



Bioprocess Catalogue
Products and Solutions
for the Biopharmaceutical
Industry

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About Sartorius

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

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

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



SARTORIUS
24430



Sartochek 3



About this Catalogue

This process catalogue offers you several options for selecting the optimal product for your application or process.

In the first chapter, you will find our offer of product solutions for individual application areas all along the process chain, and the corresponding references to the product pages. The thumbnail tabs will help guide you to the section you need to find.

Alternatively, you can use our Bioprocess Product Finder on page 8. It will assist you in choosing the recommended products for your application.

The following subjects that cover more than one application are listed below:

Housings, page 201

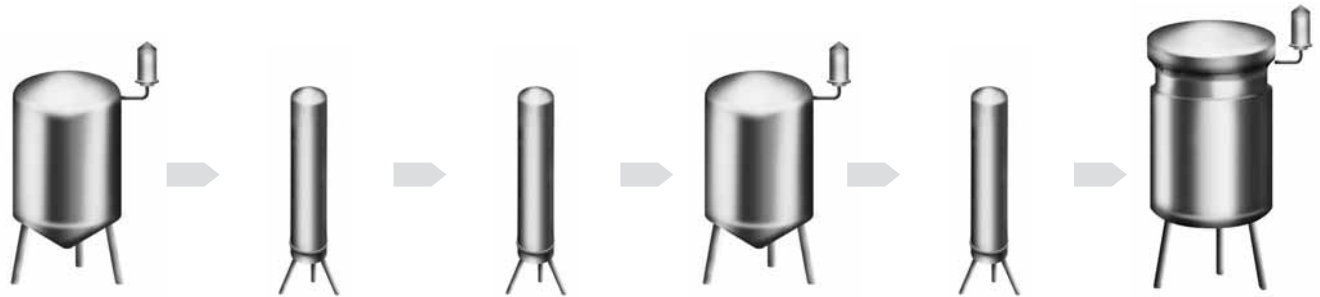
Integrity Testing, page 209

Microbiological Testing, page 231

Services, page 223

If you know the name of the product of your choice, just check the name index at the back of the catalogue to find the page number right away.

Bioprocess Product Finder



Media |
Buffer Preparation

Cell Culture &
Fermentation

Holding Tank

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Bags | 178
Fluid Mixing
Systems | 186
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Level Control | 286
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Prefiltration

Sartopore 2
0.45 μm^* | 106
Sartobran P
0.45 μm^* | 92
Sartopure GF
Plus* | 72
Sartopure PP2* | 70
Sartoclean CA* | 78
Sartoclean GF* | 76

Sterile Filtration

Sartopore 2
0.2 μm^* | 96
Sartobran P
0.2 μm^* | 84

Holding Tank

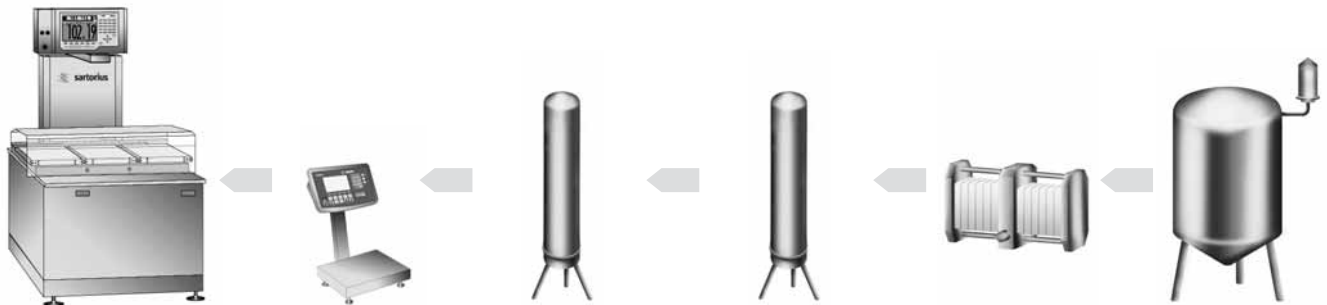
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Sterile Filtration

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0.2 μm^* | 96
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0.2 μm^* | 84

Prefiltration

Sartopore 2
0.45 μm^* | 106
Sartobran P
0.45 μm^* | 92
Sartopure PP2* | 70
Sartoclean CA* | 78

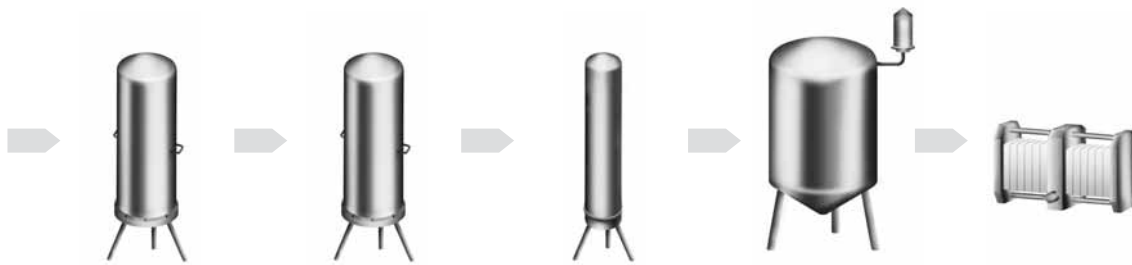
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Holding Tank

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*Also in disposable technology available.



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Intermediate Purification

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- Crossflow Microfilters* | 128
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Clarification

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- Sartoclean* GF | 76

Sterile Filtration

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Holding Tank

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Intermediate Purification

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Membrane Filtration

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Creating Value by Integrated Biomanufacturing

Sartorius offers the most comprehensive technology, product and service portfolio worldwide, which ranges from the discovery of active ingredients to production all the way to compliance with the accompanying regulatory steps. Featuring special filters, fermenters and bioreactors, products for membrane chromatography, bags, containers and mixing systems for fluid media handling as well as an extensive service portfolio, Sartorius serves all production steps in the biopharmaceutical industry.

Technology from Sartorius makes production processes more reliable, accurate and predictable. Sartorius offers not only products for individual production steps, but also technologically and economically optimized solutions developed together with the customer for complete upstream and downstream processing.

Sartorius thinks in processes and therefore focuses on the factors that are critical to success:

- Time to Market
- Regulatory Compliance
- Production Costs
- Production Capacities

As a result, Sartorius offers its customers the unique benefits of a total solution provider.

Scale-Up

Sartorius technologies are scalable so that the customer can generate increasing quantities of a substance within a short time throughout all phases, from discovery up to commercial production and with optimal yield.

Disposable Technology

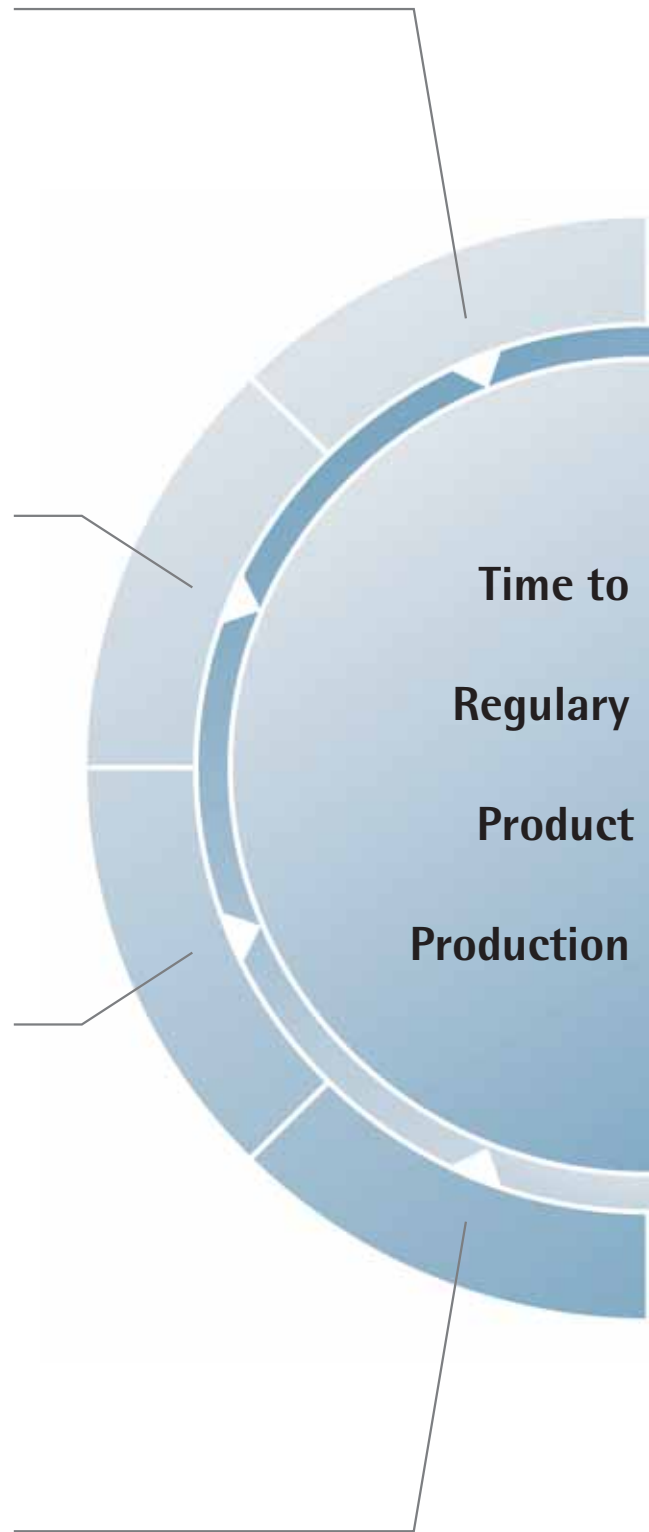
Disposable technology is decisive for the speed and efficiency of processes, while ensuring maximum security and reliability in preventing cross-contamination. For all process steps and volumes, Sartorius offers the advantages of powerful and cost-efficient disposable technology.

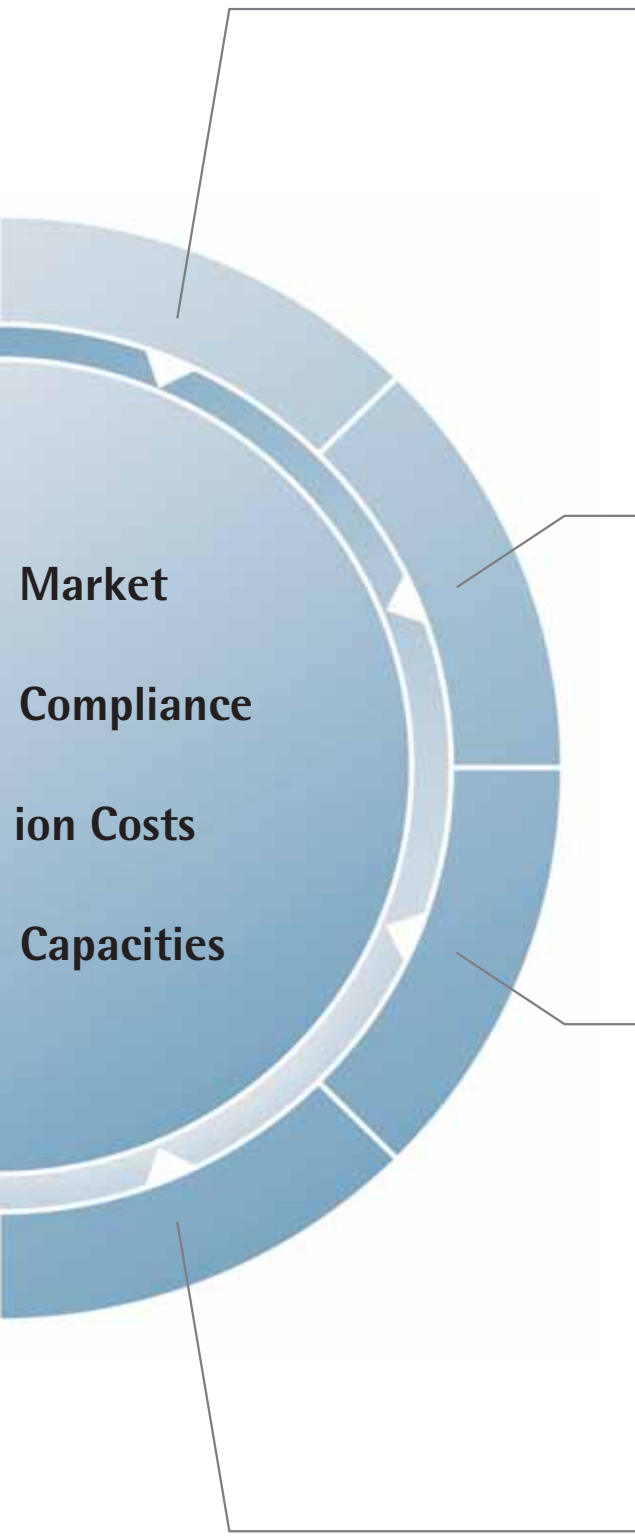
Regulatory Services

Along with the BioPharmAlliance jointly founded with KMI | Parexel, Sartorius customers have access to the entire wealth of expertise of the market leader in validation and regulatory compliance.

Validation and Training

Sartorius won't go when the going gets tough. Sartorius' experienced and highly knowledgeable experts help customers with process validation and training.





Process Optimization

Together with our customers, we analyze processes and optimize them in terms of increasing yield as well as saving time and costs. As a result, Sartorius creates genuine added value for its customers.

Cell Culture | Fermentation

Together with Sartorius BBI Systems, Sartorius offers the product and service portfolio of the market leader in cell culture and fermentation, and is focusing on the optimal interaction between fermentation | cell cultures and downstream processing.

Engineering

Sartorius engineering expertise covers customized design, production, installation, automation, integration and validation of bioreactors, fermenters and peripheral systems.

Weigh | Detect | Control

Sartorius offers a truly wide product and service portfolio for hopper weighing, fill-by-weight level control, average weight control of prepackages, completeness checks and quality assurance.



Fermentors | Bioreactors

Integrated Solutions from Research Through Production

Sartorius BBI Systems GmbH has for more than 35 years provided a range of innovative bioreactor products (BIOSTAT®) and support services to major biotechnology and pharmaceutical companies worldwide. In this position, Sartorius BBI Systems is the worldwide leading supplier of biotechnology systems.

The BIOSTAT® line of fermentation and bioreactor equipment spans the full operational spectrum – from benchtop and pilot systems to custom process skids.

The core areas of expertise of Sartorius BBI Systems are in the development and production of fermenters and bioreactors for applications in the laboratory, in production and in the corresponding automation and controlling units.

As part of the Biotechnology Division of Sartorius AG the product portfolio now also includes crossflow filtration equipment in upstream and downstream processing.

Our capabilities

Operating internationally, we are always close to our customers around the world. Our closely meshed network of agencies, each with its own service team, enables us to provide direct, individualized support to our clients, from the planning stage to operation. This "concept to completion" approach keeps our clients at the forefront of scientific and technical developments.

Our engineers all over the world tailor systems and whole plants, realizing specific solutions across the spectrum of customer applications. Units developed and tested in the laboratory are scaled up to industrial size in an elaborate and painstaking process. With the aid of special 3D CAD planning procedures, we can show the client their plant at each stage of development.

With a workforce of a good 500 persons, the company is represented with its production sites in Germany, Italy, the U.S. and India, and with sales companies in more than 50 countries.

Practical solutions at every level

Our portfolio of capabilities spans all areas of customer support. From technical consultation to project planning, in areas such as laboratory automation, industrial production, validation support and after sales service, we handle it all.

Sartorius BBI Systems is a valuable partner for companies in the pharmaceutical and biotech market where cGMP requirements and FDA guidelines must be followed. Equipment and plants supplied by Sartorius BBI Systems are fully documented "as built."

Discover our capabilities on page 33.



Cell Removal | Clarification

Within the biotech industry, cell culture and microbial fermentation are today's key processes for the production of therapeutic proteins. Key technologies relevant in the upstream and downstream processing of cell culture and microbial fermentation mainly involve filtration and purification.

Purification steps such as chromatography are very cost-intensive. Chromatography performance depends significantly on the prior removal of particulate matter, especially cell and cell debris, as well as colloidal compounds from the fermentation media.

Sartorius has developed depth filter technologies that effectively meet these requirements, applying the Sartoclear® P direct flow technology.

Effective removal of cell and cell debris, as well as contaminants by Sartoclear® P, allow for the design of economic and reliable filtration systems for such biopharmaceutical applications.

The Sartoclear® P direct flow technology combines excellent cell harvest & clarification capabilities with highest throughput of fermentation media.

The filter media of Sartoclear® P consist of cellulose fibers combined with inorganic filter aids, which offer most valuable benefits:

- Excellent clarification effect with highest capacity for retaining particles and colloidal compounds
- Particles and colloidal compounds smaller than the nominal retention rating of the filter media are captured by adsorption due to the positive-charged filter media

Discover our capabilities on page 117.

Discover our capabilities on page 65.



Capturing | Purification

Chromatography of Highly Diluted Proteins, Large Proteins and Viruses

Chromatography is the most important purification method for biopharmaceuticals as it offers the highest selectivity and product purity. It is used mainly in columns filled with gel beads having disadvantages such as long processing times, size exclusion effects due to small pore size of the beads and low throughput at 100–150 cm/h, only. Care has to be taken when handling columns, as the gel bed is susceptible to breakage, channelling and inclusion of air. Column packing and its validation can be time-consuming and costly. Investment in hardware is high and cleaning and storage conditions as well as the complex use, influence the overall process economy.

Membrane chromatography

To overcome these disadvantages Sartorius has developed a number of innovative chromatography membranes, including ion exchangers such as quaternary amine (Q), sulfonic acid (S), diethylamine (D) and carboxylic acid (C), metal chelate iminodiacetic acid (IDA) and affinity membranes such as a protein A and a Blue 3-GA membrane, benzamidine as well as membranes for creating your own affinity supports, such as aldehyde and epoxy membranes.

They feature a macroporous structure with a pore size of >3 and $0.45\text{--}0.35\ \mu\text{m}$. That means they have many times more area than do conventional chromatographic gel matrices. The pores allow large molecules and even viruses to access the binding sites within the porous structure of the membrane support by direct fluid convection, instead of being dependent on diffusion and a sieving effect of small pores in chromatography resins.

These membrane adsorbers add new options for the downstream processing, as they come ready-to-use, fully scaleable, and are usable at several times higher flow rates compared to columns.

“Innovation pure”

A single membrane and a single module cannot address all the different needs for purification. Therefore, Sartorius has developed the largest variety of chromatographic membranes and modular systems for large-scale membrane chromatography on the market.

Approved technology

In 2001 Campath®* received FDA approval. This monoclonal antibody is polished by application of Sartobind ion exchange Q modules in flow-through mode (DNA | endotoxin | leached protein A | virus removal). It was the first time that a membrane adsorber had been accepted in the production of a therapeutic protein. This shows not only Sartorius' position as the pioneer in adsorptive membrane chromatography, but also displays that this technology is proven and tested.

Sartobind® membrane adsorbers display major advantages when using very diluted protein solutions or large volumes to be processed in a very short time.

Typical capturing applications for Sartobind

- Purification of highly diluted proteins
- Purification of viruses
- Purification of large proteins
- High-speed purification of labile biomolecules

Sartobind modules can be reused hundreds of times. They are designed to achieve high binding capacity for large molecules and viruses at the highest throughput.

Sartorius has the experience and the products to optimize your membrane-based chromatographic process to improve your throughput, yield and budget.

Discover our capabilities on page 159.

* Campath is a trademark of ILEX Pharmaceuticals



Polishing Virus Clearance Technologies

The risk of viral contamination is a feature common to all biotechnological products derived from human or animal plasma and mammalian cell lines. Modern manufacturing processes employ complementary viral clearance technologies, frequently combining active virus removal with virus inactivation steps.

Among the various technologies available for viral clearance, three robust and orthogonal technologies have been integrated into the Sartorius virus clearance technology platform.

This platform comprises virus filtration with Virosart® CPV, virus inactivation with UVivatec UVC-light and Virus adsorption with Sartobind® Q Membrane Chromatography.

These individual elimination steps depend on different physical principles and address typical properties of the relevant virus classes, such as size, presence of a lipid envelope and type of the nucleic acid.

Whether you target the production of therapeutic proteins derived from cell lines or animal | human plasma, Sartorius has the product range that provides you with a total process solution meeting your needs in terms of security, reliability, GMP compliance and cost effectiveness. The three-step viral clearance technology platform ensures maximum process safety in your manufacturing scheme.

Virosart® CPV

Polyethersulfone filters for state of the art virus retention according to highest safety standards, with more than 4 log₁₀ for PPV and more than 6 log₁₀ for retroviruses.

Discover our capabilities on page 165.

UVivatec

Effective UV irradiation at 254 nm through a novel spiral flow UVivatec module. Highly efficient product mixing and evenly delivered UVC dose for homogeneous and shorter residence time. Ideal for small non-enveloped viruses like PPV.

Sartobind® Q

Sartobind® membrane adsorbers disposable formats for the purification of therapeutic proteins, antibodies and clearance of viruses, as well as for the removal of contaminants such as DNA, endotoxins or host cell proteins.

Discover our capabilities on page 159.



Disposable Bioprocess Components for Optimized Process Economy in Biopharmaceutical Production

Disposable technology

In biopharmaceutical production, disposable technology and single-use concepts are established satisfactorily during product discovery, early development phases, and also in late clinical phase time lines. Disposable components are being increasingly used in cGMP manufacturing steps from fermentation to initial recovery, purification and polishing steps. Single-use concepts eliminate the need for cleaning, ease the validation, and influence the economical situation in a positive way. Sartorius offers a wide range of disposable components: Bags, Capsules, Slice Disposable, Membrane Chromatography

Bags

Disposable bioprocessing systems have been widely applied to media preparation, filtration, storage and delivery processes. Disposable storage bags may be fitted with a variety of connectors that allow for aseptic or sterile connection to the bioreactor. In addition to the typical process scenario above, other disposable schemes are also commonly applied to the media preparation area. Due to its enormous advantages, sterile fluid handling bags have become increasingly important to numerous other process steps along the entire process chain. Typical applications include bioreactor and fermentation harvest, diafiltration, waste collection, transport, storage and mixing of bulk intermediate and final product. Together with its cooperation partners TC Tech (Bag Technology) and LevTech® (Sanitary Mixing), Sartorius provides integrated solutions for biopharmaceutical fluid handling.

Discover our capabilities on page 171.

Sartorius offers a complete line of disposable filter elements made of the same materials and mode of construction as our large scale filter cartridges.

MidiCaps

Our unique MidiCaps disposable capsule design offers multiple advantages for the user in the biopharmaceutical industry:

- GMP compliant vent and drain valve design with integral hose barb for optimal fluid containment during the venting process
- Imprinted, easy to read labelling including filter type, pore size or retention rating, lot-no., piece-no., operating parameters and direction of use for optimal traceability
- Broad range of connector styles for flexible integration into any process
- Overall optimised capsule design for reduced dead volume, maximized flow and enhanced mechanical stability

MaxiCaps

The use of disposable filter elements in the past was limited to laboratory- and small production scale. MaxiCaps incorporate standard 10", 20" and 30" cartridges in a disposable format. The implementation of MaxiCaps into your production processes allows to benefit

from the advantages of disposable technologies in large scale processing. Reduced cleaning validation, elimination of SIP and CIP cycles as well as higher flexibility in your overall production processes are typical advantages associated with the use of MaxiCaps in our production.

SartoScale

For filterability trials, to determine the ideal membrane material or combination of pre-filter and final filter ideally suited for your application, we recommend to use our SartoScale disposable filter units. The self-contained, ready to use filter disposables contain 47 mm filter discs of original filter cartridge material sealed into a polypropylene housing for reliable scale-up and scale down filtration trials. Standard filter and bag assemblies have been developed by Sartorius, Gammasart BioSystem™, to help customers implement disposable technology faster and more economically. The following Sartorius filter types are available in capsule formats:

- Sartobran P (523...)
- Sartopore 2 (544...)
- Sartopore 2 Gamma (544...)
- Sartolon (510...)
- Sartofluor GA (518...)
- Sartoclean CA (562...)
- Sartoclean GF (560...)
- Sartopure PP2 (559...)
- Sartopure GF Plus (555...)

These filters are suitable for the same applications as the larger filtration area filter cartridges. These filters are available in a variety of effective filtration areas:

150 cm²|0.15 ft², 300 cm²|0.3 ft²,
500 cm²|0.5 ft², 1000 cm²|1 ft²,
2000 cm²|2 ft², 4500 cm²|5 ft²

In order to accommodate various processing systems, these filters are available with the following inlet and outlet connectors:

1 1/2" sanitary flange, 3/4" sanitary flange,
1/2" single stepped hose barb,
Multiple stepped hose barb (DN 6-12)

Discover our capabilities on page 83.

Slice disposable

Crossflow slice disposable units are designed for single-use applications. Membrane types are available in Polyethersulfone and Hydrosart.

Discover our capabilities on page 127.

Membrane chromatography

For capturing high-value products and contaminant removal (i.e. DNA or host cell protein; endotoxins & viruses) novel technologies enter the arena for disposable bioprocess components. Membrane chromatography modules are integrated in plastic housings for ready-to-use applications. With "SingleSep" membrane chromatography disposables, the need for dedicated purification equipment can be eliminated.

Discover our capabilities on page 159.



sartorius



Integrity Testing | Filter Management Systems

In 1980, Sartorius launched the first automated integrity tester, Sartocheck 1000. Beginning with this milestone, Sartorius creative innovations entered the market. Some examples prove this innovation force, e.g., WIT (Water Intrusion Test) which is today's standard filter integrity test method for hydrophobic filters, EPS-External Pressure Sensor technology which allows the user to easily overcome distances between integrity tests and filter housing.

Filter integrity testing is more than using "stand-alone-units," only. The market constantly calls for increasingly enhanced and faster technology in order to meet the customers' demands. These demands are the driving force for our research and development as well as for our system engineers to develop innovative solutions. There are no limits in terms of technical feasibility. Sartorius can offer a broad range of filter integrity test solutions – beginning with our Sartocheck Junior series, Sartocheck 3 and the latest version Sartocheck 4, our integrated built-in concept "integrity within", WIT-Trolley and finally customized filter management systems.

Sartocheck Junior BP+

The Sartocheck Junior BP+ is designed as an easy and independent filter integrity tester with a rechargeable battery, which meets the requirements for small production and public labs. The filter integrity test is microprocessor-controlled, however the record data have to be entered manually.

Sartocheck 3 and Sartocheck 3 EPS

Both Sartocheck 3 and Sartocheck 3 EPS, the most successful filter integrity testers still, fulfill the technical requirements. It does whether matter the filter is used in the laboratory for small scale filtration or in the process for filtering high volumes on media. The technology based on the well-established and highly precise pressure decay measurement gives the user 100% security in his filter integrity testing.

Sartocheck 4

Sartocheck 4 enables you to step into the world of electronic records and electronic signatures. The system is designed to meet the requirements in GAMP guidelines in order to comply with 21CFR Part 11. The reason for the compliance with regard to data management, user handling and audit trails is to ensure 100% traceability. Furthermore, Sartocheck 4 is able to communicate via a standard network connection with an FTP server. This feature, which was requested by the industry, enables the data to be easily archived on a general file server.

Within concept

The built-in concept allows the user to integrity-test the filter inside the machine without connecting an external integrity tester, e.g. Sartocheck 3 or Sartocheck 4. The within concept utilizes the existing hardware and software platform in order to install and program the filter integrity test. The control function, as well as the mathematical algorithms, are directly integrated into the PC or PLC software as a subroutine.

WIT-Trolley

The WIT-Trolley contains the whole equipment for carrying out the WIT on a filter housing. A water reservoir inside the Trolley brings the test water under controlled conditions to the filter housing. Temperature probes ensure that the water temperature does not exceed the limits. The water level switch monitors and controls a sufficient water level inside the tank in order to perform the next test.

Filter management system

This is a new approach that not only focuses on filter integrity testing, but comprises all stages of the filter handling. The revolutionary concept makes the filter handling procedures independent of the point-of-use of the filter. After filtration has been completed, the filter housing has to be taken from the filtration line and brought to the filter management system. The filtration line can be cleaned and sanitized before a new filter housing, which is sterile and integrity tested, can be reconnected.

Discover our capabilities on page 209.



FACTS – Program Added Value for Your Business

Facts® program

Get the **FACTS®** with Fully Advanced Customer Total Support. This comprehensive service program represents our professional pledge to you to go above and beyond in customer support by paying particular attention to the many ways in which we can make a difference.

As a total solution provider, Sartorius offers a platform of innovative products and technologies, as well as an extensive service portfolio along our customer's value chain in the pharma | biotech industry, which is highly regulated and confronted with ever-changing compliance parameters.

We focus on what is of major importance to our customers. Our business strategy very clearly addresses the critical success factors like time-to-market, regulatory compliance, cost of goods and production capacities.

The service philosophy of the Sartorius **FACTS®** program means added value for your business through optimization, validation, compliance and training support.

Helping you transform the complexity of cost efficiency and regulatory compliance into a balanced situation is the goal of the **FACTS®** program and the BioPharm-Alliance, which has extended our performance spectrum. The alliance with Parexel Consulting, an independent supplier and market leader in the sector of validation and regulatory compliance, was established in 2003.

The **FACTS®** and BioPharm-Alliance Program is divided into four service categories:

DISCOVER®

Our audit and survey services:

- Compliance audits
- Regulatory inspection readiness
- Plant | Process surveys
- Validation surveys
- Quality system surveys
- Technical studies

INCREASE®

Our optimization services:

- Corrective actions guidance
- Process optimization and development support
- Design review and technology transfer
- Documentation and submittal optimization
- Regulatory guidance

CONFIDENCE®

Our validation services:

- Validation designs
- Pre-approval inspection preparation
- Post-approval change support
- CFR 21 Part 11 | GAMP compliance
- Regulatory liaison
- Equipment qualification
- Filter | Cleaning | Process validation
- Extractables | Leachables testing

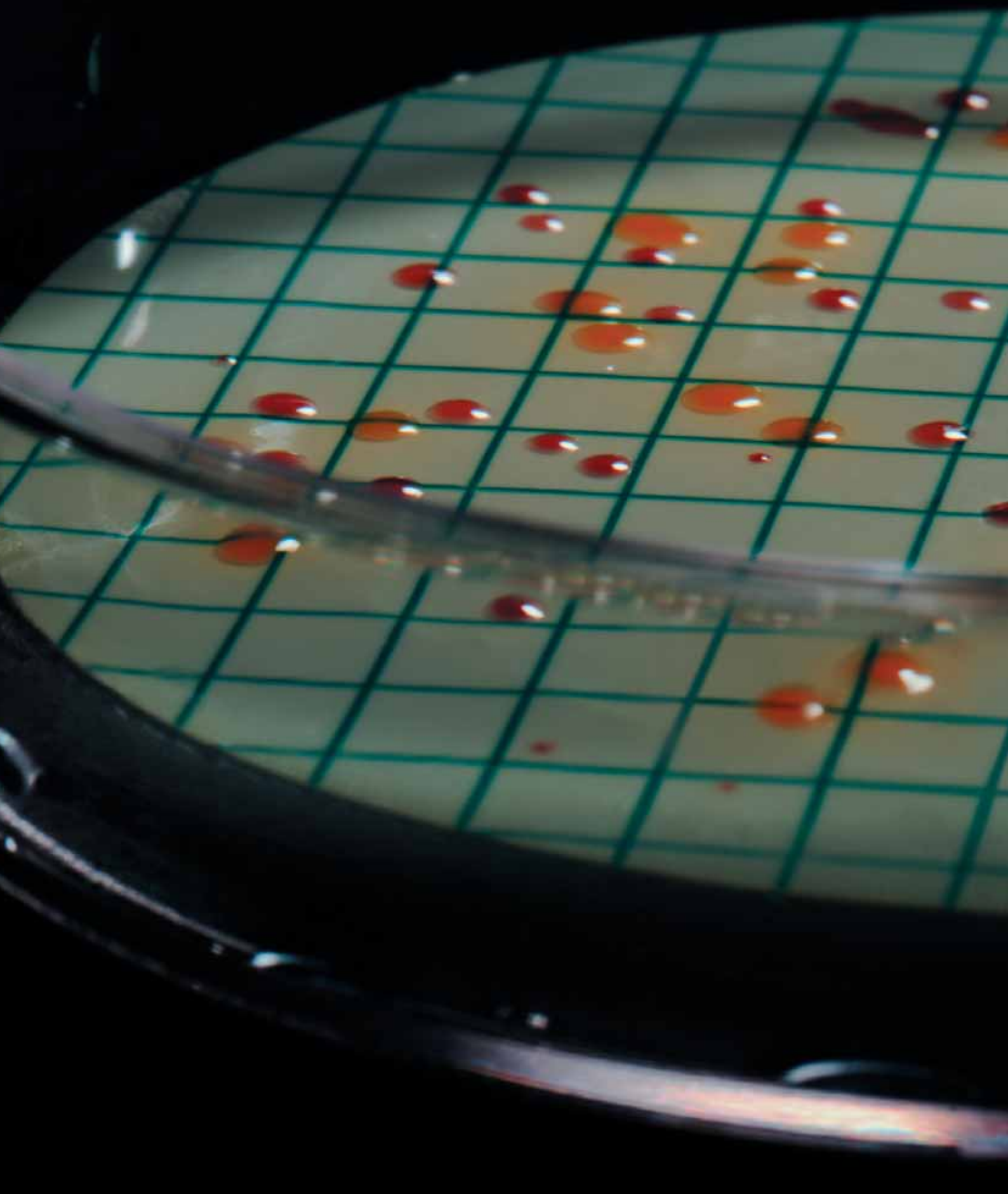
EXPAND®

Our training services:

- FDA risk-based approach
- Regulatory inspection
- CFR 21 Part 11 | GAMP
- Aseptic processing
- Upstream | Downstream processing
- Process validation
- Cell culture | Fermentation
- Integrity testing
- Quality control and quality assurance

These services are provided by experienced experts in collaboration with our BioPharm-Alliance partner.

Discover our capabilities on page 223.



Microbiological Quality Control

Colony counts

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

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

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

Nutrient pads are a further simplification. They are culture media in dry form, sterile-packed in Petri dishes, easy to stock and of consistent high quality, ready-for-use after simply wetting with water. Typical colonies grown on the various types are shown on page 250. The wide range of media includes types for food, beverage and pharmaceutical industries.

Other water testings

142 mm diameter polyamide membranes of 0.2 µm or 0.45 µm pore size are specified in a method for the collection of legionella organisms.

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

Airborne bacteria and viruses

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

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

For quicker and simpler sample filtration

Sterile, single-use funnels and monitors to replace stainless steel funnels of vacuum holders.

Biosart 250 funnels

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

Biosart 100 monitors

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

Discover our capabilities on page 231.



Combics 2

+ 12.78 kg

CF
Clear Function

REF
Reference

OK

VO
On Standby

ZN
Scale #

→0←
Zero

→T←
Tare

Fn
Function

Print

Toggle

+
-
←
→
↑
↓

sartorius

Industrial Process Weighing

Under the umbrella of the Sartorius Group, the Process Weighing & Control business area is represented in a global network – for sales and distribution, technical service and research.

We combine a wide range of products and services for process industries; from heavy duty platforms and precision scales to in-line checkweighers, from load cells and batch controllers to metal detectors.

As a specialist for solutions in the areas of industrial weighing, particle detection and process control, we see ourselves as a partner to help optimize the performance of your processes. From Goods In to Goods Out, from Production to Quality Control.

At Sartorius we provide more than just products. We are at your disposal to provide consultancy during specification and design right through start-up, commissioning and the day-to-day operation of your plant. Your individual solution is at the very heart of all our efforts at Sartorius. Our sales and service experts, with all their application and process know-how, are there to help you.

Sartorius paint mixing systems

Sartorius has demonstrated its design expertise with numerous technological highlights throughout our 130-year-plus history. Today, Sartorius customers continue to profit from the benefits of a head start in development – including in the design of paint-mixing systems – that puts us ahead of the rest.

Sartorius has the widest array of products offered anywhere in the field of paint-mixing equipment, from simple paint-mixing scales to complex network-capable systems. With outstanding product features like the recalculation function, Sartorius systems deliver practical solutions to virtually any problem. Our policy of ongoing development, integrating valuable input from the real world, ensures our global leadership in this market.

Discover our capabilities on page 279.





Fermentation | Cell Culture

Bioprocess Automation	34
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Photobioreactor Biostat® PBR	50

Platforms for Biotechnology – Bioprocess Automation



We at Sartorius can offer a broad range of bioprocess automation solutions – from teaching, research and development through process development to production in GMP environment with advanced software solutions.

Creating bench-top control

Since the introduction of our first digital fermentor controller (DCU), we have delivered several thousand systems to leading pharmaceutical and biotech companies worldwide. Use of a modular system design has enabled us to offer a range of cost-effective solutions for new users, as well as providing an upgrade platform for existing installations.

Our key platform to automation is based on the use of flexible Digital Control Systems (Micro-DCU and DCU), which are specifically tailored for fermentation and cell culture applications. First level automation is available using the Micro-DCU platform, which is delivered, together with our standard range of fermentors, in preconfigured versions according to the type and size of the fermentor.

When combined with our MFCS/win Supervisory Control and Data Acquisition (SCADA) system, this solution provides the most cost-effective platform for small- to medium-scale research and pilot plant applications.

Process automation at a single touch

Sartorius BBI Systems' DCU fermentor control system utilizes 'state of the art' technologies and software which have been specifically developed for use in biotech equipment control.

Incorporating an intuitive touch panel operator interface for ease of use, DCU can be supplied in bench top or control panel mounted versions, complete with integrated amplifiers for all standard measurements.

Standard DCU firmware provides full functionality for execution of all basic control tasks (i.e. calibration, alarm monitoring, control loops and sequences) and can be configured according to individual process requirements. A range of advanced control features (e.g. gravimetric flow controllers in combination with high precision Sartorius balances) can also be realized at this level.

Retrofitting made easy

Hardware expansion plus software configuration capabilities are combined with Sartorius BBI Systems' experience in bioprocess control to make DCU the ideal platform for replacing older fermentor control systems. Customized control panels or interface boxes ensure trouble-free integration with existing fermenters, ranging from laboratory to production scale.

With classification as GAMP Category 4 (Configurable System), DCU is a validatable local control system, which can also be used in regulated cGMP production environments.

A range of supporting functions, including multi-level password and operator logs, are standardly provided together with comprehensive documentation for validated systems.

Connection of DCU controllers via Ethernet/TCP-IP to MFCS/win SCADA software provides a range of extended control and evaluation facilities including:

- Recipe-based batch processing (ISA-S88 standard)
- Visualization
- Data acquisition, evaluation, storage and reporting
- Advanced control algorithms.

Servicing your automation needs

With options ranging from dedicated local controllers to high-level system integration using PLC/SCADA or DCS control systems, our expertise is available to ensure the optimum solution to any demanding biotech production process.

We provide standardized PLC control systems for both fermentation and crossflow filtration package units. These controllers, in combination with SCADA systems, are based on platforms offered by leading European and US PLC vendors in satisfying the 'in house' standards of our customers.

For full-scale automation of complete biotech production facilities, DCS systems are the preferred choice for performing batch control according to ISA-S88 standard.

Our involvement in providing automation solutions, together with leading automation system suppliers and system integrators, has focussed on specification and commissioning, resulting in the realization of a number of successful projects world-wide.

Experience the support

Expertise gained through long-term co-operation with pharmaceutical and biotech companies has been used to develop and refine a comprehensive range of validation support services. The scope of these services includes validation of computerized systems, as well as the qualification of automated process equipment.

In addition to the generation of comprehensive 'as built' documentation, our team of experienced engineers has developed an extensive library of qualification protocols for Installation Qualification (IQ) and Operational Qualification (OQ).

For projects requiring validation, the key factor to successful realization is through expertise in project management. Sartorius BBI Systems, with well-established methods for defined project execution according to GAMP guideline and S88 models for batch control, is today uniquely placed to guarantee delivery on schedule and within budget.

MFCS/win SCADA

MFCS/win, the 5th generation of Sartorius BBI Systems Supervisory Control and Data acquisition software package can be considered as the 'de facto' standard for SCADA in the field of bioprocess applications. Based on standard PC hardware and operating under Windows 2000 and Windows XP, MFCS/win can be supplied as a single-user system, or integrated in a local area network (LAN) environment.

MFCS/win functionality is specifically designed for bioprocess applications involving data acquisition and storage, sample data management, on-line calculations, process visualization and batch reporting. Supplied preconfigured and "ready-to-use", the configuration can easily be adapted by the user to any change in process requirements.

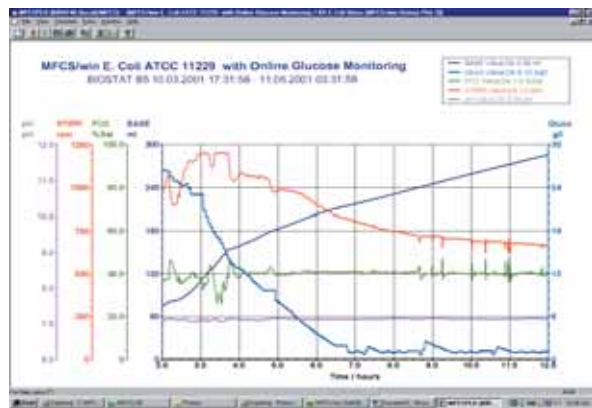
MFCS/win is designed as an open system, with an OPC (OLE for process control) interface, resulting in simple connectivity to third-party software packages for expanding the functionality of an entire system. Current versions incorporate batch management features, compliant with ISA-S88, allowing utilization of procedural batch control already on small systems, resulting in consistent process operation.

Fully validatable according to GAMP Category 4 (Configurable System), MFCS/win has all the necessary functionality for operation in a regulated cGMP production environment and supports 21 CFR Part 11 compliance for electronic records and signatures.

A comprehensive driver library and OPC Client functionality are included for easy connection to all brands of fermenters and auxiliary process instrumentation, making MFCS/win the ideal choice for laboratory or pilot plant automation retrofit projects.



Supervisory control of multiple process units



Comprehensive plot and report functions

Biostat® A plus Economy Fermentor | Bioreactor Benchtop System



Biostat®A plus... plug in and grow

The BIOSTAT®A plus is a compact, auto-clavable fermentor | bioreactor system specially designed for educational use and preliminary or investigational R&D applications. The single housing design concept with integrated measurement and control hardware, pumps, temperature, gassing and motor systems, saves valuable laboratory bench space.

The application-driven, configured packages for microbial and cell culture include everything needed for to get started immediately. The BIOSTAT®A plus is available with 1 L, 2 L, or 5 L working volume single wall culture vessel. Just select the size that meets your needs today – it can be interchanged for another vessel, if needed. Each system also includes a powerful Notebook PC with local control software, as well as our MFCS/DA software package for simultaneous control and data collection.

The BIOSTAT®A plus is ideal for:

- Microbial culture – growth of bacteria, yeast and fungi
- Cell culture – growth of animal, insect and plant cells
- Transition from shake or tissue culture flasks
- Small-scale protein expression
- For education and research

Features

- Ready-to-use packages for microbial or cell culture applications
- Inclusive Notebook PC for operation
- Control of temperature, pH, DO, stirrer speed, gas mixing, Foam | Level and substrate
- Configurable 2-stage DO controller via stirrer speed, gas mixing or substrate
- In-line pH calibration
- Trend display
- 4-gas mixing system with individual gas flow path for cell culture packages
- Oxygen enrichment capability for microbial packages
- Interchangeable culture vessels with 1 L, 2 L or 5 L working volume
- Industry proven hardware
- Powerful PC operating software – capable of handling up to four units
- MFCS/DA data storage and plotting software package
- Easy to follow step by step installation and user guide

Specifications

Technical specifications

Basic housing (dimensions W×H×D [mm])	210×455×425 mm (8½×18¼×17 in)	
Space requirements per culture vessel (inner autoclave dimension Diameter × Height)	1 L	220×500* mm (9×20* in)
	2 L	250×550* mm (10×22* in)
	5 L	280×700* mm (11¼×28* in)

Utilities

Power supply	120 VAC or 230 VAC
Gases	Controlled @ 1.5 barg; dry, particle and oil-free
Water	Controlled @ 2 barg
Drain	gravity drain with zero backpressure required

* Optional flexible adaptor for the exhaust cooler (8844593) is available to reduce autoclave height requirement

Specifications

Ordering information

Description	BIOSTAT® A plus Microbial packages			BIOSTAT® A plus Cell culture packages		
	1 L	2 L	5 L	1 L	2 L	5 L
Culture vessel						
Cat. No. 120 VAC	8843815	8843817	8843819	8843823	8843825	8843827
Cat. No. 230 VAC	8843814	8843816	8843818	8843822	8843824	8843826

Culture Vessel

Total volume [L]	1.6	3.0	6.6	1.6	3.0	6.6
Working volume [L]	0.4–1.0	0.6–2.0	0.4–5.0	0.4–1.0	0.6–2.0	0.4–5
Culture vessel tripod	•	•	•	•	•	•
Stirrer shaft with sealing	•	•	•	•	•	•
6-blade disk impeller (Rushton impeller)	2	2	2	–	–	–
3-blade pitched impeller (Marine type)	–	–	–	1	1	1
Agitation [rpm]	20–1200	20–1200	20–800	20–1200	20–1200	20–800
Baffle cage	8846375	8846812	8846820	8846375	8846812	8846820
Storage bottle 250 mL	3	3	1	3	3	1
Storage bottle 500 mL	–	–	2	–	–	2
Bottle rack	8846464	8847428	8847436	8846464	8847428	8847436
Air inlet and exhaust filter	2	2	2	3	3	3
Aeration tube with ring-sparger	•	•	•	–	–	–
Aeration tube with µ-sparger	–	–	–	•	•	•
Inoculation port	•	•	•	•	•	•
Exhaust cooler	•	•	•	•	•	•
4-way addition fitting	•	•	•	•	•	•
Fitting for overlay aeration	–	–	–	•	•	•
Sample Harvest pipe	•	•	•	•	•	•
Manual sampler	•	•	•	•	•	•
Cooling finger	•	•	•	8846456	8847819	8847827
Heating blanket	•	•	•	•	•	•
pH Electrode, cable	•	•	•	•	•	•
DO Electrode, cable	•	•	•	•	•	•
Temperature sensor with pocket	•	•	•	•	•	•
Foam Level probe, cable	•	•	•	•	•	•
Spare parts kit	34090422	34090424	34090426	34090422	34090424	34090426

Basic unit

Digital controller	•	•	•	•	•	•
Control capabilities for temperature, pH, DO (2 stage cascade), stirrer speed, combined Level Foam controller, substrate*	•	•	•	–	–	–
Rotameter for air [l/min]	0.16–1.6	0.42–4.2	1.3–13	–	–	–
O2 Enrichment	•	•	•	•	•	•
Gasging with individual gas flow path, control valve and rotameter; N2 without automatic control valve						
Air & N2 [ml/min]	–	–	–	16–166	33–333	50–500
O2 & CO2 [ml/min]	–	–	–	3.3–33	16–166	33–333
Peristaltic pumps (integrated)	3	3	3	3	3	3
Balance for weight measurement of culture vessel	8843513	8843513	8843513	8843513	8843513	8843513
Tubing, O-Ring spare set	•	•	•	•	•	•

Control PC and Software

Notebook PC for operation	•	•	•	•	•	•
PC operation software package	•	•	•	•	•	•
SCADA Software MFCS/DA	•	•	•	•	•	•

• = included, – = not included, Cat. No. = option

* Functionality only with optional system extensions

Biostat® B plus Laboratory Fermentor | Bioreactor Benchtop System...



BIOSTAT® B plus integrated system solutions...

BIOSTAT® B plus are designed to become the new benchtop systems standard in research fermentors and bioreactors, worldwide. Application-driven preconfigured packages for microbial culture and cell culture can be delivered ready-to-use right "out of the box."

A comprehensive range of preconfigured packages are available to satisfy the demands of both microbial & cell culture applications.

Basic unit comprising...

- Stainless steel housing
- Digital controller
- Operating interface
- Gassing system with rotameter, solenoid valves or mass flow controller
- Motor with controller
- Thermostat system with circulation pump or dry heating with controlled cooling water valve
- Up to 4 peristaltic pumps
- Integrated amplifier

Culture vessel equipped with...

- Sensors for temperature, pH, DO, foam and level
- Stirrer shaft with industrial sealing
- Impeller
- Aeration tube with sparger, sterile filters and exhaust cooler
- Storage bottles, sample/harvest pipe, blind plugs
- Tube, O-ring and tool kit

...and optionally, a full range of accessories to meet your future needs.

Features

(Single or Twin configuration)

- Graphical user interface with touch screen
- Trend display with up to 6 process values
- Direct balance connection
- 1 L-10 L UniVessel® culture vessel with storage bottle tray, lifting handles and sampling system
- High-performance stirrer motor for all applications and UniVessel® sizes
- Up to 4 integrated peristaltic pumps, 2 external pump connections
- Application-driven integrated gassing system, choice of:
 - Microbial culture
 - O₂ enrichment
 - Gas flow ratio control
 - Cell culture | dual use
 - Exclusive flow
 - Cell culture
 - Additive low flow
- Integrated thermostat or dry-heating system
- Space for Redox and turbidity measurement (Single only)
- Preconfigured software for system extensions

Space requirement

Required bench size approx. W×H×D (mm)	Single	Twin
BIOSTAT® B plus / 1 L	560 × 730 × 565	800 × 730 × 565
BIOSTAT® B plus / 2 L	590 × 730 × 565	860 × 730 × 565
BIOSTAT® B plus / 5 L	620 × 730 × 565	920 × 730 × 565
BIOSTAT® B plus / 10 L	670 × 820 × 565	1040 × 820 × 565
Required inner autoclave dimension Ø×H [mm]		
UniVessel® 1 L	240 × 500 *	
UniVessel® 2 L	270 × 550 *	
UniVessel® 5 L	300 × 700 *	
UniVessel® 10 L	350 × 820 *	
Utility lines	Customer supply	
Power supply	230 VAC or 120 AC	
Gases	Controlled @ 1.5 barg; dry, particle and oil-free	
Water	Controlled @ 2 barg	
Drain	@ 0 barg	

* Height reducible via flexible adaptor

...Ready to Use Packages for Your Drug Discovery and Small-Scale-Production

MFCS/DA software

To accelerate your research activities, a powerful supervisory software MFCS/DA for extended visualization, data acquisition and trend display is included.

Digital controller

BIOSTAT® B plus controller created for the needs of today's bioprocess applications.

- Single and Twin control capability
- Graphical user interface with color display and touch screen
- Integrated amplifiers for temperature, pH, DO, foam & level
- Twin combined level | foam controller
- Space for Redox and turbidity amplifier, Single only
- Integrated digital control loops for temperature, pH, DO, agitation, gas mixing, air flow and 2x substrate
- Level control via probe or balance
- Multi-stage DO cascade control
- Totalizer with digital calibration for probes and pumps
- In-process pH-recalibration
- Trend display for up to 6 process values
- Balance connection
- Developed according to GAMP guidelines

Temperature control system

Choice of dry-heating or thermostat system for precise temperature control with rapid heating and cooling rates.

Thermostat system

- Integrated in basic unit
- Powerful heater (1 kW)
- Automatically controlled cooling water valve
- Circulation pump
- Temperature range 8 °C above cooling water up to 80 °C.

Dry heating system

- Integrated in basic unit
- Plug connector for heating blanket
- Automatically controlled cooling water valve for optional cooling unit
- For temperatures up to 60°C

Gassing

Integrated culture vessel protection via safety valve

O₂ Enrichment

- For microbial cultures
- Automatic gas mixing of air and O₂
- Solenoid valve for O₂-Enrichment capability
- Controlled via DO controller
- Exchangeable rotameter
- Optional mass flow controller

Gas Flow Ratio Control

- For microbial cultures
- Gasmixing of Air and O₂ via Gas Flow Ratio Controller
- Two integrated massflow controller for Air and O₂
- Controlled via DO controller
- Exchangeable Rotameter

Exclusive Flow

- For cell culture or multipurpose use
- Sparger and Overlay gas outlet
- Automatic gasmixing of Air, O₂, N₂, CO₂ for Sparger aeration
- Air for Overlay aeration
- 2 exchangeable rotameters
- Controlled via pH/DO controller
- Optional massflow controller

Additive Low Flow

- For cell cultures
- Sparger and Overlay gas outlet
- Automatic gasmixing of O₂, N₂, CO₂ for Sparger gassing
- Air for Overlay gassing
- 4 exchangeable rotameters
- Controlled via pH/DO controller
- Optional mass flow controller for total Sparger and Overlay flow

Pumps

Controlled via BIOSTAT® B plus controller for precise media conditioning, feeding and harvest.

- Up to 4 integrated pumps
- Configurable substrate controller
- Up to 2 external or internal feed pumps
- Watson Marlow pump heads

Culture vessel

UniVessel® autoclavable culture vessels. Developed with over 40 years experience in sterile design.

- 1 L – 10 L jacketed or single wall culture vessels
- Pre-configured for microbial or cell culture application
- Stirrer shaft with single mechanical seal
- Polished head plate for highest sanitary conditions
- Vertical lifting handles for easy handling
- Head plate with maximized numbers of ports
- Removable addition bottle support
- Minimized autoclave space requirement
- 316 L stainless steel for medium contact parts
- Real O-ring sealing, no compressed O-rings
- Full range of accessories for microbial and cell culture applications

Stirrer drive

High-performance servo drive combines low shear agitation for cell cultures with high-speed mixing for microbial high-cell density fermentations.

- Speed range 20–2.000 rpm
- Maintenance-free
- High torque
- Easy handling

The following BIOSTAT® B plus benchtop systems are available:

- BIOSTAT® B plus Gas flow ratio control Page 40
- BIOSTAT® B plus Additive low flow | single wall Page 42
- BIOSTAT® B plus Additive low flow Page 44
- BIOSTAT® B plus O₂ Enrichment Page 46
- BIOSTAT® B plus Exclusive flow Page 48
- Accessories Page 52

BIOSTAT® B plus Gas Flow Ratio Control



The BIOSTAT® B plus with the integrated Gas Flow Ratio Control (GFRC), and two integrated mass flow controllers for air and oxygen, controlled via DO control loop allows advanced process control and easy gas balancing. The GFRC strategy enables highest oxygen transfer for high-cell density cultures, as well as for sheer stress sensitive gassing for filamentous organisms. It combines two operation modes for advanced gassing control of air and O₂.

- Constant flow: percentage alteration
- Constant ratio: alteration of flow rates

Digital controller

- Graphical user interface with color display and touch screen operation
- Measurement and control for temperature, pH, DO, agitation, foam & level (Twin: combined foam | level control)
- Multi-stage DO cascade control
- 2 × feed controller per vessel
- Gas flow ratio controller
- Level control via Level probe or balance
- Space for Redox and Turbidity amplifier (Single only)
- Totalizers with digital calibration for pumps
- In-process pH recalibration
- Trend display for up to 6 process values
- Up to 2 direct balance connections

"Gas Flow Ratio Control" gassing system

- Gas mixing of air and O₂
- Mass flow controllers for air and O₂ controlled via DO controller

Pumps

- Up to 4 integrated pumps per side
- Configurable to substrate controller
- Up to 2 external feed pumps per side
- Optional integrated speed-controlled pump

Temperature system

- Powerful heater (1 kW)
- Integrated controlled cooling water valve
- Circulation pump
- Temperature range 8°C above cooling; water up to 80°C.

Agitation system

- Speed range 20 up to 2,000 rpm
- Maintenance-free
- High torque for powerful mixing
- Gear-free for quiet operation

Culture vessel

Jacketed culture vessel fully equipped with:

- Probes for temperature, DO, pH, foam and level
- Stirrer shaft with single mechanical seal
- Rushton impeller
- Baffle assembly
- Aeration tube with ring sparger, sterile filters and exhaust cooler
- Manual sampler with sampling pipe
- Removable addition bottle support
- Addition bottles with stainless steel head component and sterile filters
- Inoculation | addition port
- Four-way addition port
- Tube, O-ring and tool kit

SCADA Software MFCS/DA

- Plug and Play configuration
- Online data acquisition
- Sample data management
- Enhanced Plotting
- Export functions
- Easy-to-use programming interface

The BIOSTAT® B plus GFRC packages are applicable for

- Culture of microorganisms
- Batch, fed batch and continuous culture
- Small-scale cell mass and protein production
- High-cell density culture
- Culture of filamentous microorganism
- Anaerobic | microaerophilic culture, on request

Key features

- Single or Twin configuration
- Independent vessel control
- Small footprint
- Mass flow controller for air and oxygen
- Gas Flow Ratio control strategy
- Graphical user interface with touch screen operation
- Totalizers with digital calibration for valves and pumps
- One high-performance stirrer motor for all UniVessel® sizes
- Trend display with up to 6 process values
- Direct balance connection
- Preconfigured firmware for system extensions

Specifications

Description	BIOSTAT® B plus-MO GFRC with jacketed UniVessel®				BIOSTAT® B plus-TWIN-MO GFRC with 2× jacketed UniVessel®			
	1 L	2 L	5 L	10 L	1 L	2 L	5 L	10 L
Cat. No. 230 VAC	8843489	8843491	8843493	8843497 8843495	8843750	8843752	8843754	8843758 8843756
Cat. No. 120 VAC	8843490	8843492	8843494	8843498 8843496	8843751	8843752	8843755	8843760 8843757
Culture Vessel listing per vessel	Jacketed UniVessel®							
Total volume [L]	1.6	3	6.6	13	1.6	3	6.6	13
Working volume [L]	0.4-1	0.6-2	0.4-5	1.5-10 5-10	0.4-1	0.6-2	0.4	1.5-10 5-10
Culture vessel tripod	•				•			
Stirrer shaft with Single Mechanical Seal	•				•			
6-blade disk impeller	2	2	2	3	2	2	2	3
200-watt servo motor (rpm)	20-2000	20-2000	20-1500	20-800	20-2000	20-2000	20-1500	20-800
Storage bottle 250 mL	3	3	—	—	3	3	—	—
Storage bottle 500 mL	—	—	3	3	—	—	3	3
Air Inlet and Exhaust filter	2				2			
Aeration tube with Ring-sparger	•				•			
Inoculation addition port	•				•			
Exhaust Cooler	•				•			
4-Way addition fitting	•				•			
Sample- Harvest pipe	•				•			
Manual sampler	•				•			
Baffles	•				•			
pH Electrode, cable	•				•			
DO Electrode, cable	•				•			
Level sensor, cable	•				•			
Foam sensor, cable	•				•			
Temperature sensor Pt 100	•				•			
Basic unit								
Digital controller color display with touch screen	•				•			
Control capabilities listing per vessel								
Temperature, pH, DO (2 stage cascade), Stirrer speed	•				•			
Level and Foam via probe	•				Combined Level Foam controller			
Level via balance	•				•			
Substrate A and Substrate B	•				•			
Gas mixing (integrated)	Gas Flow Ratio Control via MFC for Air and O ₂							
Rotameter [l/min]	0.16-1.6	0.42-4.2	1.3-13	2-20	0.16-1.6	0.42-4.2	1.3-13	2-20
Gas Flow								
Ration Control Air MFC [l/min]	0.06-3	0.06-3	0.4-20	0.4-20	0.06-3	0.06-3	0.4-20	0.4-20
Ration Control O ₂ MFC [l/min]	0.06-3	0.06-3	0.4-20	0.4-20	0.06-3	0.06-3	0.4-20	0.4-20
Peristaltic pumps (integrated)	4				3 per side			
Feed pump (integrated) speed controlled	○ —				8843468			
Thermostat system (integrated)	•				•			
Tubing, O-Ring spare set	•				•			
MFCS/DA	•				•			
Balance for culture vessel	○ 8843475				8843475			
Turbidity measurement	○ 8843472	8843473	8843474	8843474	—	—	—	—
Redox measurement	○ 8843469	8843470	8803471	8843471	—	—	—	—

• = included, — = not included, — — = unavailable, ○ = option

BIOSTAT® B plus Additive Low Flow | Single Wall



The BIOSTAT® B plus Additive Low Flow packages with single wall culture vessels are specially configured for cell culture. The integrated automatically controlled gas mixing system provides Sparger and Overlay gassing. Air is routed to Overlay. O₂, N₂ and CO₂ are routed to Sparger, automatically controlled via DO and pH controller. Each gas has its own rotameter for individual flow rate adjustment.

Digital controller

- Graphical user interface with color display and touch screen operation
- Integrated amplifiers for Temperature, pH, DO, combined Foam | Level amplifier
- Space for Redox and Turbidity amplifier (single only)
- Integrated digital control loops for Temperature, pH, DO, agitation, gas mixing, total Sparger flow, total Overlay flow and 2 × substrate
- Level control via Level probe or balance
- Multi-stage DO cascade control
- Totalizers with digital calibration for valves and pumps
- In-process pH-recalibration
- Trend display for up to 6 process values
- Up to 2 direct balance connections

Additive low flow gassing system

- Sparger and Overlay gas outlet
- Gasmixing of O₂, N₂, CO₂ for Sparger gassing
- Air for Overlay gassing
- Controlled via pH/DO controller
- Optional mass flow controllers for total Sparger flow and Overlay flow

Pumps

- 2 × integrated pumps per side
- Configurable to substrate controller
- Up to 2 external feed pumps per side
- Optional integrated speed controlled pump

Temperature system

- Heating blanket
- Integrated controlled cooling water valve
- Temperature range up to 60°C.
- Optional cooling finger

Agitation system

- Speed range 20 up to 2,000 rpm
- Maintenance free
- Gear-free for quiet operation

Culture vessel

Single wall culture vessel fully equipped with:

- Probes for Temperature, DO, pH, Foam and Level
- Stirrer shaft with single mechanical seal
- 3-blade segment impeller
- Aeration tube with micro Sparger, Overlay aeration fitting, sterile filters and exhaust cooler
- Manual sampler with sampling pipe
- Removable addition bottle support
- Addition bottles with stainless steel head piece and sterile filters
- Inoculation | addition port
- Four way addition port
- Tube, O-ring and tool kit

SCADA Software MFCS/DA

To accelerate your research activities, a powerful supervisory software MFCS/DA for extended visualization, data acquisition and trend display is included.

- Plug and Play configuration
- Batch oriented software package
- Online data acquisition
- Sample Data Management
- Enhanced Plotting
- Export functions
- Easy to use programming interface

The BIOSTAT® B plus Additive Low Flow packages are applicable for

- Cell culture of insect and mammalian cells
- Batch, fed batch and continuous culture
- Easy upgrade to perfusion operation
- Small scale cell mass, protein, MAb & vaccine production
- High cell density culture
- Suspension and micro carrier cultures

Key features

- Single or Twin configuration
- Independent vessel control
- Small footprint
- Automatically controlled gas mixing
- Sparger and Overlay gassing
- Graphical user interface with touch screen operation
- Totalizers with digital calibration for valves and pumps
- One high performance stirrer motor for all UniVessel® sizes
- Trend display with up to 6 process values
- Direct balance connection
- Pre-configured firmware for system extension

Specifications

Description	BIOSTAT® B plus-CC Additive Low Flow with single wall UniVessel®				BIOSTAT® B plus-TWIN Additive Low Flow with 2 × single wall UniVessel®			
	1 L	2 L	5 L	10 L	1 L	2 L	5 L	10 L
Cat. No. 230 VAC	8843730	8843732	8843734	8843738 8843736	8843792	8843794	88433796	8843800 8843798
Cat. No. 120 VAC	8843731	8843733	8843735	8843739 8843737	8843793	8843795	8843797	8843801 8843799
Culture Vessel listing per vessel	Single wall UniVessel®							
Total volume [L]	1.6	3	6.6	13	1.6	3	6.6	13
Working volume [L]	0.4–1	0.6–2	0.4–5	1.5–10 5–10	0.4–1	0.6–2	0.4	1.5–10 5–10
Culture vessel tripod	•				•			
Stirrer shaft with Single Mechanical Seal	•				•			
Magnetic coupling	○ 8847339				8847339			
3-blade segment impeller	1				1			
200-watt servo motor (rpm)	20–2000	20–2000	20–1500	20–800	20–2000	20–2000	20–1500	20–800
Storage bottle 250 mL	3	3	–	–	3	3	–	–
Storage bottle 500 mL	–	–	3	3	–	–	3	3
Air Inlet and Exhaust filter	3				3			
Aeration tube with μ-sparger	•				•			
Inoculation port	•				•			
Exhaust Cooler	•				•			
4-Way addition fitting	•				•			
Universal Adaptor 3.2 mm for overlay aeration	•				•			
Sample- Harvest pipe	•				•			
Manual sampler	•				•			
pH Electrode, cable	•				•			
DO Electrode, cable	•				•			
Level sensor, cable	•				•			
Foam sensor, cable	•				•			
Temperature sensor Pt 100	•				•			
Basic unit								
Digital controller color display with touch screen	•				•			
Control capabilities listing per vessel								
Temperature, pH, DO (2 stage cascade), Stirrer speed	•				•			
Combined Level Foam controller	•				•			
Level via balance	•				•			
Substrate A and Substrate B	•				•			
Gasmixing	Additive Low Flow							
Rotameter Sparger [l/min]	O ₂ : 0.002–0.056	N ₂ : 0.002–0.056	CO ₂ : 0.002–0.056		O ₂ : 0.002–0.056	N ₂ : 0.002–0.056	CO ₂ : 0.002–0.056	
Rotameter for Overlay [l/min]	Air: 0.010–0.270				Air: 0.010–0.270			
Automatic gasmixing	•				•			
MFC (Sparger total flow)	○ 0.03–0.150 [l/min]				0.03–0.150 [l/min]			
MFC (Overlay flow)	○ 0.06–0.3 [l/min]				0.06–0.3 [l/min]			
Peristaltic pumps (integrated)	2				2 per side			
Feed pump speed controlled (integrated)	○ –				8843468			
Temperature system with heating blanket	•				•			
Tubing, O-Ring spare set	•				•			
MFCS/DA	•				•			
Balance for culture vessel	○ 8843475				8843475			
Turbidity measurement	○ 8843510	8843511	8843512	8843512	– –			
Redox measurement	○ 8843469	8843470	8803471	8843471	– –			

• = included, – = not included, – – = unavailable, ○ = option

BIOSTAT® B plus Additive Low Flow



The BIOSTAT® B plus Additive Low Flow packages are specially configured for cell culture applications. The integrated, automatically controlled gas mixing system provides Sparger and Overlay gassing. Air is routed to Overlay. O₂, N₂ and CO₂ is routed to Sparger, automatically controlled via DO and pH controller. Each gas has its own rotameter for individual flow rate adjustment.

Digital controller

- Graphical user interface with color display and touch screen operation
- Measurement and control for Temperature, pH, DO, agitation, combined Foam | Level control
- Multi-stage DO cascade control
- 2 × feed controller per side
- Level control via Level probe or balance
- Space for Redox and Turbidity amplifier (Single only)
- Totalizers with digital calibration for pumps and valves
- In-process pH-recalibration
- Trend display for up to 6 process values
- Up to 2 direct balance connections

"Additive Low Flow" gassing system

- Sparger and Overlay gas outlet
- Gasmixing of O₂, N₂, CO₂ for Sparger gassing
- Air for Overlay gassing
- Controlled via pH/DO controller
- Optional mass flow controller for total Sparger and Overlay flow

Pumps

- 2 × integrated pumps per side
- Configurable to substrate controller
- Up to 2 external feed pumps per side
- Optional integrated speed controlled pump

Temperature system

- Powerful heater 1 kW
- Integrated cooling valve
- Circulation pump
- Temperature range 8°C above cooling water up to 80°C.

