.8–2.4 |
| 92STPA42DN-11--A | STIC PA | Luer female | 4 | 50 | 30 |
| **Sartobind® nano** | | | | | |
| 92IEXS42DD-11--D | S | Luer female | 10 | 2.0 | 0.8–2.4 |
| 92IEXS42DN-11 | S | Luer female | 1 | 25 | 30 |
| 92IEXS42DN-11--A | S | Luer female | 4 | 25 | 30 |
| **Sartobind® mini** | | | | | |
| 92IEXS42D4-OO--A | S | Hose barb | 4 | 175 | 200 |
| 92IEXS42D4-SS--A | S | Sanitary flange | 4 | 175 | 200 |

\* 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.
\*\* Lower flow rates than recommended can also be used.

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® IEX 8 mm Capsules for Capturing and Polishing

The Sartobind® Q or S capsules with 8 mm bed height are membrane chromatography devices for large scale capturing and impurity removal at high flow rates.
Sartobind® strong cation (S) and anion ligands (Q) are covalently attached as a flexible hydrogel onto the stabilized reinforced cellulose. The membrane pore size of >3 µm allows large proteins, bioparticles and viruses to enter the macroporous structure and achieve high binding capacity without size exclusion effects.

The membrane is rolled up to form a cylinder with a bed height of 8 mm around a central solid core.

The optimized design of the fluid channels reduces the void volume significantly, resulting in sharp breakthrough curves with minimal elution volumes. The internal support structures and the outer shell of the Sartobind® Jumbo are made from polypropylene.

**Applications Polishing**
- Virus clearance >6 log
- DNA below detection limit
- Endotoxins >5 log
- Host cell proteins >99%
- Leached ligand materials
- Aggregates

**Capture**
- Large proteins
- Viruses
- Vaccines
- Proteins from large feed streams

**Benefits**
- Designed for large scale flow through polishing as well as bind and elute chromatography
- Small elution volumes at 2 membrane volumes
- 8 mm bed height for increased binding capacity
- Scale down model with Sartobind® nano 3 ml with 8 mm bed height
- Recommended flow rate of 5 bed volumes per minute
- Easy and simple handling (like a filter)
- Autoclaveable or CIP with 1 N NaOH
- Single use or re-use



nano

150 ml

jumbo

**Technical Data**

| Description | Sartobind® Q nano 3 ml | Sartobind® S nano 3 ml | Sartobind® Q 150 ml | Sartobind® S 150 ml |
|---|---|---|---|---|
| Order Number | 96IEXQ42EUC11--A | 96IEXS42EUC11--A | 96IEXQ42E9BFF | 96IEX42E9BFF |
| Shipment | 4 × Sartobind® Q nano 3 ml 2 Luer male to UNF 10–32 adapters PEEK, manual, certificate | 4 × Sartobind® S nano 3 ml 2 Luer male to UNF 10–32 adapters PEEK, manual, certificate | Sartobind® Q 150 ml manual, certificate | Sartobind® S 150 ml manual, certificate |
| Membrane material | Stabilized reinforced cellulose | | | |
| Ligand | Strong basic anion exchanger: quaternary ammonium $(R\text{-}CH_2\text{-}N^+(CH_3)_3)$ | Strong acidic cation exchanger: sulfonic acid $(R\text{-}CH_2\text{-}SO_3^-)$ | Strong basic anion exchanger: quaternary ammonium $(R\text{-}CH_2\text{-}N^+(CH_3)_3)$ | Strong basic cation exchanger: sulfonic acid $(R\text{-}CH_2\text{-}SO_3^-)$ |
| Pore size | > 3 µm | > 3 µm | > 3 µm | > 3 µm |
| Bed height [mm] | 8 | 8 | 8 | 8 |
| Bed volume [ml] | 3 | 3 | 150 | 150 |
| Nominal adsorption area [$cm^3$] | 110 | 110 | 5500 | 5500 |
| Typical dynamic binding capacity 10%   ■ per $cm^2$   ■ per ml   ■ per device | 0.8 mg BSA 29 mg 88 mg | 0.7 mg lysozyme 25.5 mg 77 mg | 0.8 mg BSA 29 mg 4.4 g | 0.7 mg lysozyme 25.5 mg 3.9 g |
| Recommended flow rate [l/min] | 0.015 | 0.015 | 0.75 | 0.75 |
| Void volume* | 4 ml | 4 ml | 0.2 l | 0.2 l |
| Maximum pressure [MPa] | 0.4 (4 bar/58 psi) | 0.4 (4 bar/58 psi) | 0.4 (4 bar/58 psi) | 0.4 (4 bar/58 psi) |
| Housing material | Polypropylene | Polypropylene | Polypropylene | Polypropylene |
| Weight [g] | 10 | 10 | 400 | 400 |
| Connectors | Luer female | Luer female | Sanitary 25 mm 3/4" | Sanitary 25 mm 3/4" |
| pH stability (short term) | 2–14 | 3–14 | 2–14 | 3–14 |
| pH stability (long term) | 2-12 | 4–13 | 2-12 | 4–13 |

*Includes the porosity of the membrane which is approximately 80%

# Sartobind® Phenyl 8 mm Capsules for Capturing and Polishing
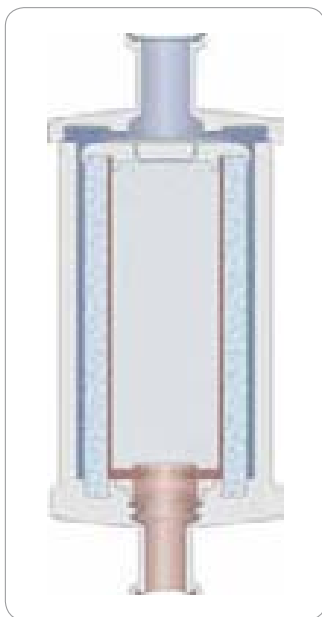
The Sartobind® Phenyl capsules with 8 mm bed height are membrane chromatography devices for large scale capturing and impurity removal at typical hydrophobic interaction conditions known from HIC columns but at much higher flow rates.

The hydrophobic interaction phenyl ligand is covalently attached directly onto an enlarged surface of stabilized reinforced cellulose. The membrane pore size of >3 μm allows large proteins and aggregates to enter the macro-porous structure achieving high binding capacity without size exclusion effects.

The membrane is rolled up to a cylinder with a bed height of 8 mm around a central solid core. The miniaturized design of fluid channels reduce the void volume significantly. The recommended flow rate is 5 bed volumes per minute. The internal support structures and the outer shell of the capsules are made from polypropylene.

## Applications Polishing
- Aggregates
- Host cell proteins
- Viruses
- Endotoxins
- Lipids, dyes and anti foam agents
- Leached chromatography ligands

## Capture
- Monoclonal antibodies
- Conjugated vaccines, viruses and phages
- Oligonucleotides

## Benefits
- Binds aggregates and hydrophobic contaminants
- Designed for large scale flow through polishing as well as bind and elute chromatography
- 8 mm bed height for increased binding capacity
- Scale down model with Sartobind® nano 3 ml with 8 mm bed height
- Cleaning in place with 1 N NaOH
- Recommended flow rate of 5 bed volumes/min
- Easy and simple handling (like a filter)
- Single use or re-use

nano                    150 ml                    jumbo

**Technical Data**

| Description | Sartobind® Phenyl nano 3 ml | Sartobind® Phenyl 150 ml |
|---|---|---|
| Order Number | 96HICP42EUC11--A | 96HICP42E9BFF |
| Shipment | 4 × Sartobind® Phenyl nano 3 ml, 2 Luer male to UNF 10–32 adapters PEEK, manual, certificate | Sartobind® Phenyl 150 ml, manual, certificate |
| Membrane material | Stabilized reinforced cellulose | |
| Ligand | Phenyl | Phenyl |
| Pore size | > 3 µm | > 3 µm |
| Bed height [mm] | 8 | 8 |
| Bed volume [ml] | 3 | 150 |
| Nominal adsorption area [cm$^3$] | 110 | 5500 |
| Typical dynamic binding capacity 10% | | |
| ▪ per cm$^2$ | 0.4 mg IgG | 0.4 mg IgG |
| ▪ per ml | 14.6 mg IgG | 14.6 mg IgG |
| ▪ per device | 44 mg IgG | 2.2 g IgG |
| Recommended flow rate [l/min] | 0.015 | 0.75 |
| Void volume* | 4 ml | 0.2 l |
| Maximum pressure [MPa] | 0.4 (4 bar/58 psi) | 0.4 (4 bar/58 psi) |
| Housing material | Polypropylene | Polypropylene |
| Weight [g] | 10 | 400 |
| Connectors | Luer female | Sanitary 25 mm $^3/_4$" |
| pH stability (short term) | 2–14 | 2–14 |
| pH stability (long term) | 3–13 | 3–13 |

*Includes the porosity of the membrane which is approximately 80%

**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 |

| Order No. | Kit | Quantity |
|---|---|---|
| 90-KIT-01 | Sartobind® Demo Kit | 1 |

**Sartobind® Capsules 4 mm Bed Height**

| Order No. | Description Sartobind® Q | Quantity |
|---|---|---|
| 92IEXQ42DD-11--D | Sartobind® Q pico 0.08 ml | 10 |
| 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 |
|---|---|---|
| 92IEXS42DD-11--D | Sartobind® S pico 0.08 ml | 10 |
| 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 |
|---|---|---|
| 92STPA42DD-11--D | Sartobind® STIC PA pico 0.08 ml | 10 |
| 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 | 1 |

# 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 °C |
| Noise level | For gelatine membrane filters, max. 62 dB (A) |
| Weight [kg] | Approx. 6.5 |
| Dimensions L × W × H [mm] | 375 × 242 × 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. |
| Included 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 × W × H [mm] | 300 × 135 × 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
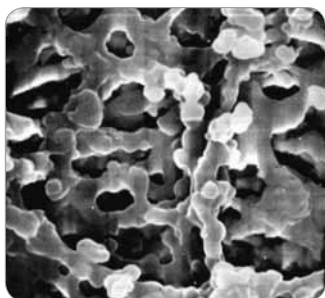
Gelatine filters in conjunction with the MD8 air samplers (gelatine filter method) are used for collecting of airborne microbes and viruses. Gelatine filter disposables are individually packed, pre-sterilized and ready-to-connect units, each consisting of a gelatine membrane filter and a holder. Gelatine 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 $\Delta p = 0.05$ 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 × 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) |

**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 × 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

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## 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 m$^3$/h |
| Max. error | 1–16 m$^3$/h, ± 2% |
| Type of protection | IP 40 |
| Allowable ambient temperature | Min. 0 °C, max. 40 °C |
| Weight | Approx. 11 kg |

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

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

### Case
A stable case for the transport and the storage of a 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 between different clean-room classes is maintained).