Agitation system

- Speed range 20 up to 2,000 rpm
- Maintenance free
- Gear-free for quiet operation

Culture vessel

Jacketed culture vessel fully equipped with:

- Probes for Temperature, DO, pH, Foam and Level
- Stirrer shaft with single mechanical seal
- 3-blade segment impeller
- Aeration tube with micro Sparger, Overlay aeration fitting, sterile filters and exhaust cooler
- Manual sampler with sampling pipe
- Removable addition bottle support
- Addition bottles with stainless steel head plates and sterile filters
- Inoculation | addition port
- Four way addition port
- Tube, O-ring and tool kit

SCADA Software MFCS/DA

- Plug and Play configuration
- Online data acquisition
- Sample Data Management
- Enhanced Plotting
- Export functions
- Easy to use programming interface

The BIOSTAT® B plus Additive Low Flow packages are applicable for

- Cell culture of insect and mammalian cells
- Batch, fed batch and continuous culture
- Easy upgrade to perfusion operation
- Small scale cell mass, protein, MAb & vaccine production
- High cell density culture
- Suspension and micro carrier cultures

Key features

- Single or Twin configuration
- Independent vessel control
- Small footprint
- Individual gas flow rate adjustment
- Automatically controlled gas mixing
- Sparger and Overlay gassing
- Graphical user interface with touch screen operation
- Totalizers with digital calibration for valves and pumps
- One high performance stirrer motor for all UniVessel® sizes
- Trend display with up to 6 process values
- Direct balance connection
- Pre-configured firmware for system extensions

Specifications

Description	BIOSTAT® B plus-CC Additive Low Flow with jacketed UniVessel®				BIOSTAT® B plus-TWIN Additive Low Flow with 2× jacketed UniVessel®			
	1 L	2 L	5 L	10 L	1 L	2 L	5 L	10 L
Cat. No. 230 VAC	8843710	8843712	8843714	8843718 8843716	8843771	8843773	8843776	8843780 8843778
Cat. No. 120 VAC	8843711	8843713	8843715	8843719 8843717	8843772	8843774	8843777	8843781 8843779
Culture Vessel listing per vessel	Jacketed UniVessel®							
Total volume [L]	1.6	3	6.6	13	1.6	3	6.6	13
Working volume [L]	0.4-1	0.6-2	0.4-5	1.5-10 5-10	0.4-1	0.6-2	0.4	1.5-10 5-10
Culture vessel tripod	•				•			
Stirrer shaft with Single Mechanical Seal	•				•			
Magnetic coupling	○ 8847339				8847339			
3-blade segment impeller	1				1			
200-watt servo motor (rpm)	20-2000	20-2000	20-1500	20-800	20-2000	20-2000	20-1500	20-800
Storage bottle 250 mL	3	3	—	—	3	3	—	—
Storage bottle 500 mL	—	—	3	3	—	—	3	3
Air Inlet and Exhaust filter	3				3			
Aeration tube with μ-sparger	•				•			
Inoculation port	•				•			
Exhaust Cooler	•				•			
4-Way addition fitting	•				•			
Universal Adaptor 3.2 mm for overlay aeration	•				•			
Sample- Harvest pipe	•				•			
Manual sampler	•				•			
pH Electrode, cable	•				•			
DO Electrode, cable	•				•			
Level sensor, cable	•				•			
Foam sensor, cable	•				•			
Temperature sensor Pt 100	•				•			
Basic unit								
Digital controller color display with touch screen	•				•			
Control capabilities listing per vessel								
Temperature, pH, DO (2 stage cascade), Stirrer speed	•				•			
Combined Level Foam controller	•				•			
Level via balance	•				•			
Substrate A and Substrate B	•				•			
Gasmixing	Additive Low Flow							
Rotameter Sparger [l/min]	O ₂ : 0.002-0.056	N ₂ : 0.002-0.056	CO ₂ : 0.002-0.056		O ₂ : 0.002-0.056	N ₂ : 0.002-0.056	CO ₂ : 0.002-0.056	
Rotameter for Overlay [l/min]	Air: 0.010-0.270				Air: 0.010-0.270			
Automatic gasmixing	•				•			
MFC (Sparger total flow)	○ 0.03-0.150 [l/min]				0.03-0.150 [l/min]			
MFC (Overlay flow)	○ 0.06-0.3 [l/min]				0.06-0.3 [l/min]			
Peristaltic pumps (integrated)	2				2 per side			
Thermostat system	•				•			
Tubing, O-Ring spare set	•				•			
MFCS/DA	•				•			
Balance for culture vessel	○ 8843475				8843475			
Turbidity measurement	○ 8843510	8843511	8843512	8843512	— —			
Redox measurement	○ 8843469	8843470	8803471	8843471	— —			

• = included, — = not included, — — = unavailable, ○ = option

BIOSTAT® B plus O₂ Enrichment



The BIOSTAT® B plus with integrated O₂-Enrichment gassing capability enables high oxygen transfer for high cell density cultures as well as for sheer stress sensitive gassing for filamentous organisms. Furthermore, it may help to solve foaming problems due to reduced gassing rates.

Digital controller

- Graphical user interface with color display and touch screen operation
- Measurement and control for Temperature, pH, DO, agitation, Foam & Level (Twin: combined Foam | Level control)
- Multi-stage DO cascade control
- 2x feed controller per vessel
- Level control via Level probe or balance
- Totalizers with digital calibration for valves and pumps
- In-process pH-recalibration
- Trend display for up to 6 process values
- Up to 2 direct balance connections
- Space for internal Redox and Turbidity amplifier (Single only)

"O₂ Enrichment" gassing system

- Gas mixing of Air and O₂
- O₂ Enrichment capability controlled via DO controller
- Optional mass flow controller for total flow

Pumps

- Up to 4 integrated pumps per side
- Configurable to feed controller
- Up to 2 external feed pumps per side
- Optional integrated speed controlled pump

Temperature system

- Powerful heater (1 kW)
- Integrated controlled cooling water valve
- Circulation pump
- Temperature range 8°C above cooling water up to 80°C.

Agitation system

- Speed range 20 up to 2,000 rpm
- Maintenance free
- High torque for power full mixing
- Gear-free for quiet operation

Culture vessel

Jacketed culture vessel fully equipped with:

- Probes for Temperature, DO, pH, Foam and Level
- Stirrer shaft with single mechanical seal
- Rushton impeller
- Baffle assembly
- Aeration tube with ring Sparger, sterile filters and exhaust cooler
- Manual sampler with sampling pipe
- Removable addition bottle support
- Addition bottles with stainless steel head piece and sterile filters
- Inoculation | addition port
- Four-way addition port
- Tube, O-ring and tool kit

SCADA Software MFCS/DA

- Plug and Play configuration
- Online data acquisition
- Sample Data Management
- Enhanced Plotting
- Export functions
- Easy to use programming interface

The BIOSTAT® B plus O₂ Enrichment packages are applicable for

- Culture of microorganisms
- Batch, fed batch and continuous culture
- High cell density culture
- Culture of filamentous microorganism
- Small scale cell mass and protein production
- Anaerobic | microaerophilic culture, on request

Key features

- Integrated system design
- Single or Twin configuration
- Independent vessel control
- Small footprint
- Automatically controlled O₂ Enrichment
- Graphical user interface with touch screen operation
- Totalizers with digital calibration for valves and pumps
- One high performance stirrer motor for all UniVessel® sizes
- Trend display with up to 6 process values
- Direct balance connection
- Pre-configured firmware for system extensions

Specifications

Description	BIOSTAT® B plus-MO O ₂ -Enrichment with Jacketed UniVessel®				BIOSTAT® B plus-TWIN-MO O ₂ -Enrichment with 2 × jacketed UniVessel®			
	1 L	2 L	5 L	10 L	1 L	2 L	5 L	10 L
Cat. No. 230 VAC	8843479	8843481	8843483	8843487 8843485	8843740	8843742	8843744	8843748 8843746
Cat. No. 120 VAC	8843480	8843482	8843484	8843488 8843486	8843741	8847343	8843745	8843749 8843747
Culture Vessel listing per vessel	Jacketed UniVessel®							
Total volume [L]	1.6	3	6.6	13	1.6	3	6.6	13
Working volume [L]	0.4–1	0.6–2	0.4–5	1.5–10 5–10	0.4–1	0.6–2	0.4	1.5–10 5–10
Culture vessel tripod	•				•			
Stirrer shaft with single mechanical seal	•				•			
6-blade disk impeller	2	2	2	3	2	2	2	3
200-watt servo motor (rpm)	20–2000	20–2000	20–1500	20–800	20–2000	20–2000	20–1500	20–800
Storage bottle 250 mL	3	3	–	–	3	3	–	–
Storage bottle 500 mL	–	–	3	3	–	–	3	3
Air Inlet and Exhaust filter	2				2			
Aeration tube with Ring-sparger	•				•			
Inoculation addition port	•				•			
Exhaust Cooler	•				•			
4-Way addition fitting	•				•			
Sample- Harvest pipe	•				•			
Manual sampler	•				•			
Baffles	•				•			
pH Electrode, cable	•				•			
DO Electrode, cable	•				•			
Level sensor, cable	•				•			
Foam sensor, cable	•				•			
Temperature sensor Pt 100	•				•			
Basic unit								
Digital controller color display with touch screen	•				•			
Control capabilities listing per vessel								
Temperature, pH, DO (2 stage cascade), Stirrer speed	•				•			
Level and Foam via probe	•				Combined Level Foam controller			
Level via balance	•				•			
Substrate A and Substrate B	•				•			
Gasmixing (integrated)	O ₂ -Enrichment							
Rotameter [l/min]	0.16–1.6	0.42–4.2	1.3–13	2–20	0.16–1.6	0.42–4.2	1.3–13	2–20
Solenoid Valve for O ₂ -Enrichment	•				•			
Mass Flow Controller	○ 0.06–3 [l/min] 8847770	0.4–20 [l/min] 8847797			0.06–3 [l/min] 8847770	0.4–20 [l/min] 8847797		
Peristaltic pumps (integrated)	4				3 per side			
Feed pump (integrated) speed controlled	○ –				8843468			
Thermostat system (integrated)	•				•			
Tubing, O-Ring spare set	•				•			
MFCS/DA	•				•			
Balance for culture vessel	○ 8843475	8843475						
Turbidity measurement	○ 8843472	8843473	8843474	8843474	– –			
Redox measurement	○ 8843469	8843470	8803471	8843471	– –			

• = included, – = not included, – – = unavailable, ○ = option

BIOSTAT® B plus Exclusive Flow



The BIOSTAT® B plus Exclusive Flow packages are configured for cell culture. The integrated automatically controlled four gas mixing system, with provides Overlay and Sparger gassing. Air is roated to Overlay. Air, O₂, N₂ and CO₂ is roated to Sparger. By an easy upgrade of culture vessel components and rotameter flow range the system can be also used for microbial cultures. Separate rotameters for gas to the Sparger and Overlay makes adjusting the flow rate easy. The gas composition is automatically controlled via DO and pH controller.

Digital controller

- Graphical user interface with color display and touch screen operation
- Measurement and control for Temperature, pH, DO, agitation, Foam & Level (Twin: combined Foam | Level control)
- Multi-stage DO cascade control
- 2 × feed controller per side
- Level control via Level probe or balance
- Space for Redox and Turbidity amplifier (Single only)
- Totalizers with digital calibration for pumps and valves
- In-process pH-recalibration
- Trend display for up to 6 process values
- Up to 2 direct balance connections

"Exclusive Flow" gassing system

- Sparger and Overlay gas outlet
- Gasmixing of Air, O₂, N₂, CO₂ for Sparger gassing
- Air for Overlay gassing
- Controlled via pH/DO controller
- Optional mass flow controller for total Sparger and Overlay flow

Pumps

- Up to 4 integrated pumps per side
- Configurable to substrate controller
- Up to 2 external feed pumps per side
- Optional integrated speed controlled pump

Temperature system

- Powerful heater (1 kW)
- Integrated controlled cooling water valve
- Circulation pump
- Temperature range 8°C above cooling water up to 80°C.

Agitation system

- Speed range 20 up to 2,000 rpm
- Maintenance free
- Gear-free for quiet operation

Culture vessel

Jacketed culture vessel fully equipped with:

- Probes for Temperature, DO, pH, Foam and Level
- Stirrer shaft with single mechanical seal
- 3-blade segment impeller
- Aeration tube with micro Sparger, Overlay aeration fitting, sterile filters and exhaust cooler
- Manual sampler with sampling pipe
- Removable addition bottle support
- Addition bottles with stainless steel head piece and sterile filters
- Inoculation | addition port
- Four-way addition port
- Tube, O-ring and tool kit

SCADA Software MFCS/DA

- Plug and Play configuration
- Batch oriented software package
- Online data acquisition
- Sample Data Management
- Enhanced Plotting
- Export functionso
- Easy to use programming interface

The BIOSTAT® B plus Exclusive Flow packages are applicable for

- Cell culture of insect, mammalian and plant cells
- Microbial culture by easy upgrade
- Batch, fed batch and continuous culture
- Easy upgrade to perfusion operation
- Small scale cell mass, protein, MAb & vaccine production
- High cell density culture
- Suspension and micro carrier cultures

Key features

- Single or Twin configuration
- Independent vessel control
- Easy multipurpose use upgrade
- Small footprint
- Automatically controlled gas mixing
- Sparger and Overlay gassing
- Graphical user interface with touch screen operation
- Totalizers with digital calibration for valves and pumps
- One high performance stirrer motor for all UniVessel® sizes and application
- Trend display with up to 6 process values
- Direct balance connection
- Pre-configured firmware for system extensions

Specifications

Description	BIOSTAT® B plus-CC Exclusive Flow with jacketed UniVessel®				BIOSTAT® B plus- TWIN Exclusive Flow with 2× jacketed UniVessel®			
	1 L	2 L	5 L	10 L	1 L	2 L	5 L	10 L
Cat. No. 230 VAC	8843499	8843501	8843503	8843507 8843505	8843761	8843763	8843765	8843769 8843767
Cat. No. 120 VAC	8843500	8843502	8843504	8843508 8843506	8843762	8843764	8843766	8843770 8843768
Culture Vessel listing per vessel	Jacketed UniVessel®							
Total volume [L]	1.6	3	6.6	13	1.6	3	6.6	13
Working volume [L]	0.4–1	0.6–2	0.4–5	1.5–10 5–10	0.4–1	0.6–2	0.4	1.5–10 5–10
Culture vessel tripod	•				•			
Stirrer shaft with Single Mechanical Seal	•				•			
Magnetic coupling	○ 8847339				8847339			
3-blade segment impeller	1				1			
200-watt servo motor (rpm)	20–2000	20–2000	20–1500	20–800	20–2000	20–2000	20–1500	20–800
Storage bottle 250 mL	3	3	–	–	3	3	–	–
Storage bottle 500 mL	–	–	3	3	–	–	3	3
Air Inlet and Exhaust filter	3				3			
Aeration tube with μ-sparger	•				•			
Inoculation port	•				•			
Exhaust Cooler	•				•			
4-Way addition fitting	•				•			
Universal Adaptor 3.2 mm for overlay aeration	•				•			
Sample- Harvest pipe	•				•			
Manual sampler	•				•			
pH Electrode, cable	•				•			
DO Electrode, cable	•				•			
Level sensor, cable	•				•			
Foam sensor, cable	•				•			
Temperature sensor Pt 100	•				•			
Basic unit								
Digital controller color display with touch screen	•				•			
Control capabilities listing per vessel								
Temperature, pH, DO (2 stage cascade), Stirrer speed	•				•			
Level and Foam via probe	•				Combined Level Foam controller			
Level via balance	•				•			
Substrate A and Substrate B	•				•			
Gasmixing	Exclusive Flow							
Rotameter Sparger [l/min]	0.016– 0.166	0.016– 0.166	0.05–0.5	0.1–1.0	0.016– 0.166	0.016– 0.166	0.05–0.5	0.1–1.0
Rotameter for Overlay [l/min]	0.1–1	0.16–1.6	0.42–4.2	0.8–8.3	0.1–1	0.16–1.6	0.42–4.2	0.8–8.3
Automatic gasmixing	•				•			
MFC (Sparger total flow)	○ 0.02–1 [l/min] 8847754				0.02–1 [l/min] 8847754			
MFC (Overlay flow)	○ 0.2–10 [l/min] 8847789				0.2–10 [l/min] 8847789			
Peristaltic pumps (integrated)	4				3 per side			
Feed pump (integrated) speed controlled	○ –				8843468			
Thermostat system	•				•			
Tubing, O-Ring spare set	•				•			
MFCS/DA	•				•			
Balance for culture vessel	○ 8843475				8843475			
Turbidity measurement	○ 8843510 8843511 8843512 8843512				– –			
Redox measurement	○ 8843469 8843470 8803471 8843471				– –			

• = included, – = not included, – – = unavailable, ○ = option

Photobioreactor Biostat® PBR Photosynthesis lights the way



Photobioreactor BIOSTAT® PBR

The new models of photobioreactor BIOSTAT® PBR are designed especially for the cultivation of phototrophic organisms, e.g. micro algae and other phototrophe single cell organisms.

The well-known and proven quality of Sartorius BBI Systems measurement and control equipment is combined with long experience of building photo bioreactors.



The standard model range consists of bioreactors of different size. A small and autoclavable unit in lab scale and two in-situ sterilizable units in different size of pilot scale offer a qualified start in a cultivation of phototrophe organisms – under sterile conditions.

All bioreactors are designed for GMP conform reproduction of either defined organisms or generation of valuable intracellular or extracellular substances.



Photosynthetic module

The autoclavable start-up model BIOSTAT® PBR 2 S is a special edition for all lab scale experiments. The BIOSTAT® PBR 20 S is the in-situ sterilizable laboratory fermenter the BIOSTAT® PBR 100 AS completes the standard series:

- Double wall vessel or unit for tempering
- Vessel for gas exchange holds probes for measuring pH, pO₂, temperature and turbidity
- Glass tubing in an external loop in the illumination unit
- Effective lighting unit for controlled illumination
- Lightening may be controlled by measured parameter
- Specific measuring and control cabinet with adapted display



The start-up BIOSTAT® PBR is designed to fit in common lab autoclaves. All other models have small footprint and need not more space than a standard microbial fermenter.

BIOSTAT® PBR 2 S meets the requirements of higher capacity. By modular combination bigger volume needs can be realised.

Features and benefits

- The BIOSTAT® PBR is a new model range for fermentation of phototrophic organisms in lab scale to pilot and production size
- The range of sterilizable fermenters is designed especially for photosynthetic organisms
- GMP conform fermentation
- Effective illumination by the photosynthetic module for optimal growth conditions
- The specific design follows the fundamental demands for cultivation of photosynthetic organisms
- Space saving construction
- Approved measuring and control equipment (DCU) from our type series BIOSTAT®
- Optional SCADA/MFCS/win software for monitoring, control and documentation
- Software is compliant to FDA21 CFR Part 11

BIOSTAT PBR® 2 S

The autoclavable model BIOSTAT® PBR 2 S is the special edition for all lab scale fermentation with pure culture.

- Double wall glass vessel with connectors for tempering
- Vessel lid for air input and exhaust, for probes for measuring pH, pO₂, temperature and OD
- Tubing for external loop in the illumination unit
- Lighting unit for installation after sterilisation

This combination has a small footprint and is designed to fit in common lab autoclaves. After sterilization the fermenter is completed by the illumination unit, which is compact and easy to be mounted.

BIOSTAT PBR® 20 S

The in-situ sterilizable pilot-scale photobioreactor is high efficient and thus designated for optimal cultivation under defined and controlled conditions.

The measuring and control cabinet with its micro DCU (Digital Control Unit) is proved in numerous BIOSTAT® fermenters. The stainless steel double wall vessel is connected to a strong circulation pump and the photosynthetic module.

Fluorescent tubes installed in between illuminate a combination of glass tubes and bends in the tubing unit.

Specifications

BIOSTAT PBR 100 AS

This photo bioreactor is a very space saving unit with its vertical arrangement of the tubing in the photosynthetic module. The total volume of 100 litres is realized in the combination of vessel and glass tubing. The liquid movement in this model is managed by an air-lift system (AS) where the liquid speed range is ruled by the variable airflow.

In the head space the streams of all tubes are mixed and the gas exchange is realized. The temperature control is done via the vessel unit in the base of the photosynthetic module.

This photo bioreactor model – as well as the BIOSTAT® PBR 20 S – allows the production under GMP conditions of single cell organisms using photosynthesis.

Light intensity can be dimmed in correlation to the measured optical density of the culture. All other parameters are shown on the LCD and can be monitored by the Sartorius BBI Systems MFCS/win software which includes multiple correlation analysis and documentation. All demands of CFR part 11 are fulfilled.

	BIOSTAT® PBR 2 S	BIOSTAT® PBR 20 S	BIOSTAT® PBR 100 AS
Max. working volume (L)	3	25	100
Footprint W × L (mm)	400 × 600	1500 × 800	3000 × 2000
Total Height (mm)	700	1300	3600
Sterilisation	Autoclave	In-situ	In-situ
Photosynthetic unit	1	1	1
Photosynthetic area (m ²)	0.5	1.8	3.0
Number of lamps	8	14	24
Wattage (W)	18	16	58
Circulation pump (l/min)	1 - 15	10 - 30	Airlift system
Volume of Gas + Heat exchange vessel (L)	1	10	50
pH sensor	+	+	+
PO2 sensor	+	+	+
OD sensor	On request	+	+
Rotameter	2	2	2
Thermostat system	yes	yes	yes
Steam generator	–	Option	Option
MFCS software	Option	Option	Option
Power supply	230 V/50 Hz 115 V/60 Hz on request 208 V/60 Hz	230 V/50 Hz	400 V/50 Hz 115 V/60 Hz on
request			
Total power input (kW)	2.0	1.8	2.0

* Technical data are subject to change prior notice

Accessories for Today's and Future Bioprocessing Needs



Perfusion system: Internal spinfilter

The Internal Spinfilter is a scalable perfusion system which is applicable for continuous medium exchange for long-term cultivation. It can be used for suspension or micro carrier cultivations and is available in stainless steel or disposable design.

It is directly mounted on the stirrer shaft, resulting in easy sterile handling and operation.



Sterile couplings: SST couplings

SST-Sterile quick connectors provide sterile connection of tubings. Due to the use of a replaceable slot membranes SST couplings provide a re-usable sterile environment.

Perfusion system: External spinfilter

The External Spin Filter (ESF) is a scalable perfusion system applicable for continuous medium exchange for long-term cultivation. It is operated in an external loop with adjustable rotation speed.





SuperSpinner

The SuperSpinner is an incubator-based cell cultivation system. It combines a traditional spinner bottle with a patented bubble free aeration | stirrer system. SuperSpinners are used for seed cultivations and micro scale production and are applicable for suspension and micro carrier cultures. Due to the disposable design of the aeration | stirrer system constant cultivation results are assured.



Bubble free aeration

Bubble free aeration is recommended for extremely shear stress sensitive cells, such as primary mammalian cells. Shear forces caused by bursting bubbles can be avoided and, in addition foam production is prevented.

Turbidity measurement system:

FUNDALUX® II

FUNDALUX® II is an absorption-based photometric probe, designed for use with fermentors | bioreactors.



By continuously measuring cell growth | biomass as a function of light absorption, the process operator can gain real-time knowledge to optimize the process control.





Air Filter

Sartofluor GA	56
Aerosart	58
Midisart® 2000	60
Sartosteel	62

Sartofluor GA Air Filter Cartridges for Bio-Pharmaceutical Applications



Description

Sartofluor GA filter cartridges, manufactured with permanently hydrophobic PTFE membranes, are specially designed for sterile venting and gas applications where adherence to cGMP's is a must. Due to their permanent hydrophobicity, Sartofluor GA cartridges offer the highest process security, even with high volume gas streams, extreme humidity and stringent in-line steam sterilizations.

Applications

Sartofluor GA cartridges are ideally suited for application requiring a sterile, hydrophobic gas filter such as:

- Fermenter and bioreactor inlet gases
- Fermenter and bioreactor vents
- Autoclave vents
- Lyophilizer vents
- Purified water system storage tank vents
- In process storage tank vents
- Filling equipment process air

Performance

PTFE is the most hydrophobic of all membranes used in sterile filtration of gases. The inherent hydrophobicity of the PTFE membrane remains unaffected by repeated autoclaving or steaming. The sterile filtration of dry or moist gases is guaranteed. The unique single layer design is optimized for high flow rates at low differential pressures with short blow down times.

Stability

Sartofluor GA can withstand high differential pressures in either the forward or reverse direction of flow. The mechanical stability and membrane structure are not affected by pulsation or high flow rates.

Water Intrusion Test (WIT) | Water Flow Test (WFT)

A Sartorius development, the WFT offers the first and only correlated in-situ integrity testing system for hydrophobic vent filters. WFT not only eliminates downstream intervention and preflushing, more importantly, it does not require a single drop of alcohol.

Quality control

Each individual element is tested for integrity prior to released assuring absolute reliability.

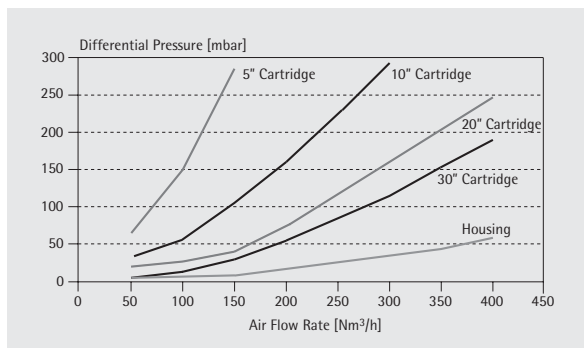
Documentation

Sartofluor GA cartridges 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.

Related products

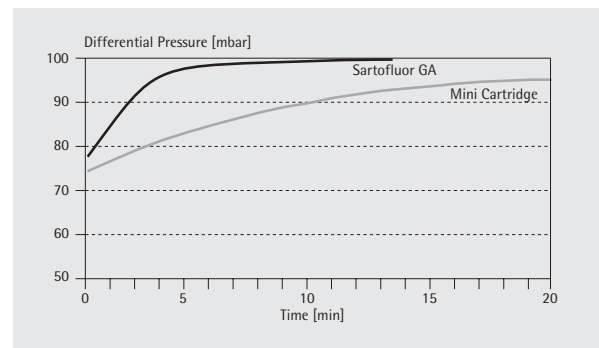
Sartopure GA, page 68

Air Flow Chart Sartofluor GA 0.2 μm



Under atmospheric pressure conditions

Blow-Down Time after WIT



Differential pressure after steam sterilization measured at 200 mbar

Specifications

Pore size

0.2 µm
0.1 µm

Available sizes | Filtration area

Size 1	10"	0.75 m ² 8.1 ft ²
Size 2	20"	1.5 m ² 16.1 ft ²
Size 3	30"	2.25 m ² 24.2 ft ²

Available adapters cartridges

25

Extractables

Sartofluor GA filter cartridges meet, or exceed the requirements for WFI quality standards set by the current USP.

Regulatory compliance

100% Individually integrity tested

Integrity test correlated to HIMA/ASTM F 838-83 Bacteria Challenge Test.

Non-pyrogenic according to USP Bacterial Endotoxins

Meets USP Plastics Class VI biological reactivity test, in vivo

Non-fiber releasing according to 21 CFR

Sterilization

In-line steam sterilization

134°C, 20 min. at max differential pressure of 0.5 bar | 7 psi

Autoclaving

134°C, 2 bar | 29 psi, 30 min

Sterilization cycles

In-line sterilization: min 150 (in direction and in reverse direction of filtration)

Technical references

Validation Guide SPK 5711-e

Materials

Membrane	PTFE
Support fleece	Polypropylene
Core	Polypropylene
End caps	Polypropylene
O-Rings	Silicone (EPDM or Viton optional)

Operating parameters

Max. allowable differential Pressure	5 bar 75 psi at 20°C 0.5 bar 7 psi at 140°C
Max. allowable back pressure	3 bar 43.5 psi at 20°C

Ordering information

Order code	Size	Pore size [µm]
5182558T1----GA	1	0.1
5182558T2----GA	2	0.1
5182558T3----GA	3	0.1
5182507T1----GA	1	0.2
5182507T2----GA	2	0.2
5182507T3----GA	3	0.2

Aerosart Airfilter Cartridge for Industrial Applications



Description

Aerosart high performance air filter cartridges can significantly reduce operating costs. The Aerosart is a high flow rate, low differential pressure, hydrophobic membrane filter. The unique single layer filter construction also reduces Blow-Down-time. Both the high flow rate and the short Blow-Down-time lowers the energy cost of air supply operations.

Applications

The Aerosart is designed for large-scale fermentation inlet and exhaust gas filtration.

Microbiological safety

Aerosart filter cartridges have been tested and passed aerosol bacterial and viral challenge tests. Tests were conducted using MS-2 coli phages (NCIMB 10 108) and *B. subtilis* var. niger spores (NCTC 10073) at a challenge level of greater than 2.5×10^7 under worst case conditions of greater than 90% RH. No MS-2 coli phages or *B. subtilis* spores were detected on the downstream side of the Aerosart filter cartridges.

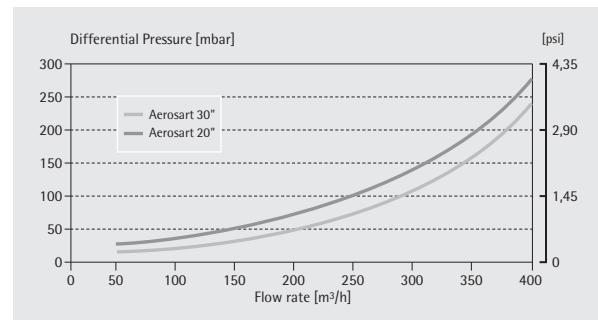
Performance

The unique single layer pleated filter construction of the highly hydrophobic PTFE membrane provides low differential pressures, excellent flow rates and the fastest blow down times of any gas service filter.

Long service life time

The mechanical and thermal stresses experienced during steam in place sterilization pose the highest risk to any filter cartridge. In many cases, Aerosart filter cartridges will be used for more the 120 steaming cycles. Tests have shown Aerosart cartridges to pass integrity tests with greater than 150 steaming cycles.

Air flow rates Aerosart



Air flow rate for Aerosart filter cartridges (0.2 μm) in relation to the filter cartridge heights at atmosphere pressure condition.

Specifications

Pore size

0.2 µm

Available sizes | Filtration area

Size 2 20" 1.5 m² | 16.1 ft²
Size 3 30" 2.25 m² | 24.2 ft²

Available adapters

25

Packaging

6 cartridges per box

Regulatory compliance

Qualified for retention of aerosolized bacterial spores and viruses (coli-phages) in air

Non pyrogenic according to USP Bacterial Endotoxins

Passes USP Plastics Class VI Test

Non fiber releasing according to 21 CFR

Sterilization

In-line steam sterilization

134°C, 20 min. at a maximum differential pressure of 0.5 bar | 7 psi

Sterilization cycles

Minimum of 150 in-line sterilization cycles

Materials

Filter membrane	PTFE
Support fleece	Polypropylene
Core	Polypropylene
End caps	Polypropylene
O-Rings	EPDM

Operating parameters

Max. allowable differential pressure	5 bar 75 psi at 20°C 0.5 bar 7 psi at 134°C
Max. allowable back pressure	3 bar 43.5 psi at 20°C 0.5 bar 7 psi at 134°C

Ordering information

Order code	Size	Pore size [µm]
5152507T2---E--C	2	0.2
5152507T3---E--C	3	0.2

Midisart® 2000

The Ready-to-use Filter for Sterilizing Gases and Venting



Midisart 2000 filtration units are ideal tools in biotechnology, the pharmaceutical industry, research institutes and anywhere you need sterile vents, bioisolation or sterile air and gases.

Midisarts are excellent for

- sterile venting of filling vessels and fermentation carboys, including culture vessels and CO₂ incubators (6 to 120 liters)
- venting of holding tanks for sterile, distilled water and liquid culture media
- autoclave venting
- in-line sterilization of and particulate removal from air and gases, such as sterilization of air for small fermenters



Midisart 2000 filtration units have been specially designed for maximum handling ease and safety. Tapered hose barbs ensure a simple and secure hold for 6- to 12-mm inner diameter tubing. Midisart is lightweight – only 20 g – so it will not weigh down or kink tubing.

User benefits

1. Maximum handling ease

- Midisart 2000 comes individually packaged and presterilized – it's ready to connect!

2. Extra reliability and safety

- Midisart 2000 is integrity testable and delivers reproducible results.
- The membrane is reinforced with polypropylene gauze, giving the Midisart unit added stability and making it pressure resistant up to 3 bar (approx. 44 psi).
- Midisart 2000 entirely eliminates moisture breakthrough because of its inherently hydrophobic PTFE material.
- In addition, Midisart is biosafe because all materials of construction meet the requirements of the current USP Plastics Class VI testing.
- Midisart 2000 units easily withstand at least 20 autoclaving cycles with no loss in performance. The convenient Memory Discs supplied with each Midisart 2000 in UPN-coded boxes enable you to keep track of the number of autoclaving cycles by marking or clipping off each cycle. This feature is key in complying with GLP and ISO standards for traceable documentation.

3. Quality control certificate

- Each unit is automatically tested 100% for housing and membrane sealing during manufacture as part of our zero-defect quality control testing.
- The lot number and the individual unit number are imprinted on the top part of each Midisart 2000 housing to ensure complete traceability.



Midisart 2000 units are visually inspected before they are packaged.

In addition to 100% leak testing, random samples taken from each lot undergo the following tests to assure compliance with Sartorius' stringent in-house quality assurance standards:

- Housing burst pressure test
- Pressure-hold test
- Bubble point test
- Pyrogen test
- Sterile filtration capability
- Flow rate test
- Sterility test

Performance

- With a diameter measuring just 64 mm, Midisart incorporates a filter area of 20 cm², which means that it is "packed" with high flow rate performance power!
- Midisarts multiply filtration performance in more ways than one. They can be autoclaved at least 20 times at 134°C!

Chemical compatibility

The materials used in Midisart (PTFE and polypropylene) give it excellent compatibility with the solvents and other chemicals listed on the right. However, its compatibility can be affected by various factors, such as temperature, concentration, composition, etc. We therefore recommend that you perform a trial filtration run to test whether Midisart is compatible with the particular medium you wish to filter.

Midisart 2000 can also be used to filter aqueous solutions. In this case, it must be first wetted with alcohol to overcome the membrane's hydrophobicity.

- Acetic acid (concentrated), acetone, acetonitrile
- n-butanol
- Cellosolve (ethyl), chloroform
- Diethylacetamide, dimethyl formamide, dimethyl sulfoxide, dioxane
- Ethanol, ethyl acetate, ethylene glycol
- Freon TF
- Gasoline
- 1 N hydrochloric acid, hexane
- Isobutanol, isopropanol
- Methanol, methylene chloride, methyl ethyl ether, methyl ethyl ketone
- Sodium hydroxide (5%)
- Pentane
- Tetrahydrofuran, toluene, trichloroacetic acid, trichloroethane
- Water
- Xylene

Specifications



Technical specifications

Filter material	PTFE – reinforced with polypropylene gauze	
Housing material	Polypropylene	
Filtration area	20 cm ²	
Housing diameter	64 mm	
Priming volume	Approx. 3 ml	
Maximum operating pressure	300 kPa (3 bar = 44 psi)	
Water penetration point (breakthrough)	0.2 µm – approx. 400 kPa (4 bar = 58 psi)	
	0.45 µm – approx. 300 kPa (3 bar = ~ 44 psi)	
Max. autoclaving temperature	134°C	
Max. autoclave cycles	20	
Hold-up volume	Before the bubble point	approx. 1.0 ml
	After the bubble point	approx. 0.5 ml
Biosafety	USP Plastics Class VI	
Bubble point with isopropanol (60%)	0.45 µm	≥ 0.9 bar (~13.1 psi)
	0.2 µm	≥ 1.1 bar (~16 psi)
Flow rate for air at Δp = 0.1 bar (1.45 psi) (1 bar = 100 kPa = 14.5 psi)	0.2 µm pore size	5.0 l/min
	0.45 µm pore size	8.5 l/min

Order information

Order numbers	Pore size	Mem-brane	Connectors E A	Pieces/ Case	Sterile
17804 E	0.45 µm	PTFE	Olive Olive	12	Yes
17804 G	0.45 µm	PTFE	Olive Olive	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
17839 UNN	0.45 µm	PTFE	Luer Lock female Olive	100	No
17805 E	0.2 µm	PTFE	Olive Olive	12	Yes
17805 G	0.2 µm	PTFE	Olive Olive	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	Olive Olive	100	No
17809 UNN	0.2 µm	PTFE	1/8" 1/8" NPT	100	No
17812 UNN	0.2 µm	PTFE	1/8" Olive	100	No

In the interest of further development of Sartorius products, we reserve the right to make changes without notice.

Sartosteel Removing Particles from Liquids, Gas and Steam



Description

Sartosteel are especially developed for removing particles from liquids, gas and steam.

Applications

Sartosteel is applied in biopharmaceutical process such as:

- Steam filtration
- Condensate filtration
- Water filtration

Further applications

Chemical Industrie

- Polymer filtration (from 3 μm)
- Catalyst retention (10 μm)
- Gas filtration ($\geq 80^\circ\text{C}$)
- Cleaning agents

Performance

Sartosteel stainless steel depth filter cartridges contain sintered, homogeneous, 0.4 mm thick non woven stainless steel mesh layers, which are reinforced on both sides by mesh supports. These filters are used for removing particles from liquids and gases (steam). Sartosteel filter cartridges offer the user maximum security along with low filtration costs.

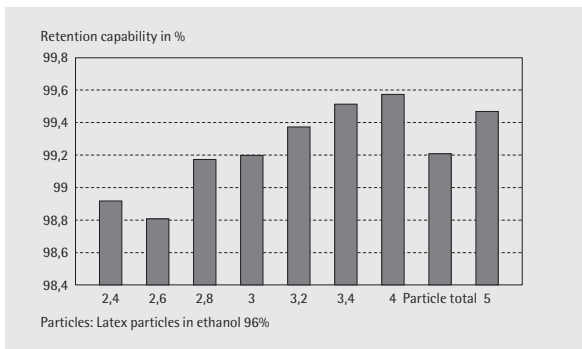
Product benefits

- High dirt-handling capacity
- High mechanical stability
- Homogeneous material construction
- Absolutely leak-proof connections between end caps and filter unit

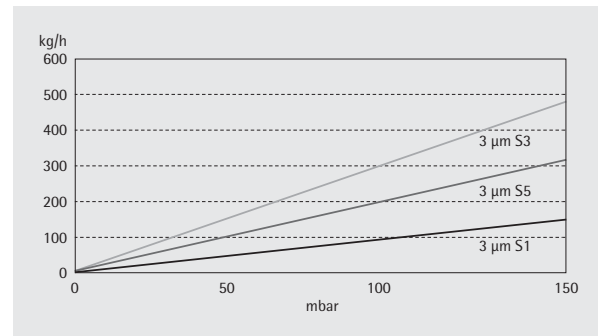
Quality control

Sartocell are designed, developed and manufactured in accordance with a DIN ISO 9001 certified Quality Management System.

Particle retention rating 3 μm Sartosteel



Sartosteel – saturated steam
(T = 121 $^\circ\text{C}$, P = 1 bar system pressure)



Specifications

Retention rates

3 µm

Filter area

10" element: 500 cm² (effective filter area)

Operation parameters

Max. differential pressure:
 ≤ 20 bar, in the direction of filtration
 ≤ 1 bar, opposite to the direction
 of filtration

Resistance | Compatibility

thermal	up to 200°C (not with silicone sealing)
chemical	inert to caustic solutions, solvents not compatible with aggressive and relatively high concentrations of acid (≥ 5%)

Materials

Sintered non woven stainless steel media, reinforced on both sides with sintered-on mesh

Filter media	AISI 316 L
Support mesh	AISI 304/316 L
Outer support	AISI 304/316 L
Core	AISI 304/316 L
End caps	AISI 304/316 L
Gaskets	silicone*

* standard: also available in Viton and EPDM

Order information

Cartridges

Order code	Adapter type	Retention rate [µm]	Height
570■■■02S1	25, 28	3	10"
570■■■02S5	25, 28	3	20"
570■■■02S3	25, 28	3	30"

■■■: Please replace the blanks with the appropriate two-letter combination for the adapter type.

Pre-Depth
Filter





Pre- | Depth Filter

Jumbo Star	66
Sartopure GA	68
Sartopure PP2	70
Sartopure GF Plus	72
Sartopure GF2	74
Sartoclean GF	76
Sartoclean CA	78
Sartofine PP	80

Jumbo Star The New Filter Generation



Features and benefits

- Highest flow rates
- Highest dirt holding capacity – improved service life
- Modular filter design for easy adaptation and handling
- Improved filter construction for highest thermal and mechanical stability
- Able to handle a broad range of flow requirements

Improved overall design and construction

The large filter area and proprietary pleat design of Jumbo Star provides highest flow rates and total throughputs. Capable of flow rates ranging from 10.000 to 40.000 liter per hour, Sartorius Jumbo Star filters are especially designed to match requirements for any large volume filtration process. Sartorius Jumbo Star filters feature up to 46 m² of filter area and thus can replace up to twenty four standard filter cartridges. The new modular filters are available in 10", 20", 30" and 40" height allow for easy adaptation into the system.



The rugged construction of Jumbo Star features unique combinations of polypropylene and glass fiber filter layers. This prevents breakthrough of particles, colloids and bio burden – providing maximum protection for downstream standard filters.



The unique, modular construction of the Jumbo Star filter requires much less set-up work and time than standard filter cartridges technology.

The closed filter system of Sartorius Jumbo Star allows ease of use and hygienic processing. Product losses and oxidation are also minimized as a result of this design.



Modular filter cartridge construction

Structural integrity

In addition to ease of handling, the new Jumbo construction provides better mechanical stability of the filter system and can withstand back-flushing. The adapter joints between the modules are constructed to meet the most stringent requirements of Food and Beverage applications.

Jumbo filter and FDA approval

All materials used for the construction of Jumbo filters meet FDA requirements for use in food and beverage applications. You can choose a wide selection of filters for both applications.

Applications

- Filtration of food & beverage products
- Filtration of water
- Filtration of large volume fluid

Quality from start to finish

All Sartorius filter cartridges are required to pass stringent in-process quality control tests.

Completely traceable documentation of the entire manufacturing process of Jumbo cartridges is guaranteed by our stringent quality assurance policy that is certified for compliance with ISO 9001. This results in consistently high product quality ranging from raw materials to the finished product. Establishing a good partnership with our customers is our No. 1 priority. That's why Sartorius offers not only excellent products, but also an international customer support service network that will make your daily work easy.

Our experienced engineers are ready to assist you in solving your filtration problems.

Specifications

Ordering information

Cartridge type	Adapter type	Retention rating (µm)	1-high (10")	2-high (20")
Sartoclean SC	40	1.20	5634003J1	5634003J2
	40	3.00	5634002J1	5634002J2
Sartopure PP2	40	0.65	5594005J1	5594005J2
	40	1.20	5594003J1	5594003J2
	40	3.00	5594002J1	5594002J2
	40	8.00	5594001J1	5594001J2
	40	20.00	5594020J1	5594020J2
Sartopure GF Plus	40	0.65	5554005J1	5554005J2
	40	1.20	5554003J1	5554003J2
Sartopure GA	40	0.20	5594007J1----GA	5594007J2----GA

Cartridge type	Adapter type	Retention rating (µm)	3-high (30")	4-high (40")
Sartoclean SC	40	1.20	5634003J3	5634003J4
	40	3.00	5634002J3	5634002J4
Sartopure PP2	40	0.65	5594005J3	5594005J4
	40	1.20	5594003J3	5594003J4
	40	3.00	5594002J3	5594002J4
	40	8.00	5594001J3	5594001J4
	40	20.00	5594020J3	5594020J4
Sartopure GF Plus	40	0.65	5554005J3	5554005J4
	40	1.20	5554003J3	5554003J4

Sartopure GA Superior Venting Filter Cartridges



Description

Sartopure GA and Sartofluor GA are the ideal choice for air filtration in the biopharmaceutical industry. Sartopure GA filters expand the service life time of sterilizing grade air filter systems by removal of particles from the air stream. In addition they can be used for all venting purposes that do not necessarily require an integrity testable membrane filter. Sartopure GA offers an outstanding flow rate at low differential pressure.

Applications

Typically applications for Sartopure GA air filters are:

- Prefiltration in front of Sartofluor GA membrane filters or any other membrane air filter
- Venting of non pressure resistant vessels
- Particle removal from air streams, e.g. pressure supplies

Retention efficiency

The excellent retention and therefore superior protection for stored products has been proven by particle retention filtration and bacteria challenge tests performed under worst case conditions. Sartopure GA retained 10 million *Bacillus subtilis* var niger spores per cm² filtration area. Featuring a retention of 0.2 µm for gas, Sartopure GA efficiently protects stored products, e.g. water, liquid sugar, oral solutions etc., in the pharmaceutical industry as well as the food and beverage industry.

Flow rate

Due to the larger filter area of 0.7 m² | 10", Sartopure GA delivers a flow rate of nearly 40 m³/h at a differential pressure of 10 mbar. This means Sartopure GA is the preferred product for high performance filling or draining of tanks | vessels.

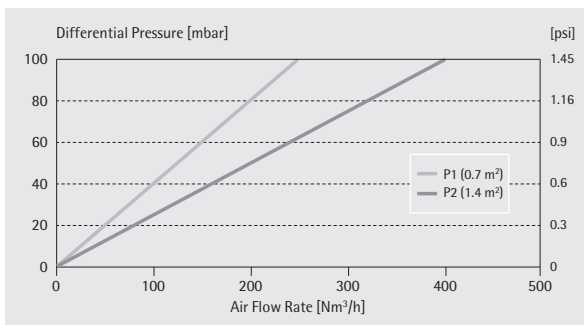
Optimized filter material

Sartopure GA's hydrophobic material guarantees an air flow recovery of 60-80% within 30 seconds after the filter has been wetted with water. The water prevents high differential pressures, ensuring fast recovery of air flow rate e. g. after cleaning the tank with hot water | agents.

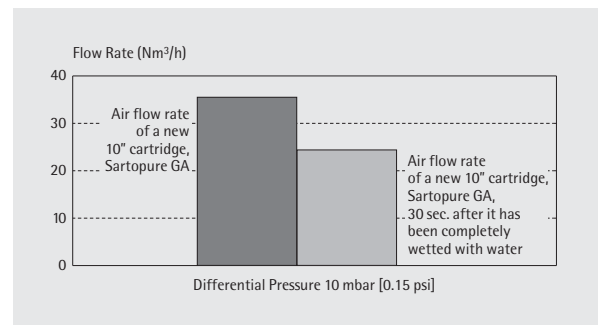
Documentation

Sartopure GA cartridges are designed, developed and manufactured in accordance with a ISO 9001 certified Quality Management System.

Air Flow Rates for 10" and 20" Cartridges



Air Flow Recovery



Specifications

0.2 µm (nominal in Gases)

Available sizes | Filtration area

Size 1	10"	0.7 m ² 7 ft ²
Size 2	20"	1.4 m ² 14 ft ²
Size 3	30"	2.1 m ² 21 ft ²

Available adapters cartridges

25, 28

Regulatory compliance

Filter material bacteria challenge tested with Bacillus subtilis var niger spores

Non pyrogenic according to USP Bacterial Endotoxins

Pass USP Plastic Class VI Test

Non fiber releasing according to 21 CFR

Sterilization

In-line steam sterilization

134°C, 20 min. at max differential pressure of 0.5 bar | 7 psi

Autoclaving

134°C, 2 bar | 29 psi, 30 min

Sterilization cycles

In-line sterilization: Min. 50

Materials

Filter material	Hydrophobic Glass Fiber
Support fleece	Polypropylene
Core	Polypropylene
End caps	Polypropylene
O-Rings	Silicone (EPDM or Viton optional)

Pore size

Operating parameters

Max. allowable differential pressure	5 bar 75 psi at 20°C	2 bar 29 psi at 80°C
Max. allowable back pressure	2 bar 29 psi at 20°C	

Ordering information

Order code	Size	Pore size [µm]
559**07P1----GA	1	0.2
559**07P2----GA	2	0.2
559**07P3----GA	3	0.2

Sartopure PP2 Particle & Bioburden Reduction Filter Cartridges



Description

Sartopure PP2 cartridges were optimized for the wide range of prefiltration. Retention of particles and reduction of bioburden from liquids as well as gases is ensured through fractionated defined depth filtration. Sartopure PP2 filters combine multiple layers of progressively finer pleated polypropylene depth filter material. They are ideally suited for clarification and prefiltration prior to membrane filtration.

Applications

Typical applications for Sartopure PP2 filters are particle removal from various media like:

- Plasma Fractions
- Vaccines
- MAB
- Diagnostics
- Purified Protein Solutions
- Biological Fluids
- Ophthalmics
- Solutions containing Preservatives
- WFI

Security

The Sartopure PP2 filter elements ensure the selective, effective and defined particle retention. It is a valuable protection for the final filter. The all polypropylene construction offers a broad chemical compatibility.

Performance

The Sartopure PP2 filter elements combine high dirt loading capacities with long service life and extremely high flow rates.

Economical results

Considering all features and benefits, Sartopure PP2 filters guarantee the maximum in process profitability.

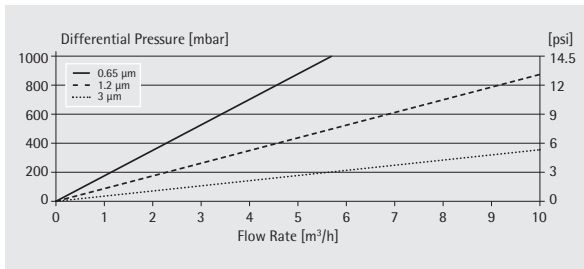
Flexibility

Sartopure PP2 filters are available as standard filter cartridges, mini cartridges, MaxiCaps, capsules and in various sizes to allow for broadest choice and highest process flexibility.

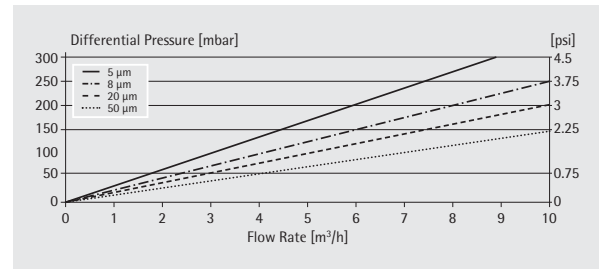
Documentation

Sartopure PP2 cartridges are designed, developed and manufactured in accordance with a ISO 9001 certified Quality Management System. A Validation Guide is available for compliance with regulatory requirements.

Water Flow Rates for 10" Cartridges and MaxiCaps



Water Flow Rates for 10" Cartridges



Specifications

Retention rates

0.65 µm, 1.2 µm, 3 µm, 5 µm, 8 µm,
20 µm, 50 µm

Available sizes | Filtration area

Cartridges | MaxiCaps

Size 1	10"	0.6 m ² 6 ft ²
Size 2	20"	1.2 m ² 12 ft ²
Size 3	30"	1.8 m ² 18 ft ²

Capsules | Mini Cartridges

Size 7	0.05 m ² 0.5 ft ²
Size 8	0.1 m ² 1 ft ²
Size 9	0.2 m ² 2 ft ²
Size 0	0.45 m ² 5 ft ² (only Capsules)

Available adapters cartridges

21, 25, 27, 28

Available adapter Mini Cartridges

15

Available connectors capsules | MaxiCaps

SS, SO, OO

Extractables

Sartopure PP2 cartridges, MaxiCaps and Capsules meet, or exceed the requirements for WFI quality standards set by the current USP.

Regulatory compliance

Non pyrogenic according to USP Bacterial Endotoxins

Pass USP Plastic Class VI Test

Non fiber releasing according to 21 CFR

Sterilization

In-line steam sterilization

134°C, 20 min. at max differential pressure of 0.5 bar | 7 psi

Note

Capsules and MaxiCaps cannot be in-line steam sterilized!

Autoclaving

134°C, 2 bar | 29 psi, 30 min

Sterilization cycles

In-line sterilization (only cartridges)	Min. 25
Autoclaving	Min. 25

Technical references

Validation Guide	SPK 5717-e
Extractables Guide	SPK 5719-e

Materials

Filter material	Multiple Polypropylene layers
Support fleece	Polypropylene
Core	Polypropylene
End caps	Polypropylene
O-Rings	Silicone (optional EPDM or Viton)

Operating parameters

Max. allowable differential pressure	5 bar 75 psi at 20°C (Cartridges)
	4 bar 58 psi at 20°C (Capsules)
	3 bar 43.5 psi at 20°C (MaxiCaps)
	2 bar 29 psi at 80°C (Cartridges and Capsules)
Max. allowable back pressure	2 bar 29 psi at 20°C

Order information

Order code	Pore size [µm]
Cartridges	
559**05PX	0.65
559**03PX	1.2
559**02PX	3
559**42PX	5
559**01PX	8
559**20PX	20
559**50PX	50

Sartopure GF Plus The New Generation of Adsorptive Depth Filters



Description

Sartopure GF Plus adsorptive depth filters are designed for removal of contaminants like colloids, lipids, protein aggregates (Host Cell Protein) and particles from biopharmaceutical fluids. They are used for protection of membrane filters, chromatography columns and ultrafiltration systems in pharmaceutical and biotechnological production processes.

Applications

Sartopure GF Plus adsorptive depth filters are the ideal choice for prefiltration and clarification of:

- Cell Culture fluids after cell harvest
- Fermentation broths
- Serum free or serum containing cell culture media
- Serum
- Highly viscous ophthalmic and LVP solutions
- All media containing lipids and colloids as contaminants



Effective clarification

Sartopure GF Plus adsorptive depth filters feature highly charged glass fiber layers for effective clarification of fluid streams based on the combination of adsorptive and mechanical retention.

Economic prefiltration

The 3-dimensional filter matrix of Sartopure GF Plus adsorptive depth filters assures outstanding total throughput performance of the filters thus ensuring most economic design of your prefiltration scheme.

Reliable operation

The high and defined particle retention capability of Sartopure GF Plus allows reliable operation and reproducible results from batch to batch even under varying process conditions.

Cost saving

The efficient protection of downstream membrane filters and purification equipment saves filter costs and helps to increase the yield of biotech production processes.

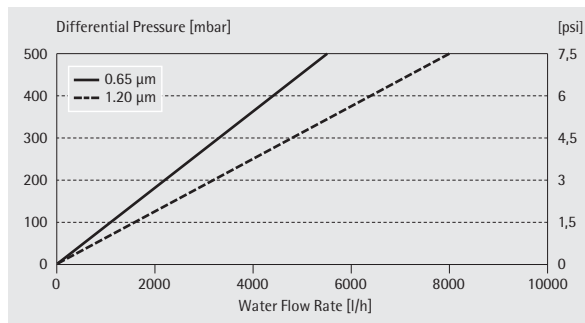
Flexibility

Sartopure GF Plus filters are available as standard cartridges and MaxiCaps. Cartridges are strong and robust and designed for maximum pressure differentials and multiple steaming cycles. Disposable MaxiCaps are designed for single use and are integral component of disposable manufacturing lines.

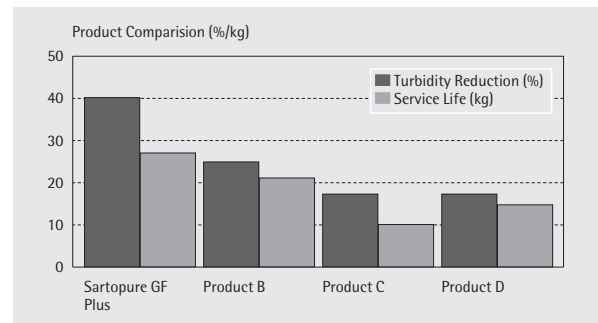
Documentation

Sartopure GF Plus adsorptive depth filters 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.

Water Flow Rates for Sartopure GF Plus
Sartopure GF Plus 10" Standard Cartridges 0.65 µm, 1.2 µm



Product Comparison Data



Specifications

Retention rates

0.65 µm, 1.2 µm

Available sizes | Filtration area Cartridges and MaxiCaps

Size 1	10"	0.6 m ² 6 ft ²
Size 2	20"	1.2 m ² 12 ft ²
Size 3	30"	1.8 m ² 18 ft ²

Available adapters cartridges

21, 25, 27, 28

Available connectors MaxiCaps

SS, SO, OO

Extractables

Sartopure GF Plus cartridges and MaxiCaps meet, or exceed the requirements for WFI quality standards set by the current USP.

Regulatory compliance

Non pyrogenic according to USP Bacterial Endotoxins

Pass USP Plastic Class VI Test

Non fiber releasing according to 21 CFR

Sterilization

In-line steam sterilization

134°C, 20 min. at max differential pressure of 0.5 bar

Note

MaxiCaps cannot be in-line steam sterilized!

Autoclaving

134°C, 2 bar, 30 min

Sterilization cycles

In-line sterilization (only cartridges)	Min. 25
Autoclaving	Min. 25

Technical references

Validation Guide SPK5753-e

Materials

Filter material	Glass Fiber fleeces
Support fleece	Polypropylene
Core	Polypropylene
End caps	Polypropylene
O-Rings	Silicone (optional EPDM or Viton)

Operating parameters

Max. allowable differential pressure	5 bar 75 psi at 20°C (Cartridges)
	2 bar 29 psi at 80°C (Cartridges)
	4 bar 58 psi at 20°C (MaxiCaps)
	3 bar 43.5 psi at 50°C (MaxiCaps)
Max. allowable back pressure	2 bar 29 psi at 20°C (Cartridges and MaxiCaps)

Order information

Order code	Pore size [µm]
Cartridges	
555**05PX	0.65
555**03PX	1.2
MaxiCaps	
5551305PX--■ ■	0.65
5551303PX--■ ■	1.2

** = Adapter 21, 25, 27, 28

X = Height 10", 20", 30", 40"

■ ■ = Inlet and outlet connectors

(O = Hosebarb 1" inner diameter

S = 1½" Sanitary flange)

Sartopure GF2 Adsorptive High Capacity Filter Cartridges



Description

Sartopure GF2 cartridges are optimized for the protection of downstream membrane filter systems and clarification in biopharmaceutical production processes. Due to their high adsorptive power by glass fiber fleeces, they are the ideal solution for removal of colloids and lipids from bio-pharmaceutical fluids.

Applications

Sartopure GF2 are ideal for the prefiltration of:

- Fermentation Broths
- Cell Debris solutions
- Serum
- Plasma
- LVP
- Colloid containing solutions
- Lipid containing solutions

High adsorption

Based on electrostatic forces of attraction, the negatively charged glass fiber material retains positively charged, small particles that would otherwise pass through the filter. These particles can even be smaller than the nominal filter retention rate.

Defined retention rates

The key feature of Sartopure GF2 cartridges is their defined and accurate retention rating >99.9%!

High profitability

The cartridges' high flow rates at a low differential pressure reduce overall costs as less energy is used. Moreover, a high total throughput guarantees the maximum in process profitability.

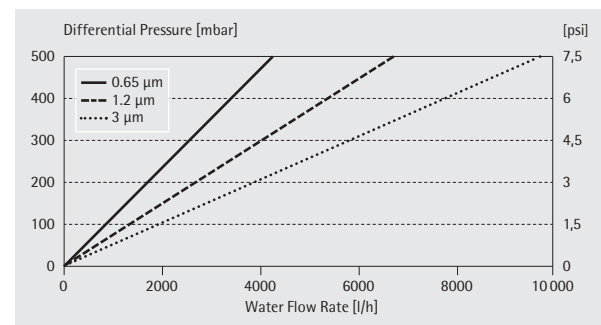
Flexibility

Sartopure GF2 filters are available as standard filter cartridges, mini cartridges, capsules and in various sizes to allow for broadest choice and highest process flexibility.

Documentation

Sartopure GF2 cartridges are designed, developed and manufactured in accordance with a ISO 9001 certified Quality Management System. A Validation Guide is available for compliance with regulatory requirements.

Water Flow Rates for Sartopure GF2 10" Standard Cartridges
0.65 μm , 1.2 μm , 3 μm



Specifications

Retention rates

0.65 µm, 1.2 µm, 3 µm

Available sizes | Filtration area

Cartridges

Size 1	10"	0.6 m ² 6 ft ²
Size 2	20"	1.2 m ² 12 ft ²
Size 3	30"	1.8 m ² 18 ft ²

Capsules | Mini Cartridges

Size 7		0.05 m ² 0.5 ft ²
Size 8		0.1 m ² 1 ft ²
Size 9		0.2 m ² 2 ft ²
Size 0		0.45 m ² 5 ft ² (only Capsules)

Available adapters cartridges

21, 25, 27, 28

Available connectors capsules

SS, SO, 00

Extractables

Sartopure GF2 cartridges and capsules meet, or exceed the requirements for WFI quality standards set by the current USP.

Regulatory compliance

Non pyrogenic according to USP Bacterial Endotoxins

Pass USP Plastic Class VI Test

Non fiber releasing according to 21 CFR

Sterilization

In-line steam sterilization

134°C, 20 min. at max differential pressure of 0.5 bar | 7 psi

Note

Capsules cannot be in-line steam sterilized!

Autoclaving

134°C, 2 bar | 29 psi, 30 min

Sterilization cycles

In-line sterilization (only cartridges)	Min. 25
Autoclaving	Min. 25

Technical references

Validation Guide SPK 5717-e

Materials

Filter material	Glass Fiber fleeces
Support fleece	Polypropylene
Core	Polypropylene
End caps	Polypropylene
O-Rings	Silicone (optional EPDM or Viton)

Operating parameters

Max. allowable differential pressure	5 bar 75 psi at 20°C (Cartridges)
	4 bar 58 psi at 20°C (Capsules)
	2 bar 29 psi at 80°C (Cartridges and Capsules)
Max. allowable back pressure	2 bar 29 psi at 20°C

Order information

Order code	Pore size [µm]
Cartridges	
557**05PX	0.65
557**03PX	1.2
557**02PX	3
Mini Cartridges	
5571505PX-----B	0.65
5571503PX-----B	1.2
5571502PX-----B	3
Capsules	
5571305PX--**--#	0.65
5571303PX--**--#	1.2
5571302PX--**--#	3

Sartoclean GF

Adsorptive Membrane Filter for Colloid and Bioburden Reduction



Description

Sartoclean GF filter cartridges combine absolute retention performance by membrane filtration with high adsorptive power by glass fiber fleeces. Therefore Sartoclean GF are ideally suited for removal of colloids and lipids as well as defined particle retention and bioburden reduction for a broad range of bio-pharmaceutical applications.

Applications

Sartoclean GF filter cartridges are widely used for prefiltration in biotech manufacturing processes to protect subsequent downstream processing equipment. Typical applications include bioburden reduction as well as effective colloid and lipid removal from:

- Fermentation broths
- Serum
- Cell Culture Media
- Colloid and Lipid containing solutions

Process safety

The removal of colloidal contaminants and lipids by adsorption allows an effective downstream processing and bioburden reduction by membrane filtration avoids formation of pyrogens during the process resulting in an increased process safety especially for biotech derived fluids.

Performance

The combination of adsorptive glass fiber fleeces with membrane filters assures optimal total throughput performance and allow for economic filtration system design.

Flexibility

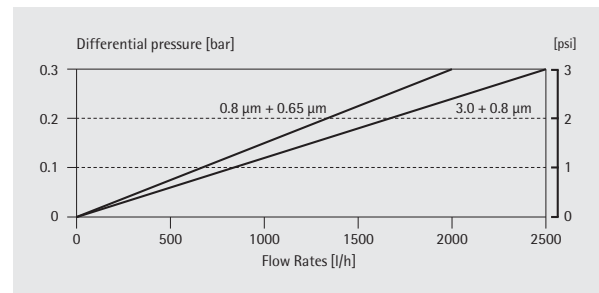
Sartoclean GF filters are available as standard filter cartridges, mini cartridges and capsules offering broadest choice for scale-up and easiest adoption to varying process volumes.

Documentation

Sartoclean GF cartridges are designed, developed and manufactured in accordance with a ISO 9001 certified Quality Management System. A Validation Guide is available for compliance with regulatory requirements.



Water Flow Rates for 10" Sartoclean GF Cartridges



Standardized at 20°C

Specifications

Pore sizes

0.8 + 0.65 µm
3.0 + 0.8 µm

Available sizes | Filtration area

Cartridges

Size 1	10"	0.6 m ² 6 ft ²
Size 2	20"	1.2 m ² 12 ft ²
Size 3	30"	1.8 m ² 18 ft ²

Capsules | Mini Cartridges

Size 7	0.05 m ² 0.5 ft ²
Size 8	0.1 m ² 1 ft ²
Size 9	0.2 m ² 2 ft ²
Size 0	0.45 m ² 5 ft ² (only Capsules)

Available adapters cartridges

21, 25, 27, 28

Available adapter Mini Cartridges

15

Available connectors capsules

SS, SO, OO

Extractables

Sartoclean GF cartridges, mini cartridges and capsules meet, or exceed the requirements for WFI quality standards set by the current USP.

Regulatory compliance

Non pyrogenic according to USP Bacterial Endotoxins

Pass USP Plastic Class VI Test

Non fiber releasing according to 21 CFR

Sterilization

In-line steam sterilization

134°C, 20 min. at max differential pressure of 0.5 bar | 7 psi

Note

Capsules cannot be in-line steam sterilized!

Autoclaving

134°C, 2 bar | 29 psi, 30 min

Sterilization cycles

In-line sterilization (only cartridges)	Min. 25
Autoclaving	Min. 25

Technical references

Validation Guide SPK5718-e

Materials

Prefilter membrane	Cellulose Acetate
Endfilter membrane	Cellulose Acetate
Filter active fleece	Glass Fiber
Support fleece	Polypropylene
Core	Polypropylene
End caps	Polypropylene
O-Rings	Silicone (optional EPDM or Viton)

Operating parameters

Max. allowable differential pressure	5 bar 75 psi at 20°C (Cartridges)
	4 bar 58 psi at 20°C (Capsules) 2 bar 29 psi at 80°C (Cartridges and Capsules)
Max. allowable back pressure	2 bar 29 psi at 20°C

Order information

Order code Pore size [µm]

Cartridges

560**05GX	0.65
560**04EX	0.8

Capsules

5601305GX--**--#	0.65
5601304EX--**--#	0.8

Mini Cartridges

5601305GX-----B	0.65
5601304EX-----B	0.8

Sartoclean CA Particle & Bioburden Reduction Filter Cartridges



Description

Sartoclean CA filter cartridges are the ideal choice for a broad range of prefiltration applications in the biopharmaceutical industry from particle removal to bioburden reduction. They offer a defined retention performance by size exclusion. The use of Sartoclean CA prefilters avoids early blockage of downstream sterilizing grade membrane filters and contributes significantly to an economical design of your filtration system.



Applications

Featuring ultra low binding cellulose acetate membranes, Sartoclean CA filters are typically used for membrane prefiltration of:

- Plasma Fractions
- Vaccines
- MAB
- Diagnostics
- Purified Protein Solutions
- Biological Fluids
- Solutions containing Preservatives



High product yield

Throughout the years the cellulose acetate membranes of the Sartoclean CA filters have proven to be the membrane material with lowest unspecific binding capabilities, assuring highest protein yields and rapid preservative recovery enhancing your process efficiency.



Performance

Sartoclean CA filters with heterogeneous double layer construction (3.0 | 0.8 μm & 0.8 | 0.65 μm) offer highest total throughput performance due to the "build-in prefiltration" to avoid filter change during filtration and assure economical system design. Single layer Sartoclean CA filters (0.45 μm & 0.2 μm) offer highest flow rates for microbe retentive filtration.

Mechanical strength

The reinforcement of the membrane results in increased mechanical and thermal resistance, especially of interest in applications with high differential pressure and with repeated steam sterilization of the filters.

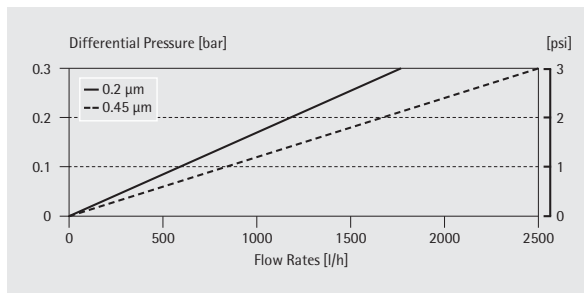
Flexibility

Sartoclean CA filters are available as standard filter cartridges, mini cartridges, capsules and MaxiCaps offering broadest choice for scale-up and easiest adoption to varying process volumes.

Documentation

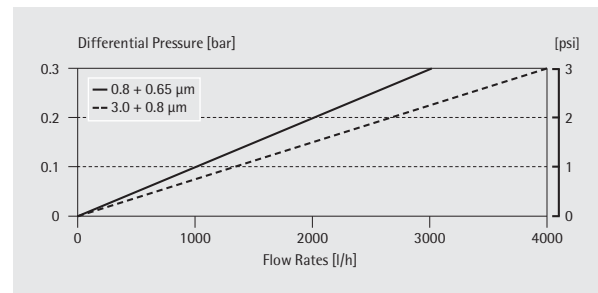
Sartoclean CA cartridges are designed, developed and manufactured in accordance with a ISO 9001 certified Quality Management System. A Validation Guide is available for compliance with regulatory requirements.

Water Flow Rates for Sartoclean CA 10" cartridges



Standardized at 20°C

Water Flow Rates for Sartoclean CA 10" cartridges



Standardized at 20°C

Specifications

Pore sizes

3.0 + 0.8 µm
 0.8 + 0.65 µm
 0.45 µm
 0.2 µm

Available sizes | Filtration area

Cartridges | MaxiCaps

Size 1	10"	0.74 m ² 7.4 ft ²
Size 2	20"	1.5 m ² 15 ft ²
Size 3	30"	2.2 m ² 22 ft ²

Capsules | Mini Cartridges

Size 7	0.08 m ² 0.8 ft ²
Size 8	0.16 m ² 1.6 ft ²
Size 9	0.3 m ² 3 ft ²
Size 0	0.6 m ² 6 ft ² (only Capsules)

Available adapters cartridges

21, 25, 27, 28

Available adapter Mini Cartridges

15

Available connectors capsules | MaxiCaps

SS, SO, OO

Extractables

Sartoclean CA cartridges, MaxiCaps and Capsules meet, or exceed the requirements for WFI quality standards set by the current USP.

Regulatory compliance

Non pyrogenic according to USP Bacterial Endotoxins

Pass USP Plastic Class VI Test

Non fiber releasing according to 21 CFR

Sterilization

In-line steam sterilization

134°C, 20 min. at max differential pressure of 0.5 bar | 7 psi

Note

Capsules and MaxiCaps cannot be in-line steam sterilized!

Autoclaving

134°C, 2 bar | 29 psi, 30 min

Sterilization cycles

In-line sterilization (only cartridges)	Min. 25
Autoclaving	Min. 25

Technical references

Validation Guide SPK5718-e

Materials

Prefilter membrane	Cellulose Acetate
Endfilter membrane	Cellulose Acetate
Support fleece	Polypropylene
Core	Polypropylene
End caps	Polypropylene
O-Rings	Silicone (optional EPDM or Viton)

Operating parameters

Max. allowable differential pressure	5 bar 75 psi at 20°C (Cartridges)
	4 bar 58 psi at 20°C (Capsules)
	3 bar 43.5 psi at 20°C (MaxiCaps)
	2 bar 29 psi at 80°C (Cartridges and Capsules)
Max. allowable back pressure	2 bar 29 psi at 20°C

Order information

Order code	Pore size [µm]
Cartridges	
562**07AX	0.2
562**06AX	0.45
562**05GX	0.65
562**04EX	0.8
MaxiCaps	
5621305GX--**	0.65
5621304EX--**	0.8
Capsules	
5621307AX--**--#	0.2
5621306AX--**--#	0.45
5621305GX--**--#	0.65
5621304EX--**--#	0.8
Mini Cartridges	
5621505GX-----B	0.65
5621504EX-----B	0.8

Sartofine PP Particle & Bioburden Reduction Filter Cartridges



Description

Sartofine filter cartridges contain no pleated filter layers. For application purposes, they feature a 14 mm thick multilayer, consisting of 4 to 7 different filter zones. The number of zones depends on the type of cartridge. Each zone, made up of polypropylene filter layers is a homogeneous depth filter itself. The nominal retention rating of the respective filter zones becomes increasingly finer in the direction of filtration. Therefore Sartofine PP filters are ideally suited for all applications requiring exceptional high dirt holding capacities with added benefit of high total throughput.

Applications

Whether in the bio-pharmaceutical or chemical industry, Sartofine PP filter cartridges are used wherever liquids with a wide range of particle sizes need to be prefiltered or clarified. You can choose from 7 different retention ratings (0.5 μm to 40 μm), depending on the size of the particles to be removed. This variety allows you to select the filter type which best suits your particular application.

Efficiency

Particle removal by fractionated depth filtration ensures optimal use of the entire multiplay which results in a long service life of the filter. The filtration efficiency is enhanced by the filter cake that can be build up within the depths of each filter zone. This filter cake allows colloids to be retained in the finer filter zones.

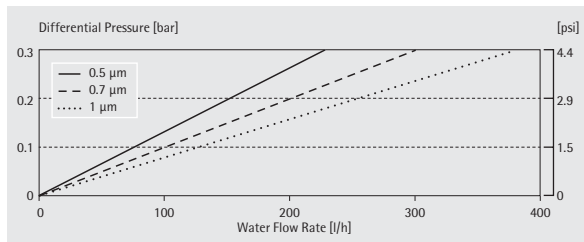
Mechanical stability

Sartofine PP filter cartridges have been designed for daily routine use. Our special production method of wrapping the filter layers tightly around the supportive core of the cartridge provides high mechanical stability and eliminates the common problem of breakthrough right from the start. The thermally bonded exterior layer and our special welding technique for joining filter layers and end caps allow you to easily backflush the cartridges during cleaning at a pressure up to 2 bar (29 psi).

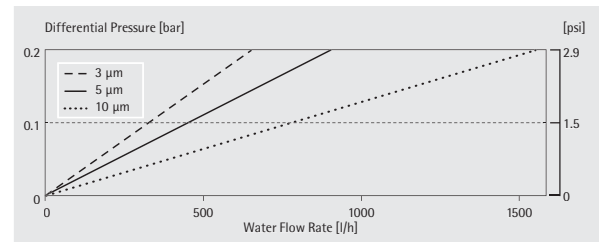
Documentation

Sartofine PP cartridges are designed, developed and manufactured in accordance with a ISO 9001 certified Quality Management System. A Validation Guide is available for compliance with regulatory requirements.

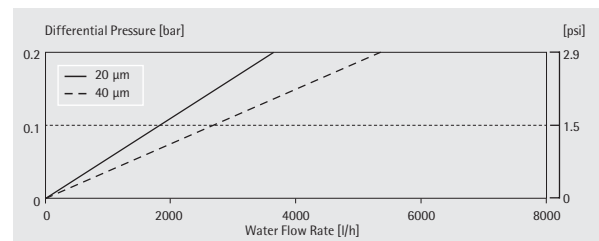
Sartofine 10" Standard Cartridges, 0.5 μm , 0.7 μm , 1 μm



Sartofine 10" Standard Cartridges, 3 μm , 5 μm , 10 μm



Sartofine 10" Standard Cartridges, 20 μm , 40 μm



Specifications

Retention rates

0.5 µm, 0.7 µm, 1 µm, 3 µm, 5 µm, 10 µm, 15 µm, 20 µm, 40 µm

Available sizes | Filtration area

Cartridges

Size 1	10"	0.05 m ² 0.5 ft ²
Size 2	20"	0.1 m ² 1 ft ²
Size 3	30"	0.15 m ² 1.5 ft ²
Size 4	40"	0.2 m ² 2 ft ²

Available adapters cartridges

00, 03, 05, 07, 08

Extractables

Sartofine PP cartridges meet, or exceed the requirements for WFI quality standards set by the current USP.

Regulatory compliance

Non pyrogenic according to USP Bacterial Endotoxins

Pass USP Plastic Class VI Test

Non fiber releasing according to 21 CFR

Sterilization

In-line steam sterilization

134°C, 20 min. at max differential pressure of 0.5 bar | 7 psi

Autoclaving

134°C, 2 bar | 29 psi, 30 min

Sterilization cycles

In-line sterilization (only cartridges) Min. 25

Autoclaving Min. 25

Technical references

Validation Guide SPK 5707-e

Materials

Filter material	Multiple Polypropylene layers
Support fleece	Polypropylene
Core	Polypropylene
End caps	Polypropylene
O-Rings	Silicone (optional EPDM or Viton)

Operating parameters

Max. allowable differential pressure	5 bar 75 psi at 20°C 2 bar 29 psi at 80°C
Max. allowable back pressure	2 bar 29 psi at 20°C

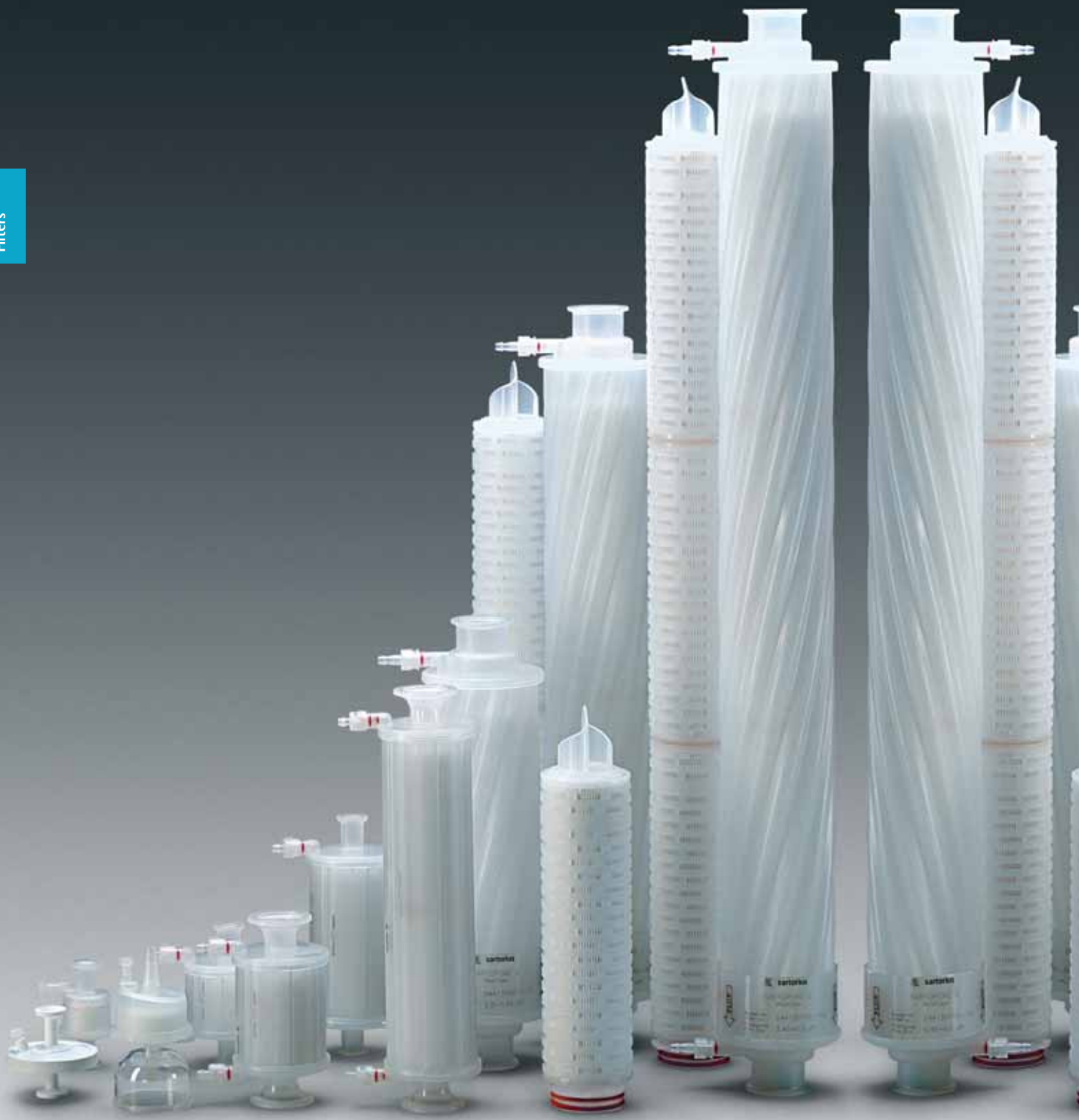
Order information

Order code	Pore size [µm]
Cartridges	
558**06WX	0.5
558**05WX	0.7
558**03WX	1
558**02WX	3
558**42WX	5
558**10WX	10
558**15WX	15
558**20WX	20
558**40WX	40

Legende

** = Adapter

X = Size



Sterile Liquid Filters

Sartobran P	84
Sartopore 2	96
Sartolon	112
Sartofluor LG MaxiCaps	114

Sterile
Liquid
Filters



Sartobran P 0.2 µm Sterilizing Grade Filter Cartridges and Mini Cartridges



Description

Sartobran P sterilizing grade filter cartridges have proven throughout the years to be the first choice in the bio-pharmaceutical industry for all applications requiring low adsorption capabilities. The unique ultra low unspecific binding capacity of the cellulose acetate membranes assures highest protein yield and rapid preservative recovery. Sartobran P filters are ideally suited for processing high value biological solutions like dilute protein solutions and pharmaceuticals sensitive to adsorption like dilute preservative solutions.

Applications

Sartobran P filters are ideally suited for all applications that require highest product recovery rates like:

- Coagulation Factors, Albumine, IgG
- Bacterial and Viral Vaccines
- MAB's
- Bio-processed Pharmaceuticals
- Diagnostics
- Purified Protein Solutions
- Biological Fluids
- Solutions containing Preservatives

Highest product yield

The Sartobran P's cellulose acetate membrane provides the lowest unspecific adsorption of any membrane material available, ensuring the highest product recovery rates.

Performance

Due to the "built-in prefiltration" by a 0.45 µm membrane, Sartobran P 0.2 µm filters provide excellent total throughputs and higher flow rates at low differential pressure for gentle product treatment.

Flexibility

Sartobran P 0.2 µm filters are available in traditional cartridge formats and disposable capsules from 150 cm² to 1.8 m² for simple linear scale up and process flexibility.

Microbiological retention

Sartobran P 0.2 µm rated filter cartridges are fully validated as sterilizing grade filter elements according to HIMA and ASTM F-838-83 guidelines.

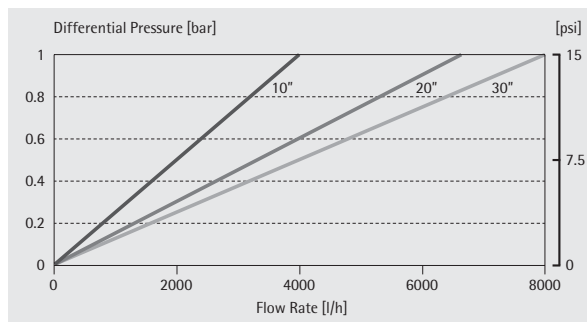
Quality control

Each individual element is integrity tested by diffusion and bubble point test prior to release, assuring absolute reliability.

Documentation

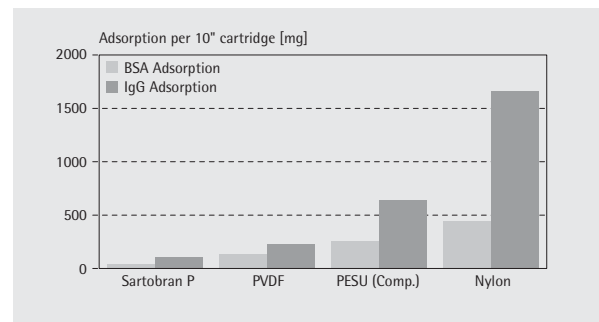
Sartobran P cartridges are designed, developed and manufactured in accordance with an ISO 9001 certified Quality Management System. A Validation Guide and Extractables Guide are available for compliance with regulatory requirements.

Water Flow Rates for Standard Cartridges and MaxiCaps



Standardized at 20°C

Total Throughput Comparison



10" Cartridge format

Specifications

Pore size

0.45 µm + 0.2 µm

Available sizes | Filtration area

Cartridges

Size 1	10"	0.6 m ² 6.5 ft ²
Size 2	20"	1.2 m ² 12.9 ft ²
Size 3	30"	1.8 m ² 19.4 ft ²

Mini Cartridges

Size 7		0.05 m ² 0.54 ft ²
Size 8		0.1 m ² 1.1 ft ²
Size 9		0.2 m ² 2.2 ft ²

Available adapters cartridges

21, 25, 27, 28

Available adapter Mini Cartridges

15, 18

Extractables

Sartobran P 0.2 µm rated filter cartridges meet, or exceed the requirements for WFI quality standards set by the current USP.

Regulatory compliance

100% Individually integrity tested

Integrity test correlated to HIMA/ASTM F 838-83 Bacteria Challenge Test

Non-pyrogenic according to USP Bacterial Endotoxins

Passes USP Plastics Class VI Test

Non-fiber releasing according to 21 CFR

Sterilization

In-line steam sterilization

134°C, 20 min. at max differential pressure of 0.5 bar | 7 psi

Note

Capsules and MaxiCaps cannot be in-line steam sterilized.

Autoclaving

134°C, 2 bar | 29 psi, 30 min

Sterilization cycles

In-line sterilization	Min. 25
Autoclaving	Min. 25

Technical references

Validation Guide	SPK5726-e
Extractables Guide	SPK5720-e

Materials

Prefilter membrane	Cellulose Acetate
Endfilter membrane	Cellulose Acetate
Support fleece	Polypropylene
Core	Polypropylene
End caps	Polypropylene
O-Rings	Silicone (optional EPDM or Viton)

Operating parameters

Max. allowable differential pressure	5 bar 75 psi at 20°C	2 bar 29 psi at 80°C
Max. allowable back pressure	2 bar 29 psi at 20°C	

Ordering information

Order code	Size	Pore size [µm]
Cartridges		
523**07H1----P	1	0.2
523**07H2----P	2	0.2
523**07H3----P	3	0.2
Mini Cartridges		
5231507H7-----B	7	0.2
5231507H8-----B	8	0.2
5231507H9-----B	9	0.2

Sartobran P 0.2 μm Sterilizing Grade MidiCaps and MaxiCaps



Description

Sartobran P membrane filter MidiCaps and MaxiCaps are self contained, ready to use, sterile filter units for sterilizing grade filtration in the pharma | biotech industry. The extremely low unspecific adsorption of their cellulose acetate membranes assures highest protein yields and rapid preservative recovery.

Applications

Sartobran P filter elements have proven throughout the years to be the first choice for all applications in the biopharmaceutical industry requiring low adsorption capabilities. They are typically used for sterilizing grade filtration of:

- Coagulation Factors, Albumin, IgG
- Bacterial & Viral Vaccines
- MAB
- Bio-processed Pharmaceuticals
- Diagnostics
- Purified Protein Solutions
- Biological Fluids
- Fluids containing preservatives

Easy to use

Sartobran P MidiCaps and MaxiCaps are delivered as individually packed sterile units. On site, pre-use sterilization can be eliminated.

Flexibility

Sartobran P 0.2 μm MidiCaps and MaxiCaps are available with various filtration areas from 500 cm^2 | 0.5 ft^2 up to 1.8 m^2 | 18 ft^2 for easy adoption to any filtration process independent from the batch size.

Scalability

Consistent and predictable scale-up and down trials can reliably be performed as all Sartobran P MidiCaps and MaxiCaps are produced with the same type of membrane and identical materials of construction.

Cost saving

The use of the disposable capsule design concept avoids investments into stainless steel filter housings and eliminates additional costs for cleaning of housings and cleaning validation.

Microbiological retention

Sartobran P MidiCaps and MaxiCaps 0.2 μm rated are fully validated as sterilizing grade filters according to HIMA and ASTM F-838-83 guidelines.

Quality control

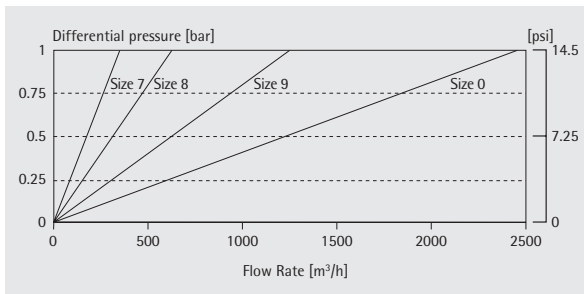
Each individual element is tested for integrity by B.-P. and Diffusion-Test prior to be released assuring absolute reliability.

Documentation

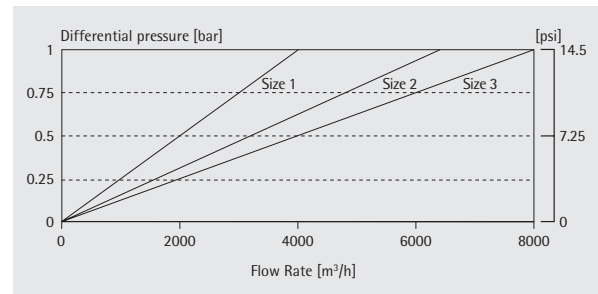
Sartobran P MidiCaps and MaxiCaps are designed, developed and manufactured in accordance with a ISO 9001 certified Quality Management System. A Validation Guide is available for compliance with regulatory requirements.



Water Flow Rates for MidiCaps with SS inlet and outlet



Water Flow Rates for MaxiCaps



Standardized at 20°C

Specifications

Pore size

0.45 µm + 0.2 µm

Available sizes | Filtration area

MidiCaps

Size 7 0.05 m² | 0.5 ft²
 Size 8 0.1 m² | 1 ft²
 Size 9 0.2 m² | 2 ft²
 Size 0 0.45 m² | 5 ft²

MaxiCaps

Size 1 0.6 m² | 6 ft²
 Size 2 1.2 m² | 12 ft²
 Size 3 1.8 m² | 18 ft²

Available connectors MidiCaps

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

Available connectors MaxiCaps

SS, SO, OO

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

Extractables

Sartobran P 0.2 µm rated filter MidiCaps and MaxiCaps 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 838-83 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

No in-line steam sterilization

Sterilization cycles

Autoclaving Min. 25

Technical references

Validation Guide
 – SPK5760-e (MidiCaps)
 – SPK5726-e (MaxiCaps)

Extractables Guide

– SPK5720-e

Materials

Prefilter membrane	Cellulose Acetate
Endfilter membrane	Cellulose Acetate
Support fleece	Polypropylene
Core	Polypropylene
End caps	Polypropylene
Capsule housing	Polypropylene
O-Rings	Silicone
Filling Bell	Polycarbonate

Operating parameters

Max. allowable differential pressure	5 bar 72.5 psi at 20°C (MidiCaps)
	2 bar 29 psi at 80°C (MidiCaps)
	4 bar 58 psi at 20°C (MaxiCaps)
	3 bar 43.5 psi at 20°C (MaxiCaps)
Max. allowable back pressure	2 bar 29 psi at 20°C

Order information

Order code	Pore size [µm]	Pack size [Pieces]	Test pressure [bar psi]	Max. diffusion [ml/min]	Min. Bubble Point [bar psi]
MidiCaps					
5235307H7--**--A	0.2	4	2.5 36	3	3.2 46
5235307H8--**--A	0.2	4	2.5 36	4	3.2 46
5235307H9--**--A	0.2	4	2.5 36	5	3.2 46
5235307H0--**--V	0.2	2	2.5 36	10	3.2 46
MaxiCaps					
5231307H1--**	0.2	1	2.5 36	15	3.2 46
5231307H2--**	0.2	1	2.5 36	30	3.2 46
5231307H3--**	0.2	1	2.5 36	45	3.2 46

** : Connector Styles

Sartobran P 150 & 300 0.2 µm Sterilizing Grade Filter Capsules



The Sartobran 150 & 300 are disposable, sterile ready-to-use membrane filter capsules. They are designed for use in small-scale production of high value pharmaceutical and biotech products, due to the ultra low binding of their cellulose acetate membrane for proteins and preservatives. The Sartobran 150 and 300 feature the same materials and type of construction as any other Sartobran P filter element, for easy scale-down and scale-up, making them perfect for R&D Labs in pharmaceutical development.



Applications

Typical applications include sterilizing grade filtration of any solution sensitive to adsorption like:

- Therapeutics
- Bioprocessed Pharmaceuticals
- Serum
- Injectables
- Media
- Buffers

Performance

The unique pleated filter construction and the "built-in-pretreatment" offers excellent flow rates and superior total throughput performance, especially in comparison to conventional stacked disc filter systems.

High product yield

The highest product yields are realized by the combination of extremely low residual volume in the capsule housing and ultra low unspecific adsorption of the cellulose acetate membrane.

Automatic venting

A hydrophobic PTFE vent filter membrane positioned at the highest point upstream allows easy venting of the capsule and prevents product loss during the venting process.

Scalability

Featuring the same materials and type of construction as any other Sartobran P filter element, Sartobran P 150 & 300 are ideally suited for R&D Labs in pharmaceutical development. Filtration trials can be performed using extremely small volumes of high value products .

Microbiological retention

Sartobran P 0.2 µm rated 150 & 300 capsules are fully validated as sterilizing grade filter elements according to HIMA and ASTM F-838-83 guidelines .

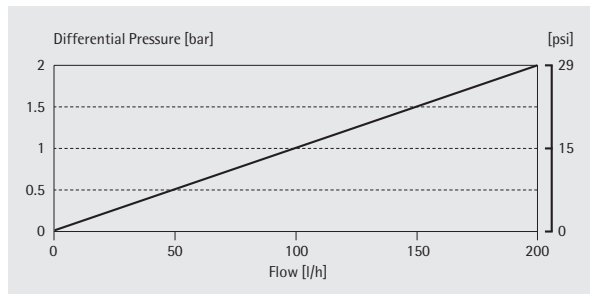
Quality control

Each individual element is integrity tested by diffusion and bubble point test prior to release, assuring absolute reliability.

Documentation

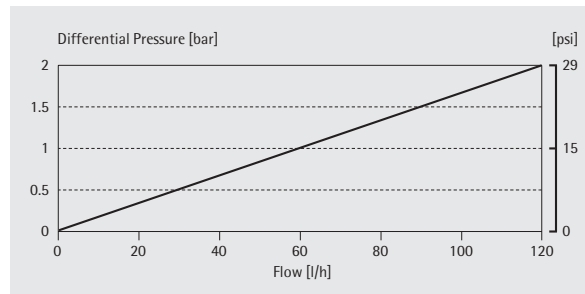
Sartobran P 150 & 300 capsules are designed, developed and manufactured in accordance with an ISO 9001 certified Quality Management System. A Validation Guide and Extractables Guide are available for compliance with regulatory requirements.

Water Flow Rate Sartobran 300



Standardized at 20°C

Water Flow Rate Sartobran 150



Standardized at 20°C

Specifications

Pore size

0.45 µm + 0.2 µm

Available sizes | Filtration area

Size 4 0.015 m² | 0.16 ft²
 Size 5 0.03 m² | 0.32 ft²

Available connectors

SS, SO, OO (Type 150)
 OO (Type 300)

Extractables

Sartobran P 0.2 µm rated 150 & 300 filter capsules meet, or exceed the requirements for WFI quality standards set by the current USP.

Regulatory compliance

100% Individually integrity tested

Integrity test correlated to HIMA/ASTM F 838-83 Bacteria Challenge Test

Non-pyrogenic according to USP Bacterial Endotoxins

Passes USP Plastics Class VI Test

Non-fiber releasing according to 21 CFR

Sterilization

Autoclaving

134 °C, 2 bar | 29 psi, 30 min

No in-line steam sterilization

Sterilization cycles

Autoclaving Min. 25 (Type 300)
 Max. 3 (Type 150)

Technical references

Validation Guide SPK5726-e
 Extractables Guide SPK5720-e

Materials

Prefilter membrane	Cellulose Acetate
Endfilter membrane	Cellulose Acetate
Support fleece	Polypropylene
Core	Polypropylene
End caps	Polypropylene
Housing	Polypropylene

Operating parameters

Max. allowable differential pressure	4 bar 58 psi at 20 °C
	2 bar 29 psi at 80 °C
Max. allowable back pressure	2 bar 29 psi at 20 °C

Ordering information

Order code	Pore size [µm]
Sartobran 150	
5231307H4--00--B	0.2
5231307H4--S0--B	0.2
5231307H4--SS--B	0.2
Sartobran 300	
5231307H5--00--B	0.2

Sartobran P 0.1 µm Sterilizing Grade Filter Cartridges and Capsules



Description

Sartobran P 0.1 µm rated, high-flow filter elements are designed to give enhanced sterility assurance for applications with microorganisms present that can pass through 0.2 µm rated sterilizing grade filters. The Sartobran P's cellulose acetate membrane offers ultra low binding properties for proteins and preservatives, making Sartobran P filters the ideal choice for filtration of high value bio-pharmaceutical products.

Applications

All applications which require sterilizing grade filtration with retention finer than conventional 0.2 µm sterilizing grade filters for removal of unusually small microorganisms. This typically includes:

- Bio-processed pharmaceuticals
- Long term filling operations
- Filtration in pharmaceutical water systems

Any other application requiring sub 0.2 µm filtration for enhanced sterility assurance.

Flow rates

Higher flow rates than other 0.1 µm rated filters provide short filtration time and gentle product treatment, even if replacement of conventional 0.2 µm rated filters is necessary.

Total throughput

Due to the "built-in prefiltration" by a 0.45 µm membrane, Sartobran P 0.1 µm filters provide higher total throughputs than any other 0.1 µm rated filter for economical process design.

Highest product yield

The ultra low adsorption characteristic of the Sartobran P's cellulose acetate membrane provides the highest product yield - especially important for high value proteins.

Flexibility

Sartobran P 0.1 µm filters are available in traditional cartridge formats and disposable capsules from 150 cm² to 1.8 m² for simple linear scale up and process flexibility.

Quality control

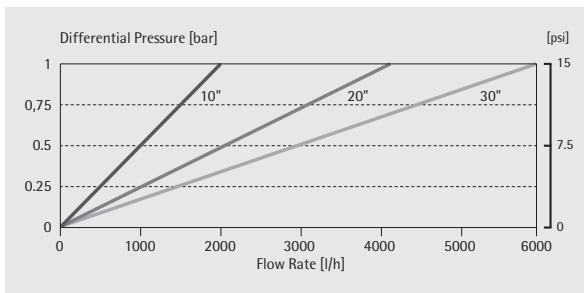
Each individual element is integrity tested by diffusion and bubble point test prior to release, assuring absolute reliability.

Documentation

Sartobran P cartridges are designed, developed and manufactured in accordance with an ISO 9001 certified Quality Management System. A Validation Guide and Extractables Guide are available for compliance with regulatory requirements.

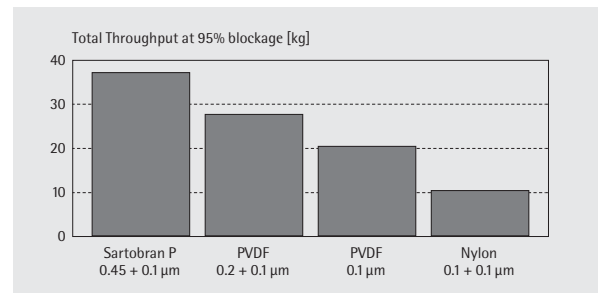


Water Flow Rates for 10", 20" and 30" Cartridges



Standardized at 20°C

Total Throughput Comparison



10" Cartridge format

Specifications

Pore size

0.45 µm + 0.1 µm

Available sizes | Filtration area

Cartridges | MaxiCaps

Size 1	10"	0.6 m ² 6 ft ²
Size 2	20"	1.2 m ² 12 ft ²
Size 3	30"	1.8 m ² 18 ft ²

Capsules | Mini Cartridges

Size 7		0.05 m ² 0.5 ft ²
Size 8		0.1 m ² 1 ft ²
Size 9		0.2 m ² 2 ft ²

Available adapters cartridges

21, 25, 27, 28

Available adapter Mini Cartridges

15

Available connectors MaxiCaps | Capsules

SS, S0, 00

Extractables

Sartobran P 0.1 µm rated filter cartridges meet, or exceed the requirements for WFI quality standards set by the current USP.

Regulatory compliance

100% Individually integrity tested

Integrity test correlated to HIMA/ASTM F 838-83 Bacteria Challenge Test.

Non-pyrogenic according to USP Bacterial Endotoxins

Passes USP Plastics Class VI Test

Non-fiber releasing according to 21 CFR

Sterilization

In-line steam sterilization

134°C, 20 min. at max differential pressure of 0.5 bar | 7 psi

Note

Capsules cannot be in-line steam sterilized.

Autoclaving

134°C, 2 bar | 29 psi, 30 min

Sterilization cycles

In-line sterilization (only cartridges)	Min. 25
Autoclaving	Min. 25

Technical references

Validation Guide	SPK5726-e
Extractables Guide	SPK5720-e

Materials

Prefilter membrane	Cellulose Acetate
Endfilter membrane	Cellulose Acetate
Support fleece	Polypropylene
Core	Polypropylene
End caps	Polypropylene
O-Rings	Silicone (optional EPDM or Viton)

Operating parameters

Max. allowable differential pressure	5 bar 75 psi at 20°C (Cartridges)
	4 bar 58 psi at 20°C (Capsules)
	2 bar 29 psi at 80°C (Cartridges and Capsules)
Max. allowable back pressure	2 bar 29 psi at 20°C

Ordering information

Order code	Size	Pore size [µm]
Standard Cartridges		
523**58H1----P	1	0.1
523**58H2----P	2	0.1
523**58H3----P	3	0.1
Mini Cartridges		
5231558H7-----B	7	0.1
5231558H8-----B	8	0.1
5231558H9-----B	9	0.1
MaxiCaps		
5231358H1--**	1	0.1
5231358H2--**	2	0.1
5231358H3--**	3	0.1
Capsules		
5231358H7--**--B	7	0.1
5231358H8--**--B	8	0.1
5231358H9--**--A	9	0.1

Sartobran P 0.45 µm Bioburden and Particle Reductive Filter Cartridges



Description

Sartobran P 0.45 µm rated filter cartridges are ideally suited for bioburden and particle removal from bio-pharmaceutical solutions for protection of subsequent downstream processing equipment or sterilizing grade filters. The unique low unspecific binding capacity of the cellulose acetate membranes assures highest protein yield and rapid preservative recovery.

Applications

Sartobran P filters are ideally suited for prefiltration of high value biological solutions and pharmaceuticals sensitive to adsorption as well as for final filtration of LVP's and Buffers. Typical applications are filtration of:

- Coagulation Factors, Albumine, IgG
- Bacterial and Viral Vaccines
- MAB's
- Bio-processed Pharmaceuticals
- Diagnostics
- Purified Protein Solutions
- LV P
- Buffers

Highest product yield

The cellulose acetate membrane of the Sartobran P filters provides the lowest unspecific adsorption of all membrane materials available for highest product recovery rates.

Performance

Due to the "built-in prefiltration" by a 0.65 µm membrane, Sartobran P 0.45 µm filters provide excellent total throughputs and higher flow rates at low differential pressure for gentle product treatment.

Flexibility

Sartobran P 0.45 µm filters are available in traditional cartridge formats and disposable capsules from 150 cm² to 1.8 m² for simple linear scale up and process flexibility.

Quality control

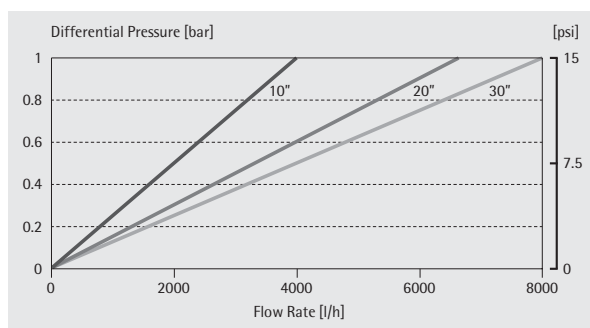
Each individual element is tested for integrity by diffusion and bubble point test prior to be released assuring absolute reliability.

Documentation

Sartobran P cartridges are designed, developed and manufactured in accordance with an ISO 9001 certified Quality Management System. A Validation Guide and Extractables Guide are available for compliance with regulatory requirements.

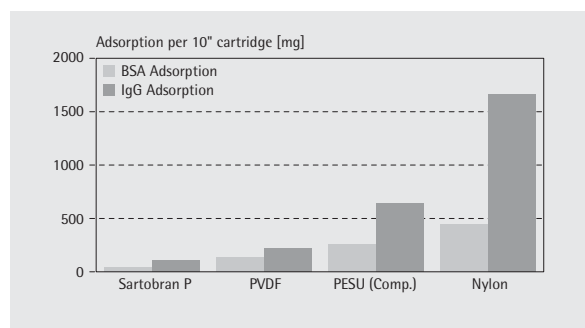


Water Flow Rates for Standard Cartridges and MaxiCaps



Standardized at 20°C

Total Throughput Comparison



10\" Cartridge format

Specifications

Pore size

0.65 µm + 0.45 µm

Available sizes | Filtration area

Cartridges

Size 1	10"	0.6 m ² 6.5 ft ²
Size 2	20"	1.2 m ² 12.9 ft ²
Size 3	30"	1.8 m ² 19.4 ft ²

Mini Cartridges

Size 7		0.05 m ² 0.5 ft ²
Size 8		0.1 m ² 1.1 ft ²
Size 9		0.2 m ² 2.2 ft ²

Available adapters cartridges

21, 25, 27, 28

Available adapter Mini Cartridges

15

Extractables

Sartobran P 0.45 µm rated filter cartridges meet, or exceed the requirements for WFI quality standards set by the current USP.

Regulatory compliance

100% Individually integrity tested

Integrity test correlated to HIMA/ASTM F 838-83 Bacteria Challenge Test

Non-pyrogenic according to USP Bacterial Endotoxins

Passes USP Plastics Class VI Test

Non-fiber releasing according to 21 CFR

Sterilization

In-line steam sterilization

134°C, 20 min. at max differential pressure of 0.5 bar | 7 psi

Note

Capsules and MaxiCaps cannot be in-line steam sterilized.

Autoclaving

134°C, 2 bar | 29 psi, 30 min

Sterilization cycles

In-line sterilization	Min. 25
Autoclaving	Min. 25

Technical references

Validation Guide	SPK 5726-e
Extractables Guide	SPK5720-e

Materials

Prefilter membrane	Cellulose Acetate
Endfilter membrane	Cellulose Acetate
Support fleece	Polypropylene
Core	Polypropylene
End caps	Polypropylene
O-Rings	Silicone (optional EPDM or Viton)

Operating parameters

Max. allowable differential pressure	5 bar 75 psi at 20°C	2 bar 29 psi at 80°C
Max. allowable back pressure	2 bar 29 psi at 20°C	

Ordering information

Order code	Size	Pore size [µm]
Standard Cartridges		
523**06D1----P	1	0.45
523**06D2----P	2	0.45
523**06D3----P	3	0.45
Mini Cartridges		
5231506D7-----B	7	0.45
5231506D8-----B	8	0.45
5231506D9-----B	9	0.45

Sartobran P 0.45 μm Bioburden and Particle Retentive MidiCaps and MaxiCaps



Description

Sartobran P membrane filter MidiCaps and MaxiCaps 0.45 μm rated are ideally suited for bioburden and defined particle reduction from bio-pharmaceutical solutions. They can be used for protection of sterilizing grade membrane filters or subsequent downstream processing equipment in biotech production processes.

Applications

Featuring extremely low adsorptive cellulose acetate membranes, Sartobran P filter elements are ideally suited for filtration of highly valuable protein solutions or solutions containing preservatives. They assure highest protein yield and rapid preservative recovery.

Typical applications include:

- Coagulation Factors, Albumin, IgG
- Bacterial & Viral Vaccines
- MAB
- Bio-processed Pharmaceuticals
- Diagnostics
- Purified Protein Solutions
- Biological Fluids
- Fluids containing preservatives

Easy to use

Sartobran P MidiCaps and MaxiCaps are delivered as individually packed sterile units. On site, pre-use sterilization can be eliminated.

Flexibility

Sartobran P 0.45 μm MidiCaps and MaxiCaps are available with various filtration areas from 500 cm^2 | 0.5 ft^2 up to 1.8 m^2 | 18 ft^2 for easy adoption to any filtration process independent from the batch size.

Scalability

Consistent and predictable scale-up and down trials can reliably be performed as all Sartobran P MidiCaps and MaxiCaps are produced with the same type of membrane and identical materials of construction.

Cost saving

The use of the disposable capsule design concept avoids investments into stainless steel filter housings and eliminates additional costs for cleaning of housings and cleaning validation.

Quality control

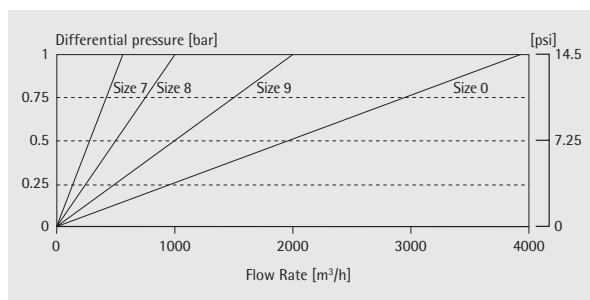
Each individual element is tested for integrity by B.-P. and Diffusion-Test prior to be released assuring absolute reliability.

Documentation

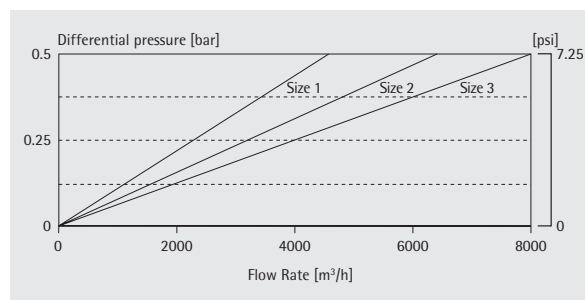
Sartobran P MidiCaps and MaxiCaps are designed, developed and manufactured in accordance with a ISO 9001 certified Quality Management System. A Validation Guide is available for compliance with regulatory requirements.



Water Flow Rates for MidiCaps with SS inlet and outlet



Water Flow Rates for MaxiCaps



Standardized at 20°C

Specifications

Pore size combination

0.65 µm + 0.45 µm

Available sizes | Filtration area

MidiCaps

Size 7 0.05 m² | 0.5 ft²
 Size 8 0.1 m² | 1 ft²
 Size 9 0.2 m² | 2 ft²
 Size 0 0.45 m² | 5 ft²

MaxiCaps

Size 1 0.6 m² | 6 ft²
 Size 2 1.2 m² | 12 ft²
 Size 3 1.8 m² | 18 ft²

Available connectors MidiCaps

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

Available connectors MaxiCaps

SS, SO, OO

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

Extractables

Sartobran P 0.45 µm rated filter MidiCaps and MaxiCaps meet, or exceed the requirements for WFI quality standards set by the current USP.

Regulatory compliance

Individually integrity tested

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

No in-line steam sterilization

Sterilization cycles

Autoclaving Min. 25

Technical references

Validation Guide
 – SPK 5760-e (MidiCaps)
 – SPK 5726-e (MaxiCaps)

Extractables Guide

– SPK5731-e

Materials

Prefilter membrane	Cellulose Acetate
Endfilter membrane	Cellulose Acetate
Support fleece	Polypropylene
Core	Polypropylene
End caps	Polypropylene
Capsule housing	Polypropylene
O-Rings	Silicone
Filling Bell	Polycarbonate

Operating parameters

Max. allowable differential pressure	5 bar 72.5 psi at 20°C (MidiCaps)
	2 bar 29 psi at 80°C (MidiCaps)
	4 bar 58 psi at 20°C (MaxiCaps)
	3 bar 43.5 psi at 20°C (MaxiCaps)
Max. allowable back pressure	2 bar 29 psi at 20°C

Order information

Order code	Pore size [µm]	Pack size [Pieces]	Test pressure [bar psi]	Max. diffusion [ml/min]	Min. Bubble Point [bar psi]
MidiCaps					
5235306D7--**--A	0.45	4	1.5 22	3	2.0 29
5235306D8--**--A	0.45	4	1.5 22	4	2.0 29
5235306D9--**--A	0.45	4	1.5 22	5	2.0 29
5235306D0--**--V	0.45	2	1.5 22	10	2.0 29
MaxiCaps					
5231306D1--**	0.45	1	1.5 22	15	2.0 29
5231306D2--**	0.45	1	1.5 22	30	2.0 29
5231306D3--**	0.45	1	1.5 22	45	2.0 29

** : Connector Styles

Sartopore 2 0.2 µm Sterilizing Grade Filter Cartridges and Mini Cartridges



Description

Sartopore 2 0.2 µm rated sterilizing grade filter cartridges are designed for filtration of a broad range of pharmaceutical products where compliance with cGMP requirements has to be fulfilled. Sartopore 2 cartridges feature a unique hydrophilic heterogeneous double layer Polyethersulfone membrane with broad chemical compatibility, high thermal resistance and higher throughput and flow-rate than any other sterilizing grade filter cartridge.



Applications

Typical applications include sterilizing grade filtration of:

- Therapeutics
- Biological Fluids
- Ophthalmics
- SVPs, LVPs
- Antibiotics
- WFI
- Chemicals
- Cleaning and sanitizing agents
- Bulk pharmaceutical products

Compatibility

The polyethersulfone membrane is compatible with a pH range from pH 1 to pH 14 and unaffected by steam sterilization cycles making Sartopore 2 cartridges ideal for filtration of solutions with high/low pH and for SIP/CI P-cycles.

Performance

Sartopore 2 cartridges provide an exceptionally high total throughput by fractionated filtration due to the "built-in prefiltration" of the 0.45 µm membrane. The asymmetric pore structure of the polyethersulfone membrane provides high flow rates at low pressure drops.

Wettability

Sartopore 2 cartridges can be easily wetted out for integrity testing even after drying at 80°C for 12 hours.

Microbiological retention

Sartopore 2 filter cartridges are fully validated as sterilizing grade filter elements according to HIMA and ASTM F-838-83 guidelines.

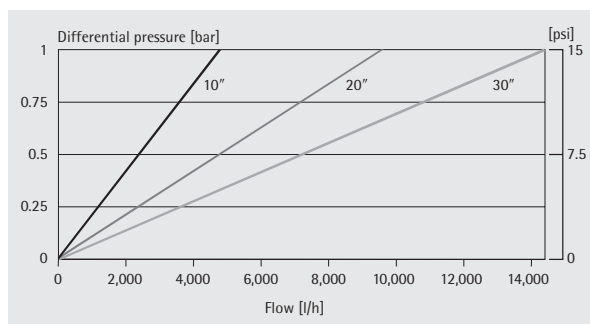
Quality control

Each individual element is integrity tested by diffusion and bubble point test prior to release, assuring absolute reliability.

Documentation

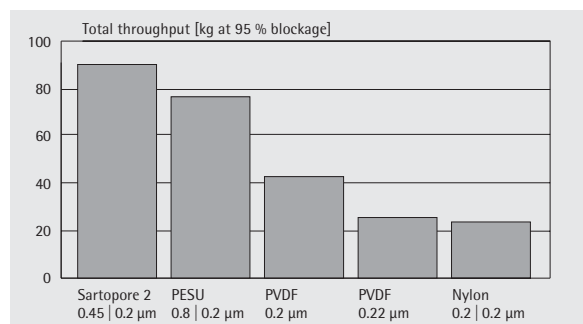
Sartopore 2 cartridges are designed, developed and manufactured in accordance with an ISO 9001 certified Quality Management System. A Validation Guide and Extractables Guide are available for compliance with regulatory requirements.

Water Flow Rates for 10", 20" and 30" Cartridges



Standardized at 20°C

Total Throughput Comparison



10" Cartridge format

Specifications

Pore size

0.45 µm + 0.2 µm

Available sizes | Filtration area

Standard cartridges

Size 0	5"	0.3 m ²	3 ft ²
Size 1	10"	0.6 m ²	6 ft ²
Size 2	20"	1.2 m ²	12 ft ²
Size 3	30"	1.8 m ²	18 ft ²

Mini Cartridges

Size 7	0.05 m ²	0.5 ft ²
Size 8	0.1 m ²	1 ft ²
Size 9	0.2 m ²	2 ft ²

Available connectors

21, 25, 27, 28

Extractables

Sartopore 2 0.2 µm rated filter cartridges 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 838-83 Bacteria Challenge Test
- Non pyrogenic according to USP Bacterial Endotoxins
- Passes USP Plastic Class VI Test
- Non fiber releasing according to 21 CFR

Sterilization

In-line steam sterilization

134°C, 20 min. at max differential pressure of 0.5 bar | 7.25 psi

Autoclaving

134°C, 2 bar | 29 psi, 30 min

Sterilization cycles

In-line sterilization	Min. 25
Autoclaving	Min. 25

Technical references

Validation Guide	SPK5732-e
Extractables Guide	SPK5731-e

Materials

Prefilter membrane	Polyethersulfone, asymmetric
Endfilter membrane	Polyethersulfone, asymmetric
Support fleece	Polypropylene
Core	Polypropylene
End caps	Polypropylene
Capsule housing	Polypropylene
O-Rings	Silicone (optional EPDM or Viton)

Operating parameters

Max. allowable differential pressure	5 bar 58 psi at 20°C	2 bar 29 psi at 80°C
Max. allowable back pressure	2 bar 29 psi at 20°C	

Integrity test limits

Maximum allowable diffusion at 2.5 bar | 36 psi at 20°C

Cartridge size	Maximum diffusion	Minimum Bubble Point
Size 0	10 ml min	3.2 bar 46 psi
Size 1	18 ml min	3.2 bar 46 psi
Size 2	36 ml min	3.2 bar 46 psi
Size 3	54 ml min	3.2 bar 46 psi
Size 7	4 ml min	3.2 bar 46 psi
Size 8	5 ml min	3.2 bar 46 psi
Size 9	7 ml min	3.2 bar 46 psi

Ordering information

Order code	Pore size [µm]	Test pressure [bar psi]	Max. diffusion [ml/min]	Min. B.P. [bar psi]
544**07H1	0.2	2.5 36	18	3.2 46
544**07H2	0.2	2.5 36	36	3.2 46
544**07H3	0.2	2.5 36	54	3.2 46

Sartopore 2 0.2 μm Sterilizing Grade MidiCaps and MaxiCaps



Description

Sartopore 2 0.2 μm membrane filter MidiCaps and MaxiCaps are self contained, ready to use, sterile filter units for sterilizing grade filtration in the pharma | biotech industry. Made of a unique hydrophilic heterogeneous double layer Polyethersulfone membrane, Sartopore 2 capsules are designed for convenient sterile filtration of a broad range of pharmaceutical products.

Applications

Typical applications include sterilizing grade filtration of:

- Therapeutics
- Biological Fluids
- Injectables
- Media
- Buffers
- Chemicals
- Cleaning and sanitizing agents

Compatibility

The polyethersulfone membrane is compatible with a pH-range from pH 1 to pH 14 making Sartopore 2 MidiCaps and MaxiCaps ideal for filtration of solutions with high | low pH.

Easy to use

Sartopore 2 MidiCaps are delivered as individually packed sterile units. On site, pre-use sterilization can be eliminated.

Flexibility

Sartopore 2 0.2 μm MidiCaps and MaxiCaps are available with various filtration areas from 500 cm^2 | 0.5 ft^2 up to 1.8 m^2 | 18 ft^2 for easy adoption to any filtration process independent from the batch size.

Scalability

Consistent and predictable scale-up and down trials can reliably be performed as all Sartopore 2 MidiCaps and MaxiCaps are produced with the same type of membrane and materials and identical construction.

Cost saving

The use of the disposable capsule design concept avoids investments into stainless steel filter housings and eliminates additional costs for cleaning of housings and cleaning validation.

Microbiological retention

Sartopore 2 filter MidiCaps and MaxiCaps 0.2 μm rated are fully validated as sterilizing grade filters according to HIMA and ASTM F-838-83 guidelines.

Quality control

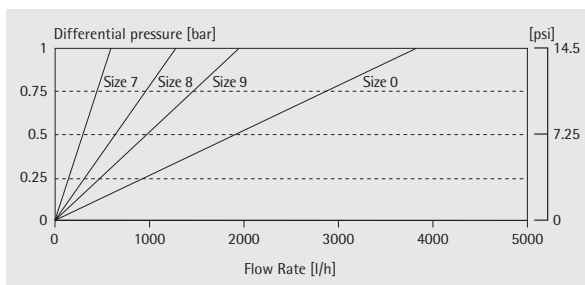
Each individual element is tested for integrity by B.-P. and Diffusion-Test prior to be released assuring absolute reliability.

Documentation

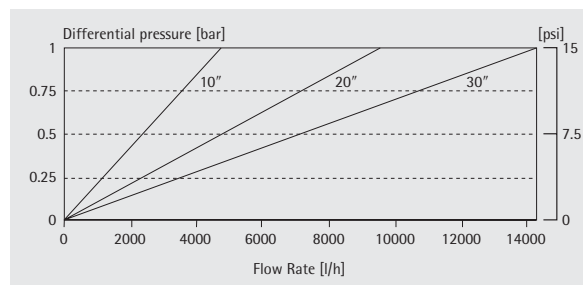
Sartopore 2 MidiCaps and MaxiCaps are designed, developed and manufactured in accordance with a ISO 9001 certified Quality Management System. A Validation Guide is available for compliance with regulatory requirements.



Water Flow Rates for MidiCaps with SS inlet and outlet



Water Flow Rates for MaxiCaps



Standardized at 20°C

Specifications

Pore size

0.45 µm + 0.2 µm

Available sizes | Filtration area

MidiCaps

Size 7 0.05 m² | 0.5 ft²
 Size 8 0.1 m² | 1 ft²
 Size 9 0.2 m² | 2 ft²
 Size 0 0.45 m² | 5 ft²

MaxiCaps

Size 1 0.6 m² | 6 ft²
 Size 2 1.2 m² | 12 ft²
 Size 3 1.8 m² | 18 ft²

Available connectors MidiCaps

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

Available connectors MaxiCaps

SS, SO, OO

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)

Extractables

Sartopore 2 0.2 µm rated filter MidiCaps and MaxiCaps 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 838-83 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

No in-line steam sterilization

Sterilization cycles

Autoclaving Min. 25

Technical references

Validation Guide
 – SPK5751-e (MidiCaps)
 – SPK5732-e (MaxiCaps)

Extractables Guide

– SPK5731-e

Materials

Prefilter membrane	Polyethersulfone, asymmetric
Endfilter membrane	Polyethersulfone, asymmetric
Support fleece	Polypropylene
Core	Polypropylene
End caps	Polypropylene
Capsule housing	Polypropylene
O-Rings	Silicone
Filling Bell	Polycarbonate

Operating parameters

Max. allowable differential pressure	5 bar 58 psi at 20°C (MidiCaps)
	3 bar 43.5 psi at 20°C (MaxiCaps)
	2 bar 29 psi at 80°C
Max. allowable back pressure	2 bar 29 psi at 20°C

Order information

Order code	Pore size [µm]	Pack size [Pieces]	Test pressure [bar psi]	Max. diffusion [ml/min]	Min. Bubble Point [bar psi]
MidiCaps					
5445307H7--**--A	0.2	4	2.5 36	4	3.2 46
5445307H8--**--A	0.2	4	2.5 36	5	3.2 46
5445307H9--**--A	0.2	4	2.5 36	7	3.2 46
5445307H0--**--V	0.2	2	2.5 36	14	3.2 46
MaxiCaps					
5441307H1--**	0.2	1	2.5 36	18	3.2 46
5441307H2--**	0.2	1	2.5 36	36	3.2 46
5441307H3--**	0.2	1	2.5 36	54	3.2 46

** : Connector Styles

Sartopore 2 HF 0.2 µm Sterilizing Grade Filter Cartridges



Description

Sartopore 2 High Flow sterilizing grade filter cartridges are developed for filtration of water based pharmaceutical formulations. Sartopore 2 HF cartridges feature a unique single layer, hydrophilic polyethersulfone membrane. This membrane is characterized by broadest chemical compatibility, highest thermal resistance, increased mechanical stability and higher flow-rates than any other sterilizing grade filter cartridge offers.

Applications

Typical applications include sterilizing grade filtration of:

- Large Volume Parenterals (LVP)
- Buffers
- WFI
- Cleaning and sanitizing agents
- Bulk pharmaceutical products
- Each application requiring exceptional high flow rates

Compatibility

The polyethersulfone membrane is compatible with a pH-range from pH 1 to pH 14 and to multiple steam sterilization cycles making Sartopore 2 HF cartridges ideal for filtration of solutions with high|low pH and for SIPICIP-cycles.

Performance

The increased effective filtration area of Sartopore 2 HF filter cartridges allows for highest flow rates and assures thereby most economic design of filtration systems.

Wettability

Sartopore 2 HF cartridges can be easily wetted out for integrity testing even after drying cycles with 80°C for 12 hours.

Microbiological retention

Sartopore 2 HF filter cartridges 0.2 µm rated are fully validated as sterilizing grade filters according to HIMA and ASTM F-838-83 guidelines.

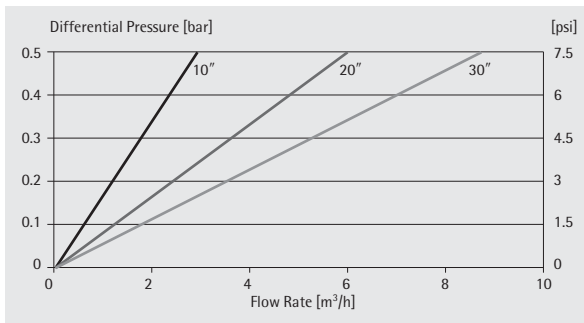
Quality control

Each individual element is tested for integrity by B.-P. and Diffusion-Test prior to release, assuring absolute reliability.

Documentation

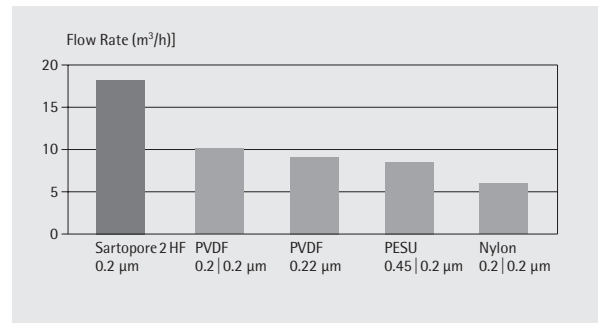
Sartopore 2 HF cartridges are designed, developed and manufactured in accordance with a ISO 9001 certified Quality Management System. A Validation Guide and an Extractables Guide are available for compliance with regulatory requirements.

Water Flow Rates for 10", 20" and 30" Cartridges



Standardized at 20°C

Flow Rate Comparison



30" Filter cartridges at 1 bar | 14.5 psi differential pressure (20°C)

Specifications

Pore size

0.2 µm

Available sizes | Filtration area

Size 1	10"	0.7 m ²	7ft ²
Size 2	20"	1.4 m ²	14ft ²
Size 3	30"	2.1 m ²	21ft ²

Available adapters

25

Extractables

Sartopore 2 HF 0.2 µm rated filter cartridges 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 838-83 Bacteria Challenge Test
- Non pyrogenic according to USP Bacterial Endotoxins
- Pass USP Plastic Class VI Test
- Non fiber releasing according to 21 CFR

Sterilization

In-line steam sterilization

134°C, 20 min. at max differential pressure of 0.5 bar | 7 psi

Autoclaving

134°C, 2 bar, 30 min

Sterilization cycles

In-line sterilization	Min. 25
Autoclaving	Min. 25

Technical references

Validation Guide	SPK 5741-e
Extractables Guide	SPK 5742-e

Materials

Filter membrane	Polyethersulfone, asymmetric
Support fleece	Polypropylene
Core	Polypropylene
End caps	Polypropylene
O-Rings	Silicone

Operating parameters

Max. allowable differential pressure	5 bar 75 psi at 20°C	2 bar 29 psi at 80°C
Max. allowable back pressure	2 bar 29 psi at 20°C	

Integrity test limits

Maximum allowable diffusion at 2.5 bar | 36 psi at 20°C

Cartridge size	Maximum diffusion	Minimum Bubble Point
Size 1	21 ml min	3.2 bar 46 psi
Size 2	42 ml min	3.2 bar 46 psi
Size 3	63 ml min	3.2 bar 46 psi

Ordering information

Order code	Pore size [µm]	Test pressure [bar psi]	Max. diffusion [ml/min]	Min. B.P. [bar psi]
544**07H1	0.2	2.5 36	18	3.2 46
544**07H2	0.2	2.5 36	36	3.2 46
544**07H3	0.2	2.5 36	54	3.2 46

Sartopore 2 150 0.2 µm Sterilizing Grade Filter Capsule



Description

Sartopore 2 150 is a disposable, sterile, ready-to-use membrane filter capsule for convenient sterilizing grade filtration. Sartopore 2 150 capsules are made with a unique hydrophilic Polyethersulfone membrane providing outstanding total throughput, flow rate, low extractables and broadest chemical compatibility.

Applications

Typical applications include sterilizing grade filtration of:

- Therapeutics
- Biological Fluids
- Injectables
- Purified Water
- Media
- Buffers

Compatibility

The polyethersulfone membrane is compatible with a pH range from pH 1 to pH 14 making Sartopore 2 150 ideal for filtration of solutions with high | low pH.

Performance

The unique pleated filter construction combined with the highly asymmetric pore structure of the polyethersulfone membrane offers excellent flow rates and superior total throughput performance, especially in comparison to conventional stacked disc filter systems.

Easy to use

Sartopore 2 150 capsules are available with hose barb, ¼ inch NPT-thread or ½ inch Tri-Clamp connectors for simple installation in your filtration system. The Tri-Clamp connection assures secure and reliable integrity testing.

Automatic venting

The new 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 capsule and prevents product loss during the venting process.

Scalability

Featuring the same materials and type of construction as any other Sartopore 2 filter element, Sartopore 2 150 is ideally suited for R&D Labs in pharmaceutical development. Filtration trials can be performed using extremely small volumes of high value products.

Microbiological retention

Sartopore 2 150 0.2 µm rated capsules are fully validated as sterilizing grade filters according to HIMA and ASTM F-838-83 guidelines.

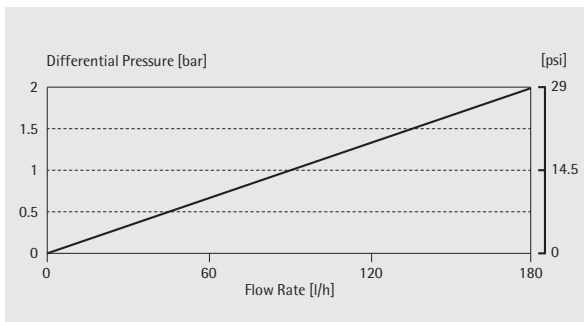
Quality control

Each individual element is integrity tested by diffusion and bubble point test prior to release, assuring absolute reliability.

Documentation

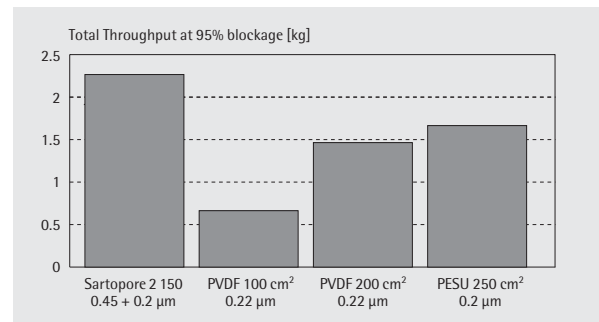
Sartopore 2 150 capsules are designed, developed and manufactured in accordance with a ISO 9001 certified Quality Management System. A Validation Guide and Extractables Guide is available for compliance with regulatory requirements.

Water Flow Rate



Standardized at 20°C

Total Throughput Comparison



At 0.5 bar | 7.25 psi differential pressure

Specifications

Pore size

0.45 µm + 0.2 µm

Available sizes | Filtration area

Size 4 0.015 m² | 0.15 ft²

Available connectors

SS, SO, OO

Extractables

Sartopore 2 150 filter capsules meet, or exceed the requirements for WFI quality standards set by the current USP.

Regulatory compliance

- 100% Individually integrity tested
- Integrity test correlated to HIMA/ASTM F 838-83 Bacteria Challenge Test
- Non-pyrogenic according to USP Bacterial Endotoxins
- Meets USP Plastics Class VI biological reactivity test, in vivo
- Non-fiber releasing according to 21 CFR

Sterilization

Autoclaving

134°C, 2 bar | 29 psi, 30 min

No in-line steam sterilization

Technical references

Validation Guide SPK5732-e
Extractables Guide SPK5731-e

Materials

Prefilter membrane	Polyethersulfone, asymmetric
Endfilter membrane	Polyethersulfone, asymmetric
Support fleece	Polypropylene
Core	Polypropylene
End caps	Polypropylene
Housing	Polypropylene

Operating parameters

Max. allowable differential pressure	4 bar 58 psi at 20°C
	2 bar 29 psi at 80°C
Max. allowable back pressure	2 bar 29 psi at 20°C

Ordering information

Order code	Pore size [µm]
5441307H4--OO--B	0.2
5441307H4--SO--B	0.2
5441307H4--SS--B	0.2

Sartopore 2 0.1 µm Sterilizing Grade and Mycoplasma Retentive Filter Cartridges



Description

Sartopore 2 0.1 µm rated filter cartridges are especially developed for validated sterile filtration and reliable mycoplasma removal from any media likely to contain it such as those originating from animal sources. In addition these elements are ideally suited for removal of unusually small microorganisms that have been shown to pass through a 0.2 µm rated sterilizing grade filter.

Applications

Typical applications include sterilizing grade filtration and Mycoplasma removal from:

- Animal Sera
- Cell Culture Media
- Media Components
- Bioprocessed Pharmaceuticals
- Biological Fluids

Any other application requiring sub 0.2 µm filtration for enhanced sterility assurance.

Compatibility

Featuring a unique hydrophilic polyether-sulfone membrane, Sartopore 2 0.1 µm cartridges are compatible from pH 1 to pH 14 and to numerous steam sterilization cycles. Therefore they are also ideally suited for filtration of solutions with high | low pH and for multiple SIP | CIP cycles.

Performance

Sartopore 2 0.1 µm cartridges provide exceptionally high flow rates, resulting in economical sizing of filtration systems. Due to the "built-in prefiltration" by a 0.2 µm membrane, Sartopore 2 0.1 µm rated cartridges achieve outstanding total throughputs.

Wettability

Sartopore 2 cartridges can be easily wetted out for integrity testing even after drying at 80°C for 12 hours

Microbiological retention

Sartopore 2 0.1 µm rated filter cartridges are validated as sterilizing grade filters according to ASTM F 838-83 standard and for Mycoplasma removal with a Log Reduction Value (LRV) of 7 for *Acholeplasma laidlawii*.

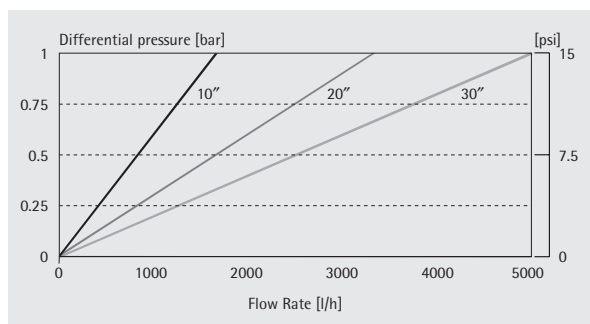
Quality control

Each individual element is tested for integrity by diffusion test prior to be released assuring absolute reliability.

Documentation

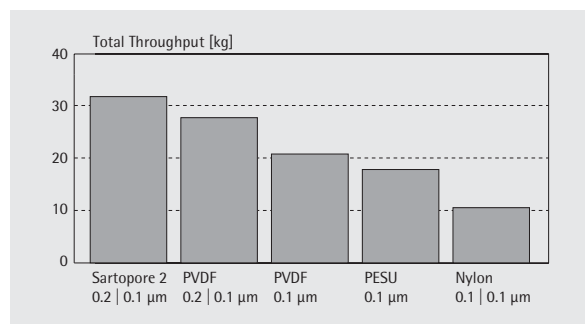
Sartopore 2 0.1 µm rated cartridges are designed, developed and manufactured in accordance with an ISO 9001 certified Quality Management System. A Validation Guide and Extractables Guide are available for compliance with regulatory requirements.

Water Flow Rates for 10", 20" and 30" Cartridges



Standardized at 20°C

Total Throughput Comparison



10" Cartridge format

Specifications

Pore size

0.2 µm + 0.1 µm

Available sizes | Filtration area

Size 1	10"	0.6 m ² 6 ft ²
Size 2	20"	1.2 m ² 12 ft ²
Size 3	30"	1.8 m ² 18 ft ²

Available adapters

21, 25, 27, 28

Extractables

Sartopore 2 0.1 µm rated filter cartridges 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 838-83 Bacteria Challenge Test and Mycoplasma removal.