**Accessories for Remote Control Function**

Users of the MD8 airscan® now have the possibility of operating this air sampler from a distance, using either of two remote control configurations:

a) Via a PC (with Microsoft 95/98 or higher) with MD8 airscan® dialog system and cable connection to the MD8 airscan® (1ZE---0004).
b) Via a PLC interface unit (1ZE---0003).

**Gelatine Membrane Filter, 80 mm, Sterile, Pack of 50 for Use with Stack**

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

**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 × 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.
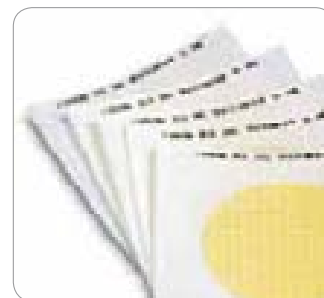
### High Flow Membranes
The standard membrane filter for microbiological analysis is an 0.45 µm filter. One special variant is the High Flow membrane. It provides 30% higher flow rates in comparison to traditional 0.45 µm membranes. The special pore structure of the new 0.45 µm HighFlow membrane filters 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 284).

Cellulose nitrate (cellulose ester) and cellulose acetate membrane filters, white, individually sterile packaged (page 286).

Hydrophobic edge membranes are used mainly in the sterility testing of solutions containing antibiotics (page 288).

# 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 switch can be optionally connected to the dispenser. Thanks to their 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 × H × W [mm] | 204 × 213 × 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 | Foot switch for Microsart® e.motion dispenser |

# Microsart® e.motion Membrane Filters

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

Some of the advantages you will benefit from when using the Microsart® e.motion membrane filters:

- Outstanding recovery rates for microorganisms
- 0.45 µm are acc. to ISO 7704
- Multi-fit: Fits into various dispensers
- Protective paper-free
- Packaged on a special pleated band
- Product data are printed on
- High Flow membranes available
- Gamma irradiated, 25kGray

**Specifications**

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

**Order Numbers for Microsart® e.motion Membrane Filters**

**Diameter 47 mm or 50 mm, in Pack of 3 × 100 Membranes, Individually Sterile Packaged, without Protective Paper**

| | | |
|---|---|---|
| White\|black | 11407Z-47----SCM | 0.2 µm |
| White\|black | 11407Z-50----SCM | 0.2 µm |
| White\|black | 114H6Z-47----SCM | 0.45 µm High Flow |
| White\|black | 114H6Z-50----SCM | 0.45 µm High Flow |
| White\|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 291).

## Cellulose Nitrate (Cellulose Ester) Membrane Filters
## Gridded, Individually Sterile Packaged
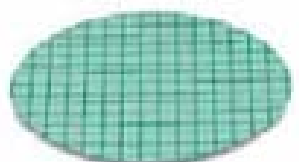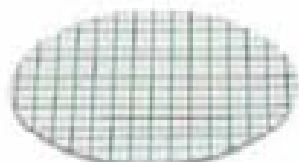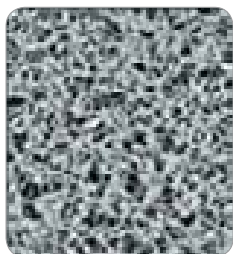
### Applications
Membrane filters for colony counting, particle testing and microscopy

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<br>■ No enhancement or inhibition due to chemical extractables<br>■ 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 196). |

### 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**

| Pore Size | Order No. | Diameter | Pack Size |
|---|---|---|---|
| 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**

| Pore Size | Order No. | Diameter | Pack Size |
|---|---|---|---|
| 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**

| Pore Size | Order No. | Diameter | Pack Size |
|---|---|---|---|
| 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
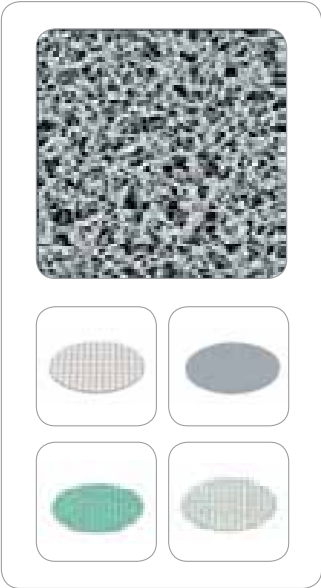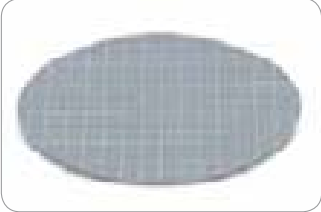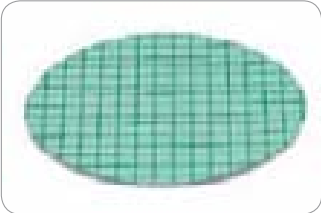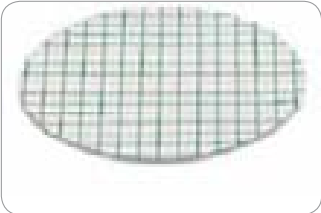
## Applications
Membrane filters for colony counting, particle testing and microscopy

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<br>■ 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 196). |

## 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
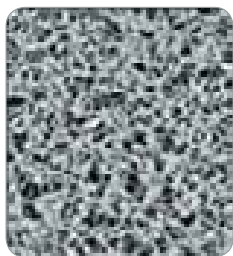
Sterile, individually packed filters have long become standard for routine microbiological quality control because of the user benefits they offer. They are pre-sterilized and ready-to-use and save preparatory time. As they are individually packed, they avoid the possibility of contaminating remaining 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<br>■ 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 196). |

**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<br>11306--47----ACN<br>11306--50----ACN | 25 mm<br>47 mm<br>50 mm | 100<br>100<br>100 |
| 0.65 µm | 11305--47----ACN<br>11305--50----ACN | 47 mm<br>50 mm | 100<br>100 |
| 0.8 µm | 11304--47----ACN<br>11304--50----ACN | 47 mm<br>50 mm | 100<br>100 |
| 1.2 µm | 11303--47----ACN<br>11303--50----ACN | 47 mm<br>50 mm | 100<br>100 |
| 3 µm | 11302--47----ACN<br>11302--50----ACN | 47 mm<br>50 mm | 100<br>100 |
| 8 µm | 11301--47----ACN<br>11301--50----ACN | 47 mm<br>50 mm | 100<br>100 |

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

| Pore Size | Order No. | Diameter | Pack Size |
|---|---|---|---|
| 0.2 µm | 11107--47----ACN<br>11107--50----ACN | 47 mm<br>50 mm | 100<br>100 |
| 0.45 µm | 11106--47----ACN<br>11106--50----ACN | 47 mm<br>50 mm | 100<br>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<br>■ No enhancement or inhibition due to chemical extractables<br>■ 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 196, 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.

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

### Trouble-free Storage
Nutrient Pad Sets can be stored at room temperature in a warehouse, 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 × 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 × 100 pads | 1,000 per box, incl. one dispenser | 15410--47----ALR |
| Absorbent Pad Set, 10 × 100 pads plus 1,000 membrane filters (0.45 µm, white\|green) | 1,000 per box, incl. two dispensers | 13906--47----APR |

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

| Description | Packaging | Order No. |
| --- | --- | --- |
| Absorbent Pad Set, 10 × 10 pads in sleeves plus 100 membrane filters (0.2 µm, white\|black) | 100 per box | 13707--47----ALN |
| Absorbent Pad Set, 10 × 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 × 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 × 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*<br>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 O-ring | Biosart® 100 Monitor onto Sartorius Stedim Biotech stainless steel base 1ZU---0002 Microsart® Base 47 mm (stainless steel base for Combisart® and Microsart® Combi.jet) | 16424 |
| Biosart® 100 Adapter, silicone | Biosart® 100 Monitor onto Sartorius Stedim Biotech stainless steel frits e.g. 16840 (Combisart® single base, 50 mm) or onto 16841 (individual base) | 16414 |
| Biosart® 100 Adapter, polypropylene | Biosart® 100 Monitor onto 50 mm supports | 16415 |
| Biosart® 100 Adapter, polypropylene | Biosart® 100 Monitor onto 56 mm supports and vacuum pumps | 16416 |
| Biosart® 100 Membrane Lifter, ABS | For easy transfer of the membrane onto agar | 16417 |

# Biosart® 100 Nutrient Media

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
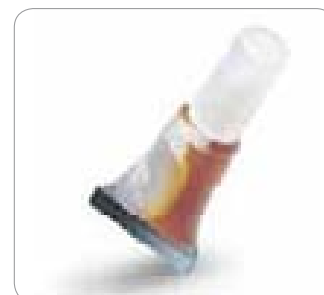
**Biosart® 100 Nutrient Media, 2.5 ml, Individually, Sterile-packaged in Ampoules, 50 Units**

| 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 of 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<br>250 ml, 50, 100, 200 and 250 ml graduations |
| Filter diameter | 47 mm, prefilter 40 mm (particle testing only) |
| Filtration area | 13.2 cm$^2$ |
| Max. operating pressure | Vacuum only |
| Sterilization | Gamma irradiation |
| 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 |
| 0.45 | CN white│black | 16D01--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**

| | | |
|---|---|---|
| 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 |
| 0.45 | CN white│black | 16D01--25-06--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**

| | | |
|---|---|---|
| 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 |
| 0.45 | CN white│black | 16D01--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**

| | | |
|---|---|---|
| 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 |
| 0.45 | CN white│black | 16D01--25-06--BK |