Non pyrogenic according to USP Bacterial Endotoxins

Pass USP Plastic Class VI Test

Non fiber releasing according to 21 CFR

Sterilization

In-line steam sterilization

134°C, 20 min. at max differential pressure of 0.5 bar | 7.25 psi

Autoclaving

134°C, 2 bar | 29 psi, 30 min

Sterilization cycles

In-line sterilization	Min. 25
Autoclaving	Min. 25

Technical references

Validation Guide	SPK5735-e
Extractables Guide	SPK5731-e

Materials

Prefilter membrane	Polyethersulfone, asymmetric
Endfilter membrane	Polyethersulfone, asymmetric
Support fleece	Polypropylene
Core	Polypropylene
End caps	Polypropylene
O-Rings	Silicone (optional EPDM or Viton)

Operating parameters

Max. allowable differential pressure	5 bar 75 psi at 20°C
	2 bar 29 psi at 80°C
Max. allowable back pressure	2 bar 29 psi at 20°C

Ordering information

Order code	Pore size [µm]
544**58K1	0.1
544**58K2	0.1
544**58K3	0.1

Sartopore 2 0.45 µm Bioburden & Particle Reductive Filter Cartridges



Description

Sartopore 2 0.45 µm rated filter cartridges are designed for bioburden reduction and particle removal from a broad range of pharmaceutical products. They offer extremely high flow rates and total throughputs and are therefore ideally suited for membrane prefiltration of aqueous solutions and highly viscous, difficult to filter pharmaceutical products.

Applications

Typical applications include bioburden reduction and particle removal from:

- Buffers
- Biological Fluids
- Ophthalmics
- LVP
- Antibiotics
- Bulk pharmaceutical products

Compatibility

Featuring a unique hydrophilic polyether-sulfone membrane, Sartopore 2 0.45 µm cartridges are compatible with solutions from pH 1 to pH 14 and are unaffected by numerous steam sterilization cycles. They are ideally suited for filtration of solutions with high | low pH and for multiple SIP | CIP cycles.

Performance

Sartopore 2 0.45 µm cartridges provide exceptional high flow rates, resulting in economical sizing of filtration systems. Due to the "built-in prefiltration" by a 0.8 µm membrane, Sartopore 2 0.45 µm rated cartridges offer outstanding total throughputs.

Wettability

Sartopore 2 cartridges can be easily wetted out for integrity testing even after drying at 80°C for 12 hours.

Microbiological retention

Sartopore 2 0.45 µm rated filter cartridges are validated for removal of *Serratia marcescens* with a Log Reduction Value (LRV) of 7 according to HIMA and ASTM F-838-83 guidelines.

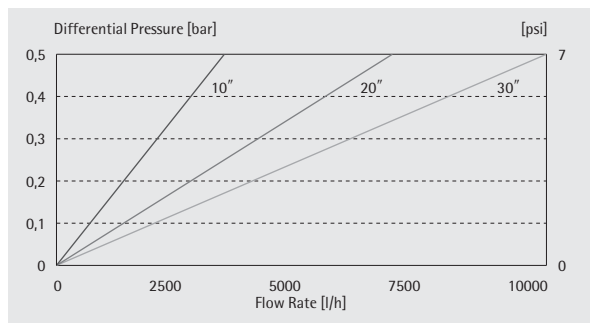
Quality control

Each individual element is integrity tested by diffusion and bubble point test prior to release, assuring absolute reliability.

Documentation

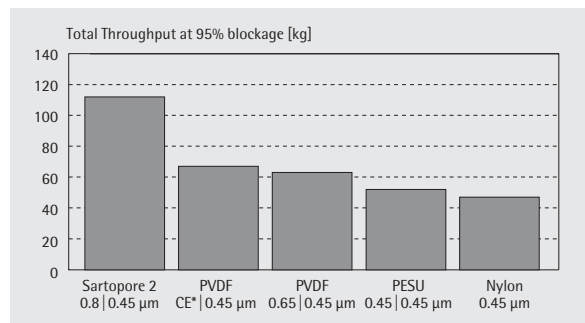
Sartopore 2 cartridges are designed, developed and manufactured in accordance with an ISO 9001 certified Quality Management System. A Validation Guide and Extractables Guide are available for compliance with regulatory requirements.

Water Flow Rates for Standard Cartridges



Standardized at 20°C

Total Throughput Comparison



10" Cartridges

* Cellulose Ester prefilter

Specifications

Pore size

0.8 µm + 0.45 µm

Available sizes | Filtration area

Size 1	10"	0.6 m ²	6.5 ft ²
Size 2	20"	1.2 m ²	12.9 ft ²
Size 3	30"	1.8 m ²	19.4 ft ²

Available adapters

21, 25, 27, 28

Extractables

Sartopore 2 0.45 µm rated filter cartridges meet, or exceed the requirements for WFI quality standards set by the current USP.

Regulatory compliance

100% Individually integrity tested

Integrity test correlated to HIMA/ASTM F 838-83 Bacteria Challenge Test using *Serratia marcescens*

Non-pyrogenic according to USP Bacterial Endotoxins

Meets USP Plastics Class VI biological reactivity test, in vivo

Non-fiber releasing according to 21 CFR

Sterilization

In-line steam sterilization

134°C, 20 min. at max differential pressure of 0.5 bar | 7.25 psi

Autoclaving

134°C, 2 bar | 29 psi, 30 min

Sterilization cycles

In-line sterilization	Min. 25
Autoclaving	Min. 25

Technical references

Validation Guide	SPK 5732-e
Extractables Guide	SPK 5731-e

Materials

Prefilter membrane	Polyethersulfone, asymmetric
Endfilter membrane	Polyethersulfone, asymmetric
Support fleece	Polypropylene
Core	Polypropylene
End caps	Polypropylene
O-Rings	Silicone (optional EPDM or Viton)

Operating parameters

Max. allowable differential pressure	5 bar 75 psi at 20°C
	2 bar 29 psi at 80°C
Max. allowable back pressure	2 bar 29 psi at 20°C

Ordering information

Order code	Pore size [µm]
544**06G1	0.45
544**06G2	0.45
544**06G3	0.45

Sartopore 2 0.2 μm Sterilizing Grade γ -Irradiatable Filter Capsules



Description

Sartopore 2- γ -Capsules are 0.2 μm rated sterilizing grade filter capsules designed for connection to flexible-bag-container-systems prior to sterilization by gamma-irradiation.

Applications

Typical applications include sterilizing grade filtration of:

- Pharmaceuticals
- Biologicals
- Cell Culture Media
- Culture Media Components
- Serum
- Buffers
- Diagnostic Reagents

Compatibility

Sartopore 2- γ -Capsules are designed for sterilization by gamma irradiation ≤ 50 kGy irradiation dosage. The polyethersulfone membrane of the Sartopore 2- γ -Capsules offers a broad chemical compatibility from pH 1 to pH 14 making them ideally suited for a broad range of applications in the Pharma | Biotech field.

Performance

Due to the superior construction including a "build-in prefiltration" by a 0.45 μm membrane Sartopore 2- γ -Capsules offer outstanding total throughputs and excellent flow rates.

Flexibility

Sartopore 2- γ -Capsules are available with filtration areas from 0.015 m^2 | 0.15 ft^2 up to 0.45 m^2 | 5 ft^2 for easy use in any bag-filtration process independent of the batch size.

Microbiological retention

Sartopore 2- γ -Capsules 0.2 μm rated are fully validated as sterilizing grade filters according to HIMA and ASTM F-838-83 guidelines.

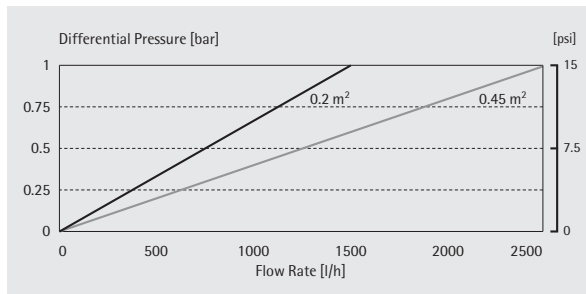
Quality control

Each individual element is integrity tested by diffusion and bubble point test prior to release, assuring absolute reliability.

Documentation

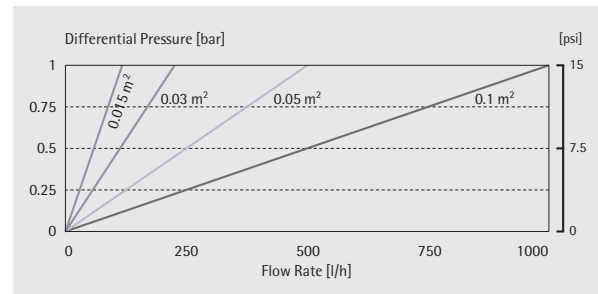
Sartopore 2 Gamma capsules are designed, developed and manufactured in accordance with an ISO 9001 certified Quality Management System. A Validation Guide and Extractables Guide are available for compliance with regulatory requirements.

Water Flow Rates for 0.2 m^2 and 0.45 m^2 Capsules



Standardized at 20°C

Water Flow Rates for 0.015 m^2 , 0.03 m^2 , 0.05 m^2 and 0.1 m^2 Capsules



Standardized at 20°C

Specifications

Pore size

0.45 µm + 0.2 µm

Available sizes | Filtration area

Size 4	0.015 m ² 0.15 ft ²
Size 5	0.03 m ² 0.3 ft ²
Size 7	0.05 m ² 0.5 ft ²
Size 8	0.1 m ² 1 ft ²
Size 9	0.2 m ² 2 ft ²
Size 0	0.45 m ² 5 ft ²

Available connectors

SS, SO, OO

Extractables

Sartopore-γ-Capsules meet, or exceed the requirements for WFI quality standards set by the current USP.

Regulatory compliance

100% Individually integrity tested

Integrity test correlated to HIMA/ASTM F 838-83 Bacteria Challenge Test

Non-pyrogenic according to USP Bacterial Endotoxins

Passes USP Plastic Class VI Test

Non-fiber releasing according to 21 CFR

Sterilization

γ- irradiation ≤ 50 kGy irradiation dosage

Autoclaving

134°C, 2 bar | 29 psi, 30 min

No in-line steam sterilization

Sterilization cycles

γ- Irradiation	Max. 1
Autoclaving	Max. 3

Technical references

Validation Guide	SPK5734-e
Extractables Guide	SPK5740-e

Materials

Prefilter membrane	Polyethersulfone, asymmetric
Endfilter membrane	Polyethersulfone, asymmetric
Support fleece	Polypropylene
Core	Polypropylene
End caps	Polypropylene
Capsule housing	Polypropylene

Operating parameters

Max. allowable differential pressure	4 bar 58 psi at 20 °C
	2 bar 29 psi at 80 °C
Max. allowable back pressure	2 bar 29 psi at 20 °C

Ordering information

Order code	Pore size [µm]
5441307H4G--**--B	0.2
5441307H5G--OO--B	0.2
5441307H7G--**--B	0.2
5441307H8G--**--B	0.2
5441307H9G--**--A	0.2
5441307H0G--**	0.2

Sartopore 2 0.1 μm Sterilizing Grade and Mycoplasma Retentive γ -Irradiatable Filter Capsules



Description

Sartopore 2 0.1 μm rated γ -irradiatable filter capsules are designed for sterilizing grade filtration and Mycoplasma removal in bag filtration processes. Prior or after connection to flexible-bag-container-systems they can be sterilized by γ -irradiation ≤ 50 kGy.

Applications

Typical applications for Sartopore 2- γ -Capsules include combined sterilizing grade filtration and mycoplasma removal from

- Cell Culture Media
- Culture Media Components
- Serum

They are ideally suited for bioprocessed pharmaceuticals and any other applications requiring sub 0.2 μm filtration for enhanced sterility assurance.

Compatibility

Sartopore 2- γ -Capsules are designed for sterilization by gamma irradiation ≤ 50 kGy irradiation dosage. The Polyethersulfone membrane of the Sartopore 2- γ -Capsules offers a broad chemical compatibility from pH 1 to pH 14 making them ideally suited for a broad range of applications in the Pharma | Biotech field.

Performance

Due to the superior construction including a "build-in" prefiltration by a heterogeneous double layer membrane Sartopore 2- γ -Capsules achieve outstanding total throughputs and excellent flow rates.

Flexibility

Sartopore 2- γ -Capsules are available with filtration areas from 0.03 m^2 | 0.3 ft^2 up to 0.45 m^2 | 5 ft^2 for easy adaption to any bag-filtration process independent from the batch size.

Microbiological retention

Sartopore 2- γ -Capsules 0.1 μm rated are validated as sterilizing grade filters according to ASTM F 838-83 standard and for Mycoplasma removal with a Log Reduction Value (LRV) of 7 for *Acholeplasma laidlawii*.

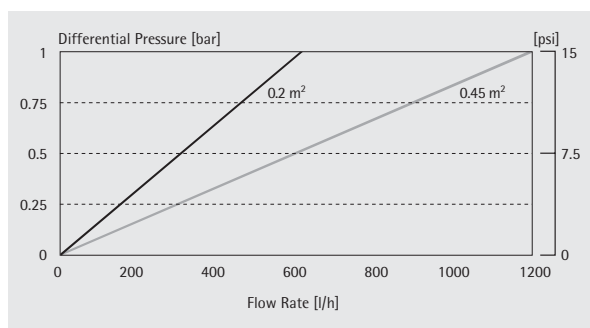
Quality control

Each individual element is tested for integrity by Diffusion-Test prior to be released assuring absolute reliability.

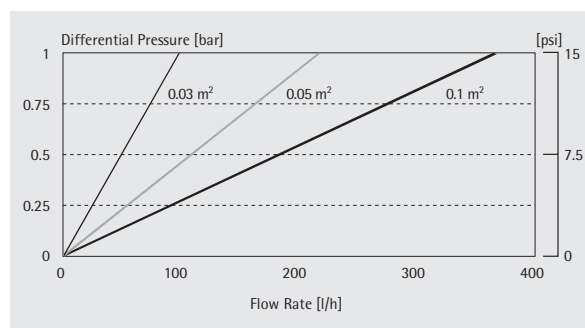
Documentation

Sartopore 2 Gamma capsules are designed, developed and manufactured in accordance with a ISO 9001 certified Quality Management System. A Validation Guide is available for compliance with regulatory requirements.

Water Flow Rates for 0.2 m^2 and 0.45 m^2 Capsules



Water Flow Rates for 0.03 m^2 , 0.05 m^2 and 0.1 m^2 Capsules



Specifications

Pore size

0.2 μm + 0.1 μm

Available sizes | Filtration area

Size 5	0.03 m ² 0.3 ft ²
Size 7	0.05 m ² 0.5 ft ²
Size 8	0.1 m ² 1 ft ²
Size 9	0.2 m ² 2 ft ²
Size 0	0.45 m ² 5 ft ²

Available connectors

SS, SO, OO

Extractables

Sartopore- γ -Capsules 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 838-83 Bacteria Challenge Test

Non pyrogenic according to USP Bacterial Endotoxins

Pass USP Plastic Class VI Test

Non fiber releasing according to 21 CFR

Sterilization

γ -irradiation \leq 50 kGy irradiation dosage

Autoclaving

134 °C, 2 bar | 29 psi, 30 min

No in-line steam sterilization

Sterilization cycles

γ -Irradiation	Max. 1
Autoclaving	Max. 3

Technical references

Validation Guide	SPK5734-e
Extractables Guide	SPK5740-e

Materials

Prefilter membrane	Polyethersulfone, asymmetric
Endfilter membrane	Polyethersulfone, asymmetric
Support fleece	Polypropylene
Core	Polypropylene
End caps	Polypropylene
Capsule housing	Polypropylene

Operating parameters

Max. allowable differential pressure	4 bar 58 psi at 20 °C 2 bar 29 psi at 80 °C
Max. allowable back pressure	2 bar 29 psi at 20 °C

Order information

Order code	Pore size [μm]
5441358K5G-00--B	0.1
5441358K7G-**-B	0.1
5441358K8G-**-B	0.1
5441358K9G-**-A	0.1
5441358K0G-**-	0.1

** Inlet | Outlet connectors

Sartolon Sterilizing Grade Filter Cartridges and MaxiCaps



Description

Sartolon sterilizing grade filter cartridges, MaxiCaps and capsules are designed for broad chemical compatibility for specific applications in the pharmaceutical and chemical industry. Their superior filtration performance compared to competitive nylon membrane filters allow more economical design of your filtration process.

Applications

Featuring a unique hydrophilic nylon membrane, Sartolon filters are ideally suited for sterilizing grade filtration of:

- Solvents
- Antibiotics
- Bulk Pharmaceutical Chemicals
- LVP

Compatibility

Sartolon filter elements are ideal for filtration of a broad range of solvents and liquids containing solvents. The Nylon membrane material provides a broad chemical compatibility especially for aggressive solvent solutions.

Performance

Sartolon filter elements offer higher total throughputs than any other sterilizing grade Nylon filter element on the market. The heterogeneous double layer construction provides higher total throughputs than homogeneous double layer types due to the "built-in prefiltration".

Microbiological retention

Sartolon 0.2 μm rated filter elements are fully validated as sterilizing grade filter elements according to HIMA and ASTM F-838-83 guidelines.

Quality control

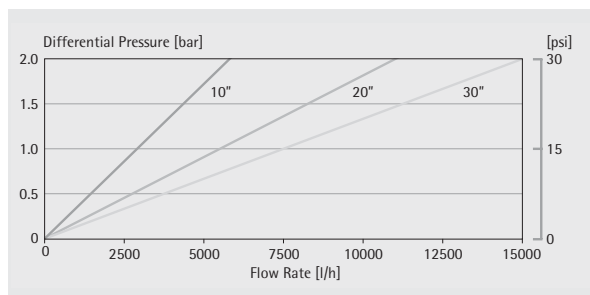
Each individual element is integrity tested by Diffusion and Bubble-Point-Test prior to release, assuring absolute reliability.

Documentation

Sartolon filter elements are designed, developed and manufactured in accordance with an ISO 9001 certified Quality Management System. A Validation Guide and Extractables Guide are available for compliance with regulatory requirements.

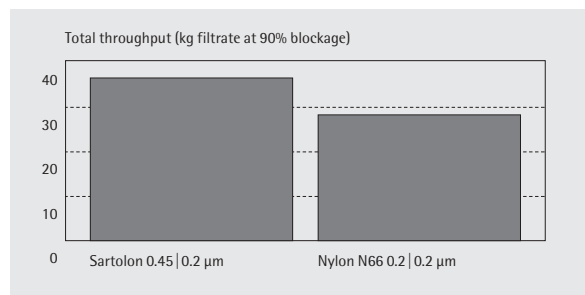


Water Flow Rates for 10", 20" and 30" Cartridges



Standardized at 20°C

Total Throughput Comparison



10" Cartridge format

Specifications

Pore size

0.45 µm + 0.2 µm

Available sizes | Filtration area

Cartridges | MaxiCaps

Size 1	10"	0.6 m ²	6 ft ²
Size 2	20"	1.2 m ²	12 ft ²
Size 3	30"	1.8 m ²	18 ft ²

Mini Cartridges | Capsules

Size 9	0.2 m ²	2 ft ²
--------	--------------------	-------------------

Available adapters cartridges

21, 25, 27, 28

Available adapter Mini Cartridges

15

Available connectors capsules | MaxiCaps

SS, SO, 00

Extractables

Sartolon cartridges, MaxiCaps and capsules meet, or exceed the requirements for WFI quality standards set by the current USP.

Regulatory compliance

100% Individually integrity tested

Integrity test correlated to HIMA/ASTM F 838-83 Bacteria Challenge Test

Non-pyrogenic according to USP Bacterial Endotoxins

Passes USP Plastics Class VI Test

Non-fiber releasing according to 21 CFR

Sterilization

In-line steam sterilization

134°C, 20 min. at max differential pressure of 0.5 bar | 7 psi

Note

Capsules and MaxiCaps cannot be in-line steam sterilized!

Autoclaving

134°C, 2 bar | 29 psi, 30 min

Sterilization cycles

In-line sterilization (only cartridges)	Min. 25
Autoclaving	Min. 25

Technical references

Validation Guide	SPK5716-e
Extractables Guide	SPK5729-e

Materials

Prefilter membrane	Nylon
Endfilter membrane	Nylon
Support fleece	Polypropylene
Core	Polypropylene
End caps	Polypropylene
O-Rings	Silicone (optional EPDM or Viton)

Operating parameters

Max. allowable differential pressure	5 bar	75 psi at 20°C (Cartridges)
	4 bar	58 psi at 20°C (Capsules)
	3 bar	43.5 psi at 20°C (MaxiCaps)
	2 bar	29 psi at 80°C (Cartridges and Capsules)
Max. allowable back pressure	2 bar	29 psi at 20°C

Ordering information

Order code	Size	Pore size [µm]
Cartridges		
510**07H1	1	0.2
510**07H2	2	0.2
510**07H3	3	0.2
MaxiCaps		
5101307H1--**	1	0.2
5101307H2--**	2	0.2
5101307H3--**	3	0.2
Capsules		
5101307H9--**--A	4	0.2
Mini Cartridges		
5101507H9-----B	4	0.2

Sartofluor LG MaxiCaps Membrane Filtration of Aggressive Media



Description

MaxiCaps are a unique new housing design concept from Sartorius that brings the benefits of single use filter elements to process scale. The incorporation of standard filter cartridges into self contained, high, quality polypropylene housings makes it possible to operate large scale filter installations without the need for filter housings.

Applications

Sartofluor LG MaxiCaps improve the process security of sterile filtration of aggressive media (acids and bases) and solvents. There is no need to open the filter housing after filtration. The capsule design allows filtration of such media without any handling of the contaminated filter cartridge post use.

Speed of operation

MaxiCaps are ready-to-use, saving time and money. No more backup filtration rigs to prepare. MaxiCaps can be easily replaced should any operational difficulties occur.

Process security

By relying on established process validation data for standard cartridge elements, MaxiCaps can easily be implemented into current filtration processes.

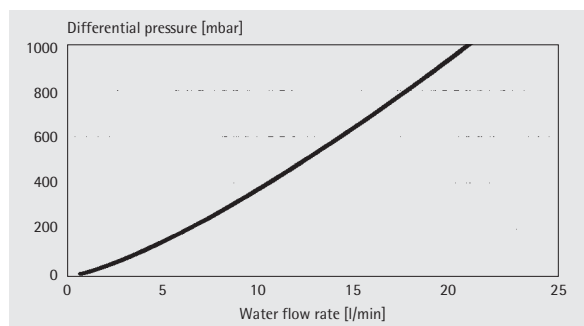
Cleaning validation

As these capsules are single use filter elements, there is no need to spend time and money for validating the efficiency of your cleaning procedure for filter housing.

Cost

Sartofluor LG MaxiCaps remove the need for investment in stainless steel or PVDF filter housings and an inventory of spare parts such as valves and O-rings.

Water Flow Rates* for Sartofluor LG MaxiCaps 0.2 μm with Sanitary Flanges



* Prewetted with IPA | water

Specifications

Pore size

0.2 µm

Available sizes | Filtration area

Size 1	10"	0.5 m ²	5.4 ft ²
Size 2	20"	1.0 m ²	10.8 ft ²
Size 3	30"	1.5 m ²	16.1 ft ²

Available adapters connectors

SS, SO, OO

Extractables

Sartofluor LG MaxiCaps meet, or exceed the requirements for WFI quality standards set by the current USP.

Regulatory compliance

100% Individually integrity tested

Integrity test correlated to HIMA/ASTM F 838-83 Bacteria Challenge Test

Non-pyrogenic according to USP Bacterial Endotoxins

Meets USP Plastics Class VI biological reactivity test, in vivo

Non-fiber releasing according to 21 CFR

Sterilization

Autoclaving

134°C, 2 bar | 29 psi, 30 min

No in-line steam sterilization

Sterilization cycles

Autoclaving min 25

Materials

Filter membrane	PTFE
Support fleece	Polypropylene
Core	Polypropylene
End caps	Polypropylene
O-Rings	EPDM (Viton as accessory in the package)

Operating parameters

Max. allowable differential pressure	3 bar 43.5 psi at 20°C
Max. allowable back pressure	2 bar 29 psi at 20°C

Ordering information

Order code	Size	Pore size [µm]
Capsules		
5181307T1--**	1	0.2
5181307T2--**	2	0.2
5181307T3--**	3	0.2



Clarification Filters

Depth Filter Capsules – Sartoclear® P	118
Depth Filter Capsules – Sartoclear® P MaxiCaps	120
Sartoclear® P Depth Filter Modules	122
Sartoclear® P Depth Filter Sheets	124

Clarification
Filters



Sartoclear® P Depth Filter Capsules for Bench Scale Trials



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

Applications

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

Filter area

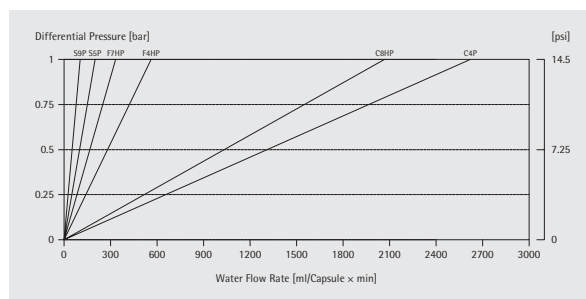
Each Sartoclear® P Cap contains an effective filter area of 25 cm².

Product benefits

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

Flexibility

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



Specifications

Retention rates

C4P	8 µm
C8HP	4 µm
F4HP	1.5 µm
F7HP	1 µm
S5P	0.3 µm
S9P	0.1 µm

Filtration area

25 cm²

Sterilization

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

Extractables

The depth filter media of Sartoclear® P meets the requirements for WFI quality standards set by the USP 26.

- Non pyrogenic according to USP Bacterial Endotoxins after a flush of 50l/m² WFI
- LAL level < 0.125 UE/ml
- Pass USP Plastic Class VI Test

Metal extractables

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

Non fiber releasing according 21 CFR

Materials

Depth filter media	Cellulosic depth filter media with inorganic filter aids
Core	Polypropylene
Capsule housing	Polypropylene

Operating parameters

Max. allowable system pressure	5.5 bar 80 psi at 20°C
Max. allowable pressure differential	2.0 bar 29 psi
Max. allowable back pressure	0.03 bar 0.4 psi

Order information

293	C4-	P	13	A	C	FF	- -	M	Sartoclear® P
									Retention Rate
									Pharma Biotech
									Capsule Design
									Internal Code
									25 cm² Capsule
									Connector
									FF = Sanitary Inlet + Outlet
									Dash Space
									3 Capsules per box

Sartoclear® P MaxiCaps®

Depth Filter MaxiCaps® for the Biopharmaceutical Industry



Description

Sartoclear® P MaxiCaps® are especially developed for cell harvest and clarification of cell culture and microbial fermentation media in biopharmaceutical applications. The products feature cellulose based depth filter media with highest dirt holding capacity and electrokinetic adsorption combined with the advantage of the unique and closed MaxiCap® system.

Applications

- Sartoclear® P MaxiCaps® are applied in biopharmaceutical processes such as:
- Cell harvest & clarification of cell culture and other fermentation media
 - Upstream filtration of growth media
 - Particle and colloid removal from serum & plasma
 - Removal of cryoprecipitants

Performance

At 1.100 cm² filter area each 10" MaxiCap® element contains more filter area than any comparable capsules on the market – offering you maximum benefits in terms of costs & speed of operation.

Product benefits

Sartoclear® P MaxiCaps® are completely disposable filters, which provides you the flexibility you need for modern disposable manufacturing. These disposable filters do not need stainless steel filter housing and thus eliminate cleaning validation. Sartoclear® P MaxiCaps® can be simply and directly connected to the downstream processing line or disposable bags. This minimizes direct contact of product with the operator and thus improves operator safety.

Flexibility

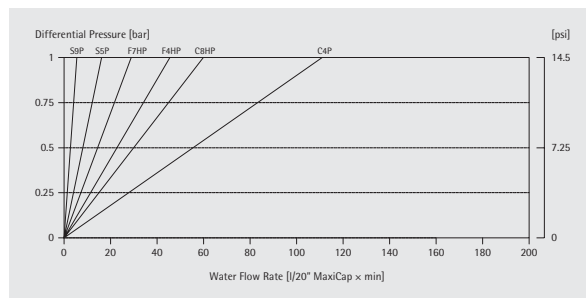
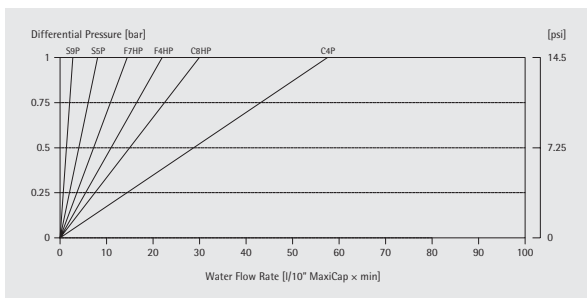
Sartoclear® P MaxiCaps® are available with various filtration areas from 0.11 m² to 0.22 m² for ease of use in any depth filtration processes from batch sizes of 500 ml to 100 liter.

Scale up

Sartoclear® P MaxiCaps® provide highest scale-up security for either small scale manufacturing or large scale production. Scale up from a small 25 cm² Sartoclear® P Cap capsule to a full scale production design will be optimized by employing an intermediary scale up step with Sartoclear® P MaxiCaps®.

Quality control

Each individual MaxiCap® undergoes a pressure hold test during manufacture to guarantee product stability.



Specifications

Retention rates

C4P	8 µm
C8HP	4 µm
F4HP	1.5 µm
F7HP	1 µm
S5P	0.3 µm
S9P	0.1 µm

Filtration area

10" MaxiCap®	1.100 cm ²
20" MaxiCap®	2.200 cm ²

Extractables

Sartoclear® P MaxiCaps® meet the requirements for WFI quality standards set by the current USP.

Non pyrogenic according to USP Bacterial Endotoxins after a flush of 8 l WFI per 10" MaxiCap® and 16 liter per 20" MaxiCap®. LAL level < 0.125 UE/ml

Pass USP Plastic Class VI Test

Metal extractables

(Please see validation guide of Sartoclear® P MaxiCaps®)
Non fiber releasing according 21 CFR

Sterilization

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

Technical references

Brochure	85030-519-85
Validation Guide	85030-519-88

Materials

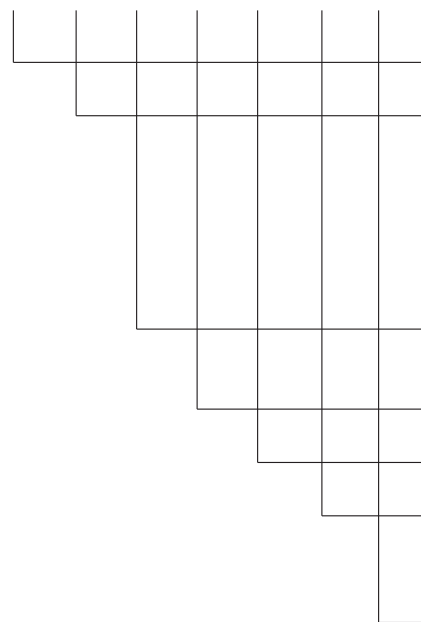
Depth filter media	Cellulosic depth filter media with inorganic filter aids
Sealing media	Silicone
Core	Polypropylene
End caps	Polypropylene
Capsule housing	Polypropylene

Operating parameters

Max. allowable differential pressure	2.0 bar 29psi
Max. allowable back pressure	0.03 bar 0.4 psi

Order information

293 F7H P 13 A 1 SS



Sartoclear® P MaxiCaps®

Retention rate

C4-	8 µm	(Type C4P)
C8H	4 µm	(Type C8HP)
F4H	1.5 µm	(Type F4HP)
F7H	1 µm	(Type F7HP)
S5-	0.3 µm	(Type S5P)
S9-	0.1 µm	(Type S9P)

Developed

for biopharmaceutical applications

Capsule design

A = Internal Code

Height

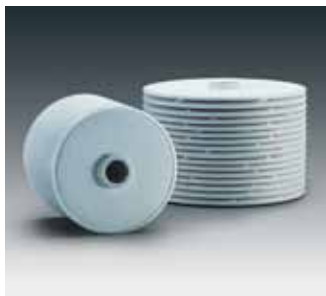
1	= 10"
2	= 20"

Connector

SS = Sanitary Inlet + Outlet

Sartoclear® P Depth Filter Modules

Depth Filter Modules for the Biopharmaceutical Industry



Description

Sartoclear® P depth filter modules are especially developed for use in the biopharmaceutical industry. They feature cellulose based depth filtration media with highest dirt holding capacity and electrokinetic adsorption combined with the advantage of a closed filtration system.

Applications

Sartoclear® P depth filter modules are applied in biopharmaceutical processes such as:

- Cell harvest & clarification of cell culture and other fermentation media
- Upstream filtration of growth media
- Particle and colloid removal serum and plasma
- Removal of cryoprecipitants

Typical process volumes for Sartoclear® P depth filter modules are regularly higher than 100 liters. Smaller volumes are being filtered by Sartoclear® P MaxiCaps.

Performance

Sartoclear® P depth filter modules provide an excellent total throughput and enhanced clarification. They provide economical upstream- and downstream filtration when retention of both, high particle load and colloidal contamination have to be realised.

Product benefits

- The vertical modular system ensures totally enclosed process design
- Modular system optimises handling costs due to easy and quick handling
- Maximum product yield
- No droplet losses or contamination

Using Sartoclear® P depth filter modules

Sartoclear® P depth filter modules are being used in vertical filter housings which can be easily adapted to the batch volumes and process conditions on sight.

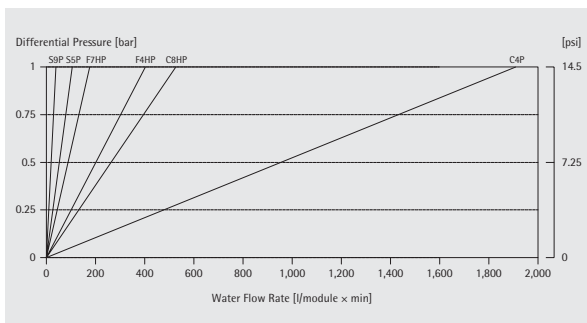
Scalability

For bench scale and scale up trials Sartoclear® P capsules (from 50 ml to 1.000 ml) and Sartoclear® P MaxiCaps (from 1.000 ml to 100 Liter) are being used. Scale up trials can be optimized applying the Zero T test system.

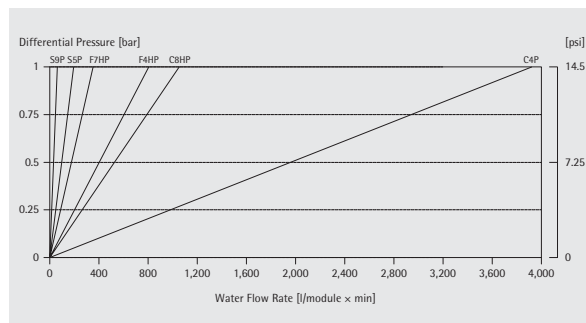
Validation

Sartoclear® P filter modules have been validated according to the USP 26. A Validation Guide is available with detailed data for compliance with regulatory requirements.

Water Flow Rates for Sartoclear® P 12" Depth Filter Module



Water Flow Rates for Sartoclear® P 16" Depth Filter Module



Specifications

Retention rates

C4P	8 µm
C8HP	4 µm
F4HP	1.5 µm
F7HP	1 µm
S5P	0.3 µm
S9P	0.1 µm

Filtration area

12" module	1.8 m ²
16" module	3.6 m ²

Extractables

Sartoclear® P depth filter modules meet the requirements for WFI quality standards set by the USP 26.

Non pyrogenic according to USP Bacterial Endotoxins
LAL level < 0,124 EU/ml

Metal extractables

Please see validation guide of Sartoclear® P depth filter modules

Pass USP Plastic Class VI Test

Sterilization

Steam 121°C, 30 or 60 min

Technical references

Brochure	SR-1501-e
Validation Guide	SR-5700-e

Materials

Polypropylene

EPDM o-rings

Cellulose

Diatomaceous earth

Perlite

Resin binder

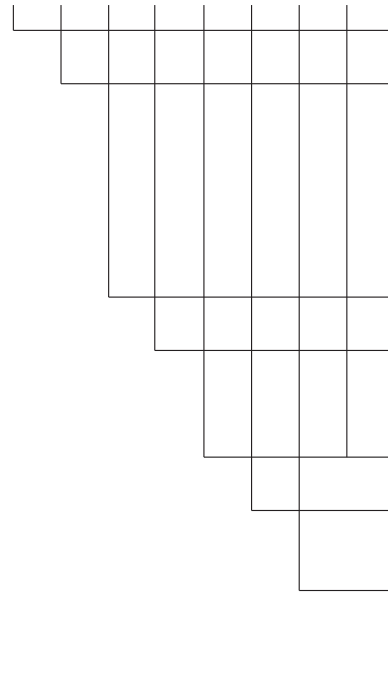
Operating parameters

Max. allowable differential Pressure 2.0 bar | 29 psi

Max. allowable back pressure 0.03 bar | 0.4 psi

Order information

293 F7H P 12 - 1 FA -- V



Sartoclear® P depth filter module

Retention rate

C4-	8 µm	(Type C4P)
C8H	4 µm	(Type C8HP)
F4H	1.5 µm	(Type F4HP)
F7H	1 µm	(Type F7HP)
S5-	0.3 µm	(Type S5P)
S9-	0.1 µm	(Type S9P)

Pharma Biotech

Module diameter

12	= 12"
16	= 16"

Blank

Height

1	= 10" height
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Module adapter

FA	= Flat adapter
DO	= Double O-ring adapter

Book size

V	= 2 modules per box
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Sartoclear® P Depth Filter Sheets for the Biopharmaceutical Industry



Description

Sartoclear P filter sheets are especially developed for use in the biopharmaceutical industry. They feature cellulose based depth filtration media with highest dirt holding capacity and electrokinetic adsorption.

Applications

Sartoclear P filter sheets are applied in biopharmaceutical processes such as:

- Upstream filtration of growth media
- Downstream filtration of fermentation media (removal of cells or cell debris)
- Particle removal from chemical bulk ware
- Particle removal from serum and plasma
- Filtration of plasma derived products
- Separation of precipitants
- Endotoxin removal

Performance

Sartoclear P filter sheets provide an excellent total throughput and enhanced clarification. They provide economical upstream- and downstream filtration when retention of both, high particle load and colloidal contamination have to be realised.

Using Sartoclear P

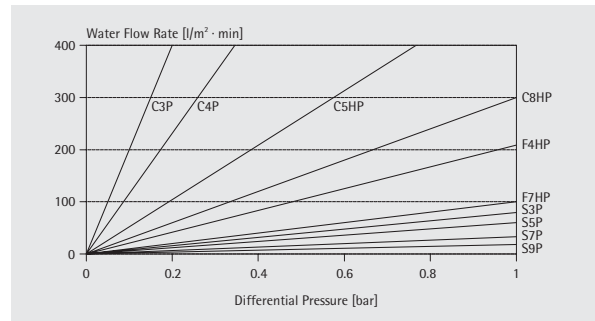
Sartoclear P filter sheets are being used in horizontal filter presses which can be easily adapted to the batch volumes and process conditions on sight.

Scalability

For scale up trials 60 mm Sartoclear P filter pads are available which can be used together with the Zero T test. Filtration trials can then be performed using small volumes of products.

Quality control

Sartoclear P filter sheets are designed, developed and manufactured in accordance with a DIN ISO 9001 certified Quality Management System. A Validation Guide is available with detailed data for compliance with regulatory requirements.



Specifications

Retention rate

C4P	8 µm
C8HP	4 µm
F4HP	1.5 µm
F7HP	1 µm
S5P	0.3 µm
S9P	0.1 µm

Filtration area

40 × 40 cm	0.16 m ²
60 × 60 cm	0.36 m ²

Extractables

Sartoclear P filter sheets meet the requirements for WFI quality standards set by the current USP.

Non pyrogenic according to USP Bacterial Endotoxins
LAL level < 0,124EU/ml

Metal extractables

Please see brochure of Sartoclear P | Sartocell P

Pass USP Plastic Lass VI Test

Sterilization

Steam: 121°C, 30 min

Technical references

Brochure	SR-1501-e
Validation Guide	SR-5700-e

Materials

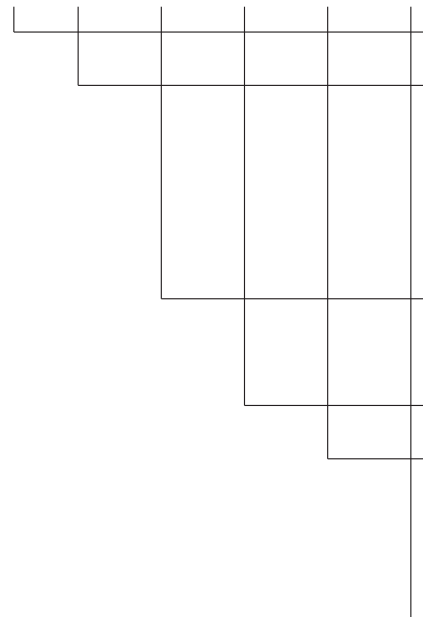
Cellulose
Diatomaceous earth
Perlite
Resin binder

Operating parameters

Max. allowable differential pressure	C4P	2.5 bar	36 psi at 20°C
	C8HP	2.5 bar	36 psi at 20°C
	F4HP	2.0 bar	29 psi at 20°C
	F7HP	2.0 bar	29 psi at 20°C
	S5P	1.5 bar	21 psi at 20°C
	S9P	1.5 bar	21 psi at 20°C

Order information

290 F7H 060060 P K 02



Sartoclear filter sheets

Retention rate

C4-	8 µm	(Type C4P)
C8H	4 µm	(Type C8HP)
F4H	1.5 µm	(Type F4HP)
F7H	1 µm	(Type F7HP)
S5-	0.3 µm	(Type S5P)
S9-	0.1 µm	(Type S9P)

Dimensions (in cm)

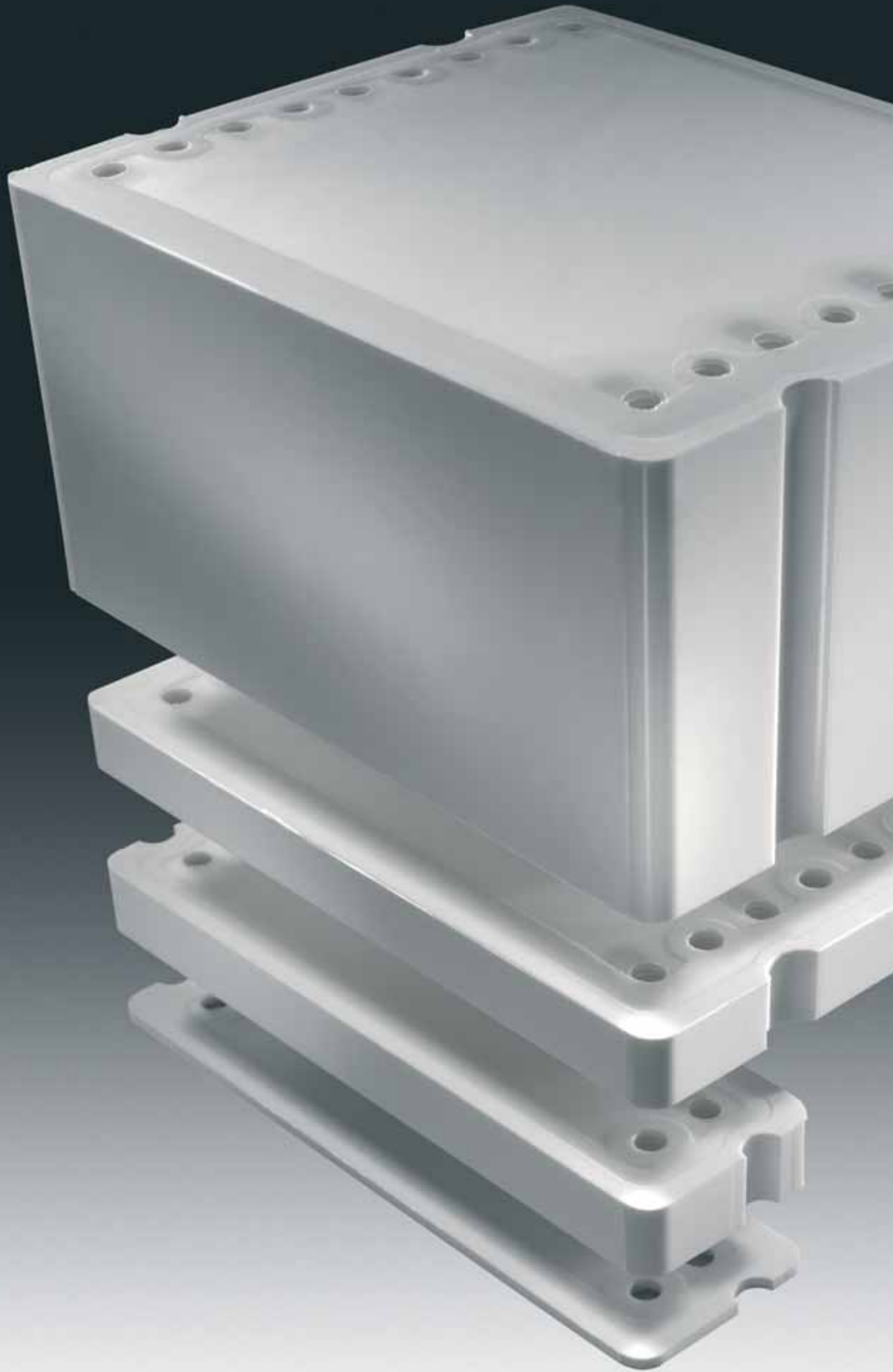
040040	= 40 × 40
060060	= 60 × 60

P = Pharma Grade

Pack size

K	= 50 Sheets/Package (60 × 60 cm)
N	= 100 Sheets/Package (40 × 40 cm)

Internal code





Crossflow Consumables

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Crossflow
Consum-
ables

Polyethersulfone Microfiltration Cassettes Cell Removal and Mycoplasma Reduction



Description

The polyethersulfone membrane

The polyethersulfone membrane (PESU) is a membrane polymer that is well established in the biotechnological and pharmaceutical industries. The PESU membrane is a stable polymer that features a broad pH and temperature range. Its wide temperature range makes it possible to sterilize the membrane by either steam or autoclaving. Membrane regeneration, storage and depyrogenation can be accomplished by using NaOH even at elevated temperatures. Because of these features, the PESU membrane is ideally suited for biotechnological applications. PESU cassettes are available in 0.1 μm .

Applications

Polyethersulfone membranes are designed for applications in the biotechnological and pharmaceutical industries. They can be used to remove the following cells from liquids:

- mammalian cells
- clostridia
- yeasts
- salmonella
- mycoplasma reduction

Product profile

Polyethersulfone can withstand in-line steam sterilization without any loss of integrity or changes in membrane retention. Membrane retention is unaffected by repeated re-use.

Feature

Low adsorption
 Low protein-binding
 Wide pH and a wide variety of temperature range
 High flow rates
 Self sealing cassette
 Silicone sealing compound
 Enlarged inlet and outlet holes

Benefits

Minimal loss of proteins
 High product yield
 Chemicals can be used for the removal of foulants
 Economical filtration runs
 No gaskets needed
 No glue
 Lower pressure drop

Specifications

Pore size | Retention rate

PESU microfiltration cassettes are available in a choice of 0.1 µm pore size.

Available sizes

Sartorius Crossflow Cassettes are available in **Standard Cassette** size for pilot- | production scale and in **Sartocon Slice** format for reduced volume handling.

Available filterholder

Sartorius Crossflow Cassettes are designed for Sartorius filter holders like SartoconSlice (0.1 m² Cassettes only), Sartocon, Sartocon 2 Plus, Sartocon 3, and different Sartoflow holder.

Filtration area

Filter area Sartocon Cassette	0.6 m ²
Filter area Sartocon Slice Cassette	0.1 m ²

Sterilization

121°C, 30 min, steaming 121°C, 40 min, autoclaving

Regulatory compliance

All materials have passed the current USP Biological Test. The filtrate meets or exceeds USP and EP requirements for Sterile Water for Injection with respect to total solids, oxidizable substances, particulate matter, ammonia, chloride, nitrate, sulfate and heavy metals.

Quality control

Each filter cassette is individually assigned a serial number, integrity tested and certified.

It complies with cGMP requirements for non-fiber-releasing filters and is filed under the Drug Master File Number DMF 5967 by the Food and Drug Administration, Washington, DC. Validation information is available upon request.

If you use holding devices from other suppliers, please contact our Applications Department. A different torque might be needed due to specific variations in design.

Technical references

Validation Guide
Publication No.: SPC5701-e

Directions for Use (Sartocon Cassettes and Sartocon Slice Cassettes)
Publication No.: SPC6001-a

Materials of construction

Membrane	Polyethersulfone
Gaskets	PVDF
Spacer	Polypropylene
Sealing compound	Silicone

Operating parameters

Feed pressure, P _{in}	58 psi 4 bar maximum
Operating temperature	50°C maximum
pH stability	1–14
Air diffusion rates at P _{in} = 15 psi 1 bar	15 ml air/min for 0.6 m ² filter area 5 ml air/min for 0.1 m ² filter area
Cleaning	NaOH Sodium hydroxide, 1M, max. 40°C
Disinfection	NaOH, 1 M, max. 50°C, 30 min
Storage	NaOH, 0.1 M

Typical flux for water

Permeate*	1300 l/h/m ²
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* Feed pressure, P_{in} = 29 psi | 2.0 bar; retentate pressure, P_{out} = 7 psi | 0.5 bar

Retention coefficient

Marker	Retention (static conditions)
Mycoplasmen	LRV ≥ 7
Brevundimonas diminuta	LRV > 7

Order information

Available types and order numbers

Type	Filter area	Pore size	Order No.
Sartocon Cassettes	0.6 m ²	0.1 µm	302 154 58 06 W–SG
Sartocon Slice Cassettes	0.1 m ²	0.1 µm	305 154 58 01 W–SG

Hydrosart® Microfiltration Cassettes Cell Harvest and Bacteria Concentration



Description

The Hydrosart® membrane

Hydrosart is a stabilized cellulose derivative membrane polymer that has been optimized for the biotechnological and pharmaceutical industries. The Hydrosart membrane is a stable polymer that features a broad pH and temperature range. Hydrosart is also extremely hydrophilic, making it non-protein-binding and virtually non-fouling. As a result, it has extremely high flux. Hydrosart's wide temperature range makes it possible to sterilize the membrane by either steam or autoclaving. Membrane regeneration, storage and depyrogenation can be accomplished by using NaOH even at elevated temperatures.

Product profile

Hydrosart has minimal adsorption of proteins, viruses, etc. Membrane retention is unaffected by repeated re-use. Hydrosart has been validated to withstand in-line steam sterilization without any loss of integrity or changes in membrane retention.

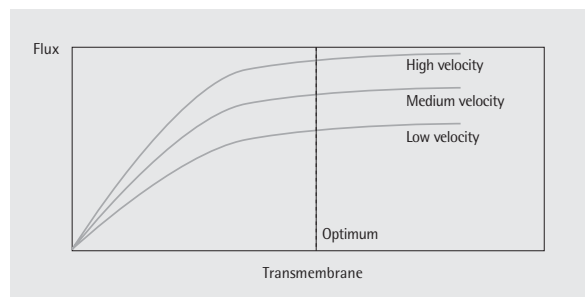
Applications

Hydrosart membranes are designed for use in the biotechnological and pharmaceutical industries. They can be used to remove the following from liquids:

- Mammalian cells
CHO
BHK
- Bacteria
E. coli
Pasteurella
C. diphtheria
- Yeasts
- Cell lysates

Feature	Benefits
Non-adsorptive	No loss of proteins, easy to clean, sustained flux
Non-protein-binding	High product yield
Wide pH and temperature range	More choices in sanitizing agents
High flow rates	Economical filtration runs
Steam-resistant polymer	Withstands repeated steam-sterilization cycles
Self sealing cassette	No gaskets needed
Silicone sealing compound	No glue
Enlarged inlet and outlet holes	Lower pressure drop

Because of these features, Hydrosart is ideal for biological applications.



Effect of Transmembrane Pressure (TMP) and crossflow velocity on flux rates

Specifications

Pore size | Retention rate

Hydrosart Microfilter Cassettes are available in a choice of 0.2 µm and 0.45 µm pore sizes.

Available sizes

Sartorius Crossflow Cassettes are available in **Standard Cassette** size for pilot- | production scale and in **Sartocon Slice** format for reduced volume handling.

Available filter holder

Sartorius Crossflow Cassettes are designed for Sartorius filter holders like SartoconSlice (0.1 m² Cassettes only), Sartocon, Sartocon 2 Plus, Sartocon 3, and different Sartoflow holder.

Filtration area

Filter area Sartocon Cassette 0.6 m²
Filter area Sartocon Slice Cassette 0.1 m²

Sterilization

Sterilization 121°C, 30 min, steaming
121°C, 30 min, autoclaving

Regulatory compliance

All materials have passed the current USP Biological Test. The filtrate meets or exceeds USP and EP requirements for Sterile Water for Injection with respect to total solids, oxidizable substances, particulate matter, ammonia, chloride, nitrate, sulfate and heavy metals.

Quality control

Each filter cassette is individually assigned a serial number, integrity tested and certified.

It complies with cGMP requirements for non-fiber-releasing filters and is filed under the Drug Master File Number DMF 5967 by the Food and Drug Administration, Washington, DC. Validation information is available upon request.

If you use holding devices from other suppliers, please contact our Applications Department. A different torque might be needed due to specific variations in design.

Technical references

Validation Guide
Publication No.: SPC5701-e

Directions for Use (Sartocon Cassettes and Sartocon Slice Cassettes)
Publication No.: SPC6001-a

Materials of construction

Membrane	Hydrosart (stabilized cellulose based membrane)
Gaskets	PVDF
Spacer	Polypropylene
Sealing compound	Silicone

Operating parameters

Feed pressure, P _{in}	58 psi 4 bar maximum
Operating temperature	50°C maximum
pH stability	2–14
Air diffusion rates at P _{in} = 15 psi (1 bar)	50 ml air/min for 0.6 m ² filter area 15 ml air/min for 0.1 m ² filter area
Cleaning	P3 Ultrasil 11, 1%, pH 13, max. 50°C, 30 min P3 Ultrasil 53, 1.5%, pH 8, 50°C, 60 min P3 Ultrasil 62/60a, 1%, pH 6.5; max. 50°C, 30 min Sodium hydroxide, 1 M; 40°C, 60 min
Disinfection	NaOH, 1 M, max. 50°C, 30 min
Storage	NaOH, 0.1 M

Examples of flux for water

Pore size	Sartocon Cassettes 0.6 m ² filter area Permeate*	Sartocon Slice Cassettes 0.1 m ² filter area Permeate*
0.2 µm	2,100 l/h/m ²	1,350 l/h/m ²
0.45 µm	2,300 l/h/m ²	1,855 l/h/m ²

* (Feed pressure, P_{in} = 29 psi | 2.0 bar; retentate pressure, P_{out} = 7 psi | 0.5 bar)

Retention coefficient

Marker	Retention
Bacteria	>99%
Mammalian cells	>99%

Order information

Available types and order numbers

Type	Filter area	Pore size	Order No.
Sartocon Cassettes	0.6 m ²	0.2 µm	302 186 07 06 W–SG
Sartocon Cassettes	0.6 m ²	0.45 µm	302 186 06 06 W–SG
Sartocon Slice Cassettes	0.1 m ²	0.2 µm	305 186 07 01 W–SG
Sartocon Slice Cassettes	0.1 m ²	0.45 µm	305 186 06 01 W–SG

Polypropylene Microfiltration Cassettes Cell Harvest and Bacteria Concentration



Description

The Polypropylene membrane

The Polypropylene membrane is a stable polymer that features a broad pH and temperature range. Polypropylene wide temperature range makes it possible to sterilize the membrane by either steam or autoclaving. Membrane regeneration, storage and depyrogenation can be accomplished by using NaOH even at elevated temperatures. Because of these features, Polypropylene is ideal for biological applications. Polypropylene cassettes are available in 0.2 µm.

Applications

Polypropylene membranes are designed for use in the biotechnological and pharmaceutical industries. They can be used to remove the following from liquids:

- mammalian cells
- clostridia
- yeasts
- salmonella

Product profile

Polypropylene can withstand in-line steam sterilization without any loss of integrity or changes in membrane retention. Membrane retention is unaffected by repeated re-use.

Feature	Benefits
Low adsorption	Minimal loss of proteins
Low protein-binding	High product yield
Steam stable polymer	Withstands repeated steam-sterilization cycles
Wide pH and a wide variety of temperature range	Chemicals can be used for the removal of foulants
High flow rates	Economical filtration runs
Self sealing cassette	No gaskets needed
Silicone sealing compound	No glue
Enlarged inlet and outlet holes	Lower pressure drop

Specifications

Pore size | Retention rate

PP microfiltration cassettes are available in a choice of 0.2 µm pore size.

Available sizes

Sartorius Crossflow Cassettes are available in **Standard Cassette** size for pilot- | production scale.

Available filterholder

Sartorius Crossflow Cassettes are designed for Sartorius filter holders like Sartocon, Sartocon 2 Plus, Sartocon 3, and different Sartoflow holder.

Filtration area

Filter area Sartocon Cassette 0.6 m²

Sterilization

121°C, 30 min, steaming 121°C, 110 min, autoclaving

Regulatory compliance

All materials have passed the current USP Biological Test. The filtrate meets or exceeds USP and EP requirements for Sterile Water for Injection with respect to total solids, oxidizable substances, particulate matter, ammonia, chloride, nitrate, sulfate and heavy metals.

Quality control

Each filter cassette is individually assigned a serial number, integrity tested and certified.

It complies with cGMP requirements for non-fiber-releasing filters and is filed under the Drug Master File Number DMF 5967 by the Food and Drug Administration, Washington, DC. Validation information is available upon request.

If you use holding devices from other suppliers, please contact our Applications Department. A different torque might be needed due to specific variations in design.

Technical references

Validation Guide
Publication No.: SPC5701-e

Directions for Use (Sartocon Cassettes and Sartocon Slice Cassettes)
Publication No.: SPC6001-a

Materials of construction

Membrane	Polypropylene
Gaskets	PVDF
Spacer	Polypropylene
Sealing compound	Silicone

Operating parameters

Feed pressure, P _{in}	58 psi 4 bar maximum
Operating temperature	50°C maximum
pH stability	1–14
Air diffusion rates at P _{in} = 15 psi 1 bar	15 ml air/min for 0.6 m ² filter area
Cleaning	P3 Ultrasil 91, (2–4%), pH 13; max. 50°C; Sodium hydroxide, 1 M; 40°C
Disinfection	NaOH, 1 M, max. 50°C, 30 min
Storage	NaOH, 0.1 M

Examples of flux for water

Permeate*	0.2 µm	1000 l/h/m ²
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* Feed pressure, P_{in} = 29 psi | 2.0 bar; retentate pressure, P_{out} = 7 psi | 0.5 bar

Retention coefficient

Marker	Retention
Bacteria	>99%
Mammalian cells	>99%

Order information

Available types and order numbers

Pore size	Sartocon Cassettes 0.6 m ² filter area
0.2 µm	302 175 07 06 W-SG

Sartocon® Single-Use Cassettes

Protein Purification, Concentration and Diafiltration



Description

The polyethersulfone membrane

The polyethersulfone membrane (PESU) is a membrane polymer that is well established in the biotechnological and pharmaceutical industries. The PESU membrane is a stable polymer that features a broad pH and temperature range. Its wide temperature range makes it possible to sterilize some of the membrane by either steam or autoclaving. Because of these features, the PESU membrane is ideally suited for biotechnological applications. Polyethersulfone membranes are designed for Single Use applications use in the biotechnological and pharmaceutical industries.

They can be used for the following applications:

- IgG
- Blood factors
- Enzymes
- Peptides

Product profile

The polyethersulfone membrane in Sartococon® Single-Use Cassettes has minimal adsorption of proteins, viruses, etc. Membrane retention is unaffected by always out of the box performance. Some PESU ultrafiltration cassettes have been validated to withstand in-line steam sterilization without any loss or changes in membrane retention.

Feature	Benefits
New Filter-Cassette in each production run	Reproducibility - Consistent process economics "Ready to use easy to use conditions" - High Target Protein rejection "Consistent Yield" - Sustained Performance (Lot-to-Lot) - Batch-to-Batch Consistency "Always out of the box performance"
Single use	Eliminate cleaning Validation Reduced down time
Alcohol Glycerol storage	Consistently low TOC limits
Consistent performance	Minimal processing time
Self sealing cassette	No gaskets required
Silicone sealing internal external	No glue No Polyurethane extractables
Opimized Cassette construction	Lower pressure drop across the Cassette

Specifications

Pore size | Retention rate

PESU ultrafiltration cassettes are available in a choice of the following nominal molecular weight cut offs: 1kD, 5kD, 8kD, 10kD, 30kD, 50kD, 300kD.

Available sizes

Sartorius Sartoco[®] Single-Use Crossflow Cassettes are available in **Standard Cassette** format size for pilot- | production scale.

Available filterholder

Sartorius Sartoco[®] Single-Use Crossflow Cassettes are designed for Sartorius filter holders like Sartoco, Sartoco 2 Plus, Sartoco 3, and different Sartoflow holder.

Filtration area

Filter area
Sartoco Cassette 0.7 m²

Sterilization

only 30 kD | 100 kD | 300 kD, 121°C, 30 min., steaming; 121°C, 110 min, autoclaving

Regulatory compliance

All materials have passed the current USP Biological Test. The filtrate meets or exceeds USP and EP requirements for Sterile Water for Injection with respect to total solids, oxidizable substances, particulate matter, ammonia, chloride, nitrate, sulfate and heavy metals.

Quality control

Each filter cassette is individually assigned a serial number, integrity tested and certified.

It complies with cGMP requirements for non-fiber-releasing filters and is filed under the Drug Master File Number DMF 5967 by the Food and Drug Administration, Washington, DC. Validation information is available upon request.

If you use holding devices from other suppliers, please contact our Applications Department. A different torque might be needed due to specific variations in design.

Technical references

Validation Guide
Publication No.: SPC5701-e

Directions for Use
Publication No.: SPC6001-a

Materials of construction

Membrane	Polyethersulfone
Gaskets	PVDF
Spacer	Polypropylene
Sealing compound	Silicone

Operating parameters

Feed pressure, P _{in}	58 psi 4 bar maximum
Operating temperature	50°C maximum
Air diffusion rates at P _{in} = 15 psi 1 bar	1 k-300 k: 50 ml 50 ml air/min for 0.7 m ² filter area 15 ml air/min for 0.1 m ² filter area

Retention rates Polyethersulfone

Substance	Approx. Mol. wt	1 kD	5 kD	8 kD	10 kD	30 kD	50 kD	100 kD	300 kD
Vitamin B12	1.200	>70	>50	<45	-	-	-	-	-
Inulin	5.000	>85	>70	-	-	-	-	-	-
Cytochrome C	12.400	-	>99	>99	>95	>60	-	-	-
Myoglobin	17.000	-	-	-	>99	>98	>95	<80	-
Albumin	67.000	-	-	-	>95	-	-	-	-
γ-Globulin	169.000	-	-	-	-	-	>99	>98	<70
Dextran	2,000.000	-	-	-	-	-	-	-	>95

Typical water flux release data

Cutoff	Sartoco [®] Single-Use Cassettes 0.7 m ² filter area [l/h]
1 kD	9
5 kD	21
8 kD	125
10 kD	160
30 kD	280
50 kD	460
100 kD PESU	530
300 kD	630

* (Feed pressure, P_{in} = 22 psi | 1.5 bar; Retentate pressure, P_{out} = closed valve; P_{Filtrate} = open valve)

Order information

Available types and order numbers

Cutoff	Sartoco [®] Single-Use Cassettes, 0.7 m ² filter area
1 kD	3021460907E--SUD
5 kD	3021462907E--SUD
8 kD	3021463407E--SUD
10 kD	3021463907E--SUD
30 kD	3021465907E--SUD
50 kD	3021465007E--SUD
100 kD	3021466807E--SUD
300 kD	3021467907E--SUD

Polyethersulfone Ultrafiltration Cassettes Protein Purification, Concentration and Diafiltration



Description

The polyethersulfone membrane

The polyethersulfone membrane (PESU) is a membrane polymer that is well established in the biotechnological and pharmaceutical industries. The PESU membrane is a stable polymer that features a broad pH and temperature range. Its wide temperature range makes it possible to sterilize some of the membrane by either steam or autoclaving. Membrane regeneration, storage and depyrogenation can be accomplished by using NaOH even at elevated temperatures. Because of these features, the PESU membrane is ideally suited for biotechnological applications. Polyethersulfone membranes are designed for use in the biotechnological and pharmaceutical industries.

They can be used for the following applications:

- IgG
- Blood factors
- Enzymes
- Peptides

Product profile

The polyethersulfone membrane has minimal adsorption of proteins, viruses, etc. Membrane retention is unaffected by repeated re-use. PESU ultrafiltration cassettes have been validated to withstand in-line steam sterilization without any loss or changes in membrane retention.

Feature	Benefits
Low adsorption	Minimal loss of proteins
Low protein-binding	High product yield
pH Wide pH and a wide variety of temperature range	Chemicals can be used for the removal of foulants
High flow rates	Economical filtration runs
Self sealing cassette	No gaskets needed
Silicone sealing compound	No glue
Enlarged inlet and outlet hole	Lower pressure drop

Specifications

Pore size | Retention rate

PESU ultrafiltration cassettes are available in a choice of the following nominal molecular weight cut offs: 1kD, 5kD, 8kD, 10kD, 30kD, 50kD, 300kD.

Available sizes

Sartorius Crossflow Cassettes are available in **Standard Cassette** size for pilot- | production scale and in **Sartocon Slice** format for reduced volume handling.

Available filterholder

Sartorius Crossflow Cassettes are designed for Sartorius filter holders like SartoconSlice (0.1 m² Cassettes only), Sartocon, Sartocon 2 Plus, Sartocon 3, and different Sartoflow holder.

Filtration area

Filter area Sartocon Cassette 0.7 m²
Filter area Sartocon Slice Cassette 0.1 m²

Sterilization

only 30 kD | 100 kD | 300 kD, 121°C, 30 min., steaming; 121°C, 110 min, autoclaving

Regulatory compliance

All materials have passed the current USP Biological Test. The filtrate meets or exceeds USP and EP requirements for Sterile Water for Injection with respect to total solids, oxidizable substances, particulate matter, ammonia, chloride, nitrate, sulfate and heavy metals.

Quality control

Each filter cassette is individually assigned a serial number, integrity tested and certified.

It complies with cGMP requirements for non-fiber-releasing filters and is filed under the Drug Master File Number DMF 5967 by the Food and Drug Administration, Washington, DC. Validation information is available upon request.

If you use holding devices from other suppliers, please contact our Applications Department. A different torque might be needed due to specific variations in design.

Technical references

Validation Guide
Publication No.: SPC5701-e

Directions for Use (Sartocon Cassettes and Sartocon Slice Cassettes)
Publication No.: SPC6001-a

* (Feed pressure, P_{in} = 22 psi | 1.5 bar;
Retentate pressure, P_{out} = closed valve;
 $P_{filtrate}$ = open valve)

Materials of construction

Membrane	Polyethersulfone
Gaskets	PVDF
Spacer	Polypropylene
Sealing compound	Silicone

Operating parameters

Feed pressure, P_{in}	58 psi 4 bar maximum
Operating temperature	50°C maximum
Air diffusion rates at P_{in} = 15 psi 1 bar	1 k-300 k: 50 ml 50 ml air/min for 0.7 m ² filter area 15 ml air/min for 0.1 m ² filter area
Cleaning	P3 Ultrasil 91, (2-4%), pH 13; max. 50°C; Sodium hydroxide, 1 M; 40°C
Disinfection	NaOH, 1 M, max. 50°C, 30 min
Storage	NaOH, 0.1 M

Retention rates Polyethersulfone

Substance	Approx. Mol. wt	1 kD	5 kD	8 kD	10 kD	30 kD	50 kD	100 kD	300 kD
Vitamin B12	1.200	>70	>50	<45	-	-	-	-	-
Inulin	5.000	>85	>70	-	-	-	-	-	-
Cytochrome C	12.400	-	>99	>99	>95	>60	-	-	-
Myoglobin	17.000	-	-	-	>99	>98	>95	<80	-
Albumin	67.000	-	-	-	>95	-	-	-	-
γ -Globulin	169.000	-	-	-	-	-	>99	>98	<70
Dextran	2,000.000	-	-	-	-	-	-	-	>95

Typical water flux release data

Cutoff	Sartocon Cassettes 0.7 m ² filter area [l/h]	Sartocon Slice Cassettes 0.1 m ² filter area, permeate* [l/h]
1 kD	9	3
5 kD	21	5
8 kD	125	25
10 kD	160	38
30 kD	280	70
50 kD	460	90
100 kD PESU	530	100
300 kD	630	120

Order information

Available types and order numbers

Cutoff	Sartocon Cassettes, 0.7 m ² filter area	Sartocon Slice Cassettes, 0.1 m ² filter area
1 kD	3021460907E-SG	3051460901E-SG
5 kD	3021462907E-SG	3051462901E-SG
8 kD	3021463407E-SG	3051463401E-SG
10 kD	3021463907E-SG	3051463901E-SG
30 kD	3021465907E-SG	3051465901E-SG
50 kD	3021465007E-SG	3051465001E-SG
100 kD	3021466807E-SG	3051466801E-SG
300 kD	3021467907E-SG	3051467901E-SG

Sartocube™ – Hydrosart® Ultrafilter Cassette

Protein purification, concentration and diafiltration



Description

The Hydrosart® Membrane

Hydrosart is a stabilized cellulose based membrane that has been optimized for the biotechnological and pharmaceutical industry. The Hydrosart membrane is a stable polymer that features a broad pH range. Hydrosart is also extremely hydrophilic, making it non-protein binding, virtually non-foul, and has extremely high flux. Membrane regeneration, storage and depyrogenation can be accomplished by using NaOH even at elevated temperatures. These features make Hydrosart an ideal membrane for biological applications. Hydrosart ultrafiltration Sartocube™ cassettes are available in the following nominal molecular weight cutoffs: 10 kD | 30 kD

Applications

Hydrosart ultrafiltration membranes are designed for use in the biotechnological and pharmaceutical industries. They can be used for the following applications:

- Oligonucleotide
- Proteins
 - Albumin, even with 40% EtOH
 - Hemoglobin
- Coagulation factors
 - Factor VIII
 - Factor III
- Vaccines
 - Tetanus
 - Diphtheria
- Monoklonal Antibodies

Product profile

Hydrosart shows minimal adsorption of proteins, viruses, etc. Membrane retention is unaffected by repeated re-use.

The Hydrosart ultrafiltration membrane can be re-used without any less cleaning loss of integrity or performance.

Feature	Benefits
Non-adsorptive	No loss of proteins, easy to clean, sustained flux
Non-protein binding	High product yield
Wide pH and temperature range	More choices in sanitizing agents
High flow rates	Economical filtration runs
Self sealing cassette	No gaskets needed
Silicone sealing compound	No glue
Enlarged inlet and outlet holes	Lower pressure drop

Better solvent resistance than Polyethersulfone and Cellulose Triacetate

Specifications

Pore size | Retention rate

Hydrosart ultrafiltration cassettes are available in a choice of the following nominal molecular weight cut offs: 10 kD | 30 kD

Available sizes

Sartorius Crossflow Cassettes are available in **Standard Cassette** size for pilot- | production scale and in **Sartocon Slice** format for reduced volume handling.

Available filterholder

Sartorius Crossflow Cassettes are designed for Sartorius filter holders like, Sartocon, Sartocon 2 Plus, Sartocon 3, and different Sartoflow holder.

Filtration area

Filter area Sartocube™ Cassette is 3.0 m²

Sterilization

NaOH, 1 M, 40 °C, 30 min

Regulatory compliance

All materials have passed the current USP Biological Test. The filtrate meets or exceeds USP and EP requirements for Sterile Water for Injection with respect to total solids, oxidizable substances, particulate matter, ammonia, chloride, nitrate, sulfate and heavy metals.

Quality control

Each filter cassette is individually assigned a serial number, integrity tested and certified.

It complies with cGMP requirements for non-fiber-releasing filters and is filed under the Drug Master File Number DMF 5967 by the Food and Drug Administration, Washington, DC. Validation information is available upon request.

If you use holding devices from other suppliers, please contact our Applications Department. A different torque might be needed due to specific variations in design.

For further assistance, please contact your local Sartorius field engineer or our Goettingen- based Applications Department in Germany.

Technical references:

Validation Guide
Publication No.: SPC5704-e

Directions for Use (Sartocube™ Cassettes)
Publication No.: SPC6018-a

Materials of construction

Membrane	Hydrosart (stabilized cellulose based membrane)
Gaskets	PVDF
Spacer	Polypropylene
Sealing compound	Silicone

Operating parameters

Feed pressure, P _{in}	58 psi 4 bar maximum
Operating temperature	50 °C maximum, at 20 °C
Max. air diffusion rates at P _{in} = 15 psi 1 bar	50 ml air/min for 3.0 m ² filter area
Cleaning	NaOH, 1 M, 40 °C
Disinfection	NaOH, 1 M, 40 °C, 30 min
Storage	NaOH, 0.1 M

Typical water flux release data*

Nominal molecular weight cutoff (kD)	Sartocube™ Cassettes 3.0 m ² filter area Permeate* [l/h]
10 kD	190
30 kD	600

Retention rates Hydrosart®

Substance	Approx. Mol. Wt.	2 kD	5 kD	10 kD	30 kD	100 kD
Vitamin B12	1.200	≥88%	-	-	-	-
Inulin	5.000	-	>97%	-	-	-
Cytochrome C	12.400	-	-	>97,5%	-	-
Albumin	67.000	-	-	-	>97,5%	≤60%
γ Globulin	169.000	-	-	-	>97,5%	≥96%

Order information

Available types and order numbers

Type	Filter area	Cut off	Order no.
Sartocon Cassettes	3.0 m ²	10 kD	302 144 39 30 E-BSW
Sartocon Cassettes	3.0 m ²	30 kD	302 144 59 30 E-BSW

Hydrosart® Ultrafiltration Cassettes Protein Purification, Concentration and Diafiltration



Description

The Hydrosart® membrane

Hydrosart is a stabilized cellulose based membrane that has been optimized for the biotechnological and pharmaceutical industry. The Hydrosart membrane is a stable polymer that features a broad pH range. Hydrosart is also extremely hydrophilic, making it non-protein binding, virtually non-foul, and has extremely high flux. Membrane regeneration, storage and depyrogenation can be accomplished by using NaOH even at elevated temperatures. These features make Hydrosart an ideal membrane for biological applications. Hydrosart ultrafiltration cassettes are available in the following nominal molecular weight cutoffs: 2 kD | 5 kD | 10 kD | 30 kD | 100 kD

Applications

Hydrosart ultrafiltration membranes are designed for use in the biotechnological and pharmaceutical industries. They can be used for the following applications:

- Oligonucleotide
- Proteins
 - Albumin, even with 40% EtOH
 - Hemoglobin
- Coagulation factors
 - Factor VIII
 - Factor III
- Vaccines
 - Tetanus
 - Diphtheria
- Monoklonal Antibodies

Product profile

Hydrosart shows minimal adsorption of proteins, viruses, etc. Membrane retention is unaffected by repeated re-use.

The Hydrosart ultrafiltration membrane can be re-used without any less cleaning loss of integrity or performance.

Feature	Benefits
Non-adsorptive	No loss of proteins, easy to clean, sustained flux
Non-protein binding	High product yield
Wide pH and temperature range	More choices in sanitizing agents
High flow rates	Economical filtration runs
Self sealing cassette	No gaskets needed
Silicone sealing compound	No glue
Enlarged inlet and outlet holes	Lower pressure drop

Better solvent resistance than Polyethersulfone and Cellulose Triacetate

Specifications

Pore size | Retention rate

Hydrosart ultrafiltration cassettes are available in a choice of the following nominal molecular weight cut offs: 2 kD | 5 kD | 10 kD | 30 kD | 100 kD

Available sizes

Sartorius Crossflow Cassettes are available in **Standard Cassette** size for pilot- | production scale and in **Sartocon Slice** format for reduced volume handling.

Available filterholder

Sartorius Crossflow Cassettes are designed for Sartorius filter holders like SartoconSlice (0.1 m² Cassettes only), Sartocon, Sartocon 2 Plus, Sartocon 3, and different Sartoflow holder.

Filtration area

Filter area Sartocon Cassette 0.6 m²
Filter area Sartocon Slice Cassette 0.1 m²

Sterilization

NaOH, 1 M, 40°C, 30 min

Regulatory compliance

All materials have passed the current USP Biological Test. The filtrate meets or exceeds USP and EP requirements for Sterile Water for Injection with respect to total solids, oxidizable substances, particulate matter, ammonia, chloride, nitrate, sulfate and heavy metals.

Quality control

Each filter cassette is individually assigned a serial number, integrity tested and certified.

It complies with cGMP requirements for non-fiber-releasing filters and is filed under the Drug Master File Number DMF 5967 by the Food and Drug Administration, Washington, DC. Validation information is available upon request.

If you use holding devices from other suppliers, please contact our Applications Department. A different torque might be needed due to specific variations in design.

Technical references

Validation Guide
Publication No.: SPC5701-e

Directions for Use (Sartocon Cassettes and Sartocon Slice Cassettes)
Publication No.: SPC6001-a

* (Feed pressure, P_{in} = 22 psi | 1.5 bar;
Retentate pressure, P_{out} = closed valve;
P_{Filtrate} = open valve)

Materials of construction

Membrane	Hydrosart (stabilized cellulose based membrane)
Gaskets	PVDF
Spacer	Polypropylene
Sealing compound	Silicone

Operating parameters

Feed pressure, P _{in}	58 psi 4 bar maximum
Operating temperature	50°C maximum, at 20°C
Max. air diffusion rates at P _{in} = 15 psi 1 bar	15 ml air/min for 0.6 m ² filter area 5 ml air/min for 0.1 m ² filter area
Cleaning	NaOH, 1 M, 40°C
Disinfection	NaOH, 1 M, 40°C, 30 min
Storage	NaOH, 0.1 M

Typical water flux release data*

Nominal molecular weight cutoff (kD)	Sartocon Cassettes 0.6 m ² filter area permeate* [l/h]	Sartocon Slice Cassettes 0.1 m ² filter area permeate* [l/h]
2 kD	7	1.5
5 kD	12	3
10 kD	35	8
30 kD	120	25
100 kD	340	70

Retention rates Hydrosart®

Substance	Approx. Mol. Wt.	2 kD	5 kD	10 kD	30 kD	100 kD
Vitamin B12	1.200	≥88%	-	-	-	
Inulin	5.000	-	>97%	-	-	
Cytochrome C	12.400	-	-	>97,5%	-	
Albumin	67.000	-	-	-	>97,5%	≤60%
γ Globulin	169.000	-	-	-	>97,5%	≥96%

Order information

Available types and order numbers

Type	Filter area	Cutoff	Order No.
Sartocon Cassettes	0.6 m ²	2 kD	302 144 19 06 E--SG
Sartocon Cassettes	0.6 m ²	5 kD	302 144 29 06 E--SG
Sartocon Cassettes	0.6 m ²	10 kD	302 144 39 06 E--SG
Sartocon Cassettes	0.6 m ²	30 kD	302 144 59 06 E--SG
Sartocon Cassettes	0.6 m ²	100 kD	302 144 68 06 E--SG
Sartocon Slice Cassettes	0.1 m ²	2 kD	305 144 19 01 E--SG
Sartocon Slice Cassettes	0.1 m ²	5 kD	305 144 29 01 E--SG
Sartocon Slice Cassettes	0.1 m ²	10 kD	305 144 39 01 E--SG
Sartocon Slice Cassettes	0.1 m ²	30 kD	305 144 59 01 E--SG
Sartocon Slice Cassettes	0.1 m ²	100 kD	305 144 68 01 E--SG

Cellulose Triacetate Ultrafiltration Cassettes Protein Purification, Concentration and Diafiltration



Description

Cellulose triacetate membrane

The cellulose triacetate membrane is a membrane polymer that is well established in the biotechnological and pharmaceutical industries. The cellulose triacetate membrane is extremely hydrophilic, making it virtually non-protein-binding. These features make cellulose triacetate membranes ideally suited for biotechnological applications. Cassettes with cellulose triacetate membranes are available in a choice of the following nominal molecular weight cutoffs:

- 5 kD
- 20 kD

Applications

Cellulose triacetate membranes are designed for use in the biotechnological and pharmaceutical industries. For example, these membranes can be used to separate or concentrate the following from liquids:

- Blood fractions
- Enzymes
- Proteins
- Peptides
- Antibodies

Product profile

The cellulose triacetate membrane shows minimal adsorption of proteins, viruses, etc. Membrane retention is unaffected by repeated re-use. The cellulose triacetate membrane can be re-used without any loss of integrity or performance.

Feature	Benefits
Non-adsorptive	No loss of proteins, easy to clean, sustained flux
Non-protein binding	High product yield
High flow rates	Economical filtration runs
Self sealing cassette	No gaskets needed
Silicone sealing compound	No glue
Enlarged inlet and outlet holes	Lower pressure drop

Specifications

Pore size | Retention rate

CTA ultrafiltration cassettes are available in a choice of the following nominal molecular weight cut offs: 5 kD, 20 kD

Available sizes

Sartorius Crossflow Cassettes are available in **Standard Cassette** size for pilot- | production scale.

Available filter holder

Sartorius Crossflow Cassettes are designed for Sartorius filter holder like Sartocon, Sartocon 2 Plus, Sartocon 3, and different Sartoflow holder.

Filtration area

Filter area Sartocon Cassette 0.7 m²

Sterilization

2–3% formaldehyde, 20°C, 30 min

Regulatory compliance

All materials have passed the current USP Biological Test. The filtrate meets or exceeds USP and EP requirements for Sterile Water for Injection with respect to total solids, oxidizable substances, particulate matter, ammonia, chloride, nitrate, sulfate and heavy metals.

Quality control

Each filter cassette is individually assigned a serial number, integrity tested and certified.

It complies with cGMP requirements for non-fiber-releasing filters and is filed under the Drug Master File Number DMF 5967 by the Food and Drug Administration, Washington, DC. Validation information is available upon request.

If you use holding devices from other suppliers, please contact our Applications Department. A different torque might be needed due to specific variations in design.

Technical references

Validation Guide
Publication No.: SPC5701-e

Directions for Use (Sartocon Cassettes and Sartocon Slice Cassettes)
Publication No.: SPC6001-a

Materials of construction

Membrane	Cellulose triacetate
Gaskets	Polyester
Spacer	Polypropylene
Sealing compound	Silicone

Operating parameters

Feed pressure, P _{in}	58 psi 4 bar maximum
Operating temperature	50°C maximum
pH stability	4–8
Air diffusion rates at P _{in} = 15 psi 1 bar	15 ml air/min for 0.7 m ² filter area
Cleaning	P3 Ultrasil 53, 1,5%, pH 8; 35°C; Sodium tetraborate (5g/l) + citric acid, free of tensides and proteases (2.5 g/l), pH 8; 40°C Calgonit CMR™ (1%), pH 4; 40°C
Disinfection	Formaldehyde, 2–3%, 20–30°C, 30 min Sodium azide, 0.1%, 20–30°C, 15 min
Storage	Formaldehyd 2–3% Sodium disulfite, 0.1%, pH 4 Ethanol, 20%

Examples of flux for water

	5 kD	20 kD
Permeate*	12 l/h/m ²	200 l/h/m ²

* (Feed pressure, P_{in} = 29 psi | 2.0 bar; Retentate pressure, P_{out} = 7 psi | 0.5 bar; Permeate= Valve open)

Retention coefficient

Marker	5 kD	20 kD
Inulin	>80%	
Cytochrome C	>99%	<75%
Myoglobin		>85%
Albumin		>99%

Order information

Available types and order numbers

Cutoff	Order No.
5 kD	302 145 29 07 E-SG
20 kD	302 145 49 07 E-SG

New Albumin Ultrafiltration Cassettes "PESU-MAX" Albumin Concentration



Description

The PESU-MAX membrane

The PESU-MAX membrane is made out of polyethersulfone (PESU). This membrane polymer is well established in the biotechnological and pharmaceutical industries. The PESU-MAX cassette, is designed for use in the blood market specially for ALBUMIN rejectable applications. The PESU-MAX membrane is a stable polymer that features a broad pH and temperature range. Membrane regeneration, storage and depyrogenation can be accomplished by using NaOH even at elevated temperatures. Because of these features, the PESU membrane is ideally suited for blood market applications.

Product profile

The polyethersulfone membrane has minimal adsorption of proteins, viruses, etc. Membrane retention is unaffected by repeated re-use. PESU ultrafiltration cassettes have been validated to withstand in-line steam sterilization without any loss or changes in membrane retention.

The Sartorius design "Stress test" as an indication of cassette cleaning cycles

Purpose

The goal of this test is to establish that Sartorius Cassette is resistant to NaOH exposure as is recommended in this Guide for cleaning and storage.

Test procedure

PESU-MAX Sartococon® Cassette (Mat. No. 302146AL07K--SW) are tested under stress test conditions according to demonstrate compatibility with caustic. The test conditions are: feed pressure in 4 bar; retentate pressure 0 bar and permeate open; pH is 14 with 1 N NaOH at above 50°C for minimum 200 hours.

Results

All released and published Sartococon® cassettes are validated according to this procedure. All cassettes passed the integrity test after minimum 50 hours.

Feature	Benefits
Low adsorption	Minimal loss of proteins
Low protein-binding	High product yield
Wide pH and a wide variety of temperature range	Chemicals can be used for the removal of foulants
High flow rates	Economical filtration runs
Self sealing cassette	No gaskets needed
Silicone sealing compound	No glue
Enlarged inlet and outlet hole	Lower pressure drop

Specifications

Pore size | Retention rate

PESU-MAX ultrafiltration cassette is available in a retention rate of >99.99% for Albumin.

Available sizes

Sartorius Crossflow Cassettes are available in **Standard Cassette** size for pilot- | production scale and in **Sartocon Slice** format for reduced volume handling.

Available filterholder

Sartorius Crossflow Cassettes are designed for Sartorius filter holders like SartoconSlice (0.1m² Cassettes only), Sartocon, Sartocon 2 Plus, Sartocon 3, and different Sartoflow holder.

Filtration area

Filter area Sartocon Cassette	0.7 m ²
Filter area Sartocon Slice Cassette	0.1 m ²

Sterilization

Sterilization NaOH, 1 M, max. 50°C, 30 min

Regulatory compliance

All materials have passed the current USP Biological Test. The filtrate meets or exceeds USP and EP requirements for Sterile Water for Injection with respect to total solids, oxidizable substances, particulate matter, ammonia, chloride, nitrate, sulfate and heavy metals.

Quality control

Each filter cassette is individually assigned a serial number, integrity tested and certified. It complies with cGMP requirements for non-fiber-releasing filters and is filed under the Drug Master File Number DMF 5967 by the Food and Drug Administration, Washington, DC. Validation information is available upon request.

If you use holding devices from other suppliers, please contact our Applications Department. A different torque might be needed due to specific variations in design.

Technical references

Validation Guide
Publication No.: SPC5701-e
Directions for Use (Sartocon Cassettes and Sartocon Slice Cassettes)
Publication No.: SPC6001-a

Materials of construction

Membrane	Polyethersulfone
Gaskets	PVDF
Spacer	Polypropylene
Sealing compound	Silicone white

Operating parameters

Feed pressure, P _{in}	58 psi 4 bar maximum
Operating temperature	50 °C maximum
Air diffusion rates at P _{in} = 14,5 psi 1 bar	20 ml air/min for 0.7 m ² filter area 5 ml air/min for 0.1 m ² filter area
Cleaning	Sodium hydroxide, 1M, 40 °C, 60 min
Disinfection	NaOH, 1 M, max. 50 °C, 30 min
Storage	NaOH, 0.1 M

Operating parameters

Feed pressure, P _{in}	58 psi 4 bar maximum
Operating temperature	50°C maximum
Air diffusion rates at P _{in} = 14,5 psi 1 bar	50 ml air/min for 0.7 m ² filter area 15 ml air/min for 0.1 m ² filter area
Cleaning	P3 Ultrasil 53TM, 1.5%, 50°C, 60 min, pH 8 P3 Ultrasil 11 (1%), 50°C, 30 min, pH 13 Sodium hydroxide, 1M, 40°C, 60 min
Disinfection	NaOH, 1 M, max. 50°C, 30 min
Storage	NaOH, 0.1 M

An Example of Flux Rates for Water

Permeate l/h/m ²	per Cassette 0.7 m ²	per Cassette 0.1 m ²
approx. 350	250	50

(P_{in} = 29 psi | 2.0 bar, P_{out} = 7 psi | 0.5 bar)

Retention rates PESU-MAX

Polyethersulfone

Retention coefficient

Marker	Retention
Albumin	>99.99%

Ordering information

Available types and order numbers

Cutoff	Sartocon Cassettes 0.7 m ² filter area	Sartocon Slice Cassettes 0.1 m ² filter area
Albumin	302146AL07K--SW	305146AL01K--SW



Crossflow Holders & Systems

Sartocon® 2Plus Stainless Steel Holder	148
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Sartoflow® 20 Stainless Steel Holder	152
Sartoflow® Alpha DL Crossflow System	154
Sartoflow® Beta Crossflow System	156

Sartocon® 2Plus Stainless Steel Holder Crossflow Holder for Sartocon® Cassettes



Description

Sartocon 2Plus holder

The Sartocon 2Plus stainless steel holder is optimized for the use with up to ten Sartocon production scale Crossflow cassettes (max. 7 m²). It is designed for applications from 30 l to 1000 l volume.

Target use:

- process development
- preclinical trials
- clinical trials
- pilot lots

Sartocon cassettes with a filter area of up to 0.7 m² each, are available with Polyethersulfone, Hydrosart, Polypropylene and Cellulose Triacetate membrane types.

The Sartocon 2Plus system covers the whole range of pharmaceutical and biotechnological crossflow applications like concentration and diafiltration of proteins, vaccines, viruses, antibodies, oligo nucleotides, endotoxin removal etc. The system is also suitable for cell harvesting and clarification processes. The family of Sartorius Crossflow holders feature the latest advances in crossflow design:

- vertical orientation of cassettes
- self draining systems
- autoclavable and inline steamable
- no welds
- minimized hold up volume

The Sartocon 2Plus holding device is part of a modular micro- and ultrafiltration system and fits up to ten Sartocon filter cassettes. It is designed for process development and pilot scale production in pharmaceutical and biotechnology applications. Easy handling design and high quality materials make this holder the perfect tool.

The Sartocon cassettes are placed between filter and clamping plate without a need for additional gaskets. It's not even necessary to remove the clamping plate for installation of the cassettes. Just place the cassettes on the guide rods and close the holder with a torque wrench.

The vertical positioning of the cassettes allows complete draining of retentate and permeate channels by gravity during harvesting and steaming procedures.

Thermal sterilisation in an autoclave or steaming in place even with cassettes installed is possible. A special pressure compensation tool was designed to allow thermal sterilisation of Sartocon filter cassettes in the Sartocon 2Plus device.

The Sartocon 2Plus's flow distribution plate is machined from a single piece of stainless steel. It's sanitary 1 1/2" tri-clamp connections are not welded but machined from the same plate. This eliminates potentially problems associated with welds and ensures long service life and safe and reliable connection to other equipment.

The feed and retentate connectors are located on one side of the plate. This allows easy integration into any skid design and assures a compact system with low minimum working volume.

Port locations on the distribution plate are situated to eliminate potential air locks and to assure thorough cleaning and total product recovery.

The Sartocon 2Plus device is available in a grinded and an electro polished surface version.

Feature	Benefits
Cassettes in vertical position	Self draining
Tri-clamp connectors	Safe fit of accessories
No welds	No corrosion
Steamable	No cross contamination
Fits up to ten Sartocon cassettes	High flexibility for up to 1000 l working volume

Specifications

Materials of construction

Filter and Clamping plate	316L (1.4404) Stainless steel
Connectors	1"–1 ½" sanitary Tri Clamp flange (DN25)
Nuts for tie rods	Nickel coated bronze
Other components	316L Stainless steel

Technical data

Surface finish	Ra ≤ 0.6 µm
Maximum number of cassettes	10 Sartocan cassettes
Dimensions (L×W×H)	371×270×348 mm
Weight	approx. 50 kg

Ordering informations and accessories

Sartocan 2Plus stainless steel holder, grinded	17546---002
Sartocan 2Plus microfiltration set	17546---201
Sartocan 2Plus ultrafiltration set	17546---202
Sartocan 2Plus stainless steel holder, electro polished	17546E--002
Torque wrench for Sartocan 2Plus holder	17128
Socket, 27 mm	6986135
Pressure gauge, 0–6 bar, 1–1 ½" autoclavable	17546---003
Diaphragm valve, 1–1 ½"	17546---005
Silicone gasket (FDA), 1–1 ½"	17546---012
Clamp for 1–1 ½" Tri Clamp	17033
Sartocan 2Plus manifold for permeate outlet	17546---016
Hose connector to 1–1 ½" Tri Clamp flange	17546---018
Pressure compensation tool for steaming and autoclaving	17625

Available Sartocan® cassettes are described in Chapter "Crossflow Consumables" on page 127.

Sartoflow® 10 Stainless Steel Holder Hydraulic Crossflow Holder for Sartocan® Cassettes



Description

Sartoflow10 holder

The Sartoflow10 stainless steel holder is optimized for the use with up to ten Sartocan production scale Crossflow cassettes (max. 7 m²). It is designed for applications from 30 l to 1000 l volume.

Target use:

- process development
- preclinical trials
- clinical trials
- pilot lots

Sartocan cassettes with a filter area of up to 0.7 m² each, are available with Polyethersulfone, Hydrosart, Polypropylene and Cellulose Triacetate membrane types.

The Sartoflow10 system covers the whole range of pharmaceutical and biotechnological crossflow applications like concentration and diafiltration of proteins, vaccines, viruses, antibodies, oligo nucleotides, endotoxin removal etc. The system is also suitable for cell harvesting and clarification processes. The family of Sartorius Crossflow holders feature the latest advances in crossflow design:

- vertical orientation of cassettes
- self draining systems
- autoclavable and inline steamable
- no welds
- minimized hold up volume

The Sartoflow10 holding device is part of a modular micro- and ultrafiltration system and fits up to ten Sartocan filter cassettes. It is designed for process development and pilot scale production in pharmaceutical and biotechnology applications.

The Sartocan cassettes are placed between filter and clamping plate without a need for additional gaskets. It's not even necessary to remove the clamping plate for installation of the cassettes. Just place the cassettes on the guide rods and close the holder with the manual driven oil hydraulic pump. The crossflow holder and the hand oil hydraulic pump are mounted on a stainless steel skid for easy handling.

The clamping pressure can be controlled by an integrated oil pressure gauge. This allows very accurate and reproducible clamping conditions. Defined clamping conditions are essential, especially for steaming in place applications but it is also very valuable when cassettes have to be changed frequently. The Sartoflow10 holder offers high performance production scale technology for every process development and small scale production facility.

The vertical positioning of the cassettes allows complete draining of retentate and permeate channels by gravity during harvesting and steaming procedures.

The Sartoflow10 flow distribution plate is machined from a single piece of stainless steel. It's sanitary 1 1/2" tri-clamp connections are not welded but machined from the same plate. This eliminates potentially problems associated with welds and ensures long service life and safe and reliable connection to other equipment. The feed and retentate connectors are located on one side of the plate. This allows easy integration into any skid design and assures a compact system with low minimum working volume.

Port locations on the distribution plate are situated to eliminate potential air locks and to assure thorough cleaning and total product recovery.

Feature	Benefits
Cassettes in vertical position	Self draining
Tri-clamp connectors	Safe fit of accessories
No welds	No corrosion
Steamable	No cross contamination
Fits up to ten Sartocan cassettes	High flexibility for up to 1000 l working volume
Hydraulic closure	Precise and reproducible clamping conditions

Specifications

Materials of construction

Filter and Clamping plate	316L (1.4435) Stainless steel, grinded
Connectors	1"–1 ½" sanitary Tri Clamp flange (DN25)
Other components	316L Stainless steel
Skid	1.4301 stainless steel, grinded

Technical data

Surface finish, grinded	Ra ≤ 0.6 µm
Hydraulic hand pump	Enerpac P-392
Closure	Lukas Hydraulic ram ACM 10/150
Oil pressure gauge	0–400 bar 0–6000 psi
Pressure limit	430 bar
Maximum number of cassettes	10 Sartocan cassettes
Dimensions (L×W×H)	680×420×508 mm
Weight	approx. 70 kg

Ordering informations and accessories

Sartoflow10 stainless steel holder, grinded	17901-----5301
Pressure gauge, 0–6 bar, 1–1 ½"	17546---003
Diaphragm valve, 1–1 ½"	17546---005
Silicone gasket (FDA), 1–1 ½"	17546---012
Clamp for 1–1 ½" Tri-clamp	17033
Sartocan manifold for permeate outlet	17546---016
Hose connector to 1–1 ½" Tri-clamp flange	17546---018

Available Sartocan® cassettes are described in Chapter "Crossflow Consumables" on page 127.

Sartoflow® 20 Stainless Steel Holder Hydraulic Crossflow Holder for Sartocor® Cassettes



Description

Sartoflow20 holder

The Sartoflow20 stainless steel holder is optimized for the use with up to twenty Sartocor production scale Crossflow cassettes (max. 14 m²). It is designed for applications from 200 l to 2500 l volume.

Target use:

- process development
- preclinical trials
- clinical trials
- pilot lots

Sartocor cassettes with a filter area of up to 0.7 m² each, are available with Polyethersulfone, Hydrosart, Polypropylene and Cellulose Triacetate membrane types.

The Sartoflow20 system covers the whole range of pharmaceutical and biotechnological crossflow applications like concentration and diafiltration of proteins, vaccines, viruses, antibodies, oligo nucleotides, endotoxin removal etc. The system is also suitable for cell harvesting and clarification processes.

The family of Sartorius Crossflow holders feature the latest advances in crossflow design:

- vertical orientation of cassettes
- self draining systems
- autoclavable and inline steamable
- no welds
- minimized hold up volume

The Sartoflow20 holding device is part of a modular micro- and ultrafiltration system and fits up to twenty Sartocor filter cassettes. It is designed for process development and pilot scale production in pharmaceutical and biotechnology applications.

The Sartocor cassettes are placed between filter and clamping plate without a need for additional gaskets. It's not even necessary to remove the clamping plate for installation of the cassettes. Just place the cassettes on the guide rods and close the holder with the oil hydraulic system. Manual driven hydraulic pump and automatic hydraulic pumps are available.

The clamping pressure can be controlled by an oil pressure gauge of a manual or automatic hydraulic pump. This allows very accurate and reproducible clamping conditions. Defined clamping conditions are essential, especially for steaming in place applications but it is also very valuable when cassettes have to be changed frequently. The Sartoflow20 holder offers high performance production scale technology for every pilot and production scale facility.

The vertical positioning of the cassettes allows complete draining of retentate and permeate channels by gravity during harvesting and steaming procedures.

The Sartoflow20 flow distribution plate is machined from a single piece of stainless steel. It's sanitary 1 1/2" tri-clamp connections are not welded but machined from the same plate. This eliminates potentially problems associated with welds and ensures long service life and safe and reliable connection to other equipment. The feed and retentate connectors are located on one side of the plate. This allows easy integration into any skid design and assures a compact system with low minimum working volume.

Port locations on the distribution plate are situated to eliminate potential air locks and to assure thorough cleaning and total product recovery.

Feature	Benefits
Cassettes in vertical position	Self draining
Tri-clamp connectors	Safe fit of accessories
No welds	No corrosion
Steamable	No cross contamination
Fits up to twenty Sartocor cassettes	High flexibility for up to 2500 l working volume
Hydraulic closure	Precise and reproducible clamping conditions

Specifications

Materials of construction

Filter and Clamping plate	316L (1.4435) Stainless steel, electro polished
Connectors	1" – 1 1/2" sanitary Tri-clamp flange (DN35: feed, retetate, DN25: permeate)
Other components	316L Stainless steel

Technical data

Surface finish, grinded	Ra ≤ 0.6 µm
Closure	Lukas Hydraulic ram ACM 10/150
Maximum number of cassettes	20 Sartocan cassettes (max. 14 m ²)
Dimensions (L×W×H)	933×270×348 mm
Weight	approx. 80 kg

Ordering informations and accessories

Sartoflow20 stainless steel holder, electro polished, to be completed with hydraulic pump system	17922E--001
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Manual and automatic hydraulic pumps are available on request.

Available Sartocan® cassettes are described in Chapter
"Crossflow Consumables" on page 127.

Sartoflow® Alpha DL Crossflow System Crossflow System with Datalogger (DL) for Sartoco® Slice Cassettes



Description

The family of Sartoflow Alpha benchtop systems feature the latest advances in crossflow technology from Sartorius. It is designed to fulfill all requirements of small scale crossflow filtration systems for Micro- and Ultrafiltration in pharmaceutical and biotech applications. It is mainly used in cGMP facilities to run Scale-Up and Scale-Down trials as well as clinical trial and small scale production lots. The system is designed to accommodate up to 5 Sartorius Sartoco Slice Cassettes (max. 0.5 m² membrane area). The design and engineering of this modular system is equivalent to large scale production systems.

Sartoflow Alpha DL features digital display and 21CFR Part11 compliant acquisition of the process parameters via a digital data recorder. Log-In functions and password protection for user mapping are included. The audit trail and all process data are securely transferred to an external computer for read out and data storage. Data transfer via serial interface or PCMCIA data storage card is possible.

The modular Sartoflow Alpha DL system allows a large variety of options to fulfill all needs of cGMP production processes. Even automatic diafiltration with an external peristaltic pump controlled by a platform balance is possible.

All Sartoflow Alpha DL systems can use Sartorius recirculation bags instead of stainless steel tanks.

The basic features of all Sartoflow Alpha DL systems are:

- 21CFR Part11 compliant data recorder
- Rotary lobe pump for shear sensitive and reliable operation (500 l/h at 4 bar, 1 cP, 20°C)
- Sartoco Slice filter holder for up to 5 Sartoco Slice Cassettes (0.5 m² membrane area)
- Min. working volume < 400 ml (depending on filter area and accessories)
- Tubular, zero dead leg, pressure gauges
- Magnetic flow meter
- Sanitary membrane valves and Tri-clamp connectors
- Overpressure protection
- Self draining, zero dead leg piping
- Qualified material in contact with product: 316L (1.4404/1.4435) stainless-steel, Surface finish Ra: < 0.8 µm
- Gaskets: EPDM (FDA)
- Small footprint benchtop system
- Documentation package for easy start-up

Sartoco Slice cassettes (0.1 m² each) utilize the same parallel leaf design and materials like the Sartoco production scale cassettes (up to 0.7 m² each). This provides the user with predictable performance for large scale processes.

Specifications

Materials of construction

Product wetted components	316L (1.4404/1.4435) Stainless steel
Surface finish	Ra < 0.8 µm
Connectors	¾" sanitary Tri-clamp flange

Specifications

Pump output	500 l/h @ 4 bar 60 psi
Filter area	0.5 m ²
Max. Inlet pressure	4 bar 60 psi
Min. working volume	< 400 ml (depending on the accessories)
Weight	60 kg (depending on the accessories)
Dimensions (L×W×H)	600×480×580 mm (depending on the accessories)

Ordering informations and accessories

Sartoflow Alpha DL System Sartocon Slice holding device, three pressure indicators magnetic flow meter (permeate) over pressure protection 21CFR Part11 compliant digital data recorder	220 V 50 Hz: 179SFG-02-00-22 110 V 60 Hz: 179SFG-02-00-11
Sartoflow Alpha DL-Retentate Flow meter Sartocon Slice holding device Three pressure transducers two magnetic flow meters (permeate and retentate) 21CFR Part 11 compliant digital data recorder	220 V 50 Hz: 179SFG-02-02-22 110 V 60 Hz: 179SFG-02-02-11
Sartoflow Alpha DL-Conductivity Sartoflow Slice holding device Three pressure transducers magnetic flow meter (permeate) Conductivity probe (permeate) Temperature probe 21CFR Part11 compliant digital data recorder	220 V 50 Hz: 179SFG-02-06-22 110 V 60 Hz: 179SFG-02-06-11
Sartoflow Alpha DL-Diafiltration Sartoflow Slice holding device Three pressure transducers Magnetic flow meter (permeate) Conductivity probe (permeate) Temperature probe Platform balance for recirculation vessel or bag External diafiltration peristaltic pump 21CFR Part11 compliant digital data recorder	179sfg-02-07 220 V 50 Hz: 179SFG-02-07-22 110 V 60 Hz: 179SFG-02-07-11
2 l jacketed tank with interconnection piping and zero dead leg harvest valve	179sfzt01
10 l jacketed tank with interconnection piping and zero dead leg harvest valve	179sfzt02

Complete IQ | OQ package and additional options on request

Available Sartocon® cassettes are described in Chapter
"Crossflow Consumables" on page 127.

Sartoflow® Beta Crossflow System Crossflow System for Sartococon® Cassettes



Description

The Family of manual and semi automatic Sartoflow Beta Crossflow Systems feature the latest advances in crossflow technology from Sartorius. The Sartoflow Beta is a compact and movable Crossflow filtration system for Micro- and Ultrafiltration in pharmaceutical and biotech applications. It is mainly used in cGMP facilities to run development, clinical trial and production lots. The system is designed to accommodate up to 10 Sartorius Sartococon Cassettes (7 m² membrane area). The Sartoflow Beta system covers the whole range of pharmaceutical and biotechnological crossflow applications like concentration and diafiltration of proteins, vaccines, viruses, antibodies, oligo nucleotides, endotoxin removal etc. The system is also suitable for cell harvesting and clarification processes.

The modular design allows a large variety of options to fulfill all needs of cGMP production processes. The basic features of all Sartoflow Beta systems are:

- Rotary lobe pump for shear sensitive and reliable operation (7.000 l/h at 4 bar, 1 cP, 20°C)
- Crossflow filter holder for up to 10 Sartococon Cassettes (7 m² membrane area)
- Min. working volume < 5.000 ml (depending on filter area and accessories)
- Tubular, zero dead leg, pressure gauges
- Sanitary membrane valves and Tri-clamp connectors
- Overpressure and dry run protection
- Self draining, zero dead leg piping
- Qualified material in contact with product: 316L (1.4404/1.4435) stainless steel, Surface finish Ra: < 0.8 µm
- Gaskets: EPDM (FDA)
- Movable system on casters
- Documentation package for easy start-up

Sartoflow Beta systems with digital 21CFR Part 11 compliant data recorder feature digital display and acquisition of the process pressures and flow rates. The audit trail and all process data are securely transferred to an external computer for read out and data storage. Data transfer via serial interface or PCMCIA data storage card is possible.

Log-In functions and password protection for user mapping are included.

The Sartoflow10 crossflow filter holder gives an additional security feature: A safety pressure switch controls the pressure of the hydraulic closure system and shuts down the system if the holder is not closed tightly. The clamping pressure can be controlled by an integrated oil pressure gauge. This allows very accurate and reproducible clamping conditions. Defined clamping conditions are essential, especially for steaming in place applications but it is also very valuable when cassettes have to be changed frequently.

The semi automatic Sartoflow Beta sps system is designed to run predefined process steps automatically. A set of parameters can be defined and controlled for each step. A process step once activated from the operator will run with the predefined feed and retentate pressure and stop automatically when the end of the process step is indicated. The feed pressure is controlled by the pump speed, the retentate pressure is controlled by a motor driven membrane valve.

Process steps will end automatically after a predefined time, a predefined permeate volume or when a predefined conductivity is triggered in the permeate.

Automatic diafiltration is possible with the optional 40 l vessel with integrated level probe and additional peristaltic diafiltration pump. Activation and end of each process step is indicated in the audit trail of the digital data recorder.

Steaming options for aseptic operations are available on request.

Specifications

Materials of construction

Product wetted components	316L (1.4404/1.4435) Stainless steel
Surface finish	Ra < 0.8 µm
Connectors	1"–1 ½" sanitary Tri-clamp flange

Specifications

Pump output	7.000 l/h @ 4 bar 60 psi
Filter area	0.4 to 7 m ²
Max. Inlet pressure	4 bar 60 psi
Min. working volume	< 5.000 ml (depending on the accessories)
Weight	300 kg
Dimensions (L×W×H)	1.500×800×1.500 mm (depending on the accessories)

Ordering informations and accessories

Sartoflow Beta Basic System With Sartocon 2Plus holding device, three pressure indicators over pressure and dry running protection	400 V 50 Hz: 179SFG-03----40 110 V 60 Hz: 179SFG-03----11
Sartoflow Beta DL, Sartocon 2Plus holding device Three pressure transducers, two magnetic flow meters 21CFR Part 11 compliant digital data recorder	400 V 50 Hz: 179SFG-04-00-40 110 V 60 Hz: 179SFG-04-00-11
Sartoflow Beta sps, Sartoflow10 holding device Three pressure transducers, two magnetic flow meters Conductivity probe 21CFR Part11 compliant digital data recorder Feed and Retentate pressure control, predefined process steps	179sfg-08-02 400 V 50 Hz: 179SFG-08-02-40 110 V 60 Hz: 179SFG-08-02-11
Sartoflow Beta sps tank skid for automatic diafiltration with Sartoflow Beta sps Jacketed 40 l tank on movable skid, Level probe, Spray ball, Peristaltic pump	179SFZT-05

Complete IQ/OQ package and additional options on request

Available Sartocon® cassettes are described in Chapter "Crossflow Consumables" on page 127.



Membrane
Chromatography



Membrane Chromatography

Sartobind® re-usable	160
Sartobind® SingleSep	162

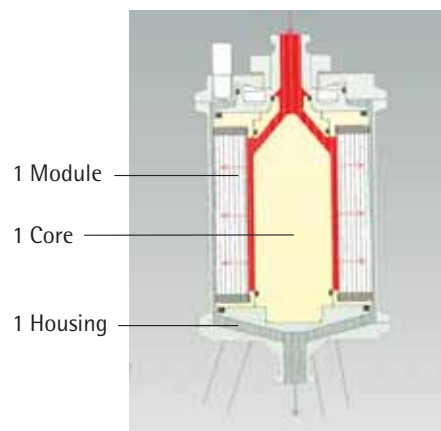
Sartobind® re-usable Process Scale Membrane Adsorbers Ion Exchange



Sartobind re-usable is a membrane chromatography system for the purification of biomolecules in the pharmaceutical and biotech industry. The technology combines the advantages of conventional chromatography columns in terms of separation power and capacity with membrane technology regarding mass transfer, high throughput and robustness. Sartorius Membrane Adsorbers are used e.g. for the purification of therapeutic proteins, antibodies and viruses and for the removal of contaminants such as DNA, endotoxins, host cell proteins and viruses.

- Simple set up
- High chemical stability (regeneration in 1 N NaOH, storage 0.1 N NaOH)
- Robust: no trouble with air entrapment, channeling or bed cracking
- Membrane pore size of $>3 \mu\text{m}$ allows separation of large biomolecules and even viruses
- Low set up and down times
- 20-100 times faster than conventional columns without sacrificing capacity
- Low cycle times = less product loss
- Reusable
- Validation and Extractables Guides available
- Scalable

For a complete re-usable system you need:



Related products for production

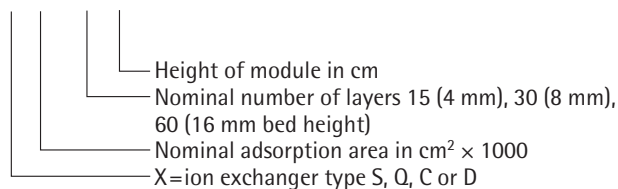
Sartobind SingleSep capsules
Sartobind Epoxy re-usable
Sartobind IDA re-usable
Sartobind rProtein A re-usable
Sartobind Aldehyde re-usable
Sartobind re-usable plastic containers
Sartobind MA units laboratory scale

Special catalogue for laboratory products available on request:
Publication number: S--0300-e

Specifications

Technical data

Order No. modules	Order No. cores	Order No. housings*	Flow rate [l/min × 100 kPa]	Nominal protein binding capacity [g]	Bed volume capacity [ml]
91-X-01K-15-03	90-CR-PO15-03	90-HS-PO---03	0.4–0.6	0.7–1	35
91-X-02K-15-06	90-CR-PO15-06	90-HS-PO---06	0.8–1.3	1.5–2	70
91-X-05K-15-12	90-CR-PO15-12	90-HS-PO---12	1.7–2.6	3–4	140
91-X-10K-15-25	90-CR-PO15-25	90-HS-PO---25	3.4–5.1	6–8	280
91-X-20K-15-50	90-CR-PO15-50	90-HS-PO---50	6.8–10	12–16	560
91-X-02K-30-03	90-CR-PO30-03	90-HS-PO---03	0.2–0.3	1.5–2	72
91-X-05K-30-06	90-CR-PO30-06	90-HS-PO---06	0.4–0.6	3–4	144
91-X-10K-30-12	90-CR-PO30-12	90-HS-PO---12	0.8–1.1	6–8	288
91-X-20K-30-25	90-CR-PO30-25	90-HS-PO---25	1.5–2.2	12–16	575
91-X-40K-30-50	90-CR-PO30-50	90-HS-PO---50	3.0–4.5	24–32	1150
91-X-05K-60-03	90-CR-PO60-03	90-HS-PO---03	0.08–0.12	3–4	133
91-X-10K-60-06	90-CR-PO60-06	90-HS-PO---06	0.16–0.24	6–8	266
91-X-20K-60-12	90-CR-PO60-12	90-HS-PO---12	0.3–0.5	12–16	533
91-X-40K-60-25	90-CR-PO60-25	90-HS-PO---25	0.6–0.9	24–32	1065
91-X-80K-60-50	90-CR-PO60-50	90-HS-PO---50	1.3–1.9	48–64	2130



Minimum static binding capacity was measured with bovine serum albumin and lysozyme: 0.6 mg/cm² for D = Diethylamine, C = Carboxylic acid, and 0.8 mg/cm² for Q = Quaternary ammonium, S = Sulfonic acid and hen egg. For downscale trials use Sartobind MA 75.

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

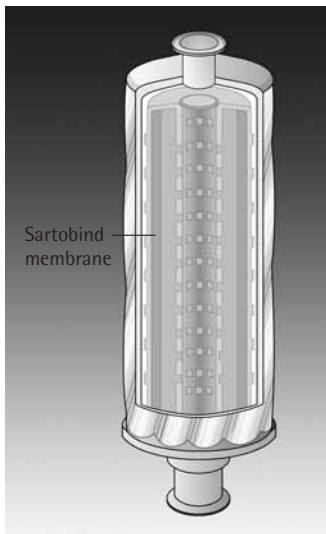
Sartobind® SingleSep



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



- Ready-to-use format
- Simple and fast set up
- No trouble with air entrapment, channeling or bed cracking
- Membrane pore size of $>3\ \mu\text{m}$ 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



Quality control

Sartobind SingleSep capsules are designed, developed and manufactured in accordance with an ISO 9001 certified Quality Management System. They have passed Plastic Class VI, particles and extractables test according to current United States Pharmacopoeia (USP) and are tested for protein binding capacity prior to release. Each package contains a certificate of quality.

Related products

Sartobind re-usable
Sartobind MA units laboratory scale

Special catalogue for laboratory products available on request:
Publication number S--0300-e

Specifications

Membrane

Base material	Stabilized reinforced cellulose
Membrane thickness	275 µm
Membranes	<ul style="list-style-type: none"> – strong cation exchanger S (sulfonic acid) – strong anion exchanger Q (quaternary ammonium)

Capsule

Design	cylindric, nominal number of layer: 15
Bed height	4 mm
Material Capsule	Polypropylene

Operation

Depyrogenation	1 N NaOH
Max. pressure	0.4 MPa (4 bar 58 psi)

Technical data

Order No. capsules	Description	Connector	Nominal protein binding capacity [g]	Bed volume [ml]	Quantity
92IEXQ42D4-00--A	Sartobind Q SingleSep mini capsule	hose barb	0.2	7	4
92IEXS42D4-00--A	Sartobind S SingleSep mini capsule	hose barb	0.2	7	4
92IEXQ42D4-SS--A	Sartobind Q SingleSep mini capsule	sanitary	0.2	7	4
92IEXS42D4-SS--A	Sartobind S SingleSep mini capsules	sanitary	0.2	7	4
92IEXQ42D9-00--A	Sartobind Q SingleSep 5" capsules	hose barb	2	70	4
92IEXS42D9-00--A	Sartobind S SingleSep 5" capsules	hose barb	2	70	4
92IEXQ42D9-SS--A	Sartobind Q SingleSep 5" capsule	sanitary	2	70	4
92IEXS42D9-SS--A	Sartobind S SingleSep 5" capsules	sanitary	2	70	4
92IEXQ42D1-SS	Sartobind Q SingleSep 10" capsule	sanitary	5.28	180	1
92IEXS42D1-SS	Sartobind S SingleSep 10" capsule	sanitary	5.28	180	1

Minimum static binding capacity was measured with bovine serum albumin and hen egg lysozyme: 0.8 mg/cm² for Q and S membranes.



Virus Filter

Virosart® CPV Capsules

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Virosart® CPV Capsules

The Parvo Virus Retentive PESU Filter Capsule for Biopharmaceutical Applications



Introduction

Virus filtration with Virosart® CPV is an integral part of the 3 step viral clearance technology platform of Sartorius featuring virus filtration, virus inactivation and virus adsorption. Virosart® CPV has been especially developed for the removal of relevant, as well as adventitious viruses from the biopharmaceutical feed stream.

Applications

Virosart® CPV is being used for effective virus retention in biopharmaceutical processes as follows:

- Upstream- & downstream processing of biotechnological feed streams
- Downstream processing of human and animal plasma derived feed streams

Product benefits

Virosart® CPV provides highest viral safety to your manufacturing process. Virosart® CPV retains more than 4 log of Parvoviruses and 6 log of Retroviruses. The PESU membrane of Virosart® CPV offers exceptional high flow rates and a maximum in capacity to speed up your virus filtration process and meet your economical expectations.

Filter area | Batch filtration

Virosart® CPV capsules height 9 feature 2.000 cm² effective filter area and thus offer massive flow rates to filter small batches from 10 liter to 100 liter in the shortest time possible. Smaller batch volumes from 1 liter to 10 liter are being filtered using Virosart CPV 180 cm² capsules.

Scalability

Consistent and predictable bench scale studies and spiking studies can reliably be performed using Virosart® CPV Minisart capsules (5 cm² filter area). Virosart® CPV 180 cm² capsules are being used for upscaling trial work and small scale manufacturing.

Integrity testing & Bacteriophage retention

Virosart® CPV filters have been validated for 4 log removal of bacteriophage PP7. Correlation of IT test data & bacteriophage retention is demonstrated in the validation guide.

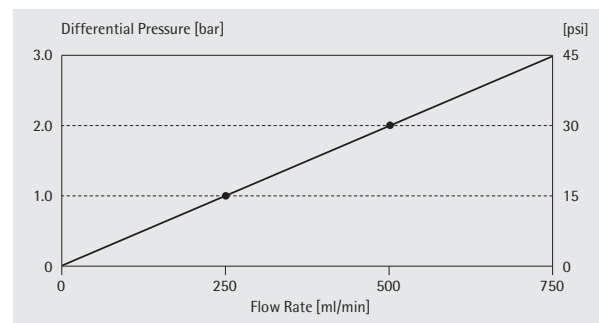
Quality control

Each individual element is tested for integrity by diffusion test prior to release assuring absolute reliability.

Documentation

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

Water Flow Rates for Virosart® CPV Standard Filter Cartridges & MaxiCaps®



Specifications

Pore size

CPV (20 nm nominal)

Available sizes | Filtration area

Capsules

Size 9 0.2 m² | 2 ft²

Available connectors for

Virosart® CPV capsule height 9

OO single stepped hose barb
inlet & outlet

FF ¾" Tri-Clamp (Sanitary)
inlet & outlet

Extractables

Virosart® CPV filters meet or exceed the requirements for WFI quality standards set by the USP 26

Non-pyrogenic according to USP Bacterial Endotoxins

Passes USP Plastics Class VI Test

Non-fiber releasing according to 21 CFR

Sterilization

Autoclaving

121°C @ 1 bar | 14.5 psi for 30 min

No in-line steam sterilization of capsules!

Technical references

Validation Guide

– SPK5754-e05021 | 85030-522-02

Brochure

– SPK1509-e05021 | 85030-521-89

Virus Information Guide

– SPK5752-e05021 | 85030-521-91

Materials

Membrane	Double layer Polyethersulfone, symmetric
Support fleece	Polypropylene
Core	Polypropylene
End caps	Polypropylene
Capsule housing	Polypropylene

Operating parameters

Max. allowable differential pressure	5 bar 58 psi at 20°C 2 bar 29 psi at 80°C
Max. allowable back pressure	2 bar 29 psi at 20°C

Order information

	Pore size	Pack size	Test pressure	Max. diffusion
5455328V9--FF--V	CPV (20 nm nom.)	2 capsules/ box	4.5 bar 65.2psi	10 ml/min/ capsule
5455328V9--OO--V	CPV (20 nm nom.)	2 capsules/ box	4.5 bar 65.2psi	10 ml/min/ capsule

Virosart® CPV The Parvo Virus Retentive PESU Filter for Biopharmaceutical Applications



Virus filtration with Virosart® CPV is an integral part of the 3 step viral clearance technology platform of Sartorius featuring virus filtration, virus inactivation and virus adsorption. Virosart® CPV has been especially developed for the removal of relevant, as well as adventitious viruses from the biopharmaceutical feed stream.

Applications

Virosart® CPV is being used for virus retention in biopharmaceutical processes as follows:

- Upstream- & downstream processing of biotechnological feed streams
- Downstream processing of human and animal plasma derived products

Product benefits

Virosart® CPV provides highest viral safety to your manufacturing process. Virosart® CPV retains more than 4 log of Parvo Viruses and 6 log of Retroviruses. The PESU membrane of Virosart® CPV features highest flow rates and maximum capacity to speed up your virus filtration process.

Scalability

Consistent and predictable bench scale- & spiking studies can reliably be performed with Virosart® CPV Minisart (5 cm²) capsules. They feature the identical type of membrane as the process elements.

Integrity testing & Bacteriophage retention

Virosart® CPV filters have been validated for 4 log removal of bacteriophage PP7. Correlation of IT test data & bacteriophage retention is demonstrated in the validation guide.

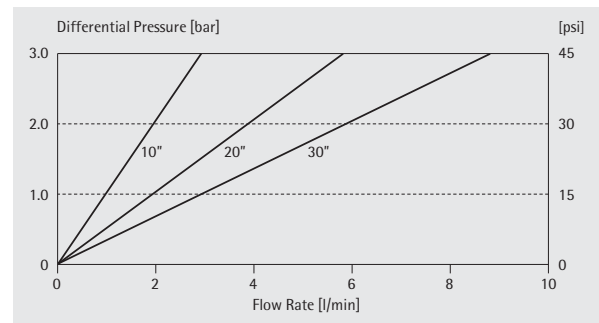
Quality control

Each individual element is tested for integrity by diffusion test prior to release assuring absolute reliability.

Documentation

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

Water Flow Rates for Virosart® CPV
Standard Filter Cartridges & MaxiCaps®



Specifications

Pore size

CPV (20 nm nominal)

Available sizes | Filtration area

Standard filter cartridges

Size 1	0.7 m ² 7 ft ²
Size 2	1.4 m ² 14 ft ²
Size 3	2.1 m ² 21 ft ²

MaxiCaps

Size 1	0.7 m ² 7 ft ²
Size 2	1.4 m ² 14 ft ²
Size 3	2.1 m ² 21 ft ²

Available connectors

Sanitary for MaxiCaps® & code 7 for cartridges

Extractables

Virosart® CPV filters meet, or exceed the requirements for WFI quality standards set by the USP 26

Non-pyrogenic according to USP Bacterial Endotoxins

Passes USP Plastics Class VI Test

Non-fiber releasing according to 21 CFR

Sterilization

Steaming | Autoclaving

121°C @ 1 bar | 14.5 psi for 30 min

No in-line steam sterilization of MaxiCaps®

Technical references

Validation Guide

– SPK5754-e05021 | 85030-522-02

Brochure

– SPK1509-e05021 | 85030-521-89

Virus Information Guide

– SPK5752-e05021 | 85030-521-91

Materials

Membrane	Double layer Polyethersulfone, symmetric
Support fleece	Polypropylene
Core	Polypropylene
End caps	Polypropylene
Capsule housing	Polypropylene

Operating parameters

Max. allowable differential pressure	5 bar 58 psi at 20°C
	2 bar 29 psi at 80°C
	1 bar 14.5 psi at 121°C
Max. allowable back pressure	2 bar 29 psi at 20°C
	1 bar 14.5 psi at 100°C
	0.5 bar 7 psi at 121°C

Ordering information Virosart® CPV standard filter cartridges

545	25	28	V1	Explanation
└──┘	└──┘	└──┘	└──┘	Virosart® CPV, double layer
└──┘	└──┘	└──┘	└──┘	Adapter 25 S-adapter top, locking bayonet adapter with 226 double O-ring bottom
└──┘	└──┘	└──┘	└──┘	Pore size 28 PPV retentive, 20 nm filter membrane
└──┘	└──┘	└──┘	└──┘	Height filtration area V1: 10" 0.7 m ² 7 ft ² V2: 20" 1.4 m ² 14 ft ² V3: 30" 2.1 m ² 21 ft ²

Ordering information Virosart® CPV MaxiCaps®

545	13	28	V1	--	SS	Explanation
└──┘	└──┘	└──┘	└──┘	└──┘	└──┘	Virosart® CPV, double layer
└──┘	└──┘	└──┘	└──┘	└──┘	└──┘	Capsule design
└──┘	└──┘	└──┘	└──┘	└──┘	└──┘	Pore size 28 PPV retentive, 20 nm filter membrane
└──┘	└──┘	└──┘	└──┘	└──┘	└──┘	Height filtration area V1: 10" 0.7 m ² 7 ft ² V2: 20" 1.4 m ² 14 ft ² V3: 30" 2.1 m ² 21 ft ²
└──┘	└──┘	└──┘	└──┘	└──┘	└──┘	Adapter SS Sanitary inlet – and outlet adapter

Disposable
Liquid Hand-
ling Systems





Disposable Liquid Handling Systems

Biopharmaceutical Fluid Handling	172
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Gammasart BioSystem™ DF	176
Sterile Fluid Handling Bags	178
Tank Liners & Cylindrical Tanks	182
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LevTech – Disposable Mixing System	184
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Integrated Solutions for Biopharmaceutical Fluid Handlingsm



Biopharmaceutical companies are confronted with ever changing and ever more complex challenges in the manufacturing of new drug products. Faced with growing demands on time to market, validation, security, capacity and under pressure to reduce capital spending, biopharmaceutical manufacturers can benefit greatly by using disposable manufacturing systems in many areas of the manufacturing process.

The integrated, fully scalable process solutions provided by Sartorius & TC Tech are designed for processing of a broad range of biopharmaceutical process fluids such as cell culture media (serum and non serum containing), buffers, intermediate and final products, cell harvest fluids, reagents and sanitizing agents. Biopharmaceutical companies will experience significant improvements in manufacturing performance by integration of single-use, disposable bag-container/filter assemblies.



Disposable manufacturing in the biopharmaceutical industry requires innovative, integrated solutions for fluid handling and it is for this reason that Sartorius and TC-Tech have formalized a cooperation to create solutions based on these requirements and operating environments.

Discover our value adding fluid processing solutions!



The combination of TC-Techs flexible biopharmaceutical bag container systems and the filtration expertise and validation services of Sartorius will help biopharmaceutical companies to address the key challenges in biopharmaceutical manufacturing: Time to Market, Production Efficiency, Cost of Goods, Process Security, Validation Complexity.



Feature

Benefits

Available from stock

Rapid delivery

Standard products

No lead time for custom design

Pre-assembled and pre-sterilized

Ready to use; eliminates risk of on-site connections

Wide variety of filter and bag sizes

Easy adaption to your process

Available from a single source

Reduction of lead times and procurement activities

Standard Disposable Systems for Biopharmaceutical Fluid Handling

The Sartorius | TC Tech alliance now enhances these benefits of the disposable Technology providing standard, pre-sterilized disposable systems to the biopharmaceutical industry. Standard filter and bag assemblies have been developed to help customers implement disposable technology faster and more economically.

Sartorius | TC Tech has developed two product lines of standard disposable filter and bag systems:
Gammasart BioSystem™ SA and
Gammasart BioSystem™ DF

Gammasart BioSystem™ SA and DF are standard items available from stock, eliminating lead times associated with the design and fabrication of custom designs. Furthermore, Gammasart BioSystem™ SA and DF are integrated systems that minimize installation time and operator errors. The wide variety of filter and bag sizes allows easy adaption to your process.

Gammasart BioSystem™ offers another important advantage for your entire process development: TC Tech Sterile Fluid Handling Bags and Sartorius Sartopore® 2 Gamma capsules ensure easy scale-up of your process from lab scale to production scale.

- TC Tech Sterile Fluid Handling Bags are characterized by a consistent LDPE fluid contact layer throughout the entire product range
- Sartopore® 2 Gamma capsules feature the same materials and type of construction from the smallest up to the largest filter element

Gammasart BioSystem SA™ Preassembled, Sterile Filter and Bag Assemblies



Description

The Gammasart BioSystem SA line of ready to use, preassembled sterile filter and bag assemblies is designed for sterilizing grade filtration, storage and transport of biopharmaceutical solutions. Each assembly incorporates a Sartopore 2 sterilizing grade filter capsule with broad chemical and pH compatibility, scaled to handle a wide range of biopharmaceutical products.

Applications

Typical applications include sterile filtration, storage and transport of:

- Cell Culture Media
- Buffers
- Bulk Harvest
- Intermediates
- WFI

Easy to use

Gammasart BioSystem SA's are delivered preassembled and sterile, ready for immediate use. There is no need for assembling individual components on site. Gammasart BioSystem SA's are integrated systems that minimize installation time and operator errors.

Flexibility

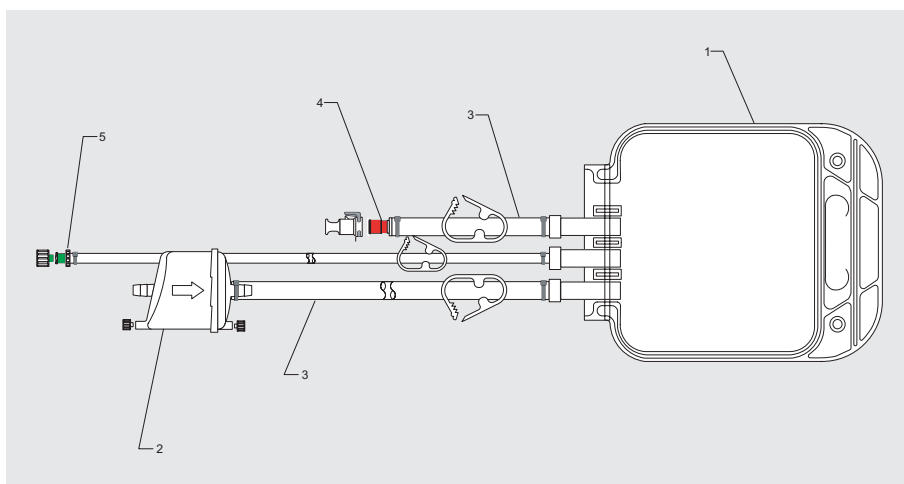
Gammasart BioSystem SA's are available in a variety of filter and bag sizes allowing easy adaption to process volume and media. Two different outlet connections are provided for flexible incorporation into your process. The quick disconnect can be attached directly or adapted to a variety of connections. The female luer fitting may be used for direct connection or sampling. A 36" length of heat weldable tubing is provided for use with a Sterile Connection Device (SCD).

Cost and risk reduction

Disposable bag assemblies incorporating filter capsules reduce the risk of cross contamination from batch-to-batch and product-to-product dramatically. Cost and time consuming CIP&SIP operations are eliminated. This results in significant cost savings throughout the entire manufacturing process. Additionally, Gammasart BioSystem SA presterilized, preassembled single use Filter and Bag Assemblies eliminate the risk of on site aseptic connections.

Available from stock

Gammasart BioSystem SA's are standard products available from stock, avoiding lead times associated with the design and fabrication of custom designs.



Specifications

Components

Filter Capsule	Sartopore 2, 0.2 µm Sterilizing Grade Gamma Capsule
Bag Chamber	LDPE Fluid Contact Surface EVOH Gas Barrier Layer Nylon strength Layer
Tubing	C-Flex 082 Heat Sealable Weldable
Outlet Fittings	Quick Disconnect Female Luer

Available sizes | Filter size

1 Liter	Size 4, 150 cm ² .15 ft ²
2 Liter	Size 4, 150 cm ² .15 ft ²
5 Liter	Size 5, 300 cm ² .3 ft ²
10 Liter	Size 5, 300 cm ² .3 ft ²
20 Liter	Size 5, 300 cm ² .3 ft ²
50 Liter	Size 7, 500 cm ² 1/2 ft ²
100 Liter	Size 8, 1000 cm ² 1 ft ²
200 Liter	Size 8, 1000 cm ² 1 ft ²

Sterilization

Presterilized by Gamma Irradiation

Regulatory compliance

Filters Capsules: 100% Integrity Tested

Filter integrity test correlated to HIMA/ASTM F838-83 bacterial Challenge Test.

All materials Non-Pyrogenic according to USP Bacterial Endotoxins

All materials pass USP Class VI Test

Filter is non-fiber releasing according to 21 CFR

Extractables

Sartopore 2 γ Capsules meet or exceed the requirements for WFI quality standards set by the current USP.

Assembly P/N	Description	Item 1 Bag chamber	Item 2 Bag port – Filter (Tubing length)	Item 3 Tubing	Item 4 Bag port 2 (Tubing length)	Item 5 Bag port 3	Case Qty
TC-145001	Gammasart BioSystem SA1	1 liter	5441307H4G-00, Sartopore 2 0.2 µm, 150 cm ² , Gamma Capsule (18")	C-Flex® Clear 082 1/4" x 7/16"	QDC Insert with Cap (6")	36" SCD® Tubing w/ Female Luer & Plug	5
TC-145002	Gammasart BioSystem SA2	2 liter with Handle	5441307H4G-00, Sartopore 2 0.2 µm, 150 cm ² , Gamma Capsule (18")	C-Flex® Clear 082 3/8" x 5/8"	QDC Insert with Cap (6")	36" SCD® Tubing w/ Female Luer & Plug	5
TC-145005	Gammasart BioSystem SA5	5 liter with Handle	5441307H5G-00, Sartopore 2 0.2 µm, 300 cm ² , Gamma Capsule (18")	C-Flex® Clear 082 3/8" x 5/8"	QDC Insert with Cap (6")	36" SCD® Tubing w/ Female Luer & Plug	5
TC-145010	Gammasart BioSystem SA10	10 liter with Handle	5441307H5G-00, Sartopore 2 0.2 µm, 300 cm ² , Gamma Capsule (18")	C-Flex® Clear 082 3/8" x 5/8"	QDC Insert with Cap (6")	36" SCD® Tubing w/ Female Luer & Plug	5
TC-145020	Gammasart BioSystem SA20	20 liter with Handle	5441307H5G-00, Sartopore 2 0.2 µm, 300 cm ² , Gamma Capsule (18")	C-Flex® Clear 082 3/8" x 5/8"	QDC Insert with Cap (6")	36" SCD® Tubing w/ Female Luer & Plug	5
TC-145050	Gammasart BioSystem SA50	50 liter	5441307H7G-S0, Sartopore 2 0.2 µm, 1/2 ft ² Gamma Capsule (36")	C-Flex® Clear 082 1/2" x 3/4"	QDC Insert with Cap (6")	36" SCD® Tubing w/ Female Luer & Plug	3
TC-145100	Gammasart BioSystem SA100	100 liter	5441307H8G-S0, Sartopore 2 0.2 µm, 1 ft ² Gamma Capsule (36")	C-Flex® Clear 082 1/2" x 3/4"	QDC Insert with Cap (6")	36" SCD® Tubing w/ Female Luer & Plug	3
TC-145200	Gammasart BioSystem SA200	200 liter	5441307H8G-S0, Sartopore 2 0.2 µm, 1 ft ² Gamma Capsule (36")	C-Flex® Clear 082 1/2" x 3/4"	QDC Insert with Cap (6")	36" SCD® Tubing w/ Female Luer & Plug	2

Gammasart BioSystem™ DF – Preassembled Bag and Filter-Bag Systems for Concentration, Diafiltration and Aseptic Handling



Description

The Gammasart BioSystem™ DF line of ready-to-use, preassembled bag and filter-bag systems are designed for cycles in downstream processes. They are ideally suited to be connected to Sartorius Sartoflow Alpha and Sartoflow Beta crossflow systems. Two different sets have been developed to meet your needs:

1. Aseptic handling set

Incorporate sterile fluid handling bags equipped with Sartopore® 2 sterilizing-grade filter capsules and a steam-through connection. The medium can be sterile filtered into the pre-sterilized bag and can be connected to existing aseptic recirculation tanks via a steam-through connection.