**Accessories**

| Description | Order No. |
|---|---|
| Microsart® Funnel Dispenser<br>Funnel dispenser for secure removal of single,<br>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<br>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<br>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<br>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 cm$^2$ |
| Max. operating pressure | Vacuum only |
| Sterilization | Ethylene oxide |
| Lot certificates | Sterility and performance tests |

## Biosart® 250 Funnels, Ready to Use Filter Funnels, 250 ml, 50 Units

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

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

# Combisart® – The Sterile-vented Filter Station
# Individual and Multi-branch Systems

The Sartorius 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 1ZU---0002 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
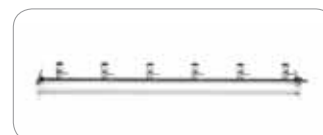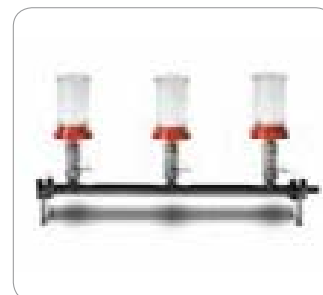


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**Specifications**

| | |
|---|---|
| Stainless steel quality | High-grade stainless steel: B.S. 304S31│AISI 304 |
| Dimensions L × H × D [mm] | 3-branch manifold: 435 × 103 × 120<br>6-branch manifold: 910 × 103 × 120 |
| Max. operating pressure | Vacuum only |
| Sterilization | By autoclaving (max. 134 ℃),<br>By dry heat (max. 180 ℃),<br>By flaming,<br>By other methods acc. to ISO 8199 |
| Parts and materials | Lid, funnel, base part, filter support, clamp<br>and tap made of stainless steel.<br>Silicone flat gasket. Silicone lid seal |
| Flow rate per filter station<br>for water at 90% vacuum | 200 ml/min with 0.2 µm membrane filter<br>600 ml/min with 0.45 µm membrane filter |
| Filtration area | 12.5 cm² (if using stainless steel funnels) |
| Suitable membrane | 50 mm (47 mm, if using a 47 mm frit 6980103)<br>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<br>(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),<br>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,<br>accommodate stainless steel funnels and Biosart® 100│250 | 16840 |
| Microsart® Base 47 mm, with frit, stainless steel base for<br>Combisart® and Microsart® Combi.jet<br>Optimized for the use with 47 mm membranes, Click-Fit closure for<br>Microsart® Funnel, Microsart® @filter (other funnel types sealed by<br>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

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

6980124 silicone flat gasket
6980104 PTFE flat gasket

16841
individual
stainless
steel base

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

17012-E
Plug Luer Lock
(pack of 12)

17575-ACK
Minisart SRP
(pack of 50)

6980225
Plug conical
(pack of 10)

6980267 3-way tap
6980268 knurled nut

## 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

6980270
stainless steel cap

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 silcone gasket)

6980274 silicone O-ring 8 × 20

6980235 silicone O-ring (pack of 3)

6980268
knurled nut

17575-ACK
Minisart SRP
(pack of 50)

17012-E
Plug Luer Lock
(pack of 12)

6980267
stainless steel
3-way tap

6980225
Plug conical
(pack of 10)

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

*) 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 Ø | 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, polypropylene and silicone O-ring | Biosart® 100 Monitors onto Sartorius Stedim Biotech stainless steel base 1ZU---0002 Microsart® Base 47 mm (stainless steel base for Combisart® and Microsart® Combi.jet) | 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. 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 × H × D [mm] | 246 × 98 × 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 × 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 305).

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# How to Set-up a Vacuum Filtration System

**Microsart® Combi.jet 2-branch Stainless Steel Manifold plus Microsart® e.jet**
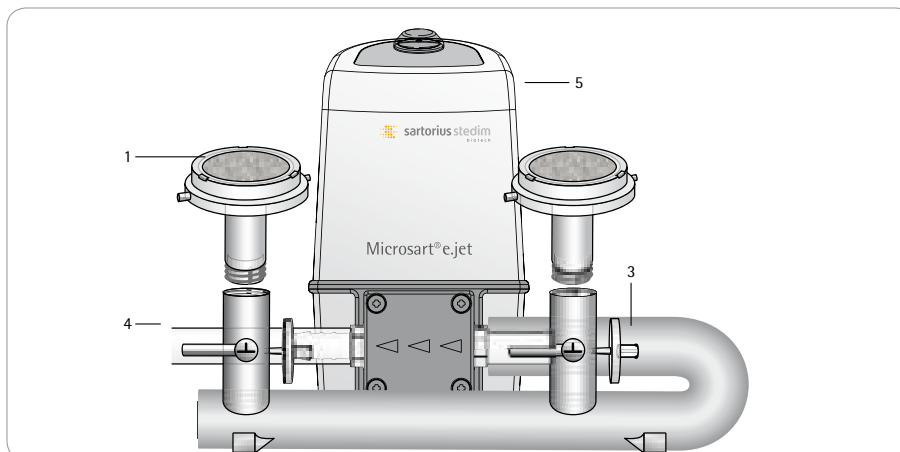


The filter stations are directly connected to the Transfer Pump for simultaneous transfer of the filtrate to waste. Easy assembling thanks to Quick Connection technology.

**Order Information**

| Pos. | Description | Order Qty. | Order No. | Detailed Information on Page |
|------|-------------|------------|-----------|------------------------------|
| | Microsart® Combi.jet stainless steel equipment: | | | 311 |
| 1 | Microsart® Base 47 mm | 2 | 1ZU---0002 | |
| 2 | Microsart® Combi.jet 2-branch manifold | 1 | 16848-CJ | |
| | Sterile venting of the filter station: | | | 308 |
| 3 | Minisart® SRP25, 0.2 µm | 1 | 17575--------ACK | |
| 4 | Silicone tubing, pressure-sided,1 m | 2* | 1ZAS--0007 | 323 |
| | Vacuum Pump: | | | 322 |
| 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 | 300 |
| | Stainless steel tweezers | 1 | 16625 | 327 |
| | Colony Counter | 1 | 17649 | 326 |
| | Incubator | 1 | 18119 | 326 |
| | Container for anaerobic incubation | 1 | 16671 | 327 |

* required length depends on distance between Transfer Pump and drain

**Combisart® 1-branch Stainless Steel Manifold Plus Microsart® mini.vac**
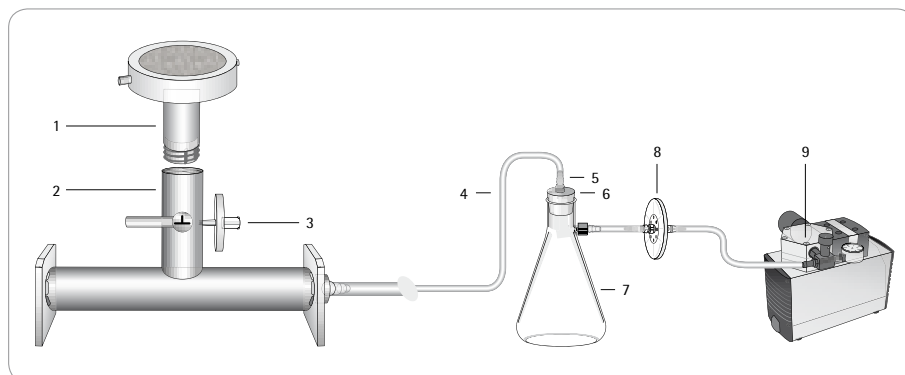


The filter station is connected to a suction flask, which is connected to a filtrate-protected vacuum pump.

**Order Information**

| Pos. | Description | Order Qty. | Order No. | Detailed Information on Page |
|------|-------------|------------|-----------|------------------------------|
| | Combisart® stainless steel equipment: | | | 305 |
| 1 | Combisart® single base, 50 mm | 1 | 16840 | |
| 2 | Combisart® 1-branch manifold | 1 | 16844 | |
| | Sterile venting of the filter station: | | | 308 |
| 3 | Minisart® SRP25, 0.2 µm | 1 | 17575--------ACK | |
| 4 | Rubber vacuum hose, 1 m | 3* | 16623 | 320 |
| | Suction flask and stopper: | | | 319 |
| 5 | Tube connector | 1 | 17204 | |
| 6 | Silicone stopper | 1 | 17173 | |
| 7 | Suction flask, 2 liters | 1 | 16672 | |
| | Water trap for pump protection: | | | 320 |
| 8 | Vacusart®, 0.45 µm | 1 | 17804----------M | |
| | Vacuum Pump: | | | 321–323 |
| 9 | Microsart® mini.vac, 230 V, 50 Hz | 1 | 16694-2-50-06 | |
| | Additional accessories: | | | |
| | Microsart® e.motion Dispenser | 1 | 16712 | 313 |
| | Stainless steel tweezers | 1 | 16625 | 327 |
| | Colony Counter | 1 | 17649 | 326 |
| | Incubator | 1 | 18119 | 326 |
| | Stainless steel prefilter attachment | 1 | 16807 | 327 |
| | Container for anaerobic incubation | 1 | 16671 | 327 |

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

**Combisart® 1-branch Stainless Steel Manifold plus Microsart® e.jet**
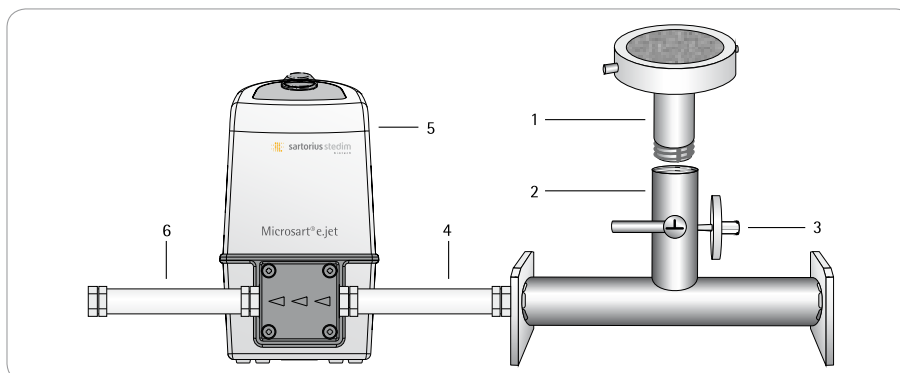


The filter station is directly connected to a vacuum fluid pump for simultaneous transfer of the filtrate to waste. Easy assembling thanks to Quick Connection technology.