2. Concentration and diafiltration set

Incorporate sterile fluid handling bags especially designed for Concentration and Diafiltration cycles in purification steps in biopharmaceutical processes. Also non-aseptic buffer preparation cycles can be ideally performed using Gammasart BioSystem™ DF. This provides the flexibility needed in advanced processes.

Applications

The broad chemical and pH compatibility of Gammasart BioSystem™ DFs assure the handling of a wide range of biopharmaceutical fluids such as:

- Buffers
- Bulk harvest
- Intermediates

Easy to use

Gammasart BioSystem™ DFs for aseptic handling are delivered pre-assembled and sterile, and are ready-to-use. No assembly of individual components is needed. Gammasart BioSystem™ DFs are integrated systems that minimize installation time and operator errors.

Flexibility

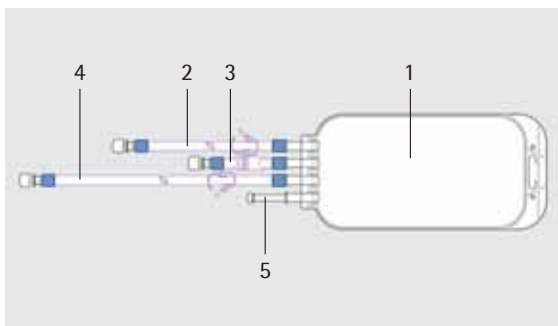
Gammasart BioSystem™ DFs incorporate a variety of bag and filter sizes. This allows easy adaptation to process volume and media. Tri-clamp connections (Concentration and Diafiltration set) and additionally a steam-through connection (Aseptic Handling Set) ensure convenient integration into existing processes.

Cost and risk reduction

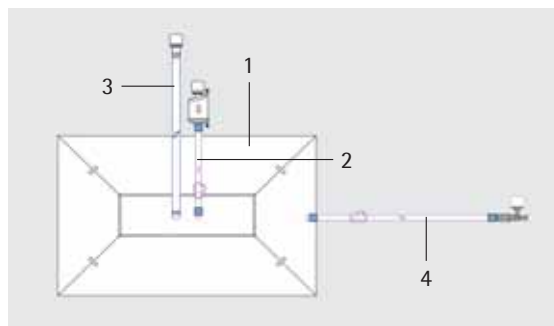
Disposable bag technology used in biopharmaceutical manufacturing, e.g. for recirculation and buffer preparation steps, reduces the risk of cross contamination from batch to batch and product to product dramatically. Cost- and time-consuming CIP & SIP operations are eliminated. This results in significant cost savings within the entire manufacturing process.

Validation

Sartorius|TC Tech has conducted extensive biological, chemical, and physical testing on its complete line of sterile fluid handling bags and filters. Sartorius|TC Tech makes this data available to customers in the form of Validation Guides. Availability of this data facilitates validation of filter and bag assemblies and reduces validation costs to pharmaceutical manufacturers.



Concentration and Diafiltration Set TC-143950



Aseptic Handling Set TC-143967

Specifications

Components

Bag Chamber	Multiple Film Construction, LDPE Fluid Contact Surface on All Bag Sizes
Filter Capsule (Aseptic Handling Set)	Sartopore® 2, 0.2 µm Sterilizing-Grade Gamma Capsule
Tubing	C-Flex® Clear 082
Outlet Fittings	¾" (1½") Sanitary Fitting Steam-through Connector (Aseptic Handling Set)
Aseptic Handling Set: Sterilization	Pre-sterilized by Gamma Irradiation
Concentration and Diafiltration Set:	non-sterile

Available bag sizes | filter sizes

Concentration and Diafiltration Set	
10-liter	
20-liter	
50-liter	
100-liter	
200-liter	
500-liter	
Aseptic Handling Set	
Volume Bag	Filtration Area
	Filter Capsule
10-liter	Size 7, 500 cm ² ½ ft ²
20-liter	Size 7, 500 cm ² ½ ft ²
50-liter	Size 7, 500 cm ² ½ ft ²
100-liter	Size 8, 1,000 cm ² 1 ft ²
200-liter	Size 8, 1,000 cm ² 1 ft ²
500-liter	Size 9, 2,000 cm ² 2 ft ²

Accessories

Tanks

TC-670015-H2.25 (50 L)
TC-670030-H2.25 (100 L)
TC-670055-H2.25 (200 L)
TC-120000-H (Dolly w/Cutout)

PolyTote

TC-120500 (500 L PolyTote)
TC-120501 (500 L SS Dolly)

Clamp, 1"

TC-011033

Concentration and Diafiltration Set

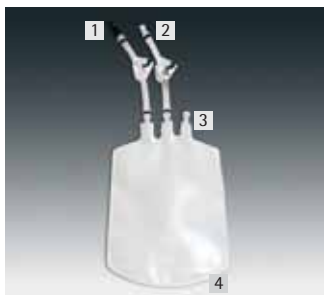
Assembly P/N	Item 1 Bag chamber	Item 2 Bag port 1 – Feed	Item 3 Bag port 2 – Diafiltration	Item 4 Bag port 3 – Retentate	Item 5 Bag port 4 – Septum
TC-143950	10-liter	½" × ¾" C-Flex®	½" × ¾" C-Flex®	½" × ¾" C-Flex®	Septum
TC-143951	20-liter	Clear 082 Tubing,	Clear 082 Tubing,	Clear 082 Tubing,	
TC-143952	50-liter	50 cm Length,	15 cm Length,	100 cm Length,	
		¾" Sanitary Fitting	¾" Sanitary Fitting	¾" Sanitary Fitting	
TC-143960	100-liter	1" × 1⅜" C-Flex®	1" × 1⅜" C-Flex®	1" × 1⅜" C-Flex®	
TC-143961	200-liter	Clear 082 Tubing,	Clear 082 Tubing,	Clear 082 Tubing,	
TC-143962	500-liter	50 cm Length,	400 cm Length,	200 cm Length,	
		1½" Sanitary Fitting	1½" Sanitary Fitting	1½" Sanitary Fitting	

Aseptic Handling Set

Assembly P/N	Item 1 Bag chamber	Item 2 Bag port 1 – Feed	Item 3 Bag port 2 – Retentate	Item 4 Bag port 3 – Optional	Item 5 Bag port 4 – Septum
TC-143955	10-liter	½" × ¾" C-Flex®	½" × ¾" C-Flex®	½" × ¾" C-Flex®	Septum
TC-143956	20-liter	Clear 082 Tubing,	Clear 082 Tubing,	Clear 082 Tubing,	
TC-143957	50-liter	15 cm Length,	150 cm Length,	15 cm Length	
		Sartopore® 2 Gamma Filter Capsule 5441307H7G-SO	SIP Connector ¾" × 1½" Sanitary Fitting		

Assembly P/N	Item 1 Bag chamber	Item 2 Bag port 1 – Feed	Item 3 Bag port 2 – Retentate	Item 4 Bag port 3 – Aseptic connection to recirculation tank
TC-143965	100-liter	½" × ¾" C-Flex®	1" × 1⅜" C-Flex®	½" × ¾" C-Flex®
TC-143966	200-liter	Clear 082 Tubing,	Clear 082 Tubing,	Clear 082 Tubing,
TC-143967	500-liter	50 cm Length,	200 cm Length,	400 cm Length,
		Sartopore® 2 Gamma Filter Capsule 5441307H8G-SO	1½" Sanitary Fitting	SIP Connector
		Filter Capsule 5441307H9G-SO (TC-143967)		1½" Sanitary Fitting

Sterile Fluid Handling Bags Standard Product Range 60 ml, 300 ml, 1 Liter, 2 Liter



- 1 liter standard
- 1 Port cover
 - 2 QDC coupling insert
 - 3 Septum injection port
 - 4 Hanger port

Our 60 ml – 2 liter sterile fluid handling bags are ideal for small volume bench-top work. Typical applications include specialty media dispensing and final product storage. Well suited for QC sampling in a manifold system. Hanger port facilitates complete drainage. May be frozen to –80°C. Consult TC Tech | Sartorius for recommendations on handling frozen bags.

Specifications



- 2 liter SCD®
- 1 Tube ratchet clamp
 - 2 Tubing for sterile welder

Specifications for sterile fluid handling bags

1 liter, 2 liter standard

LDPE fluid contact surface
Septum injection port
2 lines C-Flex® formulation 082 – 152.4 mm (6") length – 6.35 mm (1/4") ID
2 QDC coupling inserts
2 tube ratchet clamps
2 port covers
Provided sterile via 25 kGy–40 kGy gamma
Individually packaged

1 liter, 2 liter SCD®

LDPE fluid contact surface
Septum injection port
1 line C-Flex® formulation 082 – 91.44 cm (3') length – 3.175 mm (1/8") ID
1 line C-Flex® formulation 082 – 152.4 mm (6") length – 6.35 mm (1/4") ID
1 QDC coupling insert
2 tube ratchet clamps
1 male luer with female luer plug
1 tube port cover
Provided sterile via 25 kGy–40 kGy gamma
Individually packaged

Options

Fittings

QDC sealing cap
QDC coupling body | sealing plug
Sanitary fitting
Male | female luer with plug
Hose barb
Female luer for syringe connection

Tubing

Platinum cured silicone
Peroxide cured silicone
PharMed®
PVC
C-Flex® formulation 001, 050, 072

Other

Sterilizing filter
Manifold system

Order numbers for sterile fluid handling bags

Order number	Description	Quantity
TC-110050-AF	Storage bag, 60 ml standard*	50 per case
TC-110550-AF	Storage bag, 100 ml standard*	50 per case
TC-110650-AF	Storage bag, 250 ml standard*	50 per case
TC-110150-AF	Storage bag, 300 ml standard*	50 per case
TC-110125-AF	Storage bag, 1 liter standard*	25 per case
TC-111225-AF	Storage bag, 1 liter SCD	25 per case
TC-110225-AF	Storage bag, 2 liter standard	25 per case
TC-110425-AF	Storage bag, 2 liter SCD	25 per case

* equipped with Male | Female Luer with plug

Call for custom design consultation.

Sterile Fluid Handling Bags Standard Product Range 5 Liter, 10 Liter, 20 Liter



10 liter Standard
1 ODC coupling insert
2 Port cover
3 Septum injection port

The 5 liter, 10 liter, 20 liter sterile fluid handling bags accommodate fluid volumes commonly associated with bench-top and pilot plant work. Typical applications include buffer storage and harvest collection. Hanger ports facilitate complete drainage.

May be frozen to -80°C . Consult TC Tech | Sartorius for recommendations on handling frozen bags.

Specifications



20 liter SCD®
1 Tubing for sterile welder
2 Tube ratchet clamp
3 Hanger port

Specifications for sterile fluid handling bags

Standard

LDPE fluid contact surface
Septum injection port
1 line C-Flex® formulation 082 –
152.4 mm (6") Length – 6.35 mm (1/4") ID
1 line C-Flex® formulation 082 –
152.4 mm (6") Length – 9.525 mm (3/8") ID
2 ODC coupling inserts
2 tube ratchet clamps
2 port covers
Provided sterile via 25 kGy – 40 kGy Gamma:
Individually packaged

SCD®

LDPE fluid contact surface
Septum injection port
1 line C-Flex® formulation 082 –
91.44 cm (3') Length – 3.175 mm (1/8") ID
1 line C-Flex® formulation 082 –
152.4 mm (6") Length – 9.525 mm (3/8") ID
1 ODC coupling insert
1 male Luer with female Luer plug
2 tube ratchet clamps
1 port cover
Provided sterile via 25 kGy – 40 kGy Gamma:
Individually packaged

Options

Fittings

QDC sealing cap
QDC coupling body | sealing plug
Sanitary fitting
Male | female Luer with plug
Hose barb
Female luer for syringe connection

Tubing

Platinum cured silicone
Peroxide cured silicone
PharMed®
PVC
C-Flex® formulation 001, 050, 072

Other

Sterilizing filter
Manifold system
Steam-in-Place bag connector

Order numbers for sterile fluid handling bags

Order number	Description	Quantity
TC-111320-AF	Storage bag, 5 liter standard	20 per case
TC-111420-AF	Storage bag, 5 liter SCD	20 per case
TC-112320-AF	Storage bag, 10 liter standard	20 per case
TC-112420-AF	Storage bag, 10 liter SCD	20 per case
TC-113315-AF	Storage bag, 20 liter standard	15 per case
TC-113415-AF	Storage bag, 20 liter SCD	15 per case

Call for custom design consultation.

Sterile Fluid Handling Bags 50 Liter, 100 Liter, 200 Liter, 300 Liter



200 liter standard

- 1 Port cover
- 2 QDC coupling insert
- 3 Tube ratchet clamp

Our 50 liter, 100 liter, 200 liter, 300 liter sterile fluid handling bags accommodate fluid volumes associated with pilot plant work and full scale production. Typical applications include media storage, buffer storage and purified water storage.

Standard bags are designed to fit in cylindrical tanks such as NALGENE® tanks. Custom configurations available to fit your existing container.

Specifications



200 liter standard in cylindrical tank

- 1 Designed to fit cylindrical tanks

Specifications for sterile fluid handling bags

Standard

LDPE fluid contact surface
 1 line C-Flex® formulation 082 –
 91.44 cm (3') Length – 6.35 mm (1/4") ID
 1 line C-Flex® formulation 082 –
 91.44 cm (3') Length – 9.525 mm (3/8") ID
 2 QDC coupling inserts
 2 tube ratchet clamps
 2 Port covers
 Provided sterile via 25 kGy–40 kGy Gamma
 Individually packaged

SCD® (50 liter & 100 liter only)

LDPE fluid contact surface
 1 line C-Flex® formulation 082 –
 91.44 cm (3') Length – 3.175 mm (1/8") ID
 1 line C-Flex® formulation 082 –
 76.2 cm (2.5') Length – 6.35 mm (1/4") ID
 1 QDC coupling insert
 1 tube ratchet clamp
 1 port cover
 1 plug
 Provided sterile via 25 kGy–40 kGy Gamma
 Individually packaged

Options

Fittings

QDC sealing cap
 QDC coupling body | sealing plug
 Sanitary fitting
 Male | female Luer with plug
 Hose barb
 Female luer for syringe connection

Tubing

Platinum cured silicone
 Peroxide cured silicone
 PharMed®
 PVC
 C-Flex® formulation 001, 050, 072

Other

Sterilizing filter
 Manifold system
 Steam-in-place bag connector

Order numbers for sterile fluid handling bags

Order number	Description	Quantity
TC-114205-AF	Storage bag, 50 liter standard	5 per case
TC-114505-AF	Storage bag, 50 liter SCD	5 per case
TC-115205-AF	Storage bag, 100 liter standard	5 per case
TC-115505-AF	Storage bag, 100 liter SCD	5 per case
TC-116205-AF	Storage bag, 200 liter standard	5 per case

Call for custom design consultation.

NALGENE is a trademark of Nalge Nunc International

Sterile Fluid Handling Bags 500 Liter, 1000 Liter



500 liter standard in PolyTote
1 QDC coupling insert and coupling body allows for recirculation loop
2 Bottom drain line

The 500 liter and 1000 liter sterile fluid handling bags are designed to meet the demands of industrial volume filling, transport and storage. The unique design allows for easy placement in a PolyTote® container and filling with minimal bag adjustment. Bottom drain line facilitates complete fluid evacuation. Suitable for shipping via ground or sea.

Specifications

Specifications for sterile fluid handling bags

500 liter & 1000 liter Standard
 3 lines 12.7 mm (1/2") × 19.05 mm (3/4") platinum cured silicone
 Top lines 121.92 cm (4') in length
 Bottom line 243.84 cm (8') in length
 1 QDC 12.7 mm (1/2") coupling body
 1 QDC 12.7 mm (1/2") sealing plug
 2 QDC 12.7 mm (1/2") coupling inserts
 2 QDC 12.7 mm (1/2") sealing caps
 3 tube ratchet clamps
 Provided sterile via 25 kGy – 40 kGy Gamma

Options

Fittings

19.05 mm (3/4") mini sanitary fitting
 25.4 mm (1") sanitary fitting
 Hose barb

Tubing

Peroxide cured silicone
 PharMed®
 PVC
 C-Flex® formulation 082 001, 050, 072
 19.05 mm (3/4") ID fill line
 19.05 mm (3/4") ID drain line

Other

Sterilizing filter
 Steam-in-place bag connector

Order numbers for sterile fluid handling bags

Order number	Description	Quantity
TC-120555-AF	Storage bag, 500 liter standard	2 per case
TC-120565-AF	Storage bag, 1000 liter standard	Sold individually

Call for custom design consultation.

Tank Liners & Cylindrical Tanks



100 liter tank with bottom drain bag



200 liter tank with liner

Tank Liners are designed to fit cylindrical tanks by Nalge Nunc International and others. The utilization of tank liners avoids costs associated with tank cleaning & cleaning validation. Additionally risks associated with cross-contamination are reduced and tank turnaround time is accelerated.

The tank liners are constructed of the same film materials used in sterile fluid handling bags thereby reducing validation costs. Cylindrical tanks offered are constructed of HDPE and include graduation markings in liters and gallons.

Specifications

Specifications for tank liners & cylindrical tanks 50 liter – 100 liter

Tanks

HDPE construction
Gallon & liter calibrations
HDPE cover

Capacity

50 liter	Dimensions	33 × 69 cm
100 liter	Dimensions	46 × 76 cm
200 liter	Dimensions	56 × 91 cm
300 liter	Dimensions	61 × 122 cm
400 liter	Dimensions	71 × 112 cm
550 liter	Dimensions	79 × 124 cm
750 liter	Dimensions	91 × 130 cm

Liners

LDPE fluid contact surface
Provided sterile via 25 kGy – 40 kGy Gamma
Individually packaged

Options

PVDF tank construction
PP tank construction
Bottom drain port
Standard dolly
SS dolly

Order numbers for sterile fluid handling bags

Order number	Description	Quantity
TC-650510-AF	Tank liner, 50 liter	10 per case
TC-651010-AF	Tank liner, 100 liter	10 per case
TC-652005-AF	Tank liner, 200 liter	5 per case
TC-653005-AF	Tank liner, 300 liter	5 per case
TC-654005-AF	Tank liner, 400 liter	5 per case
TC-655005-AF	Tank liner, 500 liter	5 per case
TC-657575-AF	Tank liner, 750 liter	5 per case
TC-670015	Cylindrical tank, 50 liter, HDPE, with cover	Sold individually
TC-670030	Cylindrical tank, 100 liter, HDPE, with cover	Sold individually
TC-670055	Cylindrical tank, 200 liter, HDPE, with cover	Sold individually
TC-670080	Cylindrical tank, 300 liter, HDPE, with cover	Sold individually
TC-670100	Cylindrical tank, 400 liter, HDPE, with cover	Sold individually
TC-670150	Cylindrical tank, 500 liter, HDPE, with cover	Sold individually
TC-670200	Cylindrical tank, 750 liter, HDPE, with cover	Sold individually
TC-670015-H	Cylindrical tank with bottom drain port, 50 liter, HDPE, with cover	Sold individually
TC-670030-H	Cylindrical tank with bottom drain port, 100 liter, HDPE, with cover	Sold individually
TC-670055-H	Cylindrical tank with bottom drain port, 200 liter, HDPE, with cover	Sold individually
TC-670080-H	Cylindrical tank with bottom drain port, 300 liter, HDPE, with cover	Sold individually
TC-670100-H	Cylindrical tank with bottom drain port, 400 liter, HDPE, with cover	Sold individually

Ask about tanks with heating and cooling capability.

PolyTote® Container System for 500 Liter, 1000 Liter Standard Bags



- 1 Folding side panels | removable end panels for easy storage
- 2 Easy access for fill preparation
- 3 Designed for partial fill with one panel removed



- 1 Complete fill with minimal bag adjustment
- 2 Secure tubing storage
- 3 Shipping | stacking cover in place

Our 500 liter and 1000 liter PolyTote containers are designed to meet the demands of industrial filling, transport and storage. Used in conjunction with the fluid handling bags these containers optimize handling of biopharmaceutical processing fluids. With features such as a sloped floor for efficient drainage, removable end panels for easy fill preparation, and a secure tube storage area to protect bottom drain assembly, the PolyTote container provides for hassle-free operation.

The PolyTote container also maximizes utilization of valuable floor space as it is stackable 3 units high full and 5 units high empty. Suitable for shipping via ground or sea. Collapsible upon return.

Specifications

Specifications for 500 liter & 1000 liter PolyTote

500 liter & 1000 liter PolyTote
 HDPE construction
 Stackable 3 high full
 Stackable 5 high empty
 Bottom drain
 Sloped floor
 Tube & fitting storage area w/ security cover
 Collapsing side panels
 Removable end panels
 Shipping cover
 Autoclavable

500 liter

91.44 cm (36") × 126.37 cm (49 3/4") × 83.82 cm (33") [W × L × H]
 103 kg (227 lb) tare weight
 579 kg (1276 lb) capacity

1000 liter

91.44 cm (36") × 126.37 cm (49 3/4") × 134.62 cm (53") [W × L × H]
 165 kg (364 lb) tare weight
 1197 kg (2640 lb) capacity

Dolly

304 L stainless steel
 Electro polished
 25 kg (55 lb) weight
 1197 kg (2640 lb) capacity
 Clean room wheels

Order numbers

Order number	Description	Quantity
TC-120500	500 liter PolyTote container	Sold individually
TC-121000	1000 liter PolyTote container	Sold individually
TC-120501	500 liter PolyTote Dolly	Sold individually
TC-121001	1000 liter PolyTote Dolly	Sold individually

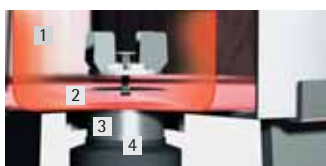
LevTech Disposable Mixing System



Replace stainless steel mixing tanks
LevTech mixing system



1 Magnetic levitation & coupling
2 HDPE impeller (pictured outside bag)



LevTech core technology (exploded view)

- 1 Single-use bag
- 2 Bag interface plate with alignment post
- 3 Thermal separation
- 4 Superconductor

Description

The LevTech system is a unique, innovative disposable mixing system using patented LevTech mixing technology. For the first time the efficiency and speed of traditional mixing can be achieved in single-use bags avoiding extensive cleaning validation.

Operation principle

The LevTech Mixing System utilizes patented superconductor technology to levitate and drive a single-use impeller inside sterile disposable fluid handling bags. When aligned with the specially designed impeller, the drive unit causes the impeller to levitate and lock in position. A variable speed controller allows the impeller to be run at the desired speed.

Applications

The LevTech drive delivers strong torque for efficient mixing of most biopharmaceutical solutions. Typical applications include:

- Liquid – Liquid Mixing
- Powder – Liquid Mixing
- Buffer & Media Preparation
- Product Formulation | Reformulation
- Viral Inactivation
- Bulk Intermediate Resuspension
- Final Bulk Storage, Shipping and Mixing

Flexibility

The LevTech drive unit operates independently of the tank, dolly and bag so that a single drive unit can serve multiple tanks of different sizes. Jacketed tanks are available in order to control the temperature inside the bag. Standardized tanks and bags are available in sizes between 50 L and 500 L. Mixing bags may be readily customized to optimise the integration into specific processes. Expert design service is available on-site through Sartorius | TC Tech experts on a worldwide basis.

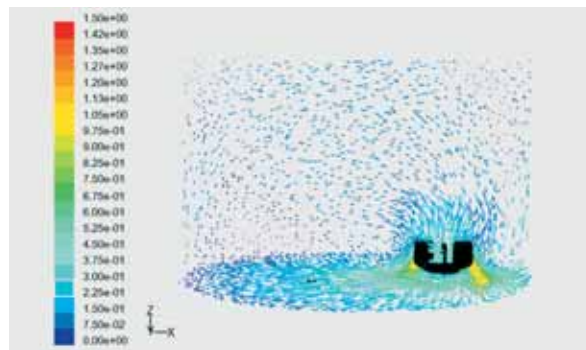
CE compliance

The LevTech Mixing System has been extensively tested according to the ISO/IEC Guide 22. The unit is in effective conformance to the respective guidelines. A certificate is available upon request.

Impeller



Velocity Vectors in Gammasart BioSystem MX



Velocity vectors in the in LevTech DB-200E disposable mixing bag with levitating impeller running at 170 RPM. Vectors are colored by magnitude (m/s.)

Specifications

Drive unit specifications

Power	Single Phase 230 V, 3 A, 50/60 Hz
Input Wattage	< 350 Watts
Footprint	37 inches x 16 inches (94 cm x 41 cm)
Height (Handle)	31 inches (79 cm)
Weight	103 lb (47 kg)
Ambient temperature	4° to 30°C
Ambient Humidity	Less than 75%
Mobility	Mounted on Stainless Steel Cart with Four Clean Room Wheels and Push Handles
IP Rating	IP23
Impeller Speed	0–180 RPM
Initial Set-up Time	45 Minutes
Vessel Changeover Time	< 7 Minutes
CE Mark	Compliant
Material for External Surfaces	Stainless Steel #316

Dolly specifications

Material	Stainless Steel #316
Finish	Bead Blasting
Wheels	Clean Room Wheels
Dimensions	34 inches (86 cm) W x 40 inches (101 cm) L x 36 inches (94.5 cm) H
Load Capacity	1,250 lb (570 kg)
Weight	80 lb (36.5 kg)

Ordering information

Part number	Description
Hardware	
LT-DBMC010	Superconducting drive machine with European certification on cart. Control panel (220V) and lifting mechanism on handle and welded body. Includes tool kit with accessories
LT-DBMC022	Superconducting drive machine with European certification and UK plug on cart. Control panel (220 V) and lifting mechanism on handle and welded body. Includes tool kit with accessories
LT-DBMC015	Upgraded elevated stainless steel 316 dolly on clean room wheels, with push handle and guide rail for drive positioning and lifting.
LT-DBMC021	Upgraded elevated stainless steel 316 dolly on clean room wheels, with push handle and guide rail for drive positioning and lifting – polished to 180 grit.
LT-DBMC030	30 liter rotationally molded retaining MDPE plastic tank
LT-DBMC050	50 liter rotationally molded retaining MDPE plastic tank
LT-DBMC100	100 liter rotationally molded retaining MDPE plastic tank
LT-DBMC200	200 liter rotationally molded retaining MDPE plastic tank
LT-DBMC250	250 liter rotationally molded retaining MDPE plastic tank
LT-DBMC300	300 liter rotationally molded retaining MDPE plastic tank
LT-DBMC350	350 liter rotationally molded retaining MDPE plastic tank
LT-DBMC500	500 liter rotationally molded retaining MDPE plastic tank with two-part construction
LT-DBC1001	Magnetic charger with bearing
LT-DBAK004	Testing Impeller

LevTech disposable bags

Standard configuration

TC-159513-AF	50 L Gammasart BioSystem™ MX, STD, 3 Ports, w/Drain
TC-159514-AF	100 L Gammasart BioSystem™ MX, STD, 3 Ports, w/Drain
TC-159515-AF	200 L Gammasart BioSystem™ MX, STD, 3 Ports, w/Drain
TC-159517-AF	300 L Gammasart BioSystem™ MX, STD, 3 Ports, w/Drain
TC-159518-AF	350 L Gammasart BioSystem™ MX, STD, 3 Ports, w/Drain
TC-159519-AF	500 L Gammasart BioSystem™ MX, STD, 3 Ports, w/Drain

IFS4 Stainless Steel Weighing Platforms for LevTech Sanitary Mixing System



Description

The IF series represents a new generation of industry weighing technology, from 5 g to 3,000 kg, from basic weighing to convenient, application-oriented weighing systems. IF S4 Flat Bed Scales from Sartorius are ideally suited to be used in conjunction with the LevTech Sanitary Mixing System.

Applications

IF S4 Flat Bed Scales are used for level control and level management in typical mixing applications in the biopharmaceutical industry:

Liquid – Liquid Mixing:

- Final Formulation
- Intermediate pH Adjustment
- Bulk Intermediate Suspension | Resuspension
- Ultrafiltration | Diafiltration Retentate
- Viral Inactivation

Powder – Liquid Mixing

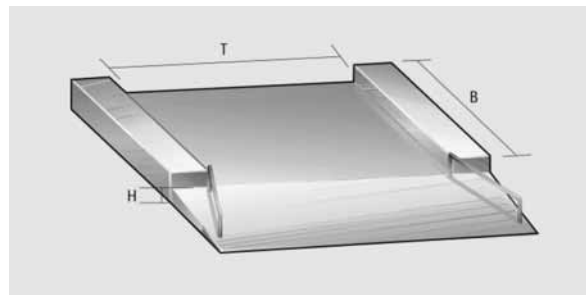
- Excipient Preparation
- Buffer Preparation
- Media Preparation

Accuracy

The IF weighbridges are designed as flat-bed scales using strain-gauge technology, with capacities of 600 kg, 1,500 kg, 3,000 kg and a resolution of 30,000 digits for non-legal-for-trade applications and $1 \times 3,000$ digits (single-range) or $2 \times 3,000$ e (multiple-range) for Accuracy Class III applications.

Easy to clean

On IF scales, the surface roughness of parts that have contact with the product, such as the load plate, is well below EHEDG recommendations. The surface is completely smooth, making it easy to clean. Because there are no moving parts on the IF scale, it can be used in cleanrooms rated to class 10,000 in accordance with US Federal Standard 209 D (equivalent to Class C in accordance with EEC-GMP).



Specifications

Material of construction	Stainless steel (304/316)
Surface Finish	Bead blasting eletro-polishing
Constructed	using metal sheets with pressed edges; i.e., no welded seams
Easy to clean and disinfect	
Load capacity	300 kg, 600 kg, 1,000 kg, 1,500 kg
Resolution	3,000 d, 15,000 d
Dimensions	800×800 mm
Foot Print	1,040×800 mm without ramp; 1,040×1,150 mm with ramp
Dimensions	1,000×1,000 mm
Foot Print	1,240×1,000 mm without ramp; 1,240×1,350 mm with ramp
Height	35 mm/Optional 25 mm
Access via 1 ramp (lenght 350 mm)	includes in delivery package
Handle on ramp to secure access to platform	
Option	Stop bar
Option	Lifting device by gas springs (Pharmaline version)
Cable lenght to a display unit (indicator has to be selected separately depending on application)	6 m

Ordering information

1. Part: Selection of the platform

Order number	Weighing capacity	Readability in g				Platform dimensions B×T in mm	Material load plate and frame	Cable plat-form
		-L	-I	-LCE	-NCE			
IFS4-300II	300 kg	20	10	100	50/100	800×800	St. steel	6 m
IFS4-300LL	300 kg	20	10	100	50/100	1,000×1,000	St. steel	6 m
IFS4-600II	600 kg	50	20	200	100/200	800×800	St. steel	6 m
IFS4-600LL	600 kg	50	20	200	100/200	1,000×1,000	St. steel	6 m
IFS4-1000II	1,000 kg	100	50	500	200/500	800×800	St. steel	6 m
IFS4-1000LL	1,000 kg	100	50	500	200/500	1,000×1,000	St. steel	6 m
IFS4-1500II	1,500 kg	100	50	500	200/500	800×800	St. steel	6 m
IFS4-1500LL	1,500 kg	100	50	500	200/500	1,000×1,000	St. steel	6 m

2nd Part: Selection of the readability

-NCE	Readability 2×3,000 e
-LCE	Readability 3,000 e
-I	Readability 30,000 d
-L	Readability 15,000 d

3rd Part: Options: IFS4 stainless steel platforms

	Option	Platform dimensions B×T in mm	
		II 800×800	LL 1,000×1,000
Optional height 25 mm (standard = 35 mm) for weighing capacities			
300 kg	V1	•	•
600 kg	V1	•	•
1,000 kg	V1	•	•
1,500 kg	V1	•	•
Optional height 35 mm (standard = 45 mm) for weighing 4 capacities			
300 kg	V2		
600 kg	V2		
1,000 kg	V2		
1,500 kg	V2		•
AISI 304, 2B cold-rolled steel & glass bead-blasted			
For all weighing capacities:	R6	•	•
AISI 316 Ti, 2B cold-rolled steel			
For all weighing capacities:	R2	•	•
Others			
Stop bar	T4	•	•
Operation in zone 2 and 22 hazardous areas (ATEX marking: II 3 GD Eex nR II T6 T80°C)	Y2	•	•
Lifting mechanism (pressure operated)	T8	•	•
Bottom plate	T9	•	•

Connectors & Accessories

Quick disconnect



QDC coupling insert



QDC sealing cap



QDC coupling body



QDC sealing plug



QDC 19.05 mm (3/4") coupling body



QDC 19.05 mm (3/4") coupling insert

Sanitary



Tygopure™ sanitary fitting



19.05 mm (3/4") mini sanitary fitting



38.1 mm (1.5") sanitary fitting



25.4 mm (1") C-Flex molded sanitary end



19.05 mm (3/4") silicone molded sanitary end



25.4 mm (1") silicone molded sanitary end

Luer



Male luer



Female luer plug



Female luer



Male luer plug



Injection port

Accessories



Tube ratchet clamp



Port cover



Magnetic stir bar



Reducer



Bio clamp

Accessories



BarbLock™ ultra-secure tubing retainer



Filter



T Connector



Y Connector

The following Connectors & Accessories are pictured to assist with bag design and are not generally offered for stand-alone sale:

- All luer fittings
- All tubing with molded sanitary ends
- Tube ratchet clamps
- Port covers
- Magnetic stir bars
- T Connectors
- Injection ports

Contact TC Tech | Sartorius for BarbLock ordering information.

Specifications & Order Information

Quick disconnect fittings

QDC coupling insert

Order number	Description	Quantity
TC-214200-G	QDC, 6.35 mm (1/4") coupling insert, polycarbonate	25 per case
TC-214300-G	QDC, 9.525 mm (3/8") coupling insert, polycarbonate	25 per case
TC-214400-G	QDC, 12.7 mm (1/2") coupling insert, polycarbonate	25 per case
TC-214500-G	QDC, 9.525 mm (3/8") coupling flow insert, polycarbonate	25 per case
TC-215200-G	QDC, 6.35 mm (1/4") coupling insert, polysulfone	25 per case
TC-215300-G	QDC, 9.525 mm (3/8") coupling insert, polysulfone	25 per case
TC-215400-G	QDC, 9.525 mm (3/8") flow coupling insert, polysulfone	25 per case
TC-216500-G	QDC, 12.7 mm (1/2") coupling insert, polysulfone	25 per case

QDC sealing caps

Order number	Description	Quantity
TC-216200-G	QDC, 6.35 mm (1/4") & 9.525 mm (3/8") sealing cap w/ lock, Polycarb	25 per case
TC-216300-G	QDC, 6.35 mm (1/4") & 9.525 mm (3/8") sealing cap, polycarbonate	25 per case
TC-216400-G	QDC, 12.7 mm (1/2") sealing cap, polycarbonate	25 per case
TC-216600-G	QDC, 12.7 mm (1/2") sealing cap, polycarbonate	25 per case
TC-216700-G	QDC, 6.35 mm (1/4") & 9.525 mm (3/8") sealing cap, polysulfone	25 per case
TC-216800-G	QDC, 12.7 mm (1/2") sealing cap, polysulfone	25 per case

QDC coupling body

Order number	Description	Quantity
TC-211200-G	QDC, 6.35 mm (1/4") coupling body, polycarbonate	25 per case
TC-211300-G	QDC, 9.525 mm (3/8") coupling body, polycarbonate	25 per case
TC-211400-G	QDC, 12.7 mm (1/2") coupling body, polycarbonate	25 per case
TC-211500-G	QDC, 12.7 mm (1/2") coupling body, w/ lock, Polycarb	25 per case
TC-212200-G	QDC, 6.35 mm (1/4") coupling body, polysulfone	25 per case
TC-212300-G	QDC, 9.525 mm (3/8") coupling body, polysulfone	25 per case
TC-212400-G	QDC, 9.525 mm (3/8") coupling body, w/ lock, polysulfone	25 per case
TC-212500-G	QDC, 12.7 mm (1/2") coupling body, polysulfone	25 per case
TC-212600-G	QDC, 6.35 mm (1/4") coupling body, w/ lock, polysulfone	25 per case

QDC sealing plug

Order number	Description	Quantity
TC-217300-G	QDC, 6.35 mm (1/4") & 9.525 mm (3/8") sealing plug, polycarbonate	25 per case
TC-217400-G	QDC, 12.7 mm (1/2") sealing plug, polycarbonate	25 per case
TC-217600-G	QDC, 6.35 mm (1/4") & 9.525 mm (3/8") sealing plug, polysulfone	25 per case
TC-217700-G	QDC, 12.7 mm (1/2") sealing plug, polysulfone	25 per case

Specifications

QDC 3/4" components

Order number	Description	Quantity
TC-219100-D	QDC, 19.05 mm (3/4") coupling body, polysulfone	10 per case
TC-219200-D	QDC, 19.05 mm (3/4") coupling insert, polysulfone	10 per case
TC-219300-D	QDC, 19.05 mm (3/4") sealing plug, polysulfone	10 per case
TC-219400-D	QDC, 19.05 mm (3/4") sealing cap, polysulfone	10 per case

Bio clamp

Order number	Description	Quantity
TC-540075-D	19.05 mm (3/4") sanitary clamp, nylon fiberglass	10 per case
TC-540150-D	38.1 mm (1.5") sanitary clamp, nylon fiberglass	10 per case

Sanitary fittings

Tygapure® 3/4" mini sanitary fitting

Order number	Description	Quantity
TC-4925PP-D	Tygapure, 6.35 mm (1/4") barb, polypropylene	10 per case
TC-4925PS-D	Tygapure, 6.35 mm (1/4") barb, polysulfone	10 per case
TC-4937PP-D	Tygapure, 9.525 mm (3/8") barb, polypropylene	10 per case
TC-4937P5-D	Tygapure, 9.525 mm (3/8") barb, polysulfone	10 per case
TC-4950PP-D	Tygapure, 12.7 mm (1/2") barb, polypropylene	10 per case
TC-4950PS-D	Tygapure, 12.7 mm (1/2") barb, polysulfone	10 per case
TC-49005G-D	Tygapure silicone gasket	10 per case

3/4", 1", 1.5" polypropylene sanitary fitting

Order number	Description	Quantity
TC-540101-D	mini sanitary, 3.175 mm (1/8") HB	10 per case
TC-540301-D	mini sanitary, 6.35 mm (1/4") HB	10 per case
TC-540401-D	mini sanitary, 9.525 mm (3/8") HB	10 per case
TC-540501-D	mini sanitary, 12.7 mm (1/2") HB	10 per case
TC-540601-D	mini sanitary, 15.875 (5/8") mm HB	10 per case
TC-540701-D	mini sanitary, 19.05 mm (3/4") HB	10 per case
TC-540102-D	1" sanitary, 3.175 mm (1/8") HB	10 per case
TC-540302-D	1" sanitary, 6.35 mm (1/4") HB	10 per case
TC-540402-D	1" sanitary, 9.525 mm (3/8") HB	10 per case
TC-540502-D	1" sanitary, 12.7 mm (1/2") HB	10 per case
TC-540702-D	1" sanitary, 19.05 mm (3/4") HB	10 per case
TC-540802-D	1" sanitary, 25.4 mm (1") HB	10 per case
TC-540103-D	1.5" sanitary, 3.175 mm (1/8") HB	10 per case
TC-540303-D	1.5" sanitary, 6.35 mm (1/4") HB	10 per case
TC-540403-D	1.5" sanitary, 9.525 mm (3/8") HB	10 per case
TC-540503-D	1.5" sanitary, 12.7 mm (1/2") HB	10 per case
TC-540703-D	1.5" sanitary, 19.05 mm (3/4") HB	10 per case
TC-540803-D	1.5" sanitary, 25.4 mm (1") HB	10 per case

Specifications

Polycarbonate reducers, connectors, Y connectors

Order number	Description	Quantity
TC-230300-G	Connector, 4.763 mm (3/16") × 6.35 mm (1/4")	25 per case
TC-230400-G	Connector, 6.35 mm (1/4") × 6.35 mm (1/4")	25 per case
TC-230500-G	Connector, 6.35 mm (1/4") × 9.525 mm (3/8")	25 per case
TC-230600-G	Connector, 6.35 mm (1/4") × 12.7 mm (1/2")	25 per case
TC-230700-G	Connector, 9.525 mm (3/8") × 9.525 mm (3/8")	25 per case
TC-230800-G	Connector, 12.7 mm (1/2") × 9.525 mm (3/8")	25 per case
TC-230900-G	Connector, 9.525 mm (3/8") × 15.875 mm (5/8")	25 per case
TC-231000-G	Connector, 12.7 mm (1/2") × 12.7 mm (1/2")	25 per case
TC-231100-G	Connector, 4.763 mm (3/16") × 4.763 mm (3/16") w/ luer	25 per case
TC-231200-G	Connector, 4.763 mm (3/16") × 6.35 mm (1/4") w/ luer	25 per case
TC-231300-G	Connector, 6.35 mm (1/4") × 6.35 mm (1/4") w/ luer	25 per case
TC-231400-G	Connector, 6.35 mm (1/4") × 9.525 mm (3/8") w/ luer	25 per case
TC-231500-G	Connector, 9.525 mm (3/8") × 9.525 mm (3/8") w/ luer	25 per case
TC-231600-G	Connector, 12.7 mm (1/2") × 12.7 mm (1/2") w/ luer	25 per case
TC-231700-G	Y connector, 4.763 mm (3/16") all	25 per case
TC-231800-G	Y connector, 6.35 mm (1/4") all	25 per case
TC-231900-G	Y connector, 9.525 mm (3/8") × 6.35 mm (1/4") × 6.35 mm (1/4")	25 per case
TC-232000-G	Y connector, 9.525 mm (3/8") × 9.525 mm (3/8") × 6.35 mm (1/4")	25 per case
TC-232100-G	Y connector, 9.525 mm (3/8") all	25 per case
TC-232200-G	Y connector, 12.7 mm (1/2") × 9.525 mm (3/8") × 9.525 mm (3/8")	25 per case
TC-232300-G	Y connector, 12.7 mm (1/2") all	25 per case
TC-232400-G	Y connector, 4.763 mm (3/16") all w/ luer	25 per case
TC-232500-G	Y connector, 6.35 mm (1/4") all w/ luer	25 per case
TC-232600-G	Y connector, 9.525 mm (3/8") all w/ luer	25 per case

Pharmaceutical Grade Tubing



Tygon® silicone tubing, formulation 3350

Tygon® silicone tubing, formulation 3350

Platinum cured silicone tubing with ultra-smooth inner bore to reduce potential for particle entrapment. Fully characterized in accordance with USP 24 and ISO 10993

guidelines. Extensive lot-to-lot biological and chemical testing ensures purity for critical applications. Shore A, 50.



Pharmed® tubing

Pharmed® tubing

Long life peristaltic pump tubing with low particulate generation. Can be repeatedly autoclaved. Opaque to visible and UV light for sensitive fluid protection. Fully characterized

in accordance with USP and ISO 10993 guidelines. Shore A, 64.



C-Flex® tubing, clear formulation 082, 050

C-Flex® tubing, clear formulation 082, 050

Clear thermoplastic elastomer tubing that is heat sealable and bondable. Low protein binding minimizes potential for active ingredient loss. Low gas permeability helps

maintain pH. Fully characterized in accordance with USP 24 guidelines. Formulation 082, Shore A, 60. Formulation 050, Shore A, 50.



C-Flex® tubing, clear formulation 072, 001

C-Flex® tubing, clear formulation 072, 001

Opaque thermoplastic elastomer tubing that is heat sealable and bondable with long peristaltic pump life. Low protein binding minimizes potential for active ingredient loss.

Fully characterized in accordance with USP 24 guidelines. Formulation 072, Shore A, 60. Formulation 001, Shore A, 50.



Platinum cured silicone tubing

Platinum cured silicone tubing

Platinum cured silicone tubing for use throughout the biopharmaceutical

manufacturing process. Meets USP <88> Class 6 criteria. Shore A, 50.



Peroxide cured silicone tubing

Peroxide cured silicone tubing

Peroxide cured silicone tubing with ultra-smooth inner bore. Exceptional resiliency

and durability. Meets USP <88> Class 6 criteria. Shore A, 50.



Tygon® silicone tubing, formulation 3370

Tygon® silicone tubing, formulation 3370

Platinum cured silicone tubing with braid reinforcement for increased pressure resistance. Withstands repeated CIP and

SIP sterilization cycles. Excellent bend radius. Shore A, 70.



"Y" Elements for peristaltic pumps

"Y" Elements for peristaltic pumps

TC Tech | Sartorius "Y" elements are designed for use in Watson Marlow® 505 L & 605 L peristaltic pump heads. "Y" elements are constructed of platinum cured silicone tubing

and polypropylene fittings. Individually packaged. May be sterilized by steam or gamma radiation.



Tubing on spools

Tubing on spools

TC Tech | Sartorius offers a variety of tubing products on spools. Spools allow for easy dispensing and reduced scrap. Contact

TC Tech | Sartorius for additional products or sizes on spools.

Specifications

Order information for tubing

Tygon® silicone tubing, formulation 3350

Order number	Description ID OD	Quantity per roll
TC-490150	Tubing, silicone 3350, 0.794 mm (1/32") × 2.381 mm (3/32")	15.24 m (50 ft)
TC-490250	Tubing, silicone 3350, 1.588 mm (1/16") × 3.175 mm (1/8")	15.24 m (50 ft)
TC-490350	Tubing, silicone 3350, 1.588 mm (1/16") × 4.763 mm (3/16")	15.24 m (50 ft)
TC-490450	Tubing, silicone 3350, 2.381 mm (3/32") × 3.969 mm (5/32")	15.24 m (50 ft)
TC-490550	Tubing, silicone 3350, 2.381 mm (3/32") × 5.556 mm (7/32")	15.24 m (50 ft)
TC-490650	Tubing, silicone 3350, 3.175 mm (1/8") × 4.763 mm (3/16")	15.24 m (50 ft)
TC-490750	Tubing, silicone 3350, 3.175 mm (1/8") × 6.35 mm (1/4")	15.24 m (50 ft)
TC-490950	Tubing, silicone 3350, 3.969 mm (5/32") × 5.556 mm (7/32")	15.24 m (50 ft)
TC-491150	Tubing, silicone 3350, 4.763 mm (3/16") × 6.35 mm (1/4")	15.24 m (50 ft)
TC-491250	Tubing, silicone 3350, 4.763 mm (3/16") × 7.938 mm (5/16")	15.24 m (50 ft)
TC-491350	Tubing, silicone 3350, 4.763 mm (3/16") × 9.525 mm (3/8")	15.24 m (50 ft)
TC-491450	Tubing, silicone 3350, 4.763 mm (3/16") × 11.113 mm (7/16")	15.24 m (50 ft)
TC-491650	Tubing, silicone 3350, 6.35 mm (1/4") × 7.938 mm (5/16")	15.24 m (50 ft)
TC-491750	Tubing, silicone 3350, 6.35 mm (1/4") × 9.525 mm (3/8")	15.24 m (50 ft)
TC-491850	Tubing, silicone 3350, 6.35 mm (1/4") × 11.113 mm (7/16")	15.24 m (50 ft)
TC-491950	Tubing, silicone 3350, 6.35 mm (1/4") × 12.7 mm (1/2")	15.24 m (50 ft)
TC-492250	Tubing, silicone 3350, 7.938 mm (5/16") × 11.113 mm (7/16")	15.24 m (50 ft)
TC-492350	Tubing, silicone 3350, 7.938 mm (5/16") × 12.7 mm (1/2")	15.24 m (50 ft)
TC-492750	Tubing, silicone 3350, 9.525 mm (3/8") × 12.7 mm (1/2")	15.24 m (50 ft)
TC-492850	Tubing, silicone 3350, 9.525 mm (3/8") × 14.288 mm (9/16")	15.24 m (50 ft)
TC-492950	Tubing, silicone 3350, 9.525 mm (3/8") × 15.875 mm (5/8")	15.24 m (50 ft)
TC-493250	Tubing, silicone 3350, 11.113 mm (7/16") × 14.288 mm (9/16")	15.24 m (50 ft)
TC-493350	Tubing, silicone 3350, 11.113 mm (7/16") × 15.875 mm (5/8")	15.24 m (50 ft)
TC-493650	Tubing, silicone 3350, 12.7 mm (1/2") × 15.875 mm (5/8")	15.24 m (50 ft)
TC-493750	Tubing, silicone 3350, 12.7 mm (1/2") × 17.463 mm (11/16")	15.24 m (50 ft)
TC-493850	Tubing, silicone 3350, 12.7 mm (1/2") × 19.05 mm (3/4")	15.24 m (50 ft)
TC-494550	Tubing, silicone 3350, 15.875 mm (5/8") × 20.638 mm (13/16")	15.24 m (50 ft)
TC-494650	Tubing, silicone 3350, 15.875 mm (5/8") × 22.225 mm (7/8")	15.24 m (50 ft)
TC-495350	Tubing, silicone 3350, 19.05 mm (3/4") × 25.4 mm (1.0")	15.24 m (50 ft)
TC-496250	Tubing, silicone 3350, 25.4 mm (1.0") × 31.75 mm (1 1/4")	15.24 m (50 ft)
TC-496950	Tubing, silicone 3350, 31.75 mm (1 1/4") × 38.1 mm (1 1/2")	15.24 m (50 ft)
TC-497450	Tubing, silicone 3350, 38.1 mm (1 1/2") × 50.8 mm (2.0")	15.24 m (50 ft)

Specifications

Pharmed® tubing

Order number	Description ID OD	Quantity per roll
TC-486525	Tubing, PharMed, .020" × .145"	7.62 m (25 ft)
TC-486625	Tubing, PharMed, 0.794 mm (1/32") × 3.969 mm (5/32")	7.62 m (25 ft)
TC-480225	Tubing, PharMed, 1.588 mm (1/16") × 3.175 mm (1/8")	7.62 m (25 ft)
TC-480325	Tubing, PharMed, 1.588 mm (1/16") × 4.763 mm (3/16")	7.62 m (25 ft)
TC-480525	Tubing, PharMed, 2.381 mm (3/32") × 5.556 mm (7/32")	7.62 m (25 ft)
TC-480625	Tubing, PharMed, 3.175 mm (1/8") × 4.763 mm (3/16")	7.62 m (25 ft)
TC-480725	Tubing, PharMed, 3.175 mm (1/8") × 6.35 mm (1/4")	7.62 m (25 ft)
TC-481225	Tubing, PharMed, 4.763 mm (3/16") × 7.938 mm (5/16")	7.62 m (25 ft)
TC-481325	Tubing, PharMed, 4.763 mm (3/16") × 9.525 mm (3/8")	7.62 m (25 ft)
TC-481725	Tubing, PharMed, 6.35 mm (1/4") × 9.525 mm (3/8")	7.62 m (25 ft)
TC-481825	Tubing, PharMed, 6.35 mm (1/4") × 11.113 mm (7/16")	7.62 m (25 ft)
TC-481925	Tubing, PharMed, 6.35 mm (1/4") × 12.7 mm (1/2")	7.62 m (25 ft)
TC-482225	Tubing, PharMed, 7.938 mm (5/16") × 11.113 mm (7/16")	7.62 m (25 ft)
TC-482725	Tubing, PharMed, 9.525 mm (3/8") × 12.7 mm (1/2")	7.62 m (25 ft)
TC-482925	Tubing, PharMed, 9.525 mm (3/8") × 15.875 mm (5/8")	7.62 m (25 ft)
TC-483825	Tubing, PharMed, 12.7 mm (1/2") × 19.05 mm (3/4")	7.62 m (25 ft)
TC-484625	Tubing, PharMed, 15.875 mm (5/8") × 22.225 mm (7/8")	7.62 m (25 ft)
TC-485325	Tubing, PharMed, 19.05 mm (3/4") × 25.4 mm (1.0")	7.62 m (25 ft)

C-Flex® tubing, formulation 082

Order number	Description ID OD	Quantity per roll
TC-410150	Tubing, C-Flex clear 082, 0.794 mm (1/32") × 2.381 mm (3/32")	15.24 m (50 ft)
TC-411250	Tubing, C-Flex clear 082, 1.588 mm (1/16") × 3.175 mm (1/8")	15.24 m (50 ft)
TC-411350	Tubing, C-Flex clear 082, 1.588 mm (1/16") × 4.763 mm (3/16")	15.24 m (50 ft)
TC-412250	Tubing, C-Flex clear 082, 3.175 mm (1/8") × 6.35 mm (1/4")	15.24 m (50 ft)
TC-413250	Tubing, C-Flex clear 082, 4.763 mm (3/16") × 7.938 mm (5/16")	15.24 m (50 ft)
TC-413350	Tubing, C-Flex clear 082, 4.763 mm (3/16") × 9.525 mm (3/8")	15.24 m (50 ft)
TC-414150	Tubing, C-Flex clear 082, 6.35 mm (1/4") × 9.525 mm (3/8")	15.24 m (50 ft)
TC-414250	Tubing, C-Flex clear 082, 6.35 mm (1/4") × 11.113 mm (7/16")	15.24 m (50 ft)
TC-414350	Tubing, C-Flex clear 082, 6.35 mm (1/4") × 12.7 mm (1/2")	15.24 m (50 ft)
TC-415250	Tubing, C-Flex clear 082, 7.938 mm (5/16") × 12.7 mm (1/2")	15.24 m (50 ft)
TC-416150	Tubing, C-Flex clear 082, 9.525 mm (3/8") × 12.7 mm (1/2")	15.24 m (50 ft)
TC-416250	Tubing, C-Flex clear 082, 9.525 mm (3/8") × 15.875 mm (5/8")	15.24 m (50 ft)
TC-416350	Tubing, C-Flex clear 082, 9.525 mm (3/8") × 14.288 mm (9/16")	15.24 m (50 ft)
TC-418150	Tubing, C-Flex clear 082, 12.7 mm (1/2") × 17.463 mm (11/16")	15.24 m (50 ft)
TC-418250	Tubing, C-Flex clear 082, 12.7 mm (1/2") × 19.05 mm (3/4")	15.24 m (50 ft)
TC-419150	Tubing, C-Flex clear 082, 15.875 mm (5/8") × 22.225 mm (7/8")	15.24 m (50 ft)
TC-410115	Tubing, C-Flex clear 082, 19.05 mm (3/4") × 25.4 mm (1.0")	4.57 m (15 ft)
TC-410215	Tubing, C-Flex clear 082, 19.05 mm (3/4") × 28.575 mm (1 1/8")	4.57 m (15 ft)
TC-410315	Tubing, C-Flex clear 082, 19.05 mm (3/4") × 31.75 mm (1 1/4")	4.57 m (15 ft)
TC-410615	Tubing, C-Flex clear 082, 25.4 mm (1.0") × 34.925 mm (1 3/8")	4.57 m (15 ft)
TC-410815	Tubing, C-Flex clear 082, 25.4 mm (1.0") × 38.1 mm (1 1/2")	4.57 m (15 ft)

Specifications

C-Flex® tubing, formulation 072

Order number	Description ID OD	Quantity per roll
TC-420150	Tubing, C-Flex opaque 072, 0.794 mm (1/32") × 2.381 mm (3/32")	15.24 m (50 ft)
TC-421250	Tubing, C-Flex opaque 072, 1.588 mm (1/16") × 3.175 mm (1/8")	15.24 m (50 ft)
TC-421350	Tubing, C-Flex opaque 072, 1.588 mm (1/16") × 4.763 mm (3/16")	15.24 m (50 ft)
TC-422250	Tubing, C-Flex opaque 072, 3.175 mm (1/8") × 6.35 mm (1/4")	15.24 m (50 ft)
TC-423250	Tubing, C-Flex opaque 072, 4.763 mm (3/16") × 7.938 mm (5/16")	15.24 m (50 ft)
TC-423350	Tubing, C-Flex opaque 072, 4.763 mm (3/16") × 9.525 mm (3/8")	15.24 m (50 ft)
TC-424150	Tubing, C-Flex opaque 072, 6.35 mm (1/4") × 9.525 mm (3/8")	15.24 m (50 ft)
TC-424250	Tubing, C-Flex opaque 072, 6.35 mm (1/4") × 11.113 mm (7/16")	15.24 m (50 ft)
TC-424350	Tubing, C-Flex opaque 072, 6.35 mm (1/4") × 12.7 mm (1/2")	15.24 m (50 ft)
TC-425250	Tubing, C-Flex opaque 072, 7.938 mm (5/16") × 12.7 mm (1/2")	15.24 m (50 ft)
TC-426150	Tubing, C-Flex opaque 072, 9.525 mm (3/8") × 12.7 mm (1/2")	15.24 m (50 ft)
TC-426250	Tubing, C-Flex opaque 072, 9.525 mm (3/8") × 15.875 mm (5/8")	15.24 m (50 ft)
TC-426350	Tubing, C-Flex opaque 072, 9.525 mm (3/8") × 14.288 mm (9/16")	15.24 m (50 ft)
TC-428150	Tubing, C-Flex opaque 072, 12.7 mm (1/2") × 17.463 mm (11/16")	15.24 m (50 ft)
TC-428250	Tubing, C-Flex opaque 072, 12.7 mm (1/2") × 19.05 mm (3/4")	15.24 m (50 ft)
TC-429150	Tubing, C-Flex opaque 072, 15.875 mm (5/8") × 22.225 mm (7/8")	15.24 m (50 ft)
TC-420115	Tubing, C-Flex opaque 072, 19.05 mm (3/4") × 25.4 mm (1.0")	4.57 m (15 ft)
TC-420215	Tubing, C-Flex opaque 072, 19.05 mm (3/4") × 28.575 mm (1 1/8")	4.57 m (15 ft)
TC-420315	Tubing, C-Flex opaque 072, 19.05 mm (3/4") × 31.75 mm (1 1/4")	4.57 m (15 ft)
TC-420615	Tubing, C-Flex opaque 072, 25.4 mm (1.0") × 34.925 mm (1 3/8")	4.57 m (15 ft)
TC-420815	Tubing, C-Flex opaque 072, 25.4 mm (1.0") × 38.1 mm (1 1/2")	4.57 m (15 ft)

Platinum cured silicone tubing

Order number	Description ID OD	Quantity per roll
TC-500750	Tubing, silicone platinum, 3.175 mm (1/8") × 6.35 mm (1/4")	15.24 m (50 ft)
TC-501850	Tubing, silicone platinum, 6.35 mm (1/4") × 11.113 mm (7/16")	15.24 m (50 ft)
TC-501250	Tubing, silicone platinum, 4.763 mm (3/16") × 7.938 mm (5/16")	15.24 m (50 ft)
TC-501350	Tubing, silicone platinum, 4.763 mm (3/16") × 9.525 mm (3/8")	15.24 m (50 ft)
TC-502950	Tubing, silicone platinum, 9.525 mm (3/8") × 15.875 mm (5/8")	15.24 m (50 ft)
TC-503850	Tubing, silicone platinum, 12.7 mm (1/2") × 19.05 mm (3/4")	15.24 m (50 ft)

Specifications

Peroxide cured silicone tubing

Order number	Description ID OD	Quantity per roll
TC-460750	Tubing, silicone peroxide, 3.175 mm (1/8") × 6.35 mm (1/4")	15.24 m (50 ft)
TC-461350	Tubing, silicone peroxide, 4.763 mm (3/16") × 9.525 mm (3/8")	15.24 m (50 ft)
TC-461750	Tubing, silicone peroxide, 6.35 mm (1/4") × 9.525 mm (3/8")	15.24 m (50 ft)
TC-461850	Tubing, silicone peroxide, 6.35 mm (1/4") × 11.113 mm (7/16")	15.24 m (50 ft)
TC-461950	Tubing, silicone peroxide, 6.35 mm (1/4") × 12.7 mm (1/2")	15.24 m (50 ft)
TC-462250	Tubing, silicone peroxide, 7.938 mm (5/16") × 11.113 mm (7/16")	15.24 m (50 ft)
TC-462350	Tubing, silicone peroxide, 7.938 mm (5/16") × 12.7 mm (1/2")	15.24 m (50 ft)
TC-462750	Tubing, silicone peroxide, 9.525 mm (3/8") × 12.7 mm (1/2")	15.24 m (50 ft)
TC-462850	Tubing, silicone peroxide, 9.525 mm (3/8") × 14.288 mm (9/16")	15.24 m (50 ft)
TC-462950	Tubing, silicone peroxide, 9.525 mm (3/8") × 15.875 mm (5/8")	15.24 m (50 ft)
TC-463780	Tubing, silicone peroxide, 12.7 mm (1/2") × 17.463 mm (11/16")	15.24 m (50 ft)
TC-463850	Tubing, silicone peroxide, 12.7 mm (1/2") × 19.05 mm (3/4")	15.24 m (50 ft)
TC-464650	Tubing, silicone peroxide, 15.875 mm (5/8") × 22.225 mm (7/8")	15.24 m (50 ft)
TC-465350	Tubing, silicone peroxide, 19.05 mm (3/4") × 25.4 mm (1.0")	15.24 m (50 ft)
TC-465450	Tubing, silicone peroxide, 19.05 mm (3/4") × 28.575 mm (1 1/8")	30.48 m (100 ft)

"Y" Elements for peristaltic pumps

505 L series pump head

Order number	Description ID OD	Quantity
TC-151840-D	"Y" segment, silicone, #15, 4.763 mm (3/16") × 9.525 mm (3/8")	10 per case
TC-151842-D	"Y" segment, silicone, # 119, 1.588 mm (1/16") × 6.35 mm (1/4")	10 per case
TC-151843-D	"Y" segment, silicone, #120, 3.175 mm (1/8") × 7.938 mm (5/16")	10 per case
TC-151844-D	"Y" segment, silicone, #24, 6.35 mm (1/4") × 11.113 mm (7/16")	10 per case
TC-151845-D	"Y" segment, silicone, #121, 7.938 mm (5/16") × 12.7 mm (1/2")	10 per case
TC-151846-D	"Y" segment, silicone, #122, 9.525 mm (3/8") × 14.288 mm (9/16")	10 per case

605 L series pump head

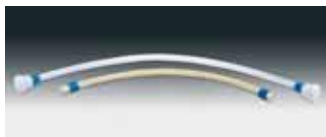
Order number	Description ID OD	Quantity
TC-151841-D	"Y" segment, silicone, #185, 8 mm × 16 mm	10 per case
TC-151847-D	"Y" segment, silicone, #186, 12 mm × 20 mm	10 per case

Specifications

Tubing on spools

Order number	Description ID OD	Quantity per spool
TC-412201	Tubing, C-Flex clear 082, 3.175 mm (1/8") × 6.35 mm (1/4")	152.40 m (500 ft)
TC-414101	Tubing, C-Flex clear 082, 6.35 mm (1/4") × 9.525 mm (3/8")	76.20 m (250 ft)
TC-414201	Tubing, C-Flex clear 082, 6.35 mm (1/4") × 11.113 mm (7/16")	91.44 m (300 ft)
TC-416201	Tubing, C-Flex clear 082, 9.525 mm (3/8") × 15.875 mm (5/8")	45.72 m (150 ft)
TC-416301	Tubing, C-Flex clear 082, 9.525 mm (3/8") × 14.288 mm (9/16")	60.96 m (200 ft)
TC-418201	Tubing, C-Flex clear 082, 12.7 mm (1/2") × 19.05 mm (3/4")	27.43 m (90 ft)
TC-422201	Tubing, C-Flex opaque 072, 3.175 mm (1/8") × 6.35 mm (1/4")	152.40 m (500 ft)
TC-424201	Tubing, C-Flex opaque 072, 6.35 mm (1/4") × 11.113 mm (7/16")	76.20 m (250 ft)
TC-426201	Tubing, C-Flex opaque 072, 9.525 mm (3/8") × 15.875 mm (5/8")	60.96 m (200 ft)
TC-428201	Tubing, C-Flex opaque 072, 12.7 mm (1/2") × 19.05 mm (3/4")	27.43 m (90 ft)
TC-462601	Tubing, silicone peroxide, 8 mm × 12 mm	76.20 m (250 ft)
TC-491201	Tubing, silicone 3350, 4.763 mm (3/16") × 7.938 mm (5/16")	152.40 m (500 ft)
TC-491301	Tubing, silicone 3350, 4.763 mm (3/16") × 9.525 mm (3/8")	152.40 m (500 ft)
TC-492901	Tubing, silicone 3350, 9.525 mm (3/8") × 15.875 mm (5/8")	76.20 m (250 ft)
TC-493801	Tubing, silicone 3350, 12.7 mm (1/2") × 19.05 mm (3/4")	76.20 m (250 ft)
TC-503701	Tubing, silicone platinum, 12.7 mm (1/2") × 17.463 mm (11/16")	76.20 m (250 ft)
TC-521201	Tubing, silicone platinum, 4.763 mm (3/16") × 7.938 mm (5/16")	76.20 m (250 ft)
TC-521801	Tubing, silicone platinum, 6.35 mm (1/4") × 11.113 mm (7/16")	76.20 m (250 ft)
TC-522901	Tubing, silicone platinum, 9.525 mm (3/8") × 15.875 mm (5/8")	76.20 m (250 ft)
TC-523701	Tubing, silicone platinum, 12.7 mm (1/2") × 17.463 mm (11/16")	76.20 m (250 ft)
TC-523801	Tubing, silicone platinum, 12.7 mm (1/2") × 19.05 mm (3/4")	76.20 m (250 ft)

Pharmaceutical Grade Tubing



Available gamma irradiated.
Available as custom tube assembly.
Call TC Tech | Sartorius for details.



Order information for tubing

Tygon® braided silicone tubing, formulation 3370

Order number	Description ID OD	Quantity per roll
TC-471850	Tubing, silicone 3370 IB, 4.763 mm (3/16") × 0.443"	15.24 m (50 ft)
TC-471950	Tubing, silicone 3370 IB, 6.35 mm (1/4") × 0.515"	15.24 m (50 ft)
TC-472050	Tubing, silicone 3370 IB, 9.525 mm (3/8") × 0.687"	15.24 m (50 ft)
TC-472150	Tubing, silicone 3370 IB, 12.7 mm (1/2") × 0.847"	15.24 m (50 ft)
TC-472250	Tubing, silicone 3370 IB, 15.875 mm (5/8") × 0.980"	15.24 m (50 ft)
TC-477150	Tubing, silicone 3370 IB, 19.05 mm (3/4") × 1.150"	15.24 m (50 ft)
TC-472450	Tubing, silicone 3370 IB, 25.4 mm (1.0") × 1.390"	15.24 m (50 ft)
TC-472525	Tubing, silicone 3370 IB, 31.75 mm (1 1/4") × 1.636"	7.62 m (25 ft)
TC-472625	Tubing, silicone 3370 IB, 38.1 mm (1 1/2") × 1.900"	7.62 m (25 ft)



C-Flex® tubing, formulation 050

Order number	Description ID OD	Quantity per roll
TC-430150	Tubing, C-Flex clear 050, 0.794 mm (1/32") × 2.381 mm (3/32")	15.24 m (50 ft)
TC-431250	Tubing, C-Flex clear 050, 1.588 mm (1/16") × 3.175 mm (1/8")	15.24 m (50 ft)
TC-431350	Tubing, C-Flex clear 050, 1.588 mm (1/16") × 4.763 mm (3/16")	15.24 m (50 ft)
TC-432250	Tubing, C-Flex clear 050, 3.175 mm (1/8") × 6.35 mm (1/4")	15.24 m (50 ft)
TC-433250	Tubing, C-Flex clear 050, 4.763 mm (3/16") × 7.938 mm (5/16")	15.24 m (50 ft)
TC-433350	Tubing, C-Flex clear 050, 4.763 mm (3/16") × 9.525 mm (3/8")	15.24 m (50 ft)
TC-434350	Tubing, C-Flex clear 050, 6.35 mm (1/4") × 9.525 mm (3/8")	15.24 m (50 ft)
TC-434250	Tubing, C-Flex clear 050, 6.35 mm (1/4") × 11.113 mm (7/16")	15.24 m (50 ft)
TC-434350	Tubing, C-Flex clear 050, 6.35 mm (1/4") × 12.7 mm (1/2")	15.24 m (50 ft)
TC-435250	Tubing, C-Flex clear 050, 7.938 mm (5/16") × 12.7 mm (1/2")	15.24 m (50 ft)
TC-436150	Tubing, C-Flex clear 050, 9.525 mm (3/8") × 12.7 mm (1/2")	15.24 m (50 ft)
TC-436250	Tubing, C-Flex clear 050, 9.525 mm (3/8") × 15.875 mm (5/8")	15.24 m (50 ft)
TC-436350	Tubing, C-Flex clear 050, 9.525 mm (3/8") × 14.288 mm (9/16")	15.24 m (50 ft)
TC-438150	Tubing, C-Flex clear 050, 12.7 mm (1/2") × 17.463 mm (11/16")	15.24 m (50 ft)
TC-438250	Tubing, C-Flex clear 050, 12.7 mm (1/2") × 19.05 mm (3/4")	15.24 m (50 ft)
TC-439150	Tubing, C-Flex clear 050, 15.875 mm (5/8") × 22.225 mm (7/8")	15.24 m (50 ft)
TC-430115	Tubing, C-Flex clear 050, 19.05 mm (3/4") × 25.4 mm (1.0")	4.57 m (15 ft)
TC-430215	Tubing, C-Flex clear 050, 19.05 mm (3/4") × 28.575 mm (1 1/8")	4.57 m (15 ft)
TC-430315	Tubing, C-Flex clear 050, 19.05 mm (3/4") × 31.75 mm (1 1/4")	4.57 m (15 ft)
TC-430615	Tubing, C-Flex clear 050, 25.4 mm (1.0") × 34.925 mm (1 3/8")	4.57 m (15 ft)
TC-430815	Tubing, C-Flex clear 050, 25.4 mm (1.0") × 38.1 mm (1 1/2")	4.57 m (15 ft)

Specifications

C-Flex® tubing, formulation 001

Order number	Description ID OD	Quantity per roll
TC-440150	Tubing, C-Flex opaque 001, 0.794 mm (1/32") × 2.381 mm (3/32")	15.24 m (50 ft)
TC-441250	Tubing, C-Flex opaque 001, 1.588 mm (1/16") × 3.175 mm (1/8")	15.24 m (50 ft)
TC-441350	Tubing, C-Flex opaque 001, 1.588 mm (1/16") × 4.763 mm (3/16")	15.24 m (50 ft)
TC-442250	Tubing, C-Flex opaque 001, 3.175 mm (1/8") × 6.35 mm (1/4")	15.24 m (50 ft)
TC-443250	Tubing, C-Flex opaque 001, 4.763 mm (3/16") × 7.938 mm (5/16")	15.24 m (50 ft)
TC-443350	Tubing, C-Flex opaque 001, 4.763 mm (3/16") × 9.525 mm (3/8")	15.24 m (50 ft)
TC-444150	Tubing, C-Flex opaque 001, 6.35 mm (1/4") × 9.525 mm (3/8")	15.24 m (50 ft)
TC-444450	Tubing, C-Flex opaque 001, 6.35 mm (1/4") × 11.113 mm (7/16")	15.24 m (50 ft)
TC-444350	Tubing, C-Flex opaque 001, 6.35 mm (1/4") × 12.7 mm (1/2")	15.24 m (50 ft)
TC-445250	Tubing, C-Flex opaque 001, 7.938 mm (5/16") × 12.7 mm (1/2")	15.24 m (50 ft)
TC-446150	Tubing, C-Flex opaque 001, 9.525 mm (3/8") × 12.7 mm (1/2")	15.24 m (50 ft)
TC-446250	Tubing, C-Flex opaque 001, 9.525 mm (3/8") × 15.875 mm (5/8")	15.24 m (50 ft)
TC-446350	Tubing, C-Flex opaque 001, 9.525 mm (3/8") × 14.288 mm (9/16")	15.24 m (50 ft)
TC-448150	Tubing, C-Flex opaque 001, 12.7 mm (1/2") × 17.463 mm (11/16")	15.24 m (50 ft)
TC-448250	Tubing, C-Flex opaque 001, 12.7 mm (1/2") × 19.05 mm (3/4")	15.24 m (50 ft)
TC-449150	Tubing, C-Flex opaque 001, 15.875 mm (5/8") × 22.225 mm (7/8")	15.24 m (50 ft)
TC-440115	Tubing, C-Flex opaque 001, 19.05 mm (3/4") × 25.4 mm (1.0")	4.57 m (15 ft)
TC-440215	Tubing, C-Flex opaque 001, 19.05 mm (3/4") × 28.575 (1 1/8")	4.57 m (15 ft)
TC-440315	Tubing, C-Flex opaque 001, 19.05 mm (3/4") × 31.75 mm (1 1/4")	4.57 m (15 ft)
TC-440615	Tubing, C-Flex opaque 001, 25.4 mm (1.0") × 34.925 mm (1 3/8")	4.57 m (15 ft)
TC-440815	Tubing, C-Flex opaque 001, 25.4 mm (1.0") × 38.1 mm (1 1/2")	4.57 m (15 ft)



Filter Cartridge Housings

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Multi-Rounds Filter Housings



Introduction

Quality gas or liquid filtration systems require both quality housings and quality filter cartridges. To meet this need, Sartorius has been producing a sanitary line of housings with quality as the primary objective. Sartorius multi-round housings have been designed to meet the scale-up requirements of pharmaceutical and biotechnology processing. These housings are designed specifically for sterile filtration with special attention taken with the choice of materials, durability, cleanability, ease of use and quality control.

Quality of materials

Only 316L Stainless steel is used for all wetted surfaces to provide maximum durability. Supplied O-rings and gaskets are compounded only from FDA approved materials that meet the requirements for direct contact with food and pharmaceutical products.

Quality surface finishes

All Sartorius Sanitary housings come standard with internal finishes of at least 0.5 micron Ra and are electropolished. Electropolishing removes surface impurities in stainless steel left over from the machining and the finishing processes. Such impurities are sites for future initiation of corrosion and possible sources of contaminants leaching into the product. Electropolishing also smooths the microscratches left by mechanical polishing, thus reducing the total surface area the product will contact, and making it harder for bacteria or contaminants to lodge on leaves a highly corrosion resistant, passive film on the surface of the steel (passivation). Thus electropolishing is the recommended finish for all applications where cleanliness and corrosion resistance are critical.

Ease in cleaning

Sartorius utilizes a unique filter cup design that is conducive for allowing a thorough cleaning. The raised filter cup design eliminates small grooves and tight spaces that might be difficult to verify or validate the cleaning while still permitting free complete drainage of the filter housing. The entire housing is cleaned, even under the receiver plate. CIP caps are also available.

Quality control and documentation

An important feature of pharmaceutical process validation is documentation. All our housings are given stringent inspections during and after manufacturing including dimensional checks, weld inspections, surface measurements and hydrostatic testing. Each housing is labeled by laser with a matching serial number on the bell and base. This serial number provides complete tractability for the Quality Control Certificate, Material Test Reports, and Weld Logs.

Ease of installation

Sartorius housings are sold ready to install with all gaskets, o-rings and clamps. All that is required are the components needed to connect to your existing hardware.

PED 97/23/EC Standard

Sartorius Stainless Steel Housings are designed and manufactured according to the Pressure Equipment Directive PED 97/23/EC. Our manufacturing process follows the highest quality standards and is monitored by an internal quality control system as well as by independent notified bodies on a regular basis.

Specifications

Available heights

3-Round 10", 20", 30", 40"
5, & 7 Round 10", 20", 30", 40"

Surface finishes

Interior Ra < 0.5 µm EP
Exterior Ra < 1.6 µm EP

Housing ratings

Pressure -1 + 10 bar
Temperature -10 + 150°C

Materials

All wetted surfaces	316L
Clamps	304
Seals	Silicone (Viton or EPDM optional)

Mini & 1 Element Filter Housings



Introduction

There has been, and is, an increasing demand for quality filter cartridge systems for sterilizing and polishing filtration processes. A large emphasis has been placed on the integrity of construction of the filter cartridges. However, the filter cartridge housing is just as an important part of any filtration system. Without a proper housing the cartridge is useless. Even the best cartridge cannot do the job if enclosed in a housing that allows fluid to bypass the filter, has external leaks, are not chemically or mechanically compatible with the application. Quality gas or liquid filtration systems require both quality housings and quality filter cartridges. To meet this need, Sartorius has been producing a sanitary line of housings with quality as the primary objective.

Quality of materials

Only 316L Stainless steel is used for all wetted surfaces to provide maximum durability. Supplied O-rings and gaskets are compounded only from FDA approved materials that meet the requirements for direct contact with food and pharmaceutical products.

Quality surface finishes

All Sartorius Sanitary housings come standard with internal finishes of at least 0.5 micron Ra and are electropolished. Electropolishing removes surface impurities in stainless steel left over from the machining and the finishing processes. Such impurities are sites for future initiation of corrosion and possible sources of contaminants leaching into the product. Electropolishing also smoothes the microscratches left by mechanical polishing, thus reducing the total surface area the product will contact, and making it harder for bacteria or contaminants to lodge on the housing surface.

Finally, electropolishing leaves a highly corrosion resistant, passive film on the surface of the steel (passivation). Thus electropolishing is the recommended finish for all applications where cleanliness and corrosion resistance are critical.

Ease in cleaning

Sartorius utilizes a unique filter cup design that is conducive for allowing a thorough cleaning. The raised filter cup design eliminates small grooves and tight spaces that might be difficult to verify or validate the cleaning while still permitting free complete drainage of the filter housing.

Flexibility

Sartorius offers the widest range of housing sizes and design options to exactly match your flow rate and pressure differential requirements. Connections are available in many styles and sizes. Custom designs and unique configurations are available upon request.

Quality control and documentation

An important feature of pharmaceutical process validation is documentation. All our housings are given stringent inspections during and after manufacturing including dimensional checks, weld inspections, surface measurements and hydrostatic testing. Each housing is labeled by laser with a matching serial number on the bell and base. This serial number provides complete tractability for the Quality Control Certificate, Material Test Reports, and Weld Logs.

Ease of installation

Sartorius housings are sold ready to install with all gaskets, o-rings and clamps. All that is required are the components needed to connect to your existing hardware.

PED 97/23/EC Standard

Sartorius Stainless Steel Housings are designed and manufactured according to the Pressure Equipment Directive PED 97/23/EC. Our manufacturing process follows the highest quality standards and is monitored by an internal quality control system as well as by independent notified bodies on a regular basis.

Specifications

Available heights

Mini	5"
Single Round	5", 10", 20", 30", 40"

Surface finishes

Interior	Ra < 0.5 µm EP
Exterior	Ra < 1.6 µm EP

Housing ratings

Pressure	-1 + 10 bar
Temperature	-10 + 150°C

Materials

All wetted surfaces	316L
Clamps	304
Seals	Silicone (Viton or EPDM optional)

Filter Cartridge Housings for the Pharmaceutical Industry Modular System for Stainless Steel Filter Housings



Filter housings with certified quality you can rely on.

The widest variety of configurations are possible when designing filter housings that meet the needs of the pharmaceutical industry.

That is why we have broken down the housing into its individual components. This enables you to select the components you need and configure your housing on your own using our special software. Then we will manufacture your custom-designed housing in compliance with certified quality standards.

You can choose from

- different vent valves or units
- pipes according to DIN, ISO or BSOD
- connectors and clamps such as Tri-clamps, flanges, and threaded fittings according to all conventional standards.

The standard we offer you

Material	AISI 316 L
Surfaces	Inner: Ra < 0.5 µm; Outer: Ra < 1.6 µm
Temperature range	-10...+150°C
Pressure range	-1...+10 bar
Adapters	Mini: 15; standard 10" cartridge: 25
Housing clamp lock	Sanitary clamp
Clamp gasket	Silicone (FDA)



We manufacture your housing in compliance with certified quality standards.

We stock a sufficient number of all the individual components for the modular system. This guarantees that delivery will be prompt and that high quality standards are maintained.

Our standard documentation includes material certificates in compliance with EN 10204 3.1 and FDA certificates of compliance for gasket materials.

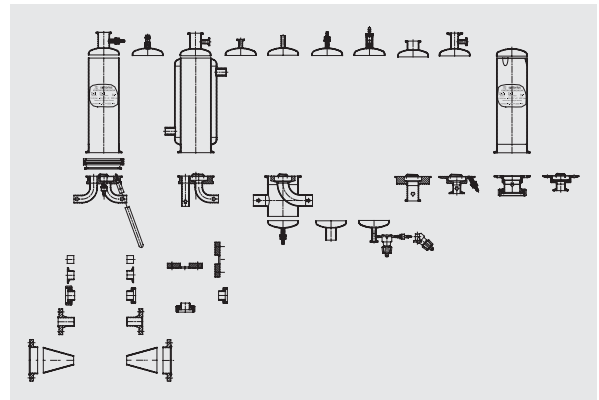
PED 97/23/EC Standard

Sartorius Stainless Steel Housings are designed and manufactured according to the Pressure Equipment Directive PED 97/23/EC. Our manufacturing process follows the highest quality standards, and is monitored by an internal quality control system as well as by an independent notified on a regular basis.

Besides supplying you with all the modular system components you need, we will be happy to provide any other variations to customize your housing design.

Modularly Designed System (M.D.S). The Sartorius software for drafting a complete modular housing.

Using our M.D.S. software, the final drawing of a modular, custom-configured housing can be produced within minutes. This drawing will also be used to prepare the cost estimate. After you have checked and approved the draft, the drawing will be sent on to our production department.



Your added benefits

- Fast configuration of your housing according to your needs
- Ability to review your housing on-site in the proper scale
- Quick order processing
- Prompt delivery
- Our software speaks your language: choose from English, French, German, Italian and Spanish

Our service is better

- Competent advice on-site
- Professional drawing based on your on-site specifications
- Better prices

You can choose from the following modular programs

- Mini 1-round housing
- Standard 1-round housing
- Standard 3-round housing
- Standard 5-round housing

This is how you configure your housing.

We'll show you the variety of individual components that our modular system provides for you to combine and configure.

Just use the code numbers to select the elements you want.

Thanks to our modularly designed system software (M.D.S), you can review your housing selection right away and make changes, if necessary.

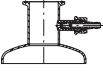


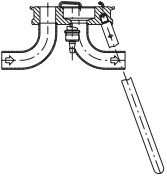
Your filter housing will be composed of the following basic components

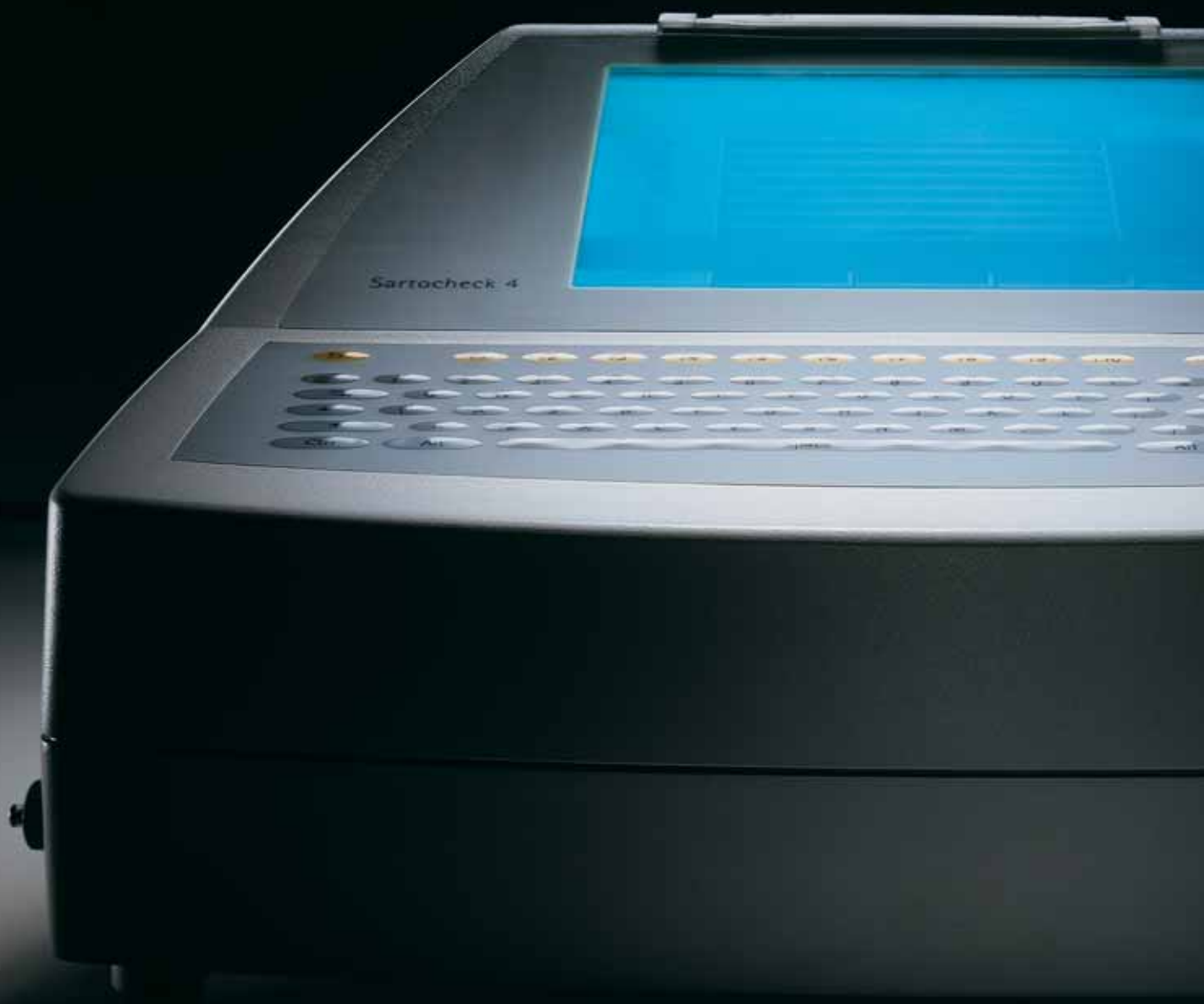
- Top part of the housing with vent
- Housing bell (of the appropriate height)
- Gaskets (made of various materials)
- Clamp for filter housing lock (Tri-clamp)
- Housing base:
 - a) without condensate run-off valves
 - b) with condensate run-off valves (connecting pipes available in types compliant with DIN, ISO, BSOD).
- Fittings
- Extra valve options
- Documentations

All filter housings are available in a choice of the following designs:

T type, in-line type or L type.

Brief example

Drawing	Modular design code	Technical description
	BA001	Fittings, general: Clamp 50.5 mm Pipe: 38.1 mm x 1.65 mm Side fittings: New pharma valve (PTFE tip, silicone O-ring)
	Bell height BBOH0 BBOH1 BBOH2 BBOH3 BBOH4	Pipe: 101.6 mm x 2.0 mm TC 119.0 mm Housing bell for: 5" filter cartridges 10" filter cartridges 20" filter cartridges 30" filter cartridges 40" filter cartridges
	BC0K2	2-piece joint clamp with 2 hexagon nuts, 119.0 mm, (4") Temp.: -10...+150°C Pressure: +10 bar (limited by housing)
	BE004 BE005 BE006	Base plate adapter 25 - with removable legs - without vent valve Pipe dimensions: BSOD 1": 25.4 mm x 1.65 mm DIN DN 25: 29.0 mm x 1.5 mm ISO DN 25: 33.7 mm x 2.0 mm





Filter Integrity Testing Systems

Sartocheck® Junior BP-Plus	210
Sartocheck 3	212
Sartocheck 3 EPS	214
Sartocheck® 4	216
Sartocheck 4 MultiUnit	218
Sartorius Trolley System	220

Sartocheck® Junior BP-Plus For Diffusion & Bubble Point Integrity Testing of Membrane Filter Systems



Sartocheck Junior BP-Plus is an automatic, microprocessor-controlled tester designed to check the integrity of membrane filter systems and provide a hard copy of the test data and results. It measures the following upstream integrity values:

- The diffusion rate
- The bubble point

A special, built-in program is available for determining the net upstream volume of your filtration systems. A comprehensive test report is printed out to meet cGMP requirements.

To increase the clarity of the test and to ensure 100% traceability of the results, complete test parameters and conditions of the test are also printed on hard copy, including:

- Net upstream volume
- Test pressure (actual value)
- Pressure drop
- Test time and date

To program a test, simply enter the maximum allowable air diffusion rate and the minimum required bubble point specified by the filter manufacturer. You can use the Sartocheck Junior BP-Plus to determine the bubble point of disc filter systems, from syringe filter holders to 293 mm filter holders, and complete integrity tests (diffusion and bubble point) on capsules, mini filter cartridges and single standard filter cartridges up to 30" high.

Sartocheck Junior BP-Plus features:

Test programs and data backup

Up to 3 test programs can be stored in the non-volatile memory of the Sartocheck unit; the program parameters are entered on the keypad. Data is backed up by the non-volatile memory.

Total test time

The Sartocheck Junior BP-Plus can complete a routine test in 8 minutes or less (includes both the diffusion and the bubble point) depending on the type of filtration system.

Continuous test updates

Continuous display updates of the momentary diffusion rate or the momentary pressure drop during a test cycle enable you to make a quick estimate of the integrity of your system during the first few minutes of the test. You can interrupt the test cycle at any time and automatically obtain a printout of the test results available up to this point.

Flushing the unit

You can flush the internal pneumatic unit any time using the built-in flushing program.

Languages

The Sartocheck Junior BP-Plus has built-in multi-language capabilities in English, German, French, Spanish and Italian. You can have the same test record printed out in several languages and obtain any number of copies.

Quality assurance

The high performance standards of Sartocheck Junior BP-Plus is assured over long periods:

- Easy calibration using the keypad
- Annual service maintenance contracts are available through our wide service network

User-friendly features

The unit is battery-operable, splash-proof and easy to handle. Its backlit display makes it easy to read the test results even in dark rooms. An acoustic signal indicates the end of the test, so operator attendance is not required. Red and green indicator lights can be seen at a distance for convenient pass or fail evaluation.

Validation

We will be glad to help you in getting your Sartocheck Junior BP-Plus validated. We can provide validation literature or validation services.

Data processing

Data processing: The interface diskette allows you to transfer the test data to an IBM-compatible PC.

Available Options:

- Computer interface cable
- Interface disk for IBM-compatible PC

Equipment supplied

- Sartocheck Junior BP-Plus Tester
- Tubing for compressed gas, inlet and outlet, with compressed air filter
- 1 liter external pressure tank, complete with pressure connections
- Battery charger
- Ink ribbon cassette and paper roll
- Installation and operating instructions, test and calibration certification

Specifications

Technical specifications

Power requirements (mains) for battery charger	220/240 V, 50 Hz 110/120 V, 60 Hz
Power supply	7.2 V, 1.8 Ah
Maximum inlet pressure	8 bar (120 psi)
Minimum inlet pressure	1 bar over test pressure (14.5 psi)

Measuring ranges

Test pressure	100–6000 mbar (1.5–87 psi)
Net housing volume	0.05–5 liters
Diffusion	0–999 ml/min
Pressure drop rate	0–200 mbar/min (0–2.9 psi/min)
Bubble point	0.5–6 bar (7.3–87 psi)

Measuring accuracy

Test pressure	± 0.5% (of the max. value)
Pressure regulation	± 0.4% (at 2.5 bar 36 psi)
Volume measurement	± 5%
Diffusion measurement	± 6%*
Bubble point	± 0.1 bar (1.5 psi)

Operating conditions

Constant ambient temperature	+15° to +35°C
Storage temperature	0° to +40° C
Relative humidity	10–80%

Order information

Order number	16296
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* at 1000 mbar (14.5 psi) atmospheric pressure and with a pressure drop « test pressure

Sartocheck 3 Microprocessor-controlled Integrity Tester



Sartocheck 3 is a fully automatic, microprocessor-controlled integrity tester to check the integrity of membrane filter systems. They measure the following upstream integrity values:

- Diffusion test
- Bubble Point test
- Diffusion and Bubble Point test
- Water Intrusion test | Water Flow test
- Pressure Drop test
- Multipoint Diffusion test

All the test relevant data and parameter are printed on the hard copy, including:

- Product, product lot, used filter cartridge(s)
- Wetting agent
- Test parameter (test pressure, time, limit values, ...)
- Results, including actual test pressure, net volume, pressure drop, actual test value, evaluation)
- Date and time

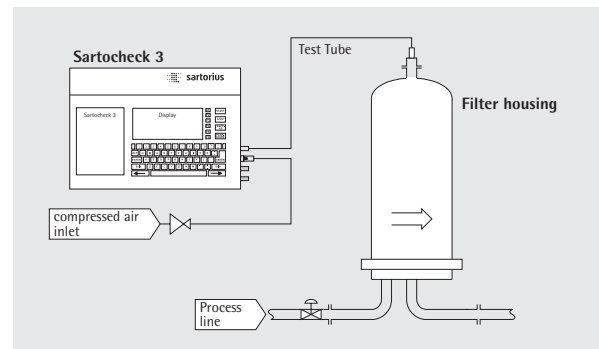
The benefits of integrity testing with Sartocheck 3

- Easy to use
- Designed for use in bio-, pharmaceutical production environments
- Reliable and accurate measuring procedure
- Individual selectable password protected programming
- Comprehensive validation guide including
 - IQ and OQ check lists
 - Installation and operating instruction

PC remote control

- Validatable data transfer via PMS interface;
- operational functions can be driven and monitored on the PC via PMS interface (Process Management System)
- installation of the WINCHECK software

Test set-up of integrity testing for membrane filters for liquids



Specifications

Technical specifications

Power requirements	85 – 240 V AC, 47 – 440 Hz
Maximum power input	60 watts
Maximum operating pressure	9999 mbar
Internal limit pressure	7000 mbar
Dimensions (W×D×H1×H2)	460×360×65×126 mm
Weight	11.2 kg
Measuring ranges	
Test pressure	100 – 6000 mbar
Pressure drop	0 – 999 mbar
System inlet volume (with external ref. Vessel)	max. 50,000 ml
Measuring accuracy	
Internal relative pressure	± 12 mbar
Internal test pressure	± 0.2 % full scale
Pressure drop	± 1 mbar
Volume determination	± 4 %
Bubble Point	≤ ± 50 mbar
Operating conditions	
Ambient temperature	+15°C to + 35°C
Rel. humidity	10 – 80 %

Equipment supplied

Sartocheck 3	16286
Memory Card	83058-000-00
Tubing for compressed gas inlet	18104
Tubing for compressed gas outlet	18103
Ribbon cassette	6982141
Rolls of printer paper	6982142
Test certificate	
Calibration certificate	
Brief instruction	
Installation and operating instructions	
Mains lead (country-specific)	

Accessories

WINCHECK software package	17011---010
WINCHECK interface cable (D-Sub 25/9)	6982148
Memory Card	6982128
Tubing for compressed gas inlet	18104
Tubing for compressed gas outlet	18103
Validation package	16280

Sartocheck 3 EPS Filter Integrity Testing Without Limits



Sartocheck 3 EPS is a fully automatic, microprocessor-controlled integrity tester including the External Pressure Sensor Technology. Sartocheck 3 EPS is especially designed for performing the Water Intrusion Test (WIT) with highest process reliability:

Accuracy

- Avoids interfering influences on the test results of the WIT based on height differences between filter housing and integrity tester. E.g.: WIT on Water for Injection storage tanks.
- No temperature influences on the connection between Sartocheck 3 EPS and filter housing due to data transfer by an electronic cable.

Flexibility

- No limitations on the distance between filter housing and Sartocheck 3 EPS up to 200 m with the delivered standard cable.
- Ideal for Clean room and EX proof areas.
- Control function via PLC interface, suitable for installation and communication between PLC (autoclaves, freeze dryer, filling machines, ...) and Sartocheck 3 EPS.

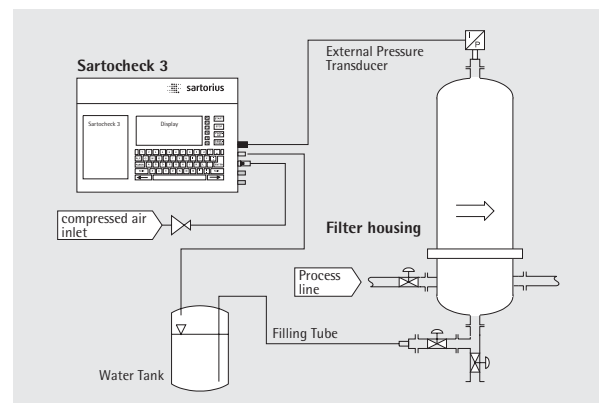
Sanitary design

- The external pressure transducer can remain on top of the filter housing during in-line steaming of the filter system.

Validation

- Individual selectable password protected programming.
- Validatable data transfer via PMS interface (Process Management System).
- Comprehensive validation package is available including IQ and OQ Check lists.
- On-site Validation support by Sartorius validation experts.

Test set-up of integrity testing for membrane filter for gas | air



Specifications

Technical specifications

Power requirements	85–240 V AC, 47–440 Hz
Maximum power input	60 watts
Maximum operating pressure	9999 mbar
Internal limit pressure	7000 mbar
Dimensions (W×D×H1×H2)	460×360×65×126 mm
Weight	11,2 kg
Measuring ranges	
Test pressure	100 – 6000 mbar
Pressure drop	0 – 999 mbar
System inlet volume (with external ref. Vessel)	max. 50000 ml
Measuring accuracy	
Internal relative pressure	± 12 mbar
Internal test pressure	± 0.2 % full scale
External relative pressure	± 6 mbar
External test pressure	± 0.1 % full scale
Pressure drop	± 1 mbar
Volume determination	± 4 %
Bubble Point	≤± 50 mbar
Operating conditions	
Ambient temperature	+ 15°C to + 35°C
Rel. humidity	10 – 80 %

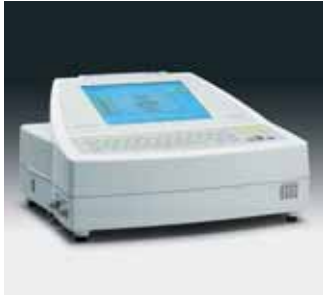
Equipment supplied

Sartocheck 3 EPS	16286---EPS
External Pressure Transducer	17011---003
Memory Card	83058-000-00
Tubing for compressed gas inlet	18104
Tubing for compressed gas outlet	18103
Ribbon cassette	6982141
Rolls of printer paper	6982142
Test certificate	
Calibration certificate	
Brief instruction	
Installation and operating instructions	
Mains lead (country-specific)	

Accessories

WIT-Kit, valve switch box to control 3 external valves	17005Z-----0003
External Pressure Transducer	17011---003
Memory Card	6982128
Validation package	16281

Sartocheck® 4 Fully Automatic Integrity Testing Device



Description

Sartocheck 4 is the consequent further development of the most successful filter integrity tester of its class, the Sartocheck 3. Based on the straightforward operator concept that distinguished its predecessor, Sartocheck 4's user-friendliness has been improved even more thanks to the following features:

- Touch screen
 - Rapid and direct program selection and data entry on the display
- Large, color TFT display
 - Clear and easy-to-read display data
- Standard PC keyboard design
 - Familiar keyboard design
- Online assistance
 - Immediate and direct help available in the display
- Straightforward menu guidance
 - Quick and reliable handling
- External Pressure transducer and external valves
 - Flexible operation
- Easy to clean
 - Cleaning and drying of the internal valve block and internal reference vessel

Sartocheck 4 performs the following tests:

- Bubble Point
- Diffusion
- Bubble Point and Diffusion (combination test)
- Pressure Drop Test
- Water Intrusion Test (WIT)
- Water Flow Test (WFT)
- Multipoint Diffusion Test

In compliance with 21 CFR part 11

The electronic archiving of processing data is currently one of the most critical subjects. Doing full justice to this topical issue, Sartocheck 4 complies with 21 CFR Part 11 in all relevant points:

- User management: The system administrator allocates individual access rights to every user. As soon as the user has logged in, all his actions are coded with his name and recorded in the audit trail. After a configurable time, the user will be automatically logged-off.
- Data security: Sartocheck 4 manages up to 250 test programs and 500 test results in an internal database. The user is requested to archive the results database onto a disk. This ensures that no data are overwritten or get lost. In addition to the internal data storage the Sartocheck 4 is able to communicate with a network. Via standard RJ45 connection, all data can be easily up-load on a FTP Server. For more information call our technical support.
- Audit trail: The audit trail documents all GMP-relevant user actions. All warnings and errors are stored on the audit trail with a real-time stamp.

Qualification

Sartocheck 4 qualification ensures that integrity tests to be conducted are carried out with high precision and accurate reproducibility. Our comprehensive Sartocheck 4 validation documentation provides the necessary support for the user. Our Technical Support Specialists are additionally available to help on-site.



A B 1 2 3 4 5

- 1: external reference tank
- 2: Venting 1
- 3: Out
- 4: Venting 2
- 5: In
- A: external Sensor
- B: external Valve



5 1 2 3 4

- 1: main switch
- 2: 3,5" floppy drive
- 3: Serial Port TU
- 4: PLC Port
- 5: RJ45 Network

Specifications

Technical specification

Power requirements	100 – 240 V AC, 50/60 Hz
Maximum power input	74 watts
Maximum operating pressure	9999 mbar 145 psi
Minimum inlet pressure	4000 mbar 58 psi
Dimensions (W × D × H1 × H2)	460 × 390 × 140 × 245

Measuring ranges

Test pressure	100–8000 mbar 1,5–116 psi
Pressure drop	1–2000 mbar 0,01–29 psi
System inlet volume	
- with internal ref. Vessel	9000 ml
- with external ref. Vessel	max. 100 l

Measuring accuracy

Pressure	± 0,1 % full scale
	± 9,5 mbar
Pressure drop	± 1 mbar
Volume determination	± 4 %
Diffusion	± 5 %
Water-Intrusion	± 5 %
Bubble Point	± 50 mbar ± 0,7 psi

Operating conditions

Ambient temperature	+15°C to +35°C
Rel. humidity	10 – 80 %

Touch screen

Size	10.4" TFT
Features	256 colors

Communication ports

Serial Port TU	RS232
Serial Port MU	RS485
PLC Port	binary signals 12 pins
Network	RJ45

Language option	English, German, French, Spanish, Italian
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Equipment supplied

Sartocheck 4	16288
Tubing for compressed gas inlet	18104
Tubing for compressed gas outlet	18103
Ribbon cassette	6982141
Rolls of printer paper	6982142
Sartocontrol CD	
Test certificate	
Calibration certificate	
Installation and operating instructions	
Validation package	16288--VP
Mains lead (country specific)	

Accessories

External pressure transducer	1ZE---0018
Valve set for external venting	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
Validation Package	16288---VP
Multiunit	16288---TU*
Cleaning Kit	16288---CK

* Available 04/05

Sartocheck 4 MultiUnit Next Generation of Filter Integrity Testing



Description

The Sartocheck 4 MultiUnit has been developed to enable parallel integrity testing of multiple filters in the biopharmaceutical industry. The MultiUnit is an identical copy of the Sartocheck 4, without the user interface and the data management system. Each MultiUnit connected to a Sartocheck 4 is operated and controlled by this Sartocheck 4 via a RS485 connection.

Efficiency

Up to 4 MultiUnits can be connected to one Sartocheck 4 allowing to integrity test up to 5 different filter systems in parallel including the testing capabilities of the Sartocheck 4 itself. Testing up to 5 filters in parallel allows to reduce the time required for filter integrity testing in bio-pharmaceutical production significantly and increases the efficiency of your production process.

Flexibility

There is no distance limitation between the Sartocheck 4 and the connected MultiUnits. The MultiUnits can be placed all over your production facility and are centrally controlled and operated by the Sartocheck 4. A printout of the test results of the MultiUnit is made by the printer of the Sartocheck 4 and the test data can be transferred to a network for review and archiving.

Data transfer security

The Sartocheck 4 MultiUnit is an independent test unit with its' own power supply, electronics and pneumatics. It will maintain the test results even if switched off or if the connection is lost until the handshake communication with the Sartocheck 4 confirms

that the test results have been transferred successfully. If the MultiUnit is switched off during the test it will transfer a corresponding error message as soon as the communication has been automatically reestablished.

Traceability

The Sartocheck 4 test result printout contains the serial number of the MultiUnit, the user name (log on identity), a unique file name and all the information that has been entered in the batch protocol. The included software, Sartocontrol, can be used to print the test results on an external printer in A4 format.

Patent pending thermal insulation

The Sartocheck 4 and its' Multiunit feature a unique, patent pending separation of the electronic components and the temperature sensitive pneumatics in addition to the efficient vent fan. This superior solution avoids any thermal influence on the integrity test measurement from the unit itself.

Clean room venting adapter

The Sartocheck 4 and its' MultiUnit can be equipped with an optional venting fan adapter that allows to contain the out coming air in order to avoid any dispersion of particles in a clean room.

Sartorius Validation Package

The MultiUnit is delivered with a comprehensive validation package including an IQ & OQ protocol that can be accomplished by qualified Sartorius personnel. Assistance for PQ can also be provided from the Sartorius Technical Support team.



1 2 3 4 5

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 B C D E F G

- A. Ext. sensor
- B. Ext. valve
- C. Ext. reference tank
- D. Venting 1
- E. Outlet (test gas)
- F. Venting 2
- G. Inlet comp. gas

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 internal ref. vessel	9000 ml
– with external ref. vessel	100 l

Measuring accuracy

Pressure	± 0.1% full scale ± 9.5 mbar
Pressure drop	± 1 mbar
Volume determination	± 4%
Diffusion	± 5%
Water intrusion	± 5%
Bubble point	± 50 mbar 0.7 psi

Operating conditions

Ambient temperature	+15 to + 35°C
Relative humidity	10–80%
Max distance between SC4 and multiunit (RS485)	100 m

Equipment supplied

MultiUnit	16288---TU
Tubing for compressed gas inlet	18104
Tubing for test gas	18103
Test certificate	
Calibration certificate	
Installation and operating instructions	
Validation package	
Mains lead (country specific)	

Accessories

External pressure Transducer	1ZE---0018
Valve kit for ext. venting (1 valve)	1ZE---0025
Valve kit for WIT and or external pressure sensor (3 valves)	1ZE---0026
Cleaning kit	16288---CK
Clean room venting adapter	1ZE---0021

Sartorius Trolley System Gain Flexibility and Mobility – Increase Process Reliability



The system consists of the integrity tester, Sartocheck 3 EPS, on top of a trolley. The Trolley System includes the equipment needed for automatic Water Intrusion Testing, e.g., pressure tank for the test water, pneumatically controlled valves, PLC.

Mobile | easy-to-use system

It is easy to move the system right to where the filters to be tested are located. Only the tubing for filling as well as the external pressure transducer need to be connected to the filter housing.

High process reliability

The entire filter test procedure is performed completely automatically by the Trolley System as follows:

- The filter housing is filled with test water
- The test is carried out according to the Water Intrusion Test Method
- The tested housing is drained
- Once the test has been completed and passed, the tubing and the external pressure transducer can be disconnected from the filter system.
- The tested filter system is now ready to use in production.

Flexibility

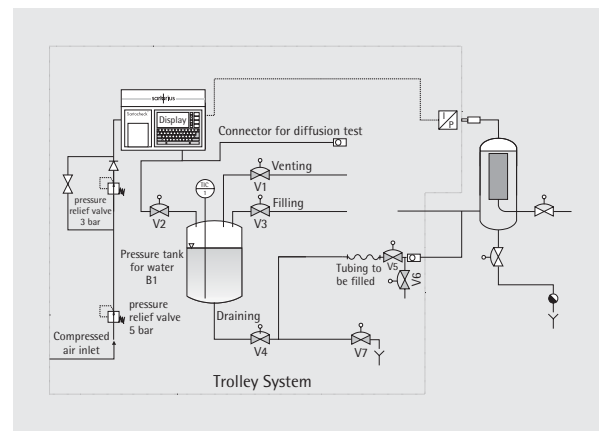
Besides automatic WIT, the system can also be used for standard integrity testing of hydrophilic filters by the Diffusion and Bubble Point Tests.

Sanitary design

Ideal for bio-, pharmaceutical production, the internal pressure vessel and the piping for water are steam-sterilisable

Thanks to Sartorius' external pressure transducer technology, there are no longer any limitations concerning the distance between the filter housing and the integrity test system. The Sartocheck 3 EPS features an external pressure transducer that is conveniently located directly on top of the housing. It uses this transducer to control the initial pressure accurately according to the value entered.

Set-up of the Trolley System



Specifications

Technical specifications

Electrical

Power requirements	110 230 V AC, 50 60 Hz
Power input	500 VA
Fuse protection	max. 10 A

Pneumatic

Inlet compressed air	min. 5 bar max. 10 bar
Connection	Stäubli RBE03/male

Steam | test water

Steam inlet temperature	max. 134°C
Steam inlet pressure	max. 2 bar
Test water inlet temperature	max. 30°C
Test water inlet pressure	max. 4 bar
Connection	Sanitary DN ISO 8 Ø 50.5 mm
External valve connection	Stäubli RBE06 OD male
External pressure transducer	Stäubli RBE03 OD female
Dimensions	650 × 450 × 800 mm
Material pressure vessel and piping	ANSI 316L

Ambient operating conditions

Temperature	+15°C to +30°C
Rel. humidity	15 to 95% (indoors) no condensation

Equipment supplied

Integrity Test "Trolley System" (without Sartocheck 3 EPS)	17005A---L--4708
External valve box (valve for draining and filling) including connectors and tubing	
PLC, SIMATIC	
Temperature sensor	
Level sensor	
Diaphragm valves	
Pressure tank, 20 l	
Documentation	



Permeate



Retentate



sartorius

17915-002

Permeate

Series 45

Feed

Sartech 3

FACTS



FACTS® Services

Added Value for Your Business

DISCOVER®	224
INCREASE®	225
CONFIDENCE®	226
EXPAND®	228
Biopharm Alliance	229

Do You Need a Fresh Approach? DISCOVER® – Surveys and Audits



The pharma | biotech industry is highly regulated and confronted with everchanging compliance parameters. In addition to complying with these regulations, companies must increase capacity and lower costs to remain competitive. The first step of any improvement is a precise analysis of the current situation.



Our customers deserve to get expert advice exactly when and where they need it. A dedicated team of professionals will visit your facility to conduct a full plant survey in which the review of equipment, operating procedures and documentation is carried out in complete confidentiality. Our recommendations for improvements can help make your facility compliant with cGMP and regulatory guidelines and, in addition, optimize product recovery.

We understand industry regulatory requirements and can take the headache out of inspections and auditing.

We specialize in:

- Steam-In-Place (SIP) procedures
- Clean-In-Place (CIP) procedures
- Filter handling for optimum results
- Integrity test methods
- Hardware design options
- Validation documentation
- Process designs and qualification
- Technical studies
- Regulatory compliance

We then will use the plant survey report as the basis for process optimization and appropriate, organized and efficient project management. This provides the Sartorius-Client team with a guide for working together with you effectively, on a project-by-project basis.

DISCOVER® – Case study

A well-known pharmaceutical company was producing a vaccine that had to be pre-filtered. There were 60 production campaigns a year, each of 3000 L. At the time, the company was using 24×40 inch filters for coarse filtration and 24×40 inch filters for fine filtration. The processing time was 2 hours.

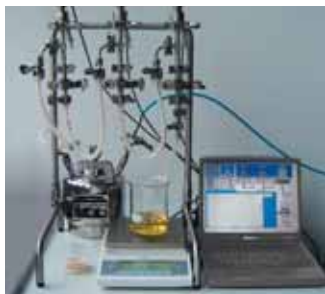
Sartorius provided the company with 11×40 inch special prefilters and 11×40 inch fine filters. The processing time was cut to one hour and there was no product loss.

Total annual savings were \$263,000.

For direct inquiries

DISCOVER® – Surveys and Audits
discover.info@sartorius.com

Are You Getting What You Really Need? INCREASE® – Process Optimization



Our goal is to find the optimal process solution for your specific application. We understand that reducing cost per liter, improving yield and implementing efficient process times while increasing product and process reliability are the major success factors that our customers require. Our attention to all detailed aspects of your filtration process can help you achieve an optimal process and maximum value.

Filter selection

The first step is selecting the right filters. We primarily base this selection on published and calculated data. We review the filter membranes with emphasis on chemical and physical compatibility in contact with pharmaceutical products and cleaning agents, particle and bacteria retention, adsorption properties, required flow rate and total throughput.



Filterability studies

In order to help our customers select a filter or a compatible combination of filters, our specialists perform filterability trials using filter discs or small pleated devices with your product under actual process conditions. To maximize your process for zero tolerance with inefficiencies and to optimize flow | pressure ratios, Sartorius has designed a filterability kit called the Zero-T. It is run by a highly refined software program that generates a permanent report featuring throughput and scale-up analysis.



Scale-up

We believe that our flexibility is a critical aspect of excellent customer service. Whether you need laboratory or process scale filter units, we've got just what you need for manufacturing sterile products in the pharma | biotech industry. By offering a wide selection of 150 cm² to 18,000 cm² of filtration area we enable our customers to accurately make the necessary adjustments for full process scale-up using the same geometry, construction and pleated filter materials in all unit sizes.

Sartorius products can be tailored to optimize your complete downstream processing. We can even meet the most exacting process requirements; for example, our Sartobind membrane adsorbers are extending the possibilities in chromatography. We offer ready to use, disposable units that perform extremely well in the purification of high-value products. The units can be used for ion-exchange applications.

INCREASE® – Case study

A pharmaceutical company produces a high viscosity eye drop solution. The batch size is 5000 L and 100 batches are produced annually at 7 production sites. The company was using 5×30 inch cartridge filters with a processing time of 18 hours because of numerous integrity test failures and early blockage of the filter.

Sartorius resolved the problem by using 5×20 inch Sartopore 2 filters. Processing time was cut to 10 hours and there were no filter blockages.

Total annual savings were \$190,000.

For direct inquiries

INCREASE® – Process Optimization
increase.info@sartorius.com

Is Time an Issue for You? CONFIDENCE® – Validation Services



Every Sartorius sterilizing grade filter is manufactured with complete traceability of materials. Our validation guides provide extensive information on technical specifications, testing and quality assurance.

Make the choice that helps bring your products to market rapidly – on time, every time. Sartorius offers the most comprehensive, documented validation studies in just 30 days.



Extractables Guides complete this information by summarizing data evaluated during worst case qualitative studies developed by Sartorius in cooperation with a well recognized research institute for elastomer technology.

Within the scope of process validation, the biopharmaceutical industry needs to prove that process components, such as filters, do not affect the pharmaceutical product by removal of ingredients from it or by release of substances into it. In addition, for sterilizing grade filtration the microbial retentivity of the filter has to be validated.



Process validation

The Sartorius CONFIDENCE® program supplies scientific evidence for validation studies by using your product formulation under simulated process conditions. We will evaluate your process with you to define relevant testing conditions on the basis of current regulatory requirements of the relevant national health authorities and industry standards, such as those established by the Parenteral Drug Administration (PDA) Technical Report No. 26 "Sterilizing Filtration of Liquids." CONFIDENCE® reflects the assurance you'll enjoy knowing that we focus on all aspects of actual worst case scenarios.

To us, full service means testing all your suppliers' products – from filters and bags to tubing, stoppers and containers – whether they are manufactured by us or by one of your other suppliers.

Flexibility

We respect our customers' individualism. You'll experience total peace of mind with the Sartorius validation services program. Our customized methodology and documentation ensures regulatory compliance for the critical steps in your manufacturing process.

Thanks to our scale-up | scale-down philosophy, we guarantee full process relevance. Depending on volume, we use pleated filter elements with the smallest filtration area (starting at 150 cm²) made of the identical filter materials as those used in your actual manufacturing process.

Quality

Our state-of-the-art validation laboratories work with qualified test equipment. Specifically for microbiological retention studies, Sartorius has designed different automatic systems that ensure process relevance by considering the influencing parameters for filter performance, like temperature, time, pressure | flow rate and sterilization methods.

The pharma|biotech market is increasingly focusing on targeted cancer therapy. Cytotoxic products require specific handling. In consideration of the relevant safety issues, Sartorius has installed procedures and a laboratory environment to meet the challenges of product specific validation testing for cytotoxic drug products.

Talking about our customers' processes is all about confidentiality and trust. This is one of Sartorius' strengths as theoretical evaluation or a database approach has never been part of our validation service portfolio. Our validation test scope ensures product and process specific significance. We define the choice of test methods together with our customers by following the principle of minimum test effort while ensuring maximum process reliability. A complete filter validation program typically includes:



Bacteria challenge

Regulatory agencies define a sterilizing grade filter as one that will produce a sterile effluent after a microbial challenge of $\geq 1 \times 10^7$ CFU/cm² of Effective Filtration Area. Sartorius will first conduct viability studies with industry standard test organisms or the customer's indigenous bioburden to determine the most appropriate test methodology. Sartorius then simulates customers "worst case" process conditions in the laboratory using scaled down process filter devices.



Extractables | Leachables

Extractables may be a concern with regard to filters in contact with pharmaceutical products. Regulatory agencies are asking manufacturers of such products to demonstrate that the product does not contain objectionable levels of extractables. Extracts from worst case extractions using water or ethanol at elevated temperatures are analyzed to qualitatively identify potential extractables. Although the information from this type of study may be valuable for evaluations on potential extractables release, it does not predict all interactions between the filter and the formulation. Sartorius also offers testing of extracts from actual formulations.

An array of analytical techniques is used to detect and identify extractables, even in the most complex formulations. These techniques include, but are not limited to, RP-HPLC, GC-MS and FTIR. As there is a growing number of materials to be tested for extractables, Sartorius has extended its tests to include filters, tubing, bags, bottles, vials, stoppers and packaging materials.

Chemical compatibility

First, each component of the product formulation is reviewed for potential chemical interaction with the filter material. For chemical compatibility testing, the filter membrane is exposed to the product formulation under the customer's worst case process conditions and tested by comparison of specific parameters prior to and after exposure to the product.

Product wet integrity test

Integrity testing is a non-destructive method of determining the presence of defects in the filter. The use of drug formulation or other process fluids as wetting media may require integrity test limit values that are different from water. Testing by Sartorius provides correct and reproducible product specific integrity test limit values.

Adsorption studies

The binding of product components to filter material may affect product efficacy and stability. Several factors influence the process of binding; these include temperature and pH. Sartorius offers adsorption studies using appropriately sensitive analytical test methods for protein and preservative determination.

Particle release testing

In general, particle release from filters should be minimized. For instance, injectable solutions should be essentially free from particles that can be observed on visual inspection. For the determination of particle size and amount after product contact, Sartorius uses a laser scattering sensor of a suitably high precision. Testing is performed in accordance with the relevant pharmacopoeia.

CONFIDENCE® – Case study

A biotechnology company was about to introduce a new antiviral drug for HIV treatment. The sales potential was \$450 million annually, translating to daily sales of over 1 million dollars. Delays in the NDA and other application costs were mounting. Other vendors offered to complete filter validations over a period of 2–3 months. Sartorius offered CONFIDENCE® Validation Services and committed to a 30-day delivery time. We kept our promise.

The difference in sales was over 40 million dollars.

For direct inquiries

CONFIDENCE® – Validation Services
confidence.info@sartorius.com

Where Do You Want to Grow Tomorrow? EXPAND® – Training and Seminars



"The only person who is educated is the one who has learned how to learn ... and change." (Carl Rogers)

At Sartorius, we realize that proper training and ongoing education are challenging tasks. We will help you expand your mind with our comprehensive course program specifically designed to address up-to-date regulatory needs and technical training in the biopharmaceutical industry.



Our independent scientific technical training courses cover both theoretical and practical aspects with a strong emphasis on hands-on, practical exercises. Completion of these training courses is documented in a certificate, which is a GMP requirement.

Our team of qualified seminar speakers and technical trainers will meet you at your place or ours.

In 2001, Sartorius unveiled a new state-of-the-art-facility in Goettingen, Germany. Plant 2001 is home to the prestigious Sartorius College, where not only seminars and technical training courses, but also conferences and conventions are held on a regular basis. Sartorius College also hosts a multitude of seminars every year, covering a variety of topics, including communications, management, economics and science. All these practical, professional, and motivating seminars are held at facilities equipped to meet the standards of contemporary learning.

Training courses are conducted at Sartorius College or on site and may be customized for the needs of your company. Our comprehensive list of seminars and courses include:

- Filtration Basics – Principles and Practice
- Regulatory Requirements for the Pharmaceutical and Biotechnology Industries
- Integrity Test Methods
- Crossflow Filtration
- Steam Sterilization
- Cleaning Validation
- Filter Validation
- Fermentation and Downstream Processing
- Membrane Adsorber Technology
- Microbiological Quality Control

Visit our website at www.sartorius.com for a current list of courses and seminars.

For direct inquiries

EXPAND® – Training and Seminars
expand.info@sartorius.com

Mechatronics services

Our Mechatronics Division is a combination of mechanical and electrical engineering expertise providing quality weighing instrumentation from micro-grams in laboratory research to tons in industry, in addition to checkweighers and metal detectors. The diversity of products provides users with the most advanced weighing technology. Our Mechatronics Calibration laboratories are recognized throughout the world for their expertise and accuracy. Software validation and systems qualification are the core competencies of our service group.

Support of the Mechatronics Services also covers calibration of our MD8 Air Samplers as well as calibration and qualification of the Sartocheck filter integrity testing systems.



BioPharm-Alliance, answers for your critical success factors

Time-to-Market

Design review and technology transfer:

We review process designs and scale-up to achieve optimal output and regulatory approval for you.

Time-to-Approval:

Our regulatory guidance, inspection readiness and submittal services accelerate validation and compliance procedures.

Validation organization:

This service evaluates your user requirements and leads to a design of the validation master plan. We organize the plan for systemic efficiency in your manufacturing process.

Cost of goods

Yield enhancement:

Process plant surveys evaluate individual process steps to eliminate or reduce yield losses during downstream processing.

Process and down-time reduction:

We investigate and analyze processes to mitigate bottlenecks and lag time within the process.

Capacity utilization:

We implement new technologies in downstream processing and processing controls to enhance process flow utilization.

Labor efficiency:

Appropriate training of your personnel supports process improvement initiatives and proper adherence to protocols.

Production capacity

Yield improvement:

We'll show you how to maximize yield improvement with your existing process that will result in increased capacity.

Process times | flow enhancement:

Achieve efficiencies in your process with state-of-the-art equipment and upstream improvement process surveys.

Process controls:

Appropriate process controls avoid prolonged quarantines, reprocessing or production stoppage of your product.

Regulatory compliance

FDA | EMEA | ISO compliance:

We'll design and write validation and operating procedures as well as submittal documentation to regulatory authorities.

Quality systems audit:

Together, we'll review new or existing quality systems to improve process controls while meeting regulatory requirements.

Regulatory guidance:

We'll help you implement regulatory requirements or changes and train personnel accordingly.

Documentation submittal support:

Lern from us about protocols and filings for inspection by regulators to minimize delays in the approval process.





Microbiological Control

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MD8 airscan® Air Sampler for Critical Applications



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

The very high air flow rate of 8 m³/h enables isokinetic sample removal at flow speed usual in laminar flow as well as for the filtration of 1 m³ air very quickly (less than 8 minutes). The filter unit can be placed remote from the air sampler.

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

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



Specifications

Specifications for the MD8 airscan air sampler

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

Ordering information for the MD8 airscan air sampler

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

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

Accessories for the MD8 airscan air sampler

17801	Holder for disposable gelatine filter units
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Ordering information for consumables

Disposable gelatine units, sterile, pack of 10

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

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

AirPort MD8 Battery-Power, Portable Air Sampler



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

AirPort MD8 offers the following benefits

- Battery-powered and portable for universal use.
- Battery power level clearly indicated so constant performance during sampling is guaranteed.
- Ergonomic design and easy to clean.

- Flexible adjustment possibilities of the volume flow and the sample volume.
- User friendly prompting with the option of five languages; English, French, German, Italian and Spanish.
- Parameters last used stored even after automatic shut-off.
- The device can be calibrated locally.

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



Specifications

Specifications for AirPort MD8

Volume flow regulation	By an integrated impeller wheel.
Volume flow adjustable in three steps	30 l/min., 40 l/min and 50 l/min.
Fixed given sample volumes	25, 50, 100, 250, 500, 750 and 1000 liters. In addition, the sample volume can be chosen manually in 5-liter steps.
Operational life with one battery charge	Approx. 4.5 hours
Noise level	For gelatine membrane filters 48 dB (A)
Weight	Approx. 2.5 kg
Dimensions (L×W×H)	300×135×165 mm

Power supply

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

Ordering information for the AirPort MD8

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

17801	Adapter for disposable gelatine filter units.
69898525	Battery charger

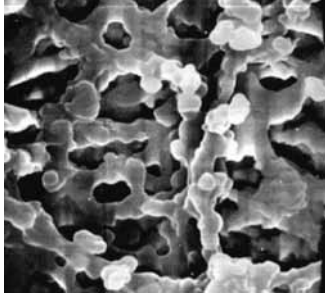
Ordering information for consumables

Disposable gelatine units, sterile, pack of 10

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

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

Gelatine Membrane Filters



Gelatine filters in conjunction with the MD8 air samplers (gelatine filter method) are used for collection of airborne microbes and viruses. Gelatine filter disposables are individually packed, presterilized and ready-to-connect units, each consisting of a gelatine membrane filter and a holder. Gelatin 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

Specifications of gelatine filters

Gelatine filters	water soluble, pore size 3 µm, thickness approx. 250 µm
Thermal resistance	Max. 60°C
Residual dampness content	46-49%
Air flow rate	Approx. 2.7 l/min./cm ² at ΔP = 0.05 bar
Retention rates	1. Bac. subtilis niger spores 99.9995% at 0.25 m/s inlet velocity. 2. Coli-Phages: phage T1, 99.9% at 0.3 m/s inlet velocity and 50% rel. air humidity. Phage T3, 99.94% at 0.3 m/s inlet velocity and 80% rel. humidity.
Filtration area	38.5 cm ²
Conditions for use	Room temperature, max. 30°C, max. air humidity 85%
Sterilization	Supplied presterilized by gamma irradiation

Disposable gelatine units, sterile, pack of 10

Order number

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

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

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

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

Accessories for the MD8 Air Samplers



New calibration unit

The user himself can calibrate the MD 8 airscan and AirPort MD8 directly on the job by means of the calibration unit*.

This is absolutely necessary above all within the scope of validation steps, for which it is important, that the shown air flow rate (desired value at the MD8) corresponds to the actual air amount (actual value at the calibration device). The calibration unit is supplied complete with battery charger | power supply unit (specific for the country in which it is used), filter holder, connectors set and connection tube (PVC, 2 m).

* Alternatively, a maintenance agreement can be signed. Within the scope of the contractual services, Sartorius technicians will carry out a calibration of the MD8 at regular intervals

Specifications for calibration unit

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

Tubing and connectors set

If the disposable gelatine filter unit is not placed directly at the MD8 airscan, but in 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 an other room.

Case

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

Aluminium stack

It consists of a middle part, 10 numbered filter holders and 2 end caps. The stack is first sterilized (by 180°C dry heat, 2 h), and then equipped with the filters under sterile conditions (LF-cleanbench). The prepared filter holders are put on a side of the middle part. After removing the sample, the inserted filter holders are put on the other side of the middle part, so that used and not-used filter holders are separated from each other.

Accessories for isolator application

For the monitoring of isolators with MD8 airscan we recommend to use 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:

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

Gelatine membrane filter, 80 mm, sterile, pack of 50 for use with stack

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

Further consumables for air monitoring

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

Accessories for the MD8 air samplers

Order numbers

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

Replacement parts for the stack

Order numbers

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

Tubing and connectors set

Order numbers

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

Accessories for isolator application

Order numbers

17016	Adapter (DN 25 hose barb to 1" - 1 1/2" sanitary flange) to connect MD8 airscan to an isolator via silicone tubing and a filter capsule, stainless steel
17030	Adapter (DN 30 hose barb to 1" - 1 1/2" sanitary flange) to connect MD8 airscan to an isolator via flexible PVC hose and filter capsule, stainless steel
17033	Clamp for 1" - 1 1/2" sanitary flanges, stainless, 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 gelatin filter disposables, stainless steel
5181307T9-----SS	Sartofluor Capsule with PTFE membrane and sanitary flange inlet and outlet, for sterile air filtration inserted between the MD8 airscan and isolator

Accessories for remote control function

Order numbers

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

Consumables used with stack

Gelatine disc filters, 3 µm pore size, 80 mm, 50 pieces/pack

Order numbers

12602-080 ALK	Gelatine disc filter, sterile, sealed in units of five each in a polyethylene bag
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Further consumables for air monitoring

Cellulose nitrate membrane filters, 80 mm diameter, 100 pieces/pack

Order numbers

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

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



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

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

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. As every Sartorius 0.45 µm membrane filter lot these membranes are also tested and released according to ISO 7704.

Additional membrane filters

Cellulose nitrate (cellulose ester) membrane filters, gridded, non-sterile packaged (page 244).

Cellulose nitrate (cellulose ester) and cellulose acetate membrane filters, white, individually, sterile packaged (page 246).

Hydrophobic edge membranes are used mainly in the sterility testing of solutions containing antibiotics (page 248).

Microsart™ e.motion



Microsart™ e.motion Dispenser

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

The membrane filters are fully automatically removed from their sterile package – either in a touch-free mode via an optical sensor or at the touch of a button. A pedal switch can be optionally connected to the dispenser.

Thanks to their new motorized traction roller, each filter is quickly and reliably dispensed. Membranes that accidentally slide out of their packaging or that even get damaged in the process are now problems of the past.

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



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

Applications

Membrane Filters for Colony Count, Particle Testing and Microscopy

Just a small sampling of the advantages you will benefit from when using the Microsart™ e.motion Dispenser:

- Fully automated membrane filter dispenser
- Works hands-free by an optical sensor
- Works by touch button
- Compact design
- Rapid and reliable transport due to sprocket feed roll technology
- Easy insertion of the filter band
- Easy-to-clean

Specifications of the Microsart™ e.motion dispenser

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

Order number for Microsart™ e.motion dispenser

16712	Microsart™ e.motion dispenser, fully automated membrane filter dispenser
1ZE---0028	Pedal 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.

Just a small sampling of the advantages you will benefit from when using the Microsart™ e.motion Membrane Filters:

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

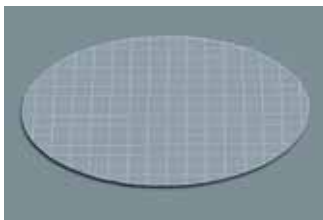
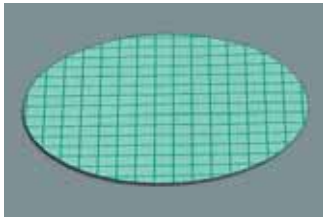
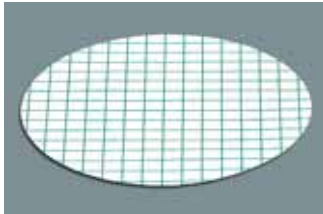
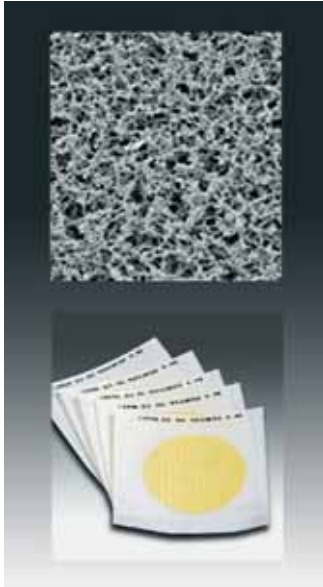
Specifications

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

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

white black	11407Z-47----SCM	0.2 µm
white black	11407Z-50----SCM	0.2 µm
white black	114H6Z-47----SCM	0.45 µm High Flow
white black	114H6Z-50----SCM	0.45 µm High Flow
white green	139H6Z-47----SCM	0.45 µm High Flow
white black	11406Z-47----SCM	0.45 µm
white black	11406Z-50----SCM	0.45 µm
gray white	13006Z-47----SCM	0.45 µm
gray white	13006Z-50----SCM	0.45 µm
green dark green	13806Z-47----SCM	0.45 µm
green dark green	13806Z-50----SCM	0.45 µm
white green	13906Z-47----SCM	0.45 µm
white green	13906Z-50----SCM	0.45 µm
gray white	13005Z-47----SCM	0.65 µm
gray white	13005Z-50----SCM	0.65 µm
gray white	13004Z-47----SCM	0.8 µm
gray white	13004Z-50----SCM	0.8 µm

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



Applications

Membrane Filters for Colony Count, Particle Testing and Microscopy

Just a small sampling 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	<ul style="list-style-type: none"> - No enhancement or inhibition by the grid lines - No enhancement or inhibition due to chemical extractables - No enhancement or inhibition by the sterilization process
Sterility Test	Sterile
Thermal resistance	130°C max.
Thickness acc. to DIN 53105	115–145 µm
Chemical Compatibility	Aqueous solutions (pH 4–8), hydrocarbons and several other organic solvents.

Typical performance rates for various pore sizes

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

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

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

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

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

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

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

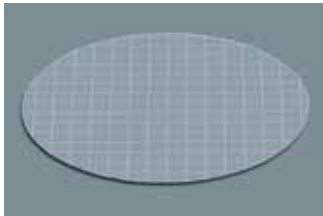
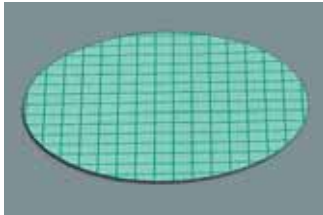
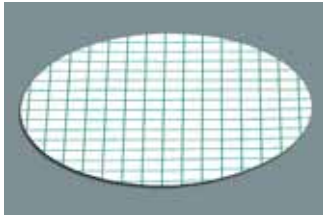
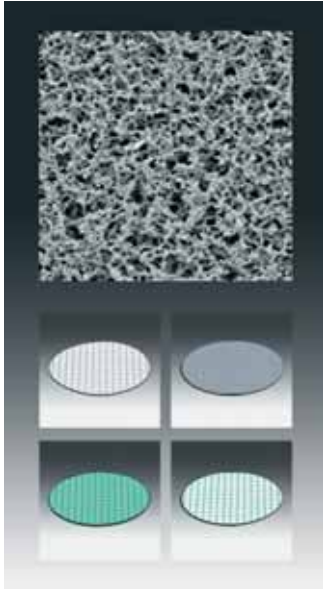
Green membrane with dark green grid, providing optimal contrast to light-colored or transparent bacteria colonies, type 138, individually, sterile packaged

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

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

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

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



Applications

Membrane Filters for Colony Count, Particle Testing and Microscopy

Just a small sampling of the advantages you will benefit from when using this type of membrane filter:

- Outstanding recovery rates for microorganisms
- 0.45 μm are acc. to ISO 7704
- Three different colors available

Specifications

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

Typical performance rates for various pore sizes

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

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

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

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

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

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

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

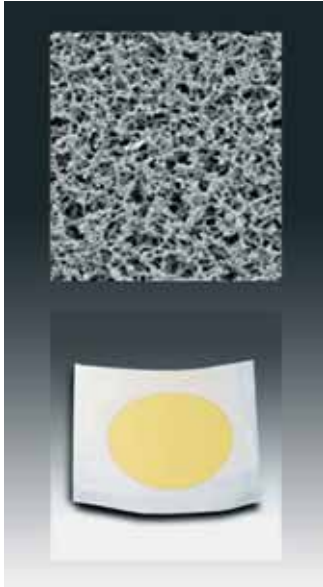
Green membrane with dark green grid, providing optimal contrast to light-colored or transparent bacteria colonies, type 138, non-sterile

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

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

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

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



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

Materials

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

Additional applications

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

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

Applications

Membrane Filters for Colony Count, Sterility Testing, Particle Testing and Microscopy

Just a small sampling of the advantages you will benefit from when using this type of membrane filter:

- Outstanding recovery rates for microorganisms
- Defined particle retention
- 0.45 μm are acc. to ISO 7704
- 0.2 μm are validated by BCT
- Certified Quality
- Gamma irradiated, 25kGray

Specifications

Design	47 or 50 mm in diameter, white
Growth Promotion Test acc. to ISO 7704	<ul style="list-style-type: none"> - No enhancement or inhibition by the sterilization process - No enhancement or inhibition due to chemical extractables
Sterility Test	Sterile
Thermal resistance	130°C max. CA: 180°C
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.