**Order Information**

| Pos. | Description | Order Qty. | Order No. | Detailed Information on Page |
|------|-------------|------------|-----------|------------------------------|
| | Combisart® stainless steel equipment: | | | 305 |
| 1 | Combisart® single base, 50 mm | 1 | 16840 | |
| 2 | Combisart® 1-branch manifold | 1 | 16844 | |
| | Sterile venting of the filter station: | | | 308 |
| 3 | Minisart® SRP25, 0.2 µm | 1 | 17575--------ACK | |
| 4 | Silicone tubing with Quick Connection Coupling, 20 cm, vacuum-sided | 1 | 1ZA---0006 | 323 |
| | Vacuum Pump: | | | 322 |
| 5 | Microsart® e.jet Transfer Pump | 1 | 166MP-4 | |
| 6 | Silicone tubing, pressure-sided 1 m | 2* | 1ZAS--0007 | 323 |
| | Additional accessories: | | | |
| | Microsart® e.motion Dispenser | 1 | 16712 | 314 |
| | Stainless steel tweezers | 1 | 16625 | 327 |
| | Colony Counter | 1 | 17649 | 326 |
| | Incubator | 1 | 18119 | 326 |
| | Stainless steel prefilter attachment | 1 | 16807 | 327 |
| | Container for anaerobic incubation | 1 | 16671 | 327 |

* 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

6981063
stainless steel lid

6981064
silicone lid seal

6981065
stainless steel
funnel 100 ml
with clamp

6981001
stainless steel lid

6981003
silicone lid seal

6981002
stainless steel funnel 500 ml
with clamp

6980264
clamp

6980264
clamp

6980270
stainless steel cap

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

Manifolds
without funnels:

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

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

6980124 silicone flat gasket
6980104 PTFE flat gasket

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 × 100 ml | 16219 |
| Individual stainless steel filter holder, 500 ml | 1 × 500 ml | 16201 |
| Individual stainless steel filter holder without lid, 40 ml | 1 × 40 ml | 16220 |

**Multi-branch Manifolds, Stainless Steel, with Stainless Steel Funnels and Lids**

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

**Glass Filter Holders**

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

**Polycarbonate Filter Holder**

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

# Accessories for Vacuum Filter Holders and Manifold Systems

### Suction Flasks and Stoppers

### Suction Flask, 2 Liter Capacity

Vacuum-resistant flask made of duran 50 glass with plastic safety hose nipple according to the – German Industrial Standard No. 12476. Outer diameter of the hose nipple, 9 mm. Inner diameter of the opening, 60 mm. Stoppers are not enclosed.

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

### Order Numbers for Suction Flasks

| Description | Order No. |
|---|---|
| Suction flask, 5 liters acc. to DIN 12476, incl. stopper 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 |

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**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<br>16694–2–50–22<br>16694–1–60–22 | Microsart® mini.vac<br>16694–2–50–06<br>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<br>16694-1-60-22: 115 V\|60 Hz | 16694-2-50-06: 230 V\|50 Hz<br>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 × H × D [mm] | 261 × 204 × 110 | 164 × 141 × 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 × L × H [mm] | 120 × 170 × 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 R$^3$/$_8$" 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 R$^3$/$_8$" 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 18 liters and is designed to hold the following numbers and sizes of petri dishes: 200 × 47 mm or 160 × 56 mm|60 mm or 72 × 90 mm.

The swing-up cover and removable insertion plate simplify loading and unloading. The cover is opaque, avoiding light penetration into the chamber.

**Specifications**

| Incubator | 18119 |
|---|---|
| Voltage [V] | 100-240 |
| Frequency [Hz] | 50|60 |
| Rated power [kW] | 0.045 |
| Weight [kg] | 7.2|15 |
| Max. shelf load [kg|lbs] | 2|4.4 |
| Dimensions W × H × D [mm] | Inner 290 × 180 × 310<br>Outer 470 × 260 × 415 |
| Temperature range | 17 °C to 40 °C |
| Temperature stability at 37 °C | Less than ±0.2 °C |
| Temperature uniformity at 37°C | ±1.2 °C |
| Capacity | Approx. 18 liters |

| Description | Order No. |
|---|---|
| Incubator | 18119 |

**Stainless Steel Tweezers**
Membrane filters should only be handled
with suitable tweezers to avoid contami-
nation which can result from hand contact.
Sartorius Stedim Biotech stainless steel twee-
zers 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 fil-
tration. 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 |

327

# School Kit for Microbiological Experiments
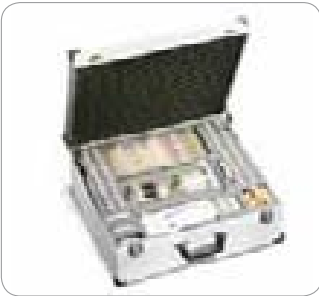


**Complete Kit**

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. Manufacturer of such products are required to supply proof of sterility of the final product batch.

The Sterisart® Universal Pump is available in two versions: the basic version 16419 and the 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**
- Enhanced safety due to the closed system without ventilation
- Robust stainless steel housing
- 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 × D × H [mm] Pump | Approx. 336 × 260 × 210 (with lever) |
| Pump with holding ring for bottles, container | Approx. 440 × 365 × 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 and 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 |
| 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 means the main risk of a secondary contamination and false positive results is eliminated. A peristaltic pump transfers the sample into the filtration units. After rinsing, the filtration units are filled with media and used for incubation of the filters without any contact to the environment.

As different pharmaceutical products and their containers need different systems for a convenient and secure sample transfer different versions adapted to the needs are available. Detailed information can be found in the corresponding data sheets
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

- Ergonomical and safe handling
  - Easy to open packaging
  - Large color-coded clamps for optimized use with gloves
  - Protective shields to avoid injuries

- Reliable results
  - Sartochem® membrane for high retention of microbes, low adsorption and high mechanical stability
  - Gas-impermeable packaging for use in isolators
  - Product and lot information on units and additionally as barcode on packaging

- Flexible use
  - Different variants with several user friendly adapters for the most common sample containers
  - Septum variants for sampling during incubation

### 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 |
| 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 |
| Lyophilisates, 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 |
| 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 Sampling during Incubation, Individually Sterilized, 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 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 |
| Lyophilisates, 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. |
|---|---|---|
| Dissolving and diluting of hardly soluble powders in closed containers | 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 included 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 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 × 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 × 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 |

## 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)**
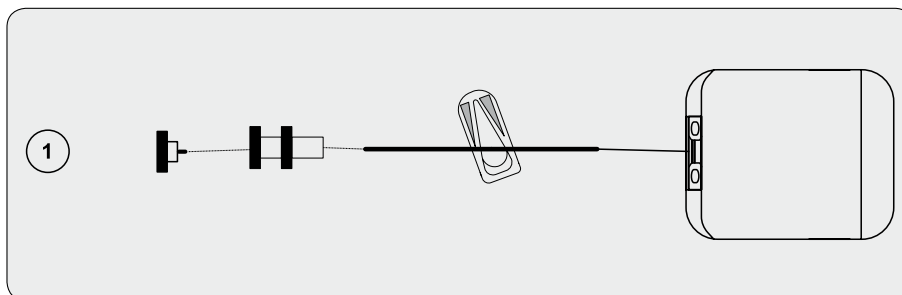


| Part Number | Description | Tubing | Bag Port 1 | Bag Port 2 | Bag Port 3 | Qty/ Box |
|---|---|---|---|---|---|---|
| FB115270 | Flexboy® 5 ml | EVA | $^3/_{16}$" × $^1/_4$" × 5 cm (2") Female LL + plug, slide clamp | NA | NA | 100 |

**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 | $1/4$" × $5/16$" × 10 cm (4") LL male + Cap, pinch clamp | $1/4$" × $5/16$" × 10 cm (4") LL female + Cap, pinch clamp | $3/16$" × $1/4$" × 5 cm (1.97 in.) + septum | 20 |
| FFB102643 | Flexboy® 150 ml | EVA | $1/4$" × $5/16$" × 10 cm (4") LL male + Cap, pinch clamp | $1/4$" × $5/16$" × 10 cm (4") LL female + Cap, pinch clamp | $3/16$" × $1/4$" × 5 cm (1.97 in.) + septum | 20 |
| FFB102670 | Flexboy® 500 ml | EVA | $1/4$" × $5/16$" × 10 cm (4") LL male + Cap, pinch clamp | $1/4$" × $5/16$" × 10 cm (4") LL female + Cap, pinch clamp | $3/16$" × $1/4$" × 5 cm (1.97 in.) + septum | 20 |
| FFB103547 | Flexboy® 1000 ml | EVA | $1/4$" × $5/16$" × 10 cm (4") LL male + Cap, pinch clamp | $1/4$" × $5/16$" × 10 cm (4") LL female + Cap, pinch clamp | $3/16$" × $1/4$" × 5 cm (1.97 in.) + septum | 20 |
| FFB102812 | Flexboy® 3000 ml | EVA | $1/4$" × $5/16$" × 10 cm (4") LL male + Cap, pinch clamp | $1/4$" × $5/16$" × 10 cm (4") LL female + Cap, pinch clamp | $3/16$" × $1/4$" × 5 cm (1.97 in.) + septum | 20 |
| FFB103551 | Flexboy® 5 l | EVA, Silicone | $3/8$" × $15/32$" × 10 cm (4") LL male + Hose barb $3/8$" × $1/4$" + $3/16$" × $5/16$" × 50 cm (20") + male Luer Lock + female screw + cap + dust cap + pinch clamp | $3/8$" × $15/32$" × 10 cm (4") LL male + Hose barb $3/8$" × $1/4$" + $3/16$" × $5/16$" × 50 cm (20") + female luer + male luer plug + dust cap + pinch clamp | $3/16$" × $1/4$" × 5 cm (1.97 in.) + septum | 20 |
| FFB102470 | Flexboy® 10 l | EVA, Silicone | $3/8$" × $15/32$" × 10 cm (4") LL male + Hose barb $3/8$" × $1/4$" + $3/16$" × $5/16$" × 50 cm (20") + male Luer Lock + female screw cap + dust cap + pinch clamp | $3/8$" × $15/32$" × 10 cm (4") LL male + Hose barb $3/8$" × $1/4$" + $3/16$" × $5/16$" × 50 cm (20") + female luer + male luer plug + dust cap + pinch clamp | $3/16$" × $1/4$" × 5 cm (1.97 in.) + septum | 20 |
| FFB102326 | Flexboy® 20 l | EVA, Silicone | $3/8$" × $15/32$" × 10 cm (4") LL male + Hose barb $3/8$" × $1/4$" + $3/16$" × $5/16$" × 50 cm (20") + male Luer Lock + female screw cap + dust cap + pinch clamp | $3/8$" × $15/32$" × 10 cm (4") LL male + Hose barb $3/8$" × $1/4$" + $3/16$" × $5/16$" × 50 cm (20") + female luer + male luer plug + dust cap + pinch clamp | $3/16$" × $1/4$" × 5 cm (1.97 in.) + septum | 20 |