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

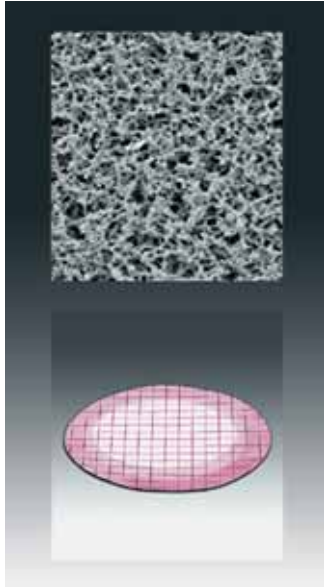
Pore size	Order No.	Diameter	Pack size
0.45 µm	11306--47----ACN	47 mm	100
	11306--50----ACN	50 mm	100
0.65 µm	11305--47----ACN	47 mm	100
	11305--50----ACN	50 mm	100
0.8 µm	11304--47----ACN	47 mm	100
	11304--50----ACN	50 mm	100
1.2 µm	11303--47----ACN	47 mm	100
	11303--50----ACN	50 mm	100
3 µm	11302--47----ACN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

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

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

* If cellulose nitrate is not compatible

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



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

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

Applications

Membrane Filters for Colony Count and Sterility Testing

Just a small sampling 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	<ul style="list-style-type: none"> - No enhancement or inhibition by the grid lines - No enhancement or inhibition due to chemical extractables - No enhancement or inhibition by the sterilization process
Sterility Test	Sterile
Thermal resistance	130°C max. CA: 180°C
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

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

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

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

0.45 µm	13106--47----HEN	47 mm	100
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**Cellulose nitrate membrane filters, white with black grid, 3 mm hydrophobic
edge, for colony count & sterility testing, type 131, non-sterile**

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

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

8 µm	13101--50----AHN	50 mm	100
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**Cellulose nitrate membrane filters, white with black grid, 6 mm hydrophobic
edge, for colony count & sterility testing, type 131, non-sterile**

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

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

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

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

0.45 µm	13506--47----ALS	47 mm	100
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**Cellulose acetate membrane filters, white with black grid, 3 mm hydrophobic
edge, for colony count & sterility testing*, type 135, non-sterile**

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

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

0.45 µm	13506--47----HCN	47 mm	100
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* If cellulose nitrate is not compatible

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



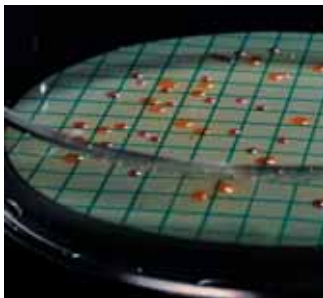
Sartorius Nutrient Pad Sets have been used successfully in the membrane filter method for 20 years. Practical and easy to handle, they reduce labor and simplify many microbiological testing procedures.

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



Ready-to-use up to 24 month

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



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

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

Benefits for the user

Economy

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

Easy handling

Nutrient pad sets can also be used in laboratories without comprehensive micro-biological equipment.

Consistent quality

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

Trouble-free storage

Nutrient pad sets can be stored at room temperature in a warehouse, between 18 and 24 months depending on the type.

Order numbers for nutrient pad sets in petri dishes

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

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

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

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

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

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

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

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

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

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

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

Thermophilic spore formers and mesophilic bacteria	Glucose Tryptone (2)	14066--47-----N
Leuconostoc oenos and other wine spoiling organ.	Jus de Tomate (Tomato Juice) (1)	14079--47-----N
Acid-tolerant microorganisms	Orange Serum pH 5.5 (1)	14062--47-----N
Acid-tolerant microorganisms	Orange Serum pH 3.2 (1)	14096--47-----N
Lactobacilli and Pediococci and other beer spoiling organisms	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
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Order numbers for nutrient pad sets in PE bags

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

Determination of	NPS type*	Order No.**
E. coli and coliforms	Endo (2)	14003--47-----K
Total count	Standard TTC (1)	14005--47-----K
E. coli and coliforms and other bio-indicators of faecal contamination	Tergitol TTC (2)	14006--47-----K
Yeasts and molds	Wort (3)***	14008--50-----K
Sterile water in ampoules, for moistening NPS, 3.5 ml each, 100 per box		
100 ampoules with sterile water		1ZZ-K0001

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

* The membrane filters are selected for optimum growth together with the corresponding nutrient media. The supplied membrane filter type is listed within brackets:

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

** Diameter of the membrane filter, 47 mm. Order number for nutrient pad set with 50 mm membrane filter as above, but --47-----N replaced by --50-----N.

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



Nutrient Pad Set poster

The photo shows a poster, original size 70 cm x 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.

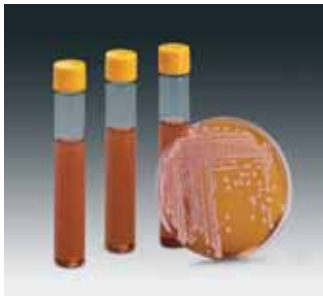
Absorbent pads

Sartorius 1.4 mm thick absorbent pads are wetted with the appropriate liquid culture medium before a membrane filter is placed on them. They come presterilized in plastic magazines, which fit onto the Sartorius manual dispensing device. The absorbent pads are available in two diameters: 47 mm with approx. 3 ml absorption capacity and 50 mm with approx. 3.5 ml absorption capacity.



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.



Agar Media in 250 ml bottles, 4 bottles per box

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



Agar Media in 20 ml tubes, 50 tubes per box

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

Broth Media in 250 ml bottles, 50 bottles per box

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

Lactose Broth Media, concentrated in bottles, for drinking water analysis

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

Broth Media in 20 ml tubes, 50 tubes per box

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

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

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

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

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

Absorbent Pads, 50 mm, sterile packaged in petri dishes

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

Disposable Petri Dishes, auto-sterile, 100 per box

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

Biosart® 100 Monitors



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

Biosart® 100 Monitors

Biosart® 100 Monitors have been specifically designed for microbiological testing of 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. 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.

High Flow membranes

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

Applications

Colony Count, Particle Testing and Microscopy

Just a small sampling of the advantages you will benefit from when using Biosart® 100 Monitors:

– Safe & reliable:

Sterile, individually, sterile packaged available, validated, certified Membrane filters: Meet ISO 7704; available in various colors; can be used for documentation; without any hydrophobic adhesive areas

– Saves time:

Ready to connect; easy to use and practical handling features

– Economy:

High flow rate, large filtration area, high total throughput

– Saves money:

Only needs a minimal amount of equipment

– Reduces waste:

Reduced volume after autoclaving means easy disposal

Specifications

Housing	Polystyrene
Membrane filter	Cellulose nitrate (cellulose ester); choice of white, green or grey, with grid; can be used as documentation
Plug and adapter	Polyethylene
Pad	Cellulose
Capacity	100 ml, 10 ml graduations
Pore size	0.2 µm, 0.45 µm or 0.65 µm
Filter diameter	47 mm or 56 mm
Filtration area	14.5 cm ² or 21.2 cm ²
Max. operating pressure	Vacuum only
Sterilization	Gamma irradiation
Outlet	6.5 × 1.5 mm
Lot certificates	Recovery rate, sterility and specifications

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

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

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

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

* CN = Cellulose nitrate (Cellulose ester)

RC = Regenerate Cellulose

Biosart® 100 Monitor Adapters

Description	Adaptation	Order No.
Biosart® 100 Adapter, silicone	Biosart® 100 Monitor onto Sartorius stainless steel frits e. g. 16840 (Combisart® base support) or onto 16841 (individual base)	16414
Biosart® 100 Adapter, polypropylene	Biosart® 100 Monitor onto 50 mm supports	16415
Biosart® 100 Adapter, polypropylene	Biosart® 100 Monitor onto 56 mm supports and vacuum pumps	16416

Biosart® 100 Nutrient Media



Applications

Colony Count

Just a small sampling of the advantages you will benefit from when using Biosart® 100 Media:

- In compliance with international standards
- Certificate of quality for every batch
- Ready-to-use – pre-sterilized media
- 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	Laury Sulfate Teepol	16400-02----LS-K
E. coli and coliforms	Tergitol TTC	16400-02----TT-K
Enterococci	KF Strep Azide	16400-02----KF-K
Pseudomonas aeruginosa	Cetrimide	16400-02----CE-K
Yeasts and molds	Sabouraud (acc. USP)	16400-02----SB-K
Yeasts and molds	m Green yeast and mold Schaufus Pottinger	16400-02----MG-K
Yeasts and molds	m Green yeast and mold selective	16400-02----GS-K
Yeasts and molds and bacteria	WL Media Wallerstein	16400-02----WN-K
Bacteria in fermentation processes	WL Differential Wallerstein	16400-02----WL-K
Acid-tolerant microorganisms	Orange Serum	16400-02----OS-K

Biosart® 250 Funnels



Biosart® 250 Funnel

The Biosart® 250 Funnel has been specially designed for microbiological and analytical quality assurance in industry. The sterile 250 ml plastic funnel guarantees fast filtration and high sample throughputs during routine testing. Its large inner diameter allows high flow rates, and the tapered inner walls permit thorough flushing of the funnel, after filtration. Biosart® 250 Funnels are also individually, sterile packaged available.

Applications

Colony Count, Particle Testing and Microscopy

Just a small sampling of the advantages you will benefit from when using Biosart® 250 Funnels:

– **Safe & reliable:**

Sterile, individually, sterile packaged available, certified, membrane filter can be used as documentation, use a new, sterile funnel for each test in order to avoid cross contamination!

– **Simpler handling:**

No more holding of hot funnels! And the complete filtration is visible, particularly useful when using manifolds in routine testing.

– **Saves time:**

Ready to use; practical design that is easy to use; ensures high flow rates, high throughputs; no preparation time necessary, just change the funnel, rather than spending time sanitizing it!

– **Saves money:**

No additional equipment needed, can be autoclaved to a limited extent.

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®, Individually and Multi-Branch Systems



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

Flexibility

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

Ready-to-use units like 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



Sterile venting

A special feature of the Combisart® 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. 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 autoclave them. You can even pour out a non-filterable sample from each unit. And Combisart® makes filtration equally easy for left- or right-handed users in your laboratory, because funnels can be positioned to suit the individual user.



The right equipment for your application

The 3- or 6-branch manifolds allow time-saving when mass examinations. In connection with the single base 16840 they are flexible to adapt disposable Biosart 250 of 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. 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. The Biosart® 100 adapter 16414 ensure that the Monitors are positioned perfectly level minimizing the risk of contamination during filtration. For low number of samples to test, we recommend the use of the 1-branch manifold or one of our individual systems on the top of a suction flask.

Just a small sampling of the advantages you will benefit from when using the Combisart® 250 System:

– Safe & reliable:

Sterile venting of each membrane after filtration, sterilization acc. to ISO 8199, special polished stainless steel surfaces allow easy cleaning & rinsing

– 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

– Economy:

Maximum Flexibility due to different set-ups, space-saving in the autoclave, low height is advantageous for working on a clean bench, Stainless steel 304 – long lifecycle

Specifications

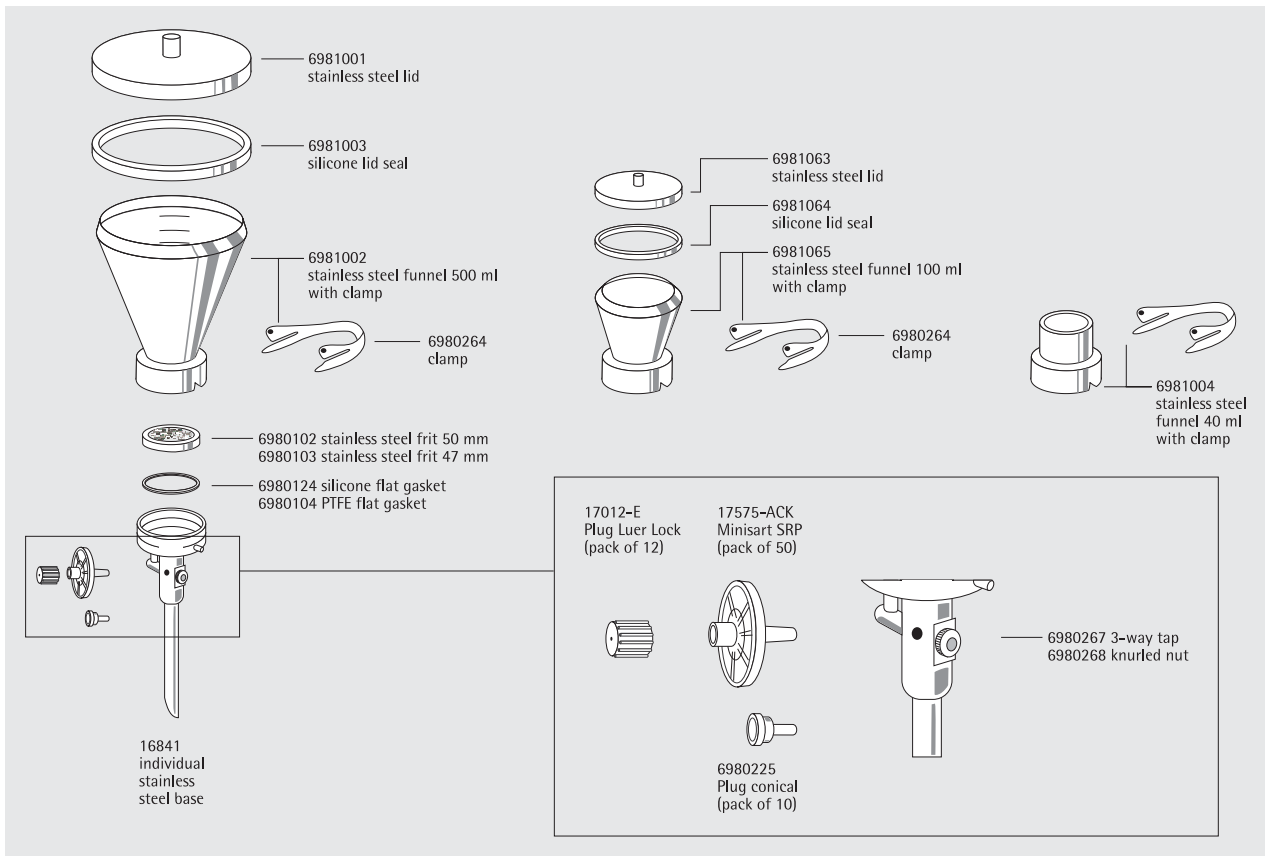
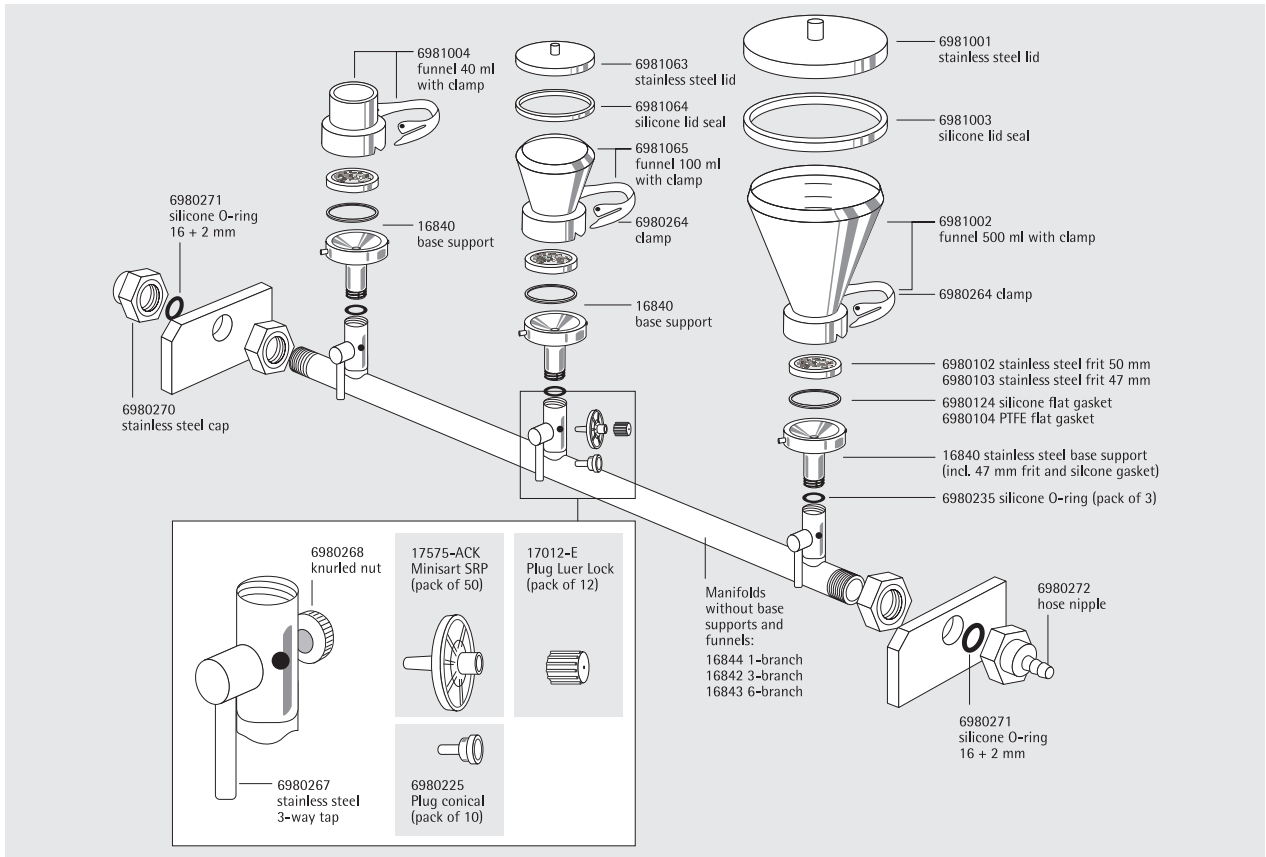
Stainless steel quality	High-grade stainless steel: B.S. 304S31 AISI 304
Dimensions in mm (L H D)	3-branch manifold: 435 103 120 6-branch manifold: 910 103 120
Max. operating pressure	Vacuum only
Sterilization	by autoclaving (max. 134°C), by dry heat (max. 180°C), by flaming, by other methods acc. to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

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

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

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

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



Accessories and replacement parts for the Combisart® System

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

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

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

Combisart® Adapter, to accommodate various funnel types

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

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



Individual filter holders

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

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



Multi-Branch manifolds

The manifold systems are available with 100 ml or 500 ml capacity funnels. The three or six separate filter holders save time when mass examinations of 100 ml volume samples 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 a 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.

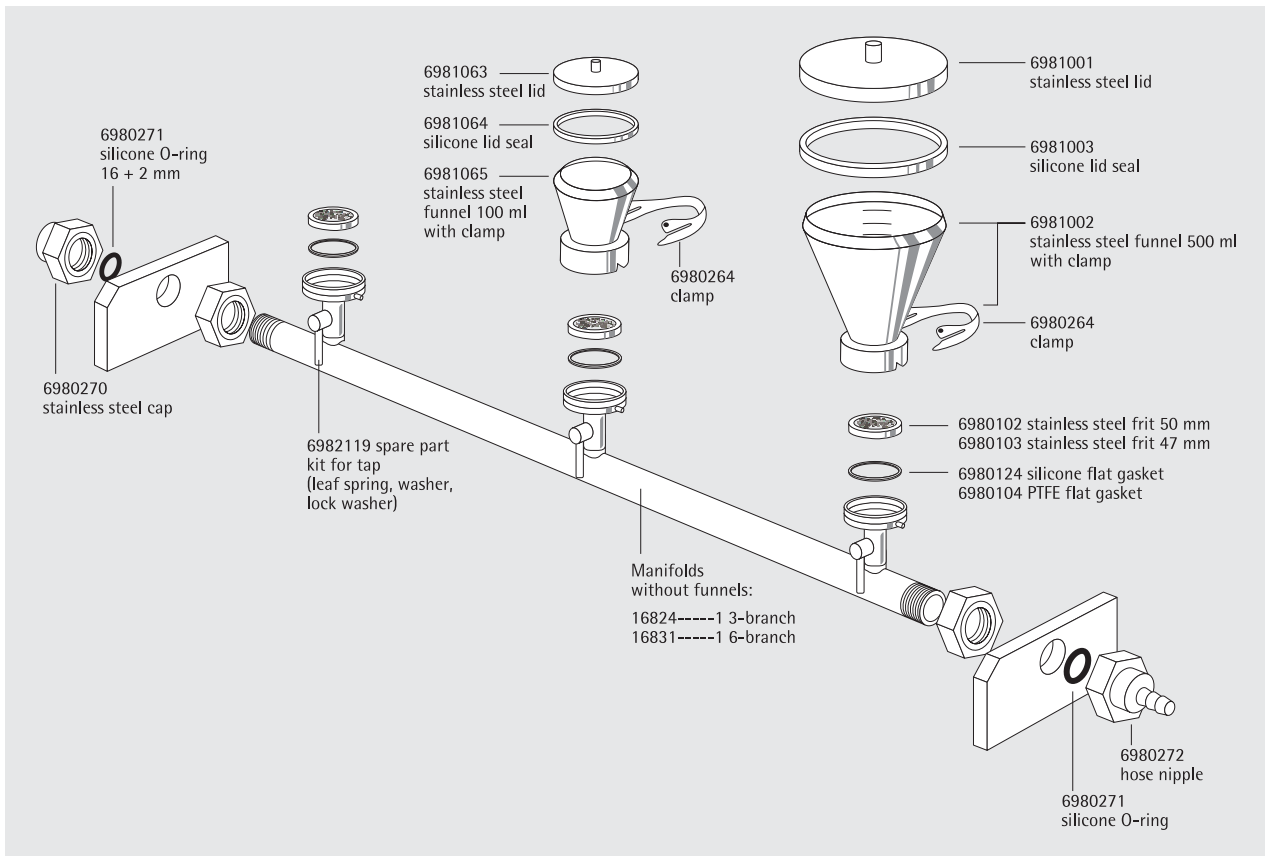
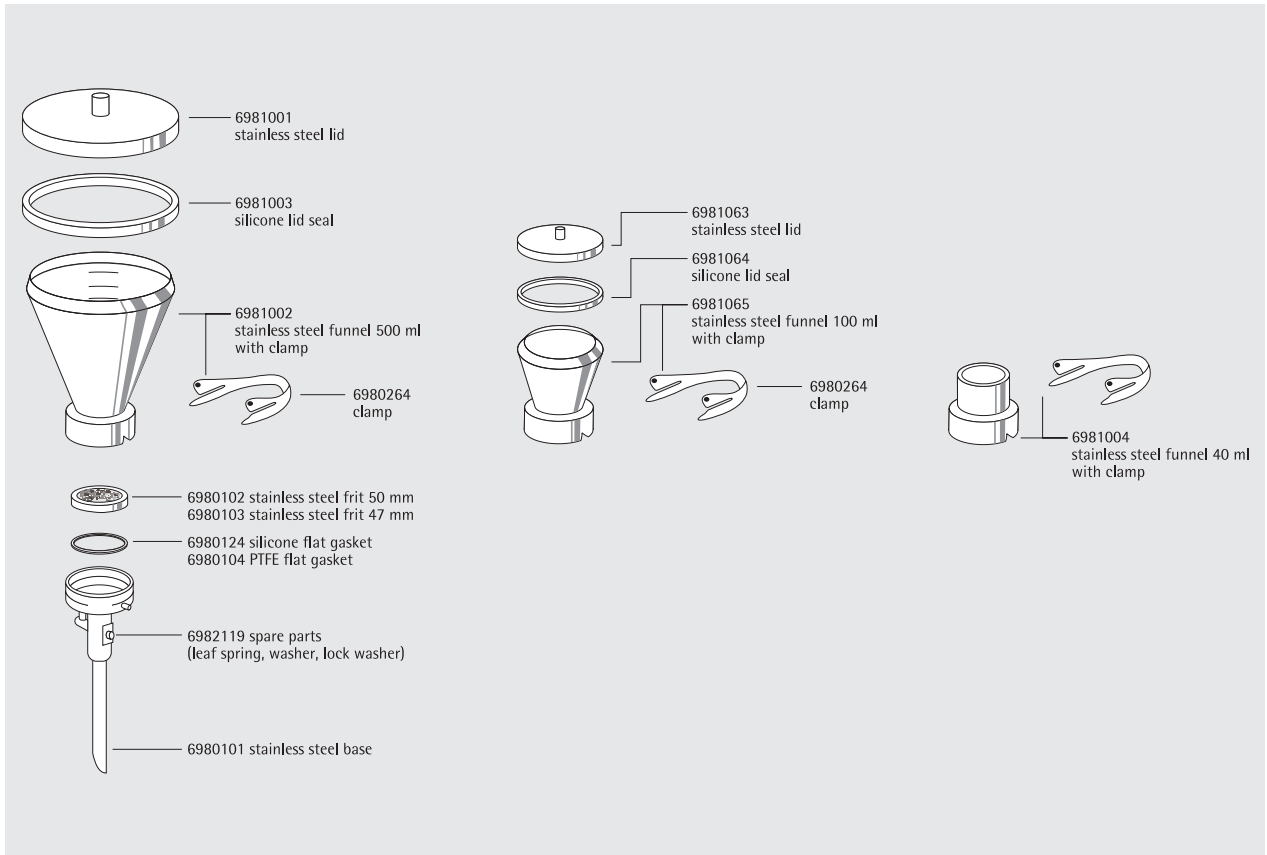
Polycarbonate filter holders

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

Multi-Branch Manifolds and Individual Filter Holders

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



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

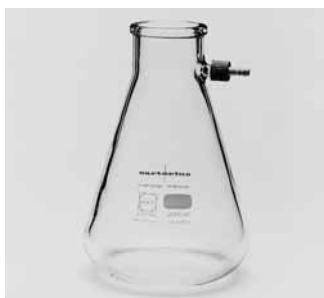
Description	Capacity	Membrane filter diameter	Order No.
Glass filter holder, complete with filter support, funnel and metal clamp	30 ml	25 mm	16306
Glass filter holder, complete with filter support, funnel and metal clamp	250 ml	47 50 mm	16307

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 Suction flask, 2 liter capacity

16672-----1	Suction flask, 5 liters acc. to DIN 12476, incl. stopper and glass tube
16672	Suction flask, 2 liters acc. to DIN 12476, without stopper
17204	Tube connector for connecting a Combisart® stainless steel manifold to a suction flask 2 or 1 liter
16606	Suction flask, 1 liter (not available in countries which have safety restrictions on glass hose nipples)

Order numbers for bored stoppers for suction flask 2 liters 16672

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

Order numbers for bored stoppers for suction flask 1 liter 16606

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

Water traps

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



Vacusart®

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

Order number Vacusart®

Order No.

17804-----M Pack of 3



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.

Order number Woulff's bottle, 500 ml

Order No.

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.

Order number Rubber vacuum hose (1 meter)

Order No.

16623



Electric vacuum pumps

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

Specifications of electric vacuum pumps

	16694-2-50-22 16694-1-40-22	16694-2-50-06 16694-1-60-06
Final vacuum	100 mbar, (76 torr), 90% vacuum	100 mbar (76 torr), 90% vacuum
Max. flow rate	22 l/min	6 l/min
Wattage	130 W	65 W
Weight	7.1 kg	1.9 kg
Dimensions (W×H×D)	261×204×110 mm	164×141×90 mm
Max. ambient temperature	40°C	40°C
Recommended application	Multiple filtration runs with multi-branch manifold	Individual filtration run with one filter holder

Order numbers electric vacuum pumps

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

Replacement parts	Order No.
Replacement kit for 16694-2-50-06 and -1-60-06, set of one membrane, two valve springs and two head seals	1ED---0054
Replacement kit for 16694-2-50-22 and -1-60-22, set of one membrane, two valve springs and two head seals	1ED---0055

Order numbers traditional pumps

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

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



Water jet pump

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

Order number Water jet pump

Description	Order No.
Water jet pump, with G 3/4 male thread	16611



Hand operated vacuum pump

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

Order number Hand operated vacuum pump

Description	Order No.
Hand operated vacuum pump with gauge	16673



Dosing Syringe

The most convenient way to moist the NPS with water is to use a dosing syringe with an adapted Minisart syringe filter. Simultaneous sterilization and dosing of demineralized water in 3.5 ml steps is easy done by dropping the sinker at the end of the suction tubing into the water, and the dosing syringe filled and dosed by operating the twigger automatically.

Order numbers Dosing Syringe

Description	Order No.
Dosing Syringe, 0.5–5 ml	16685-2
Minisart, 0.2 µm, individually, sterile packaged	17597-----K



Colony counter

Compact, handy battery operated colony counter, is as simple to use as a ball-point pen, and has a 4-digit LCD-display. The counter is supplied with an additional marker refill.

Order numbers Colony counter

Description	Order No.
Colony counter	17649
Replacement part: Black marker refill	6981540



Incubator

Compact, space saving incubator for the incubation of membrane filters on nutrient pads or other nutrient media. The incubator has a capacity of 15 liters and is designed to hold the following numbers and sizes of petri dishes: 200×47 mm or 160×56 mm | 60 mm or 72×90 mm.

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

Specifications

Incubator

	18113
Voltage	230 V
Frequency	50/60 Hz
Rated power	0.2 kW
Weight	5.5 kg (12 lbs)
Max. load for insertion plate	5 kg (12 lbs)
Dimensions (W×H×D)	Inner 270×205×288 mm Outer 340×270×431 mm
Temperature range	20°C (or 5°C above room temperature) to 50°C
Temperature deviation	over less than ±0.2°C (at 37°C and RT 20°C)
Spacial temperature deviation	less than ±0.8°C

Description	Order No.
Incubator	18113



Stainless steel tweezers

Membrane filters should only be handled with suitable tweezers in order to avoid contamination which can result from hand contact. Sartorius stainless steel tweezers can be flamed and they are autoclavable. They have blunt-edged tips for a careful, firm hold of the membrane filter.

Order number Stainless steel tweezers

Description	Order No.
Tweezers	16625



Stainless steel prefilter attachment

The stainless steel prefilter holder allows the removal of coarse, solid particles from samples for microbiological analysis before and during the actual bacteria retentive filtration. The device is clipped between funnel and base of the stainless steel vacuum filter holders, it can be autoclaved and flamed. 11301, a white cellulose nitrate 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.

Order numbers Stainless steel prefilter attachment

Description	Order No.
Prefilter attachment	16807
Cellulose nitrate membranes with 50 mm diameter and 8 μm pore size for the prefilter holder, pack of 100, sterile, individually packaged	11301--50----ACN
Replacement part: Support plate, autoclavable, flammable	6981139



Container for anaerobic incubation

Stainless steel container with 11.8 cm inner diameter, 10.7 cm depth and a with metal insert for convenient insertion and removal of petri dishes. Transparent plastic lid holds two taps for the vacuum exhaust and for cleaning with inert gas, with 6 mm hose nipples (for 16623), vacuum gauge and sealing ring. For up to fourteen 60 mm, or up to six 90 mm petri dishes.

Order numbers

Description	Order No.
Anaerobic Container	16671

Sterility Test Systems Sterisart® NF



International pharmacopeias require the complete sterility of pharmaceutical products that are injected into the blood stream or that otherwise enter the body below the skin surface. As a manufacturer of such products, you are required to supply proof of sterility of the final product batch.

Sterisart® NF is a completely closed system for the sterility testing of pharmaceutical products. It is based on the membrane filter method, however it eliminates the procedure of manipulating the filters. By this the main risk of a secondary contamination and false positive results is eliminated. A peristaltic pump transfers the sample into the filtration units, and after rinsing, the filtration units are filled with media and used for incubation of the filters without any contact to the environment.

Special brochures available on request.
Order no. SLD1002-e, SLD1001-e, SL-2019-e, SLD2006-e, SLD2005-e, SLD2007-e

Sterisart® NF offers the following features and benefits

- Reliable, Sartochem membrane:
 - High retention of microbes
 - Low adsorption
 - High mechanical stability
- Easy to use:
 - Pre-installed color-coded tube clamps
 - Easy-to-read graduated marks
 - User-friendly, several practical adapters available
 - Product- | lot number identification
- Secure:
 - Gas-impermeable packaging for protection against sterilants

Specifications

Technical specifications for Sterisart® NF

Pore size of the Sartochem membrane filter	0.45 µm, tested with <i>Serratia marcescens</i>
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 <i>B. diminuta</i>
Sample container capacity	120 ml (graduation marks at 50, 75 and 100 ml)
Max. operating pressure	3 bar (approx. 44 psi) at 20°C
Max. operating temperature	50°C
Sterilization	ETO (ethylene oxid gas) or gamma irradiation

Technical specifications for Sterisart universal pump

Pumping performance	10–700 ml/min (dependent on the tubing)
Noise level at 1 m distance	< 45 dB (A)
Voltage	90–230 VAC (a.c. voltage)
Tolerance range acc. to VDE	-15/+10%
Frequency	47–63 Hz
Power consumption	100 W
Fuse	T 1.6 A
Ambient temperature	+10°C – +40°C
Protection class	IP 20
Cooling	Self-convection and fan
Dimensions	420×220×120 (W×H×D)
Weight	approx. 11 kg

Order no. for universal pump	Description
16413	Sterisart universal pump
16412-----V	Pump adapters for use of Sterisart systems in available Millipore pumps

Additional accessories are available on request, such as a pump cover for Millipore sterility test units, order number 1ZG---0004.

Recommended disposable sterility test units for use with pump

Order no. for Sterisart® NF	Description
16466-----ACD	Sterisart® NF alpha, dual-needle metal spike for closed containers (box of 10, individually sterilized with ETO; single-packed).
16467-----ACD	Sterisart® NF alpha, 6 cm metal needle for open containers (box of 10, individually sterilized with ETO; single-packed).
16468-----ACD	Sterisart® NF alpha, system for medical devices with luer or luer lock connectors (box of 10, individually sterilized with ETO; single-packed).
16466-----GBD	Sterisart® NF gamma, dual-needle metal spike for closed containers (box of 10, individually gamma sterilized, double-packed, optimal for use in isolators).
16467-----GBD	Sterisart® NF gamma, 6 cm metal needle for open containers (box of 10, individually gamma sterilized, double-packed, optimal for use in isolators).
16468-----GBD	Sterisart® NF gamma, system for medical devices with luer or luer lock connectors (box of 10, individually gamma sterilized, double-packed, optimal for use in isolators).
16469-----GBD	Sterisart® NF gamma, system with adapter for prefilled syringes (box of 10, individually gamma sterilized, double-packed, optimal for use in isolators).
16470-----GBD	Sterisart® NF gamma, system for difficult-to-dissolve powders in unvented vials (box of 10, individually gamma sterilized, single-packed, optimal for use in isolators).
16475-----GBD	Sterisart® NF gamma, system for lyophilized or soluble powders in unvented vials (box of 10, individually gamma sterilized, double-packed, optimal for use in isolators).
16476-----GBD	Sterisart® NF gamma, system with short dual-needle metal spike for closed containers (box of 10, individually gamma sterilized, double-packed, optimal for use in isolators).
16596-----HNK	Venting Needle for Ampoules, collapsible bags and vials, gamma sterilized (box of 50).
Further units on request	16464ACD, 16464GBD

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, dishwasher safe 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

Specifications of the filter holders

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

General accessories for the re-usable sterility test system

Order numbers	Description
16523	Filter holder with 130 ml capacity
16826	Stainless steel manifold
17756	Stainless-steel adapter
16966	T-distributor for 2 filter holders
16967	Filling cap with filling needle
16968	Silicone adapter
16696	Peristaltic pump
16699	Silicone tubing, 4x1.5 mm
16974	Holding rod for inlet tube/needle
16975	Incubation rack
16978	Tube clamps (tubing clips)
17574-----K	Venting filters, 50 pieces

Additional accessories for re-usable sterility test system (for ampoule testing)

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

**Additional accessories for re-usable sterility testing system
(for testing infusion solutions in bottles)**

Order numbers	Description
16964	Inlet needle (long)
16964-----5	Inlet holder (short)

**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	0.45 µm	Cellulose nitrate membrane filter	pH 4-8, most hydrocarbons
13107--47----HCN	0.45 µm	Cellulose nitrate membrane filter with hydrophobic edge	pH 4-8, most hydrocarbons
11107--47-----N	0.45 µm	Cellulose acetate membrane filter	pH 4-8, most alcohols, hydrocarbons and oils
13507--47----HCN	0.45 µm	Cellulose acetate membrane filter with hydrophobic edge	pH 4-8, most alcohols, hydrocarbons and oils
18407--47-----N	0.45 µm	Regenerated cellulose membrane filter	pH 3-12, solvent-resistant



Peristaltic pump

Specification

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

Order number

16696





Weigh | Detect | Control

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Complete Scales



CB Counting Scales

... are ideal even for inexperienced operators. With the new rotary selector, reference quantities can be intuitively and reliably selected.

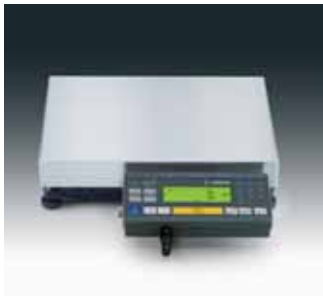
- 3 displays for piece count, avg. piece weight and wt. readout
- Max. accuracy: 1,000 on the pan = 1,000 on the display
- Sturdy plastic housing rugged in every respect
- Lightweight chassis for portable use
- Battery-operable around the clock – and beyond!



Economy Series

... are high quality scales with standard application programs for low budgets. They are easy to operate and ideal for simple weighing tasks.

- Weighing capacities: 3 kg to 150 kg
- Total ease of operation
- Built-in application programs (e.g. counting)
- SPEED UP technology for weight readouts within approx. 0.5 s
- Backlit LCD



Quality Series

... are high-resolution, rugged and universal scales with an extensive choice of accessories and a wide variety of application programs.

- Weighing capacities: 7 kg to 300 kg
- 25 product memories
- Numeric keypad, e.g. for entering the ref. quantity
- Built-in, combinable application programs
- Backlit LCD; analogue bar graph
- Can also be operated in Zone 2

Complete Scales



Combi Series

... cover a range of rugged industrial scales combinable with your choice of indicators and peripheral equipment. Flexible configuration capabilities. With programs for counting, checkweighing, totalizing, ...

- Weighing capacities: 3 kg to 3 t
- 13 platform sizes
- 4 indicators with various application levels
- Painted and stainless steel versions
- Special options (interfaces, materials, ...)
- Stainless steel models can be optionally used in Zones 2 and 22



Stainless Excellence Complete Scales

... hygienic-washdown design to meet special requirements for easy, thorough cleaning and rugged daily use in the food industry.

- From 0.1 g to 15 kg – optionally factory-verified accuracy class (III)
- HACCP | EHEDG compliance
- IP68 | IP66 protection
- High-alloy stainless steel grades
- Accurate and fast +/- checking



Factory Series Precision Scales

... are high-resolution industrial scales that are ideal for use within quality systems.

- Monolithic weigh cell with built-in calibration weight
- From 0.01 to 300 kg, also verifiable for legal metrology, accuracy class (II)
- Fast and reliable, high-resolution weighing results
- Certified IP protection, UL approvals
- Also suitable for control of measuring and test equipment
- Can be integrated into networks



Analogue Process Transmitters

... designed for tank and hopper scales. Models with an intrinsically safe load cell interface can also be used for applications in hazardous areas.

- 0.1% accuracy
- IP65 field housing or 19" Euroformat
- Process control via 2 outputs, analogue output 4..20mA
- Theoretical calibration via DIP switches



Digital Process Transmitters

... modern field instrumentation for tank and hopper scales. Models with an intrinsically safe load cell interface can be used for applications in hazardous areas.

- High accuracy, 3,000e, class III
- ModBus, Jbus, Dust protocol, DDE driver serial
- IP65 field housing or 19" Euroformat
- 3 inputs, 3 outputs, analogue output 4..20mA
- Smart Calibration



Digital Fieldbus Transmitters

... are used to integrate scales into process control and automated systems, and have an optional fieldbus interface.

- High accuracy, 3,000e, class III
- Profibus DP, Interbus S, DeviceNet
- IP65 field housing, aluminium stainless steel
- 3 inputs, 3 outputs, analogue output 4..20mA
- Smart Calibration

Process Transmitters

... for especially easy connection to PLCs via Profibus. A DIN rail simplifies mounting in control panels.

- Highly accurate digital signal processing
- Accuracy 6,000e, class III
- Configurable using PALM PDA or Windows®-PC
- IP20 protection, DIN rail mounting
- Smart Calibration



Indicators



Display and Control Units

... optimised for counting and +|- checkweighing.

- With numerous application programs
- IDs, 25 product memories
- Connect up to four 360-ohm load cells
- RS-232C serial port
- Protection rating: IP65 | NEMA 4

Stainless Excellence Indicators

... hygienic-washdown design to meet special requirements for easy, thorough cleaning and rugged design. They can be connected to platforms or load cells for the widest variety of applications.

- HACCP | EHEDG compliance
- IP68 | IP66 protection, high-alloy stainless steel
- EC type-approval certificate, with suitable load cells, verifiable for legal metrology
- Fast and accurate +|- checking
- Connects to many platforms and load cells



Combiics Indicators

... high operating reliability; practical application programs; customizable printouts; additional, optionally retrofittable interfaces.

- Up to 9 application programs (e.g. counting, +|- checkweighing, ...)
- Standard RS-232C interface port
- EC type-approval certificate; with suitable load cells, verifiable for legal metrology
- Analogue bar graph, colour-coded LEDs
- Stainless steel models can be optionally used in Zone 2 and 22

isi Terminals

... with custom-tailored, practical application programs that can be combined with one another and with an extensive range of accessories and interfaces.

- Application programs (e.g. counting, filling, ...)
- Up to 10 function keys for operator guidance
- Alphanumeric keypad
- Can also be operated in Zone 2 hazardous areas

Indicators



Digital Weighing Indicators

... required for evaluating weighing signals. The display and keys provide easy operator guidance. On-site installation possible.

- 16-bit resolution
- 3 digital control inputs | outputs
- For panel installation; 85 to 250 V power supply
- IP65 protection (front)
- Numerous interfaces



Compact Weighing Indicators

... are ideal for platform, tank and hopper scales as well as weighbridges. Operation either by front panel or via remote terminal.

- Communication with higher-level systems
- Easy connection to PLCs
- Various options and protocols available
- EC type-approval certificate, 3,000e, class (III)
- ModBus, JBus, Dust protocol, Profibus-DP, DDE driver



System Controllers

... are ideal for high accuracy platform scales, weighbridges, fill workstations, batching applications & charge and discharge processes.

- EC type-approval certificate, 5,000e, class (III)
- PLC function integrated
- Communication via fieldbus and Ethernet
- Housing for various mounting options, stainless steel, IP65
- Interface for external PC keyboard

Load Cells



Single Point Load Cells

... very low profile. They are used in bench and counting scales as well as checkweighers.

- For legal metrology acc. to OIML R60
- For various platform sizes
- Accuracy classes N, C3, C3MR, C3MR+
- Capacity range from 1 kg to 500 kg
- IP65 | 68 | 69K protection

Tension Load Cells

... manufactured from high-strength special or stainless steel. They are used in hybrid scales and for suspended vessels.

- Highly corrosion-resistant
- Hermetically welded, IP67 | 68
- For legal metrology acc. to OIML R60
- Accuracy classes N, C3, C6
- Capacity range from 60 kg to 5 t



Compression Load Cells

... feature absolute accuracy in tank and hopper scales. They are made of highly corrosion-resistant stainless steel and are impervious to vibration.

- Accuracy classes L, D1, C3, C6
- Capacity range from 30 kg to 300 t
- Operating temperature range -30°C to +95°C
- IP68 | NEMA 6 protection
- Especially rugged and reliable

Bending Beam Load Cells

... entirely made of stainless steel and designed for use in platform, tank, hopper and hybrid scales.

- Hermetically welded, IP67
- For legal metrology acc. to OIML R60
- Accuracy classes N, C3, C3MR, C3MR+
- Capacity range from 5 kg to 500 kg

Shear Beam Load Cells

... made of high-strength special or stainless steel and used in platform and tank | hopper scales.

- Highly corrosion-resistant
- Hermetically welded, IP67
- For legal metrology acc. to OIML R60
- Accuracy classes N, C3, C3MR, C3MR+
- Capacity range from 91kg to 5 t



Load Cells



PanCake® Level Cell

... the ideal solution for all level control requirements using level-by-weight measurements of liquids and solids. Thanks to its ultra-low profile, it needs only a height of 25 | 35 mm to install.

- Entirely made of stainless steel
- Hermetically welded, IP68 | NEMA 6
- Accuracy class L
- Analogue output 4..20mA (option)
- Capacity range from 500 kg to 16 t



Truck Scale Load Cells

... specially designed to meet the requirements of truck scales. They are highly resistant to surge voltage, ensuring maximum reliability.

- Proven rocker pin design
- Hermetically welded, IP68, IP69K
- Accuracy classes C3, C4
- Capacity range from 20 to 75 t
- Maintenance-free, rugged and reliable



Mounting Kits

... particularly designed for use in tank and hopper weighing. They are matched to the specific load cells, and can be easily installed.

- High accuracy
- Made of mild steel or stainless steel
- Capacity range from 30 kg to 300 t
- Rugged construction resistant to high lateral loads
- Maintenance-free constrainers and swivel eyes

Accessories

... and cable junction boxes for industrial applications in hazardous areas and in legal metrology; (extension) cables for load cells, printers and interface cards.

- Additional interface cards for controllers
- Ex equipment, e.g. remote displays
- Cables for installing load cells at large distances
- Cable junction boxes with IP65 | 68 | 69K NEMA 4x /6
- Installation cables for load cells

System Controllers



X4 Process Controllers, "X-Family"

... the right choice for weighing applications in all industrial processes. Versatile for control and communication.

- EC type-approval certificate; 6,000e, class III
- Integrated PLC function
- Communication through fieldbuses and Ethernet
- Weight and 2-line text display
- Front dimensions 192x96 mm



X5 System Controllers, "X-Family"

... with a maximum of functionality set new standards for control and weighing electronics in the industrial area. The right choice for a variety of applications.

- Easy menu-guided operation
- Integrated PLC function
- Option cards already installed
- Pre-programmed applications
- Easily adaptable with PR1750
- Approved for ATEX Zone 2+22 and FM class I, Div. 2



X6 System Controllers, "X-Family"

... offer the complete functionality of X5 system controllers with an additionally integrated keypad in the classic 19" housing.

- Easy menu-guided operation
- Integrated PLC function
- Option cards already installed
- Pre-programmed applications
- Easily adaptable with PR1750

PowerTools

... are PC programs to facilitate getting the most out of your system controllers. These tools are supplied on CD and can be used with all "X-Family" controllers.

- DisplayIt: remote control by any Windows® PC
- RecoverIt: backs up all data incl. EARAM
- TranslatIt: translates all operating texts
- AccessIt: uploads all databases to a PC for editing
- FlashIt: easily loads software updates

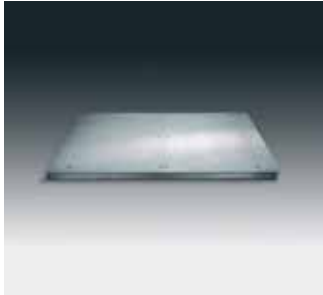
PR 1750 Program Development Tool

... for flexibility in programming system controllers. It enables you to meet customer-specific requirements precisely by extending standard software capabilities.

- Easy operation thanks to structured menus
- Programming conforms to IEC 61131
- Library functions specially designed for weighing applications
- Powerful debugging tool
- Tools for convenient project documentation



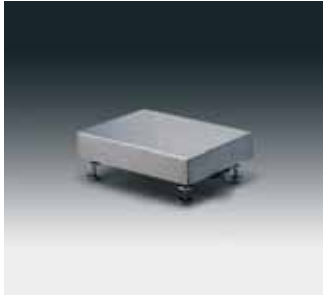
Platforms



Combiics Weighing Platforms

... from 0.1 g to 3,000 kg, these are a whole new generation of rugged and flexible industrial scales.

- Accuracy 3,000e, 2 × 3,000e, class (III); 15,000d, 30,000 d
- 13 different sizes
- IP65 | IP68 protection
- Finish: epoxy coated or various stainless steel grades
- Accessories include drive-on ramps, pit frames
- Stainless steel models can optionally be operated in Zones 2 and 22

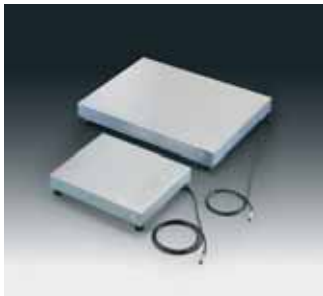


Stainless Excellence Platforms

... feature a hygienic-washdown design to meet special requirements for thorough cleaning and rugged daily use.

The SEP platform is a safe investment in all quality assurance applications.

- 0.1 g to 15 kg
- HACCP | EHEDG compliance
- IP68 | IP66 protection
- High-alloy stainless steel in various grades
- For use in legal metrology with type-approved indicators (class (III))

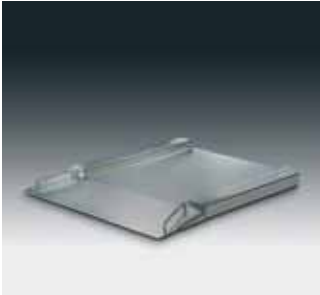


IS Weighing Platforms

... from 0.001 g to 300 kg can be used in automated processes. Verifiable in class (II) and class (III).

- Fast weighing; high resolution
- With built-in motorised calibration weight
- RS-485 or RS-232C interface
- Rugged, industry-compatible design
- High IP protection rating
- Some models can be operated in Zones 2 and 22

Platforms



IF Flat-bed Scales

... from 5 g to 3,000 kg are especially easy to load.

- 1 × 3,000e | 2 × 3,000e (for legal metrology); class III
- High resolution can be set
- Ultra-low profile design; IP68 protection
- Painted or stainless steel finish (also electropolished)
- Can be used in Zone 1, 2, 22



IF Flat-bed Scales "PharmaLine"

... from 10 g to 3,000 kg are especially easy to load.

- 1 × 3,000e | 2 × 3,000e (for legal metrology); class III
- High resolution can be set
- Ultra-low profile design; IP68 protection
- Painted or stainless steel finish (also electropolished)
- Can be used in Zone 1, 2, 22
- Very easy to clean with lifting device



IU Pallet Scales

... from 10 g to 3,000 kg allow exceptionally flexible use.

- 1 × 3,000e | 2 × 3,000e (for legal metrology); class III
- Higher resolution can be set
- High protection rating: IP68
- Hot-galvanised or stainless steel version
- Can be used Zone 1, 2, 22

Explosion-protected Weighing Products



Explosion-protected Complete Scales

... are adapted to meet different requirements for resolution and application levels.

- Intrinsically safe scales from 0.001 g to 300 kg
- Conform to ATEX, with international approval certificates for Zone 1
- Monolithic system with internal built-in calibration weight
- Network-compatible (Factory series)
- Configurable backlit display (Factory series)
- Variety of power supply options (also battery)



Explosion-protected Indicators

... are used with load cells and analogue and digital platforms. Variety of power supply options (also battery).

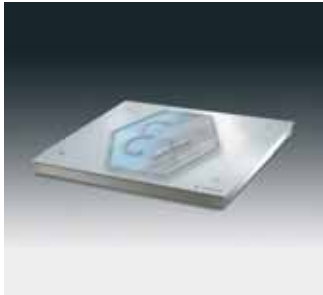
- Intrinsically safe and with ATEX and international Ex approvals for Zone 1, 21, 20, 2 and 22
- Integrated, powerful analogue|digital converter and graphical display
- Can be used as legal measuring instruments
- Verification documents for intrinsic safety included
- With filling application



Explosion-protected Terminal

... are operating terminals for all "X-Family" controllers. They are specially designed for hazardous areas and feature a rugged stainless steel housing.

- "Plug and play" function
- Easy to integrate via serial interface
- Can be used in Zone 1
- High-contrast LCD



Explosion-protected Platforms

... are analogue stainless steel scales that can be used as floor, flat-bed and pallet scales and, with a monolithic weigh cell, as high-resolution platforms.

- ATEX-compliant; many with int'l. approvals; for Zone 1, 21, 20, 2, 22 depending on model
- Model dependent type-approved monolithic system, built-in calibration weight
- High-resolution platforms with data interface
- Many can be used in hazardous dust atmospheres

Explosion-protected Weighing Products



Intrinsically Safe Interfaces

... isolate circuits for the safe area from those of the hazardous areas. They have intrinsically safe data interfaces or intrinsically safe load cell supply circuits, thus permitting safe connection.

- Safe separation of Ex equipment for data communication
- Highly accurate load cell supply
- Also for applications in legal metrology
- Especially easy to install and use



Explosion-protected Process Transmitters

... are the classical instrumentation for process, platform and tank scales. The transmitters have an integrated intrinsically safe load cell power supply.

- Accuracy up to 3000e, class III
- IP65 field housing or 19" Euroformat
- Calibration|adjustment possible without weights
- Analogue output 4..20mA or serial interface
- Digital inputs and outputs



Explosion-protected Load Cells

... have been specially designed and optimised for use in the typical process weighing applications in hazardous areas.

- Wide capacity range: up to 300 t
- Ex-certified for Zone 0, 1, 2, 20, 21 and 22, ATEX compliant
- Entirely hermetic IP68 encapsulation
- Complete with blue connecting cable

Dynamic Weighing Products



Weighing Modules

... for static \pm checkweighing with automatic sorting via motorised, bidirectional conveyor belt.

- Weighing capacity: 7 kg
- Classification accuracy: \pm 0.4 g
- Max. 30 weighings per minute
- \pm checkweighing with 25 product memories
- Interfaces: RS-232C, relay



Modules for Weighing in Motion

... constitute a flexible range of inexpensive dynamic checkweighers for bag filling and sealing machines, in-line completeness checks, determination of shipping data, and many more applications.

- Weighing capacities from 6 kg to 120 kg
- Dynamic accuracies of \pm 1 g to \pm 20 g
- For products up to 1,800 x 900 mm (L x W)
- \pm checkweighing with product memories
- Options: interfaces, st. steel finish, volumetric measurement



Compact Checkweighers

... offer all the advantages of in-line checkweighing whenever project budgets do not allow the use of a fully-equipped checkweigher. Can be connected to QC systems.

- Weighing capacities: 3,000 g to 6,000 g
- Zone of indecision: from \pm 1 g up, optionally for use in legal metrology
- Throughput: up to 170 products /min.
- Stainless steel, IP65
- Adjustable transport height and belt speed

Premium Checkweighers

... provide a wide range of weighing systems from 600 g to 100 kg. Special versions and complete integratability into the QA system SPCfWin cover all requirements.

- Zone of indecision: from \pm 20 mg up; for legal metrology according to OIML R51
- Throughput: up to 600 products/min.
- IP65, stainless steel; compliant to HACCP
- Sophisticated conveyor and sorting technology
- Clean design for complete hygiene



Combination Checkweighers and Metal Detectors

... a combined product solution for double safety.

- Optimal availability due to independent electronics
- Sorting separate for weights and metal particles
- IP65 stainless steel; HACCP compliance
- Compact version



Average Weight Control | Quality Assurance



SPCfWin Terminal Scales

... combine compact dimensions and unique user-friendly features in a high-quality system. Premium weighing technology with isoTEST for integration into quality management systems.

- Average weight control | Attribute testing
- Weighing ranges: 620 g to 34 kg; protection ratings up to IP65
- Verif. scale intervals ≥ 10 mg (one solution for every product)
- Graphical display with soft keys; sophisticated evaluation
- Off-line mode ensures optimal availability



SPCfWin Standard Terminals

... with a generous offer of interfaces and platforms allow use of product solutions directly at the production line for short control intervals.

- Average weight control | Attribute testing
- IP65 protection; optional stainless steel version
- Alphanumeric input
- Function keys for fast and error-free operation
- Off-line mode ensures optimal availability



Premium Terminal

... especially compact industrial terminal with extensive offer of interfaces; perfect for quality control and control applications.

- Closed, painted steel housing; IP65
- Tilttable display and control unit
- Backlit VGA display; 7.7"; full keypad; function keys
- Motherboard with 486-based processor
- Interfaces: 4 x serial, parallel, Ethernet; 4 relays



Combics3 AWC Terminal

... featuring the user-friendly design and industry-compatible ruggedness of the Combics system, is now available for average weight control of prepackages and attribute testing in networks.

- Compact solution for networking using Ethernet TCP/IP
- All stainless steel and IP67 protected
- For average weight control and attribute testing
- For the most diverse weighing capabilities and resolutions
- Completely integrated in the extensive Combics system

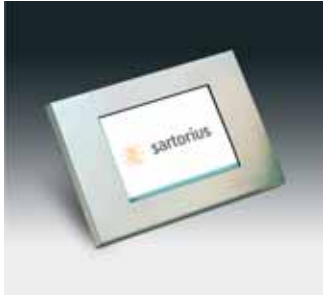
Average Weight Control | Quality Assurance



Compact Stand-Alone SartoPac Basic System

... combines compact dimensions and unique user-friendly features in a high-quality system. Premium weighing technology with isoCAL | isoTEST for integration into quality systems.

- Average weight control | SPC | Pharmacopoeia
- Weighing ranges: 230 g to 34 kg, protection up to IP65
- Verif. scale intervals ≥ 1 mg (one solution for every product)
- Graphical display with soft keys; sophisticated evaluation
- 100 product memories (500 memories optional)



Industrial PC – IPC

... particularly rugged, industry-compatible, compact version; allows the most sophisticated applications to be used directly in the processing area.

- Closed stainless steel housing
- Protection ratings up to IP65; compliant to HACCP
- INTEL or AMD processors, 128 MB RAM
- Colour TFT touch screen with XGA or SVGA resolution
- Windows® 2000 operating system



Sartorius ProControl for Windows®

... modular scale-up system for recording, monitoring, evaluating and archiving all quantitative and qualitative product, process and environmental parameters.

- Average weight control | SPC | Attribute testing | HACCP
- Ranges from stand-alone to network systems
- Solutions for every requirement
- Optimal central computer and workstation ergonomics
- The most advanced software platform guarantees a future-proof investment

Metal Detectors



Metal Detectors

... detect metal particles and sort out contaminated products. An extensive offer of detector coils and conveyors enable us to provide the ideal customised product solutions.

- Product quality assurance acc. to ISO 9001
- Safeguard against machine damage and downtimes
- Optimal compliance with legal requirements, such as HACCP
- The most advanced multi-frequency technology
- Interface for printer and QA system SPCfWin



OBSERVER Metal Detector

... detects magnetized iron and even stainless steel contaminants in aluminum-packaged products.

- Exclusively designed sensors based on magnetic field measuring technology
- Position-specific rejection by light-barrier synchronization
- Rejection monitoring optional
- Interactive prompts via four-line, backlit LCD

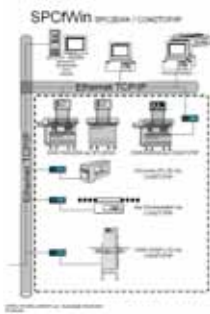
Software Solutions



Recipe | Formula Management Systems

... allow data management of raw materials, recipes or formulas and materials, and serve as central operating workstations for batching applications in automated processes.

- Easy-to-operate with Windows® user interface
- Control of up to 16 parallel formulation processes
- Several formulation processes can be performed in parallel
- Production and consumption data are generated and archived
- Open S88 interfaces for "X-Family" and PLC
- Choice of user languages



Universal Networking of Serial Terminals

... to the Sartorius Com2TCP | IP; nearly all terminals and instruments with a serial port can be connected via Ethernet TCP | IP to the quality assurance system Sartorius ProControl for Windows® or to individual data systems.

- Connects all terminals and instruments with a serial port
- Moisture analyzers (e.g. Sartorius MA | MMA).
- Electronic thermometers (important for HACCP)
- Checkweighers, metal detectors



Customised Applications

... allow the use of weighing equipment with a PC. Under Microsoft Access®, a number of different applications have been created:

- Density determination using a balance
- Differential weighing using a balance
- Sieve analysis using a scale
- Recording of machine downtimes and error sources



Communication Tools

... hardware and software for connecting and networking balances, scales, gauges and sensors.

- Verifiable scale driver with Alibi memory
- Data transfer to PC applications with control functions
- Fill level monitoring of tanks, hoppers, and fermenters with central display on a PC

Chemical Compatibility

1. Filter Materials and Mini Cartridges

	Cellulose acetate	Cellulose nitrate	Reg. Cellulose	PTFE	Polyamide	Glass fiber	Polycarbonate	Polyether-sulfone	Sartobran P cartridge	Sartofluor cartridge
Solvents	111	113	184	118	250	134	230	154		
Acetone	–	–	•	•	–	•	○	–	–	E
Acetonitrile	?	?	•	•	–	?	?	•	?	?
Gasoline	•	•	•	•	•	•	•	•	V	–
Benzene	•	•	•	•	•	•	?	•	–	–
Benzyl alcohol	○	○	•	•	•	•	?	–	○	•
n-Butyl acetate	○	–	•	•	•	•	•	•	E	?
n-Butanol	•	•	•	•	•	•	•	•	•	•
Cellosolve	•	–	•	•	?	•	–	•	–	–
Chloroform	–	•	•	•	•	•	–	–	–	–
Cyclohexane	○	○	•	•	?	•	•	–	○	V
Cyclohexanone	–	–	•	•	•	•	?	?	–	–
Diethylacetamide	–	–	•	•	•	•	?	?	–	?
Diethyl ether	•	–	•	•	•	•	•	?	–	–
Dimethyl formamide	–	–	○	•	○	•	–	?	–	•
Dimethylsulfoxide	–	–	•	•	•	•	–	–	–	•
Dioxane	–	–	•	•	•	•	–	•	–	•
Ethanol, 98%	•	○	•	•	•	•	•	•	•	•
Ethyl acetate	–	–	•	•	•	•	?	–	–	–
Ethylene glycol	•	○	•	•	?	•	•	•	•	•
Formamide	?	?	?	•	?	•	–	?	–	•
Glycerin	•	•	•	•	•	•	•	•	•	•
n-Heptane	•	•	•	•	?	•	?	?	•	V
n-Hexane	•	•	•	•	•	•	•	?	V	–
Isobutanol	○	○	•	•	•	•	•	?	–	•
Isopropanol	•	○	•	•	•	•	•	•	•	•
Isopropyl acetate	○	–	•	•	?	•	?	•	–	•
Methanol, 98%	•	–	•	•	?	•	•	•	•	•
Methyl acetate	–	–	•	•	•	•	?	–	–	•
Methylene chloride	–	○	•	•	•	•	–	–	–	–
Methyl ethyl ketone	–	–	•	•	•	•	?	–	–	•
Methyl isobutyl ketone	•	–	•	•	•	•	?	?	–	–
Monochlorobenzene	•	•	•	•	•	•	–	?	V	V
Nitrobenzene	•	○	•	•	•	•	–	?	–	–
n-Pentane	•	•	•	•	•	•	•	?	V	V
Perchloroethylene	•	•	•	•	•	•	•	?	V	V
Pyridine	–	–	•	•	•	•	–	–	–	–
Carbon tetrachloride	○	•	•	•	•	•	?	•	–	?
Tetrahydrofuran	–	–	•	•	•	•	–	–	–	–
Toluene	•	•	•	•	•	•	?	•	–	–

Key to symbols see next page.

	Cellulose acetate	Cellulose nitrate	Reg. Cellulose	PTFE	Polyamide	Glass fiber	Polycarbonate	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

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

Key to symbols see next page.

	Glass	Poly-carbonate	Poly-propylene	PTFE	Stainless steel	EPDM O-ring	PTFE O-ring	Silicone O-ring	Viton O-ring
Solvents									
Trichloroethane	•	–	?	•	•	–	•	–	•
Trichloroethylene	•	–	–	•	•	–	•	–	•
Xylene	•	–	○	•	•	–	•	–	○
Acids									
Acetic acid, 25%	•	•	•	•	•	•	•	•	–
Acetic acid, 96%	•	–	•	•	•	•	•	?	–
Hydrofluoric acid, 25%	–	–	•	•	–	○	•	–	○
Hydrofluoric acid, 50%	–	–	•	•	–	○	•	–	○
Perchloric acid, 25%	•	○	•	•	–	•	•	–	•
Phosphoric acid, 25%	•	○	•	•	○	•	•	–	•
Phosphoric acid, 85%	•	○	•	•	○	•	•	–	•
Nitric acid, 25%	•	–	•	•	–	○	•	–	•
Nitric acid, 65%	•	–	–	•	–	–	•	–	•
Hydrochloric acid, 25%	•	○	•	•	–	○	•	–	•
Hydrochloric acid, 37%	•	–	•	•	–	•	•	–	•
Sulfuric acid, 25%	•	•	•	•	○	•	•	–	•
Sulfuric acid, 98%	•	–	–	•	–	–	•	–	•
Trichloroacetic acid, 25%	•	○	•	•	–	•	•	–	–
Bases									
Ammonium, 1N	•	–	•	•	•	•	•	–	–
Ammonium hydroxide, 25%	•	–	•	•	•	•	•	•	–
Potassium hydroxide, 32%	•	–	•	•	•	•	•	○	○
Sodium hydroxide, 32%	•	–	•	•	•	•	•	○	•
Sodium, 1N	•	–	•	•	•	•	•	•	•
Aqueous solutions									
Formalin, 30%	•	•	•	•	•	•	•	○	•
Sodium hypochlorite, 5%	•	•	•	•	•	•	•	•	•
Hydrogen peroxide, 35%	•	•	•	•	•	•	•	•	•

Key to symbols

- = compatible
- = limited compatibility
- = not compatible
- ? = not tested

Contact time: 24 hours at 20°C

Chemical compatibilities can be influenced by various factors. Therefore, we recommend that you confirm compatibility with the liquid you wish to filter by performing a trial filtration run before you begin with actual filtration.

3. Ready-to-Connect Filtration Units

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

Key to symbols see next page.

	Midisart 2000	Minisart	Minisart HY	Minisart RC	Minisart SRP	Sarto- bran 300	Sartobran P Capsule	Sartofluor Capsule	Sartolab P20
Solvents									
Trichloroethane	•	○	○	•	•	?	?	•	-
Trichloroethylene	○	?	?	?	○	-	-	-	-
Xylene	•	-	-	•	•	○	○	•	-
Acids									
Acetic acid, 25%	•	○	○	?	?	•	•	•	•
Acetic acid, 96%	•	-	-	?	•	-	-	•	-
Hydrofluoric acid, 25%	•	○	○	?	•	•	•	•	-
Hydrofluoric acid, 50%	•	○	○	?	•	-	-	•	-
Perchloric acid, 25%	•	?	?	?	•	-	-	•	-
Phosphoric acid, 25%	•	•	•	?	•	•	•	•	•
Phosphoric acid, 85%	-	?	?	?	-	○	○	-	○
Nitric acid, 25%	•	-	-	?	•	-	-	•	-
Nitric acid, 65%	•	-	-	?	•	-	-	○	-
Hydrochloric acid, 25%	•	-	-	?	•	-	-	•	-
Hydrochloric acid, 37%	•	-	-	?	•	-	-	•	-
Sulfuric acid, 25%	•	-	-	?	•	-	-	•	-
Sulfuric acid, 98%	•	-	-	?	•	-	-	•	-
Trichloroacetic acid, 25%	•	-	-	•	•	-	-	•	-
Bases									
Ammonium, 1N	•	•	•	?	•	•	•	•	-
Ammonium hydroxide, 25%	•	○	○	?	•	○	○	•	-
Potassium hydroxide, 32%	•	-	-	?	•	-	-	•	-
Sodium hydroxide, 32%	•	-	-	?	•	-	-	•	-
Sodium, 1N	•	○	○	?	•	○	○	•	-
Aqueous solutions									
Formalin, 30%	•	-	-	?	•	○	○	•	○
Sodium hypochlorite, 5%	•	•	•	?	•	-	-	•	•
Hydrogen peroxide, 35%	•	•	•	?	•	•	•	•	•

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