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

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

## Order Numbers for CERTOMAT® Benchtop Shakers

|  |  | 230 V/50 Hz | 115 V/60 Hz |
|---|---|---|---|
| CERTOMAT® MO II | 12.5 mm | BBI-8860858 | convertible |
|  | 25 mm | BBI-8860866 | convertible |
| CERTOMAT® S II | 25 mm | BBI-8862524 | BBI-8862532 |
|  | 50 mm | BBI-8862621 | BBI-8862631 |
| CERTOMAT® RM | 25 mm | BBI-8862320 | BBI-8862338 |
|  | 50 mm | BBI-8862427 | BBI-8862435 |
| CERTOMAT® R | 25 mm | BBI-8863024 | BBI-8860130 |
| CERTOMAT® U | 25 mm | BBI-8863121 | BBI-8860238 |
| CERTOMAT® H | heating | BBI-8863202 | convertible |
| CERTOMAT® HK | heat\|cool | BBI-8863245 | convertible |

| Literature for CERTOMAT® benchtop shakers |
|---|
| 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 × 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

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## Accessories













| Reference | Description |
|---|---|
| BBI-886 1455 | Illumination unit for CERTOMAT® BS-1, 5 × 18 W, individually activated, programmable, only in combination with cooling |
| BBI-886 1463 | Illumination unit for CERTOMAT® BS-T, 5 × 18 W, individually activated, programmable, only in combination with cooling |
| BBI-886 4489 | Support frame for CERTOMAT® BS-T or two CERTOMAT® BS-1, welded sectional frame construction, height-adjustable feet |
| BBI-886 1471 | Grid for Petri dishes, stainless steel, adjustable height, 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 × 420 mm, for all CERTOMAT® shakers |
| BBI-885 3037 | Type FU, 800 × 420 mm, for CERTOMAT® S II, RM, R, U, and CERTOMAT® BS-1 and BS-T |
| | **Type E Trays (420 × 420 mm) Equipped with Stainless Steel Clamps for Erlenmeyer Flasks** |
| BBI-885 3533 | 39 clamps for 100 ml flasks |
| BBI-885 3568 | 20 clamps for 250 ml flasks |
| BBI-885 3584 | 14 clamps for 500 ml flasks |
| BBI-885 3606 | 9 clamps for 1000 ml flasks |
| | **Type E Trays (420 × 420 mm) Equipped with Plastic Clamps for Erlenmeyer Flasks** |
| BBI-885 3688 | 39 clamps for 100 ml flasks |
| BBI-885 3666 | 19 clamps for 250 ml flasks |
| BBI-885 3677 | 14 clamps for 500 ml flasks |
| | **Type F Trays (800 × 420 mm) Equipped with Stainless Steel Clamps for Erlenmeyer Flasks** |
| BBI-885 3738 | 74 clamps for 100 ml flasks |
| BBI-885 3762 | 40 clamps for 250 ml flasks |
| BBI-885 3789 | 26 clamps for 500 ml flasks |
| BBI-885 3800 | 15 clamps for 1000 ml flasks |
| | **Stainless Steel Clamps for Erlenmeyer Flasks, Capacity for Universal Trays** |
| BBI-885 4505 | for 25 ml flasks, type EU max. 49 clamps, type FU max. 98 clamps |
| BBI-885 4513 | for 50 ml flasks, type EU max. 48 clamps, type FU max. 96 clamps |
| BBI-885 4521 | for 100 ml flasks, type EU max. 24 clamps, type FU max. 48 clamps |
| BBI-885 4556 | for 250 ml flasks, type EU max. 17 clamps, type FU max. 39 clamps |
| BBI-885 4572 | for 500 ml flasks, type EU max. 12 clamps, type FU max. 26 clamps |
| BBI-885 4599 | for 1000 ml flasks, type EU max. 8 clamps, type FU max. 17 clamps |
| BBI-885 4610 | for 2000 ml flasks, type EU max. 4 clamps, type FU max. 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 ×1 mm |
| BBI-886 0416 | Premium, roll of 10 m, 30 × 1 mm, repeated use |
| BBI-886 4470 | Anti-skid layer, 380 × 450 mm, for individual cut |
| | **Universal mounting system** |
| BBI-885 4238 | Basic element type B-2 for EU tray |
| BBI-885 4246 | Basic element type B-3 for FU tray |
| BBI-885 4254 | Clamping rod type U |
| | max. 4 rods on basic element B-2, 7 rods on basic element B-3 |
| | **Shaking flasks, DURAN glass, Erlenmeyer type,** |
| | **straight rim for metal caps, with 3 baffles** |
| BBI-886 1005 | 300 ml flasks, max. diameter 87 mm, height 161 mm, pack of 10 |
| BBI-886 1013 | 500 ml flasks, max. diameter 105 mm, height 183 mm, pack of 10 |
| BBI-886 1021 | 1000 ml flasks, max. diameter 131 mm, height 232 mm, pack of 10 |
| BBI-886 1022 | 2000 ml flasks, max. diameter 166 mm, height 305 mm, pack of 10 |
| | **Metal caps for shaking flasks** |
| BBI-886 1099 | Aluminium caps, pack of 10 |
| BBI-886 1102 | Stainless steel caps, pack of 10 |
| | **Shaking flasks, DURAN glass, Erlenmeyer type,** |
| | **narrow neck for plugs, with 3 baffles** |
| BBI-886 0998 | 500 ml flasks, max. diameter 131 mm, height 232 mm, pack of 10 |
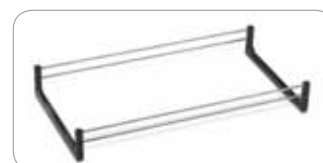
# SENSOLUX® Stand-alone Version

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 × 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.

# 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 2 l 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 bioreactor 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 measurement) 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. Calibration data are printed on the vessel label. These can be entered manually into the calibration menu of the control tower or may be transferred 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)
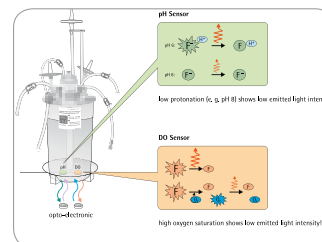



Barcode Scanner

**Product Specification UniVessel® SU Holder**

**UniVessel® SU Holder**

| | |
|---|---|
| Dimensions W × H × D [mm] | 265 × 110 × 350 |
| Weight (incl. adaptor ring) [kg] | 13.7 |
| Interface to BIOSTAT® B-DCU II | RS485 |
| Ambient temperature\|relative humidity (non-condensating) | +5 °C – 45 °C\|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 °C–45 °C | +5 °C–45 °C |
| Cross-sensitivity | $CL_2$, $SO_2$ | Slightly to ionic strength, severe to small fluorescent molecules |

* Max. 110 % air saturation at 37 °C in water

**Head Plate Connections|Ports**
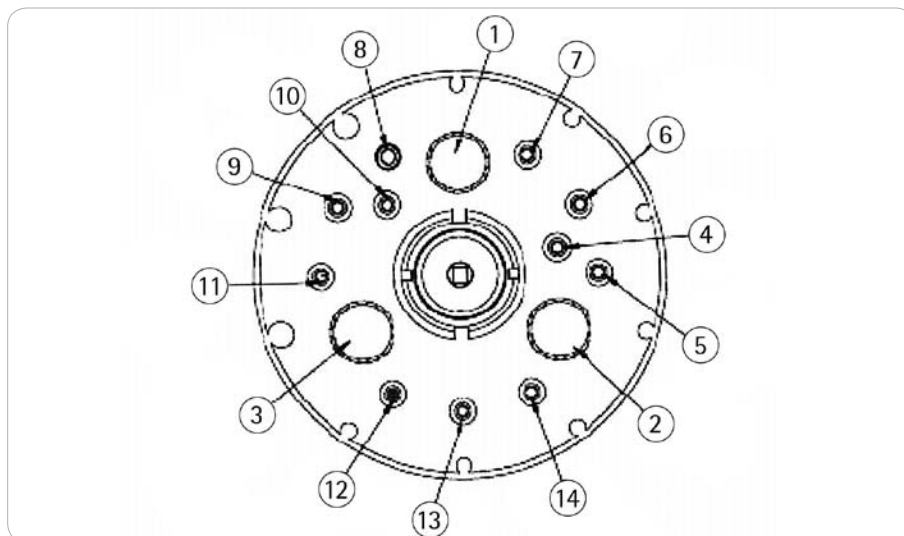


1   12 mm port with blind plug, PG 13.5 thread, for standard 12 mm sensor, length max. 225 mm

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 $1/8$" × $1/4$" × 200 mm

5   Gas Inlet Sparger, Midisart®, silicone tubing $1/8$" × $1/4$" × 200 mm

6   Addition 1, C-Flex® tubing $1/8$" × $1/4$" 500 mm, Male Luer $1/8$"

7   Dip tube 1, C-Flex® tubing $1/8$" × $1/4$", Male Luer $1/8$",
    Dip Tube to min. working volume

8   Thermowell

9   Gas Outlet, Midisart®, silicone tubing $1/4$" × $7/16$" × 200 mm

10  Addition 2, C-Flex tubing $1/4$" × $7/16$" × 500 mm, Female MPC 4"

11  Dip tube 2, C-Flex® tubing $1/4$" × $7/16$", Male MPC ¼",
    Dip Tube (bended) to vessel bottom

12  Sample port, silicone tubing $1/8$" × $1/4$", Luer with needle free septum port

13  Addition 3, C-Flex® tubing $1/8$" × $1/4$" 500 mm, Female Luer $1/8$"

14  Dip tube 3, C-Flex® tubing $1/8$" × $1/4$" × 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× 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
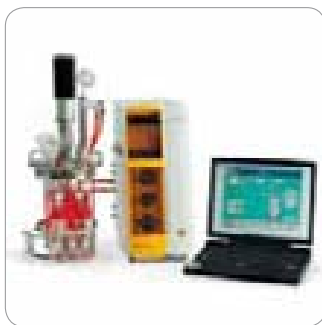






**BIOSTAT® Aplus... plug in and grow**
The BIOSTAT® Aplus is a compact, fermentor│bioreactor system specially designed for educational use and preliminary or investigational R&D applications.
The single-housing design concept with integrated measurement and control hardware, pumps, temperature, gassing and motor systems, saves valuable laboratory bench space.
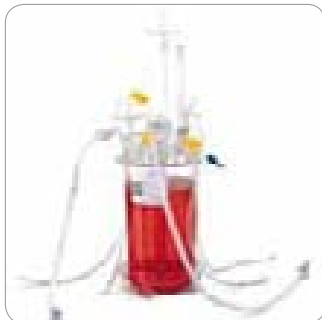
The application-driven, configured packages for microbial and cell culture include everything needed to get started immediately. The BIOSTAT® Aplus is available with interchangeable 1 l, 2 l, or 5 l working volume single-wall boroslicate glass culture vessels. Alternatively a single-use 2 l polycarbonate 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® B
## The Golden Standard of Benchtop Bioreactors

Versatile and compact bioreactor for a broad range of applications. One control platform configurable for microbial and cell culture for Academia and Industrial R&D worldwide.

Single or Twin versions are available with different vessel sizes and types including single use or glass.

Offering easy-load pumps and basic to advanced gassing strategies, the BiOSTAT® B adjusts to your individual demands.

Our compact controller provides measurement and control of temperature, pH, DO, stirrer speed, gas mixing, foam|level and substrate as well as optional redox and turbidity measurement.

**Laboratory Requirements**
**Required bench space**
**approx. W x H x D [mm]**

**Tower: W x H x D**
        **410 x 810 x 520 [mm]**

**Vessel:**

|       | Breite (B) [1] | Höhe (H) [2] | Tiefe (T) [1] |
|-------|------|------|------|
| 1 L   | 200  | 540  | 270  |
| 2 L   | 230  | 600  | 300  |
| 5 L   | 260  | 730  | 340  |
| 10 L  | 330  | 860  | 420  |

Utility lines Customer supply
Power supply 120 VAC|15 A or 230 VAC|8 A
Gasses controlled at 1.5 barg; dry, particle and oil free
Water controlled at 2 barg
Drain gravity drain with zero backpressure

## BIOSTAT® B
## The Golden Standard of Benchtop Bioreactors
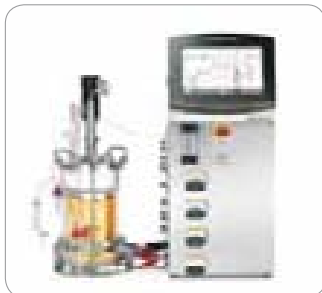
**Save Your Space!**
- Single or Twin configurations available
- Easy load pumps pre-installed in the controller

**Save Your Time!**
- Sanitary steel housing for convenient cleaning
- Fully-equipped based on your configuration needs for fast start-up
- User-friendly 12" touch screen interface for easy operation

**Gain More Flexibility!**
- Single-use and|or reusable vessel types and sizes
- Gassing and control strategies may be enhanced by optional hardware and software selections
- Up to 6 pumps per vessel

# Single-use Bioreactors

## BIOSTAT RM 20|50 Basic
The BIOSTAT RM is a single-use, wave-mixed bioreactor.

### Basic Systems
Basic systems are designed for stand alone bench top use and allow controlling rocking rate, angle, and temperature. An internal gassing module can be added for aeration with air and $CO_2$ to work with a fixed $CO_2$ concentration of 0–15% in the process gas. The digital controller is directly integrated into the rocker unit and operated with an easy to use colour touch screen directly on the rocker.

**Features of the BIOSTAT® RM Basic Include:**
- Setting of rocking rate and angle
- Individual temperature control of two bags (2 l, 10 l) or one bag (20 l, 50 l)
- Independent gassing of two bags (0–500 ml/min) or one bag (0–1000 ml/min)
- Setting of the bag configuration: will automatically select the right gassing and temperature control parameters of the system
- Integrated Air|$CO_2$ mixing by optional gassing module
- Air supply, switchable between internal air pump or process gas
- Positioning of the platform for harvest and sampling
- 2 Filter heaters made of PC, plug directly into rocker base
- Color coded plugs and socket for easy operation
- Tube and cable organizer at the sides of the bag holder
- Security function, check plug in of filter heater when gassing is switched on
- Alarm display
- 3 different user levels (Administrator, User, Locked)
- Trend display for data visualization
- Time and date display
- Selection of control mode: Local or DCU
- Potential free alarm contact
- RS-232 serial interface for communication with PC running
- Optional Ethernet interface with communication protocol for connection to third party software
- Optional ProfiBus DP interface with communication protocol for connection to third party software
- Service Interval Display

**Optical Systems**

The BIOSTAT® RM Optical provides full process automation with sophisticated feed back control. In addition to the rocker unit, it comprises a BIOSTAT® DCU (digital control unit) tower. The control tower is connected to the rocking unit for monitoring and controlling the culture, including $pO_2$, pH, agitation, and temperature in batch and fed batch mode of operation. Pre-calibrated, single-use optical sensors are included in the bag for the measurement of DO and pH.

**Perfusion Systems**

The BIOSTAT® RM Perfusion systems allow fully automated, continuous processes. The single-use bag is equipped with optical pH and DO probes. It contains an internal perfusion membrane for efficient cell retention. The feed and harvest pumps are controlled by gravimetric flow controllers, which monitor the weight of the feed and harvest containers to ensure precise flow rates.

Different perfusion configurations are available depending on the working volume, the required perfusion rate and the maximum feed and harvest container weight.

| Order Code | Description | Perfusion Rate (l/day) | Type of Pump | Weighing Capacity Balances [kg] | Readability Balances [g] |
|---|---|---|---|---|---|
| DH-----PRM11 | Perfusion Option 1 – 120 VAC | 2–55 | int. WM102 | 60 | 1 |
| DH-----PRM12 | Perfusion Option 1 – 230 VAC | 2–55 | int. WM102 | 60 | 1 |
| DH-----PRM21 | Perfusion Option 2 – 120 VAC | 2–55 | int. WM102 | 300 | 10 |
| DH-----PRM22 | Perfusion Option 2 – 230 VAC | 2–55 | int. WM102 | 300 | 10 |
| DH-----PRM31 | Perfusion Option 3 – 120 VAC | 23–1100 | ext. WM323 | 300 | 10 |
| DH-----PRM32 | Perfusion Option 3 – 230 VAC | 23–1100 | ext. WM323 | 300 | 10 |
| DH-----PRM41 | Perfusion Option 4 – 120 VAC | 23–1100 | ext. WM323 | 600 | 20 |
| DH-----PRM42 | Perfusion Option 4 – 230 VAC | 23–1100 | ext. WM323 | 600 | 20 |
| DH-----PRM51 | Perfusion Option 5 – 120 VAC | 23–1100 | ext. WM323 | 1500 | 20 |
| DH-----PRM52 | Perfusion Option 5 – 230 VAC | 23–1100 | ext. WM323 | 1500 | 20 |

**Twin Systems**
The BIOSTAT RM 20|50 is available as
Single and Twin systems. One controller can
independently control the temperature,
gas flow, pH and DO of two bags. The bags
can be mounted on two different rockers
(Twin Rocker) or on the same rocker (Twin
Controller). The BIOSTAT RM 20 and RM 50
are available either in Twin Rocker or Twin
Controller configuration, also as mixed
RM 20|RM 50 Twin variants.

| Model | Max. Working Volume [l] | Basic | System Type | | Twin Availability | | Temperature Control* | |
| | | | Optical | Perfusion | Twin Rocker | Heating Controller | Heating Only | Heating\| Cooling |
|---|---|---|---|---|---|---|---|---|
| 20 | 10 | × | × | × | ×* | × | × | × |
| 50 | 25 | × | × | × | ×* | × | × | × |

\*    only for optical and perfusion
\*\*   on request

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## CultiBag RM

### Description
The CultiBag RM is a single use bioreactor bag available in multiple sizes and configurations depending on customer requirements. The inner layer of the disposable bioreactor bag is made of ethyl vinyl acetate (EVA), which shows an excellent biocompatibility.

### Applications
Our BIOSTAT® RM bioreactors use rocking motion mixing technology which is ideal for cell cultivation with low shear stress. Easy to use, it is hassle free and applicable to all cell types, including mammalian cells, stem cells, plant cells, insect cells and microbial cells.

### Cost Reduction and Risk Minimization
Disposable Bags and single-use systems in general used in biopharmaceutical manufacturing improve process safety and reduce costs at the same time. Time and capacity consuming CIP & SIP operations are minimized.

### Flexibility and Configurations
The CultiBag RM is available in 1 l, 2 l, 10 l, 20 l, 50 l, 100 l, 200 l and 600 l bag sizes. Bags are available as basic, optical and perfusion pro configurations.

Basic bags are designed for use in seed train and production applications without pH and DO control. Basic bags up to 20 l size are also available with screw caps (38 mm diameter). The screw cap can be used for the insertion|removal of larger objects inside a laminar flow cabinet.

Optical bags feature single use optochemical pH and DO sensors, which are already installed in everybag and calibrated. Used together with the BIOSTAT® RM control tower, they allow high end cultivation with full process automation.

Perfusion bags feature an integrated 1.2 μm perfusion membrane (PES). The membrane is fixed at the bottom of the bag, forming a compartment for removal of cell free media. The wave created by the agition moves over the surface of the membrane, thereby flushing the membrane with every rocking motion. This innovative and patented design ensures low fouling and long cultivation times.

### Easy Implementation, Flexible Combinations
CultiBag RM Bags are supplied sterilized and ready to use. Setup times are kept to a minimum. The CultiBag RM is mounted on the bagholder of the rocker easily and secured on both sides through fixation clamps. Media is filled into the bag up to the required volume. A seed culture is added to the bag and cultivation is started under optimized conditions of aeration, temperature and mixing.

Sterile connection and disconnection devices like the BioWelder® or the BioSealer®, which are also provided by Sartorius Stedim Biotech, can be used to make safe connections between the C-Flex® 374 thermoplastic tubings which are used on all CultiBag RM bags. Aseptic, needle-free sampling ports allow easy and convenient sampling without the risk of cross contamination.

### Sensors
Precise and reliable single-use sensors for pH and DO come pre-installed and sterilized with the bag. The sensors are pre-calibrated and the calibration data is supplied together with the bag. After entering the data in the controller, the sensors are ready for use. Calibration is fast and convenient.

An optical fibre connects to the sensor patch, which is located at end of a sleeve in the bag. As there is no physical contact of the optical fiber to the inside of the bag, sterility is maintained at all times. The optical fibre transmits light of specific wavelengths to the sensor patch and returns the luminescence response from the sensor back to the measuring amplifier.

### Operating Volumes

| Bag Size | Min [l] | Max [l] | Total [l] |
|---|---|---|---|
| 1 l | 0.1 | 0.5 | 1 |
| 2 l | 0.2* | 1 | 2 |
| 10 l | 1.0* | 5 | 10 |
| 20 l | 2.0* | 10 | 20 |
| 50 l | 5.0* | 25 | 50 |
| 100 l | 10* | 50 | 100 |
| 200 l | 20* | 100 | 200 |
| 600 l | 60* | 300 | 600 |

* Bags with sensors might require higher min. working volumes

**Validation and Extractables Testing**
CultiBag RM Bags have been qualified applying the most complex and innovative test regimes. Biological, chemical and physical tests combined with extractable testing proove lowest extractables and leechables levels and excellent compatibilty to the relevant pharmacopoeias and guidelines. For more information, please refer to our Validation Guide and Extractables Guide. A leachables testing service is also available. Please contact your local Sartorius Stedim Biotech representative for further information.

**Quality Assurance**
All relevant materials are selected following applicable regulations and standards such as FDA, CFR's, cGMPs and inhouse guidelines. This includes the terms of delivery and acceptance of our purchasing department. Finished CultiBag RM bags undergo final product quality control which is certified with the Quality Assurance certificate included with every bag.

**Quality Management Systems**
Sartorius Stedim Biotech has implemented a certified Quality Management System according to well established standards. The complete Quality Systems Certificates are continuosly updated and can be downloaded on our website: www.sartorius-stedim.com/qm-certificates.

**Manufacturing Site**
CultiBag RM bags are produced in our factory in Tagelswangen|Switzerland in ISO class 7 and class 8 clean rooms.

**Security of Supply**
We ensure short lead times for all standard CultiBag RM Bags. Multiple warehouse locations ensure a fast delivery all over the world.

**Bag Ports**

| | |
|---|---|
| CultiBag RM basic: | Air Inlet\|Air Outlet filter<br>Sample port<br>Fill\|drain and spare ports<br>Female luer, male luer, female MPC or male MPC connectors<br>Ports with dip tubes<br>Tubing material: C-Flex® 374; Silicone |
| CultiBag RM basic screw cap: | Air Inlet\|Air Outlet filter<br>Sample port<br>Fill\|drain and spare ports<br>Female luer, male luer, female MPC or male MPC connectors<br>Ports with dip tubes<br>Tubing material: C-Flex® 374; Silicone<br>38 mm screw cap |
| CultiBag RM optical: | Air Inlet\|Air Outlet filter<br>Sample port<br>Fill\|drain and spare ports<br>Female luer, male luer, female MPC or male MPC connectors<br>Ports with dip tubes<br>Optical chemical DO sensor<br>Optical chemical pH sensor<br>Tubing material: C-Flex® 374; Silicone |
| CultiBag RM perfusion pro: | Air Inlet\|Air Outlet filter<br>Sample port<br>Fill\|drain and spare ports<br>Female luer, male luer, female MPC or male MPC connectors<br>Ports with dip tubes<br>Optical chemical DO sensor<br>Optical chemical pH sensor<br>Feed\|harvest ports<br>Acid\|base ports<br>Tubing material: C-Flex® 374; Silicone;<br>PharMed® |

**Ordering Information**

DB  B  002  L  -  -  -  -  -  -  -  -

— Disposable Bags

— Package Type
B = Basic
O = Optical
P = Perfusion
C = Customized

— Volume
001 = 1
002 = 2
010 = 10
020 = 20
050 = 50
100 = 100
200 = 200
600 = 600

— Units
L = Liter

— Bag Version
- = 1.2 µm pore size (perfusion pro bag)
   or
   standard  (basic and optical bag)
2 = Bag design fits Rocker 2

— Vent Filter Type

— Membrane
SM = Sartorius Stedim Biotech
      perfusion pro membrane

— Design number

— Design variation
SC = bag with 38 mm screw cap

| | Order Code | Description |
|---|---|---|
| Basic Bags Example: | DBB020L<br>DBB002L2 | CultiBag RM 20 l basic for Rocker 20\|50<br>CultiBag RM 2 l basic for Rocker 2 |
| Optical Bags for Example: | DBO020L | CultiBag RM 20 l optical |
| Perfusion Pro Bags Example: | DBP020L--SM | CultiBag RM 20 l perfusion pro;<br>1.2 µm pore size |
| Customized Bags for Example: | Customer own bag design DBC002L----01xx | CultiBag RM 2 l customized version |

**Bag Accessories**

| Order Code | Description |
|---|---|
| DS-------GF | Light Conductor Cable for CultiBag RM optical and perfusion pro (1 piece) |
| DS-------CGF | Clamp for Light Conductor Cable fixation (1 piece) |
| DS-----RMFH | Filter Heater for outlet filter of CultiBag RM 1 l–50 l |
| DS-----R2FH | Filter Heater for outlet filter of CultiBag RM 1 l–50 l, connectable to BIOSTAT® RM II (second generation). Also works for 600 l bag. |
| DS-----R2FP | External Power Supply for DS-----R2FH |
| DS200L-RMFH | Filter Heater for outlet filter of CultiBag RM 100 l–200 l |
| DS-------CV | Check Valves for outlet filter of CultiBag RM (50 pcs) |

RPM 1000

Mikro-Dismembrator U

sartorius stedim

biotech

# 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 $\varnothing$ 3 mm to 10 mm. Glass beads $\varnothing$ 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, $\varnothing$ 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, $\varnothing$ 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

# 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 × D × H [mm] | 460 × 390 × 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<br>± 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 × 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 × D × H1 × H2 [mm] | 460 × 390 × 140 × 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 | 14 l |
| ▪ With ext. reference vessel | 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 | +15 ℃ to +35 ℃ |
| Rel. humidity | 10-80% |

### Touch Screen

| | | |
|---|---|---|
| Size | 10.4" TFT | |
| Features | 256 colors | |
| Communication Ports | Serial Port TU | RS-232 |
| | 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 | |
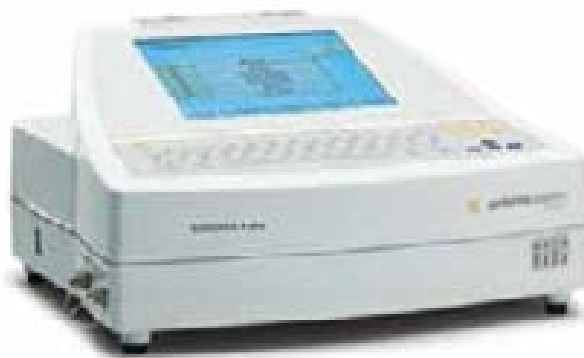
**Accessories**

| | | |
|---|---|---|
| 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 × | 1Z-LB-0002 | |



A  B    1  2  3  4  5          6 5    1    2      3    4
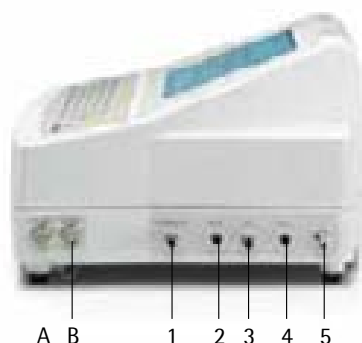
1: Ext. reference tank
2: Venting 1
3: Out
4: Venting 2
5: Compressed Air In
A: External sensor
B: External valves

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 biopharmaceutical 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 ℃ to +35 ℃ |
| 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
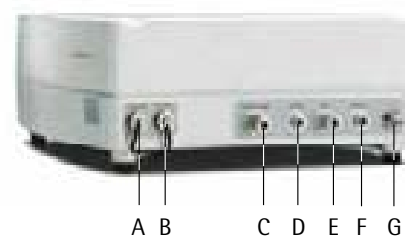
A. Ext. sensor
B. Ext. valve
C. Ext. reference tank
D. Venting 1
E. Outlet (test gas)
F. Venting 2
G. Inlet comp. gas

# Midisart® Test Manifold 10x

**Background Information**
Small venting filters like Midisart® 2000 are often used in large quantities. As for larger filter elements, the requirements on integrity testing get more and more important. The integrity testing procedure takes time and when dozens of filters are used and tested every day, it makes sense to make the testing procedure more efficient.

A single Bubble Point Test can easily take 10–15 minutes. The Midisart® Test Manifold can be used to test 10 filters in parallel which simply leads to a reduction of test time by 90%.

**About Midisart® 2000**
Midisart® 2000 is a small venting filter (filtration area 20 cm²) which is used e.g. to vent small bioreactors. An extremely hydrophobic membrane material (PTFE) is used in order to avoid blocking and to guarantee continuous air flow even at high humidity.

The Bubble Point Test is recommended for testing those small filters on integrity. The hydrophobic character of the membrane requires wetting with e.g. 60 % IPA|water mixture.

**Bubble Point Test**
The Bubble Point Test is a well accepted method for testing sterilizing grade filters for integrity. The Bubble Point is defined as the test pressure at which the liquid inside the pore structure of a wetted membrane is actively removed by overcoming the capillary forces. Therefore, the Bubble Point depends on the diameter of a pore.

As soon as the BP is higher than the given minimum BP, the membrane is within its specification and sterility of the filtrate is guaranteed.

**Application**
The Midisart® Test Manifold was developed in order to test these small venting filters using a parallel approach. After wetting the filters with IPA|water mixture a Bubble Point Test is started via a standard automatic integrity tester (e.g. Sartocheck 4), which gives reliable information regarding the integrity of all 10 filters. When the test result is "test passed", all 10 filters are intact. As soon as a test is failed, at least one defect filter is amongst the tested filters.

Each Midisart® can be pneumatically decoupled using a valve. Since each outlet is equipped with a separate valve, the manifold can also be used for testing less than 10 filters.

**Proven Efficiency and Safety**
It has been shown that the filter with the lowest Bubble Point strictly defines the Bubble Point of the complete arrangement when filters are tested in parallel. When a single defect Midisart® 2000 filter is tested together with 9 intact filters, the test will definitely fail. Therefore, the user can be sure to have highest safety even when using this economic, time-saving parallel approach.
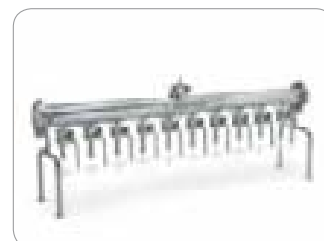


**Technical Specifications**

| | |
|---|---|
| Max. allowed test pressure | 6 bar |
| Material of construction | Stainless Steel (316L) |
| Surface finishes | Ra <0.5 µm internal epol. Ra <1.6 µm epol. |
| Dimensions | 1100 mm length |
| Weight | 13.5 kg |
| Connector | Stäubli (RBE03 male) |
| Closure system | Clamp |
| Gasket materials | EPDM |
| Order code | 1Z-LB-0002 |

# 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

EXPAND® Technical Trainings
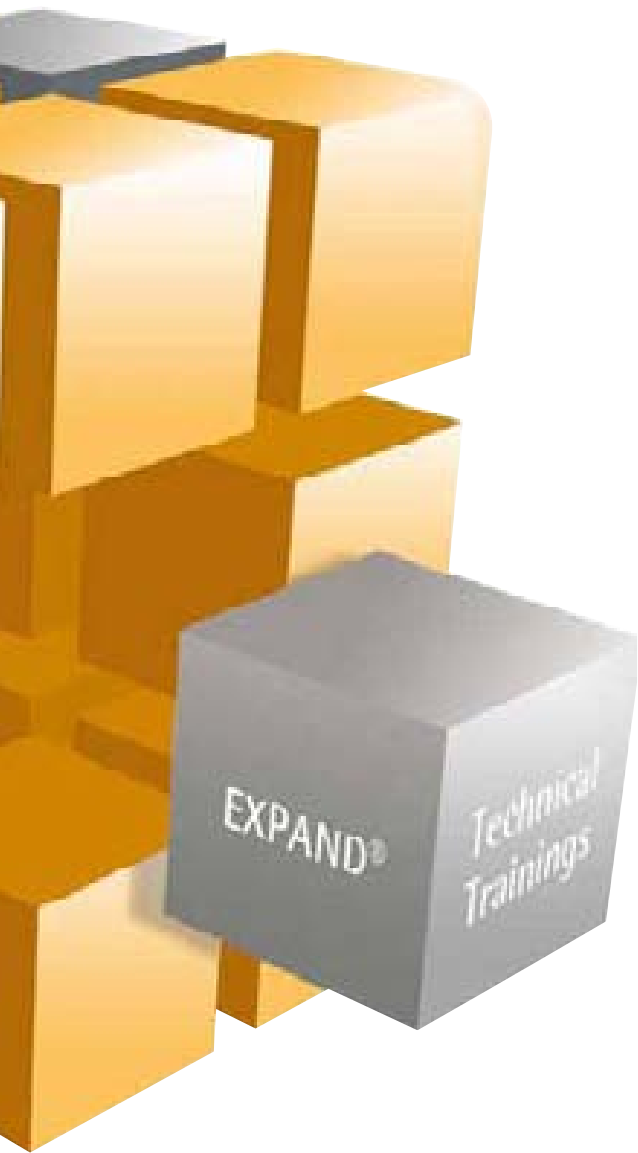
# Instrument Services

## 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

## EXTEND|Instrument Services

Our service portfolio extends across innumerable areas like contracts for calibration, maintenance and service with guaranteed response times just to mention a few selected items.

Preventive maintenance, for example, considerably enhances the performance and the product life of your systems, allowing problems to be identified at an early stage or – ideally – to be prevented from happening at all. This way, we safeguard your investment and help you synergize your overall costs.

We support you:
- Installation and startup
- Spare parts and consumables
- Equipment qualification (IQ | OQ)
- Maintenance services, training and service contracts
- Certificates and calibration services
- Corrective maintenance



**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; High cell density cultivation; Monoclonal Antibodies; Bioprocess Control

**Downstream Processing**
Downstream Processing; Animal Cell Culture Workshop

**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; Antibodies in Analysis

**Lab-|Quality Management**
Balances as test divices in QM; Gravimetric Pipette Calibration

**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

Who should attend: 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

Who should attend: 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 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
Who should attend: 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
Who should attend: 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

### # 862002 High Cell Density Cultivation of Animal Cells
Who should attend: Technicians and scientists in research and production with basic knowledge of mammalian cell culture in bioreactors.

Small groups perform high cell density cultivations of CHO cells in 2 L lab scale bioreactors. Based on essential theoretical aspects this course covers topics like bioreactor set up, feeding strategies, perfusion culture, sterile handling, analytics and process control.

Theoretical section:
- Components used in modern media formulations suitable for high cell concentration cultivation
- Strategies for culture media optimisation
- Basic mathematical models of batch-, fed-batch-, chemostat- and perfusion cultures
- Physical background of different cell retention devices
- Brief introduction of analytical devices used in the practical part

Practical exercises:
- Fed batch cultivations in 2 L scale using highly concentrated substrate feeds
- Set up and operation of perfusion cell culture systems in 2 liter scale
- Set up of basic components, such as balances, pumps, electrodes, etc.
- Use of generated data for process control
- Preparation of two different cell retention systems
- Sterilisation procedures and assembly of the perfusion system
- Hands on cultivation
- Analytics, including quantification of:
  - cell concentration (on-line and off-line, manual, with different cell counters)
  - different analytes
- Data management with WIN|MFCS
- Calculation of cell line specific metabolic rates

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# Abstract of Our Training Program

**# 862086 Animal Cell Culture Workshop: From Cryo Culture to Bioreactor (Part 1)**
Who should attend: 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

**Downstream Processing**

**# 862087 Animal Cell Culture Workshop: Downstream Processing (Part 2)**
Who should attend: 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

Who should attend: 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

Who should attend: Technicians and scientists 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

Who should attend: 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
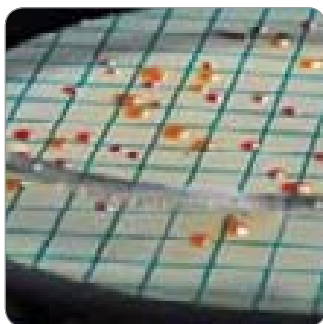
**Microbiology**

**# 862001 Basic Course Microbiology**
Who should attend: Technicians and scientists without 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**
Who should attend: 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 experience in the handling of sterility testing in clean rooms and isolators.

Theoretical aspects include:
- 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

Practical exercises:
- Sterility testing of different sterile products (LVPs│SVPs│ampoules│antibiotics│syringes│medical devices)
- Visual inspection and evaluation of sterile test samples

# Abstract of Our Training Program

## Molecular Biology

### # 862042 Molecular Biology

Who should attend: 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.

Topics included:
- 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

Who should attend: 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

Who should attend: 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
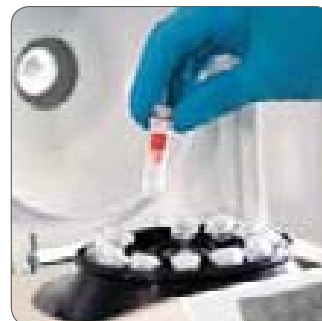
**Complete Program & Online Registration: www.sartorius–stedim.com/expand**

**Lab-|Quality Management**

**# 862601 Balances as Inspection, Measuring and Test Equipment in the QM System**
Who should attend: 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**
Who should attend: 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

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:
- Risk assessment consultancy
- 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<br>■ Single-use fluid management containers<br>■ Sterility Test Validation Support |
| Physico-chemical studies | ■ Filter elements<br>■ 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<br>■ Freeze and thaw bags<br>■ Mixing systems<br>■ Transfer systems<br>■ Tubing\|connectors\|gaskets<br>■ Polymer-based syringes\|vials\|ampoules\|bottles (including labels, ink or glue) |

**Explore Your Possibilities: www.sartorius–stedim.com/confidence**

Benefit from the expertise supplied by our specialists:

- Science-driven consulting services
- Long history of regulatory expertise
- Unique product and process specific test approach
- In-depth knowledge of actual drug product testing
- Pioneers with polymer and elastomer extractables | leachables knowledge
- Modern state-of-the art laboratories
- Fast turnaround by effective and dedicated project management

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.

**www.sartorius−stedim.com/discover**

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

**www.sartorius-stedim.com/increase**

# Index by Application│Product Name

# Index by Application│Product Name

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