Sartorius Biotechnology
Filter Cartridges
At Sartorius, we don’t just sell you a filter. You work with experienced Sartorius filtration engineers, scientists and sales representatives who first gain a thorough understanding of your filtration needs. Only then do we offer a specific filtration system recommendation based on an understanding of your production process. More than 60 years of expertise in filtration technology and support of applications from laboratory bench scale to full manufacturing scale stand behind our recommendations.

For ongoing support, our sales representatives and customer service organization are available worldwide. With two manufacturing sites and fully stocked facilities worldwide, we are ready to respond to your product requirements at all times. We help you maintain productive and efficient use of your filtration products with a full range of support services and filtration specialists globally.

We offer a complete range of filtration products from prefiltration depth filters to final sterilizing membrane filters in products ranging from flat filter discs to capsules, up to standard filter cartridges and MaxiCaps.

Housings designed for all process scales, whether laboratory, pilot plant or full production, are available to match the requirements of your application.

Filter cartridges are available as:

- Depth prefilters
- Membrane prefilters
- Final membrane filters

**Depth Prefilters**
Sartorius polypropylene depth filters protect downstream membrane filters economically, are highly effective at cell removal and are the most inert depth filters available. Sartorius glass fiber depth filters add the power of adsorptive retention to the polypropylene filters’ physical retention. Molecular force interaction between colloidal particles and the glass fibers results in retention of particles smaller than the rating, making Sartorius glass fiber filters very effective for clean-up of biological solutions. Sartorius filter cartridges containing glass fiber layers always include a downstream polypropylene layer or membrane to prevent the shedding of fibers into the process solution.

**Membrane Prefilters**
Biological solutions can contain heavy loads of submicron particles which can quickly plug 0.2 µm and smaller membrane filters. A prefilter cartridge, that combines layers of depth and membrane filters can more than double the throughput of downstream sterilizing grade filters, making the entire process more economical.

The proper selection of prefilters, whether depth filters or membrane prefilters, will result in lower filtration costs and improved overall performance of the final filters. This can result in the uninterrupted filtration of complete batches without the need for oversized filter systems or costly change-outs during filtration.

**Final Membrane Filters**
The highly uniform, porous structure of these sterilizing grade membrane filters provides highly effective filtration by retaining particles and bacteria absolutely, with 100% retention.

The Sartorius product range of sterilizing grade filter elements for liquids consists of 3 different types of hydrophilic membrane filters (Sartobran P, Sartopore 2, Sartolon) ideally suited for specific applications in the pharmaceutical industry.

**Scale-up with Sartorius**
Our entire range of Sartobran P filters, for example, is made of the same membranes and materials of construction from the smallest element, our Sartobran 150 with 150 cm²/0.15 ft² filtration area to capsules with up to 0.45 m² (5 ft²) filter area, all the way to our standard filter cartridge systems and MaxiCaps with up to 1.8 m² (18 ft²) filter area. This product selection gives you the opportunity to easily scale-up from R&D laboratory stages to pilot plant and production processes. Sartorius' philosophy of scaling up allows you to adapt the filter element size to meet your changing production needs and optimize your process by maximizing flow rates and throughputs.
Creating a New Industrial Standard
With our new “Plant 2001” production facilities, we intend to set a new quality standard for biotechnology products. That is why we used the top standards of our customers in the pharmaceutical industry as guidance in designing our facilities. Optimized personnel and materials flow management assures the highest product quality and process efficiency.

ISO 9001 Certified Quality
Sartorius is certified to meet ISO 9001 standards. This covers our entire organization and ensures the highest of standards to provide for a quality management system ranging from R&D to production, warehousing, materials management and customer service. Our manufacturing facilities all operate in conformance to cGMP requirements, in addition to the ISO 9001 standards.

Sartorius’ philosophy on quality ensures that our customers receive products and service which meet the strictest quality controls and regulatory requirements.

All Sartorius filter cartridges conform to testing protocols outlined in our Validation Guides, as well as other in-house quality assurance tests. Total quality of the filter is assured from raw materials through final products, with complete in-process control testing along the way. Our sterilizing grade filter cartridges are 100% factory pre-tested prior to release to assure the highest level of security and quality.

Audit Our Manufacturing Sites
At Sartorius, our filters are manufactured at facilities that meet the stringent needs of the pharmaceutical industry. All of the Sartorius facilities worldwide are audited on a regular basis and are accessible for you to audit.

Validation Guides
Sartorius filter cartridges are supplied with a quality assurance certification to assist in the validation of your manufacturing process.

Comprehensive product-specific validation packages are available for all Sartorius filter elements. All Validation Guides for prefilter cartridges and sterilizing membrane cartridges contain the following information:

- Technical specifications for the filters
- Biological Safety Testing, including the USP24 Class VI Plastics Test
- Extractable testing
- Filtrate analysis according to USP24
- Chemical compatibility information

These results are included in the Sartorius Drug Master File DMF 5967 at the U.S. Food and Drug Administration (FDA).

Process Validation
In order to validate the filtration products for your process, Sartorius offers a wide range of validation support services. Sartorius has assisted pharmaceutical manufacturers in validating their products and fulfilling the requirements for process validation relating to the use of filtration products. The use of these support services is growing as regulatory requirements change.

Applications and Technical Support
Whether you have a technical question regarding the specifications of our filter products or require assistance in filter selection, our Applications Department is available to offer you assistance. We can perform filterability testing to properly select and optimize your filtration process, both in our laboratories or at your facility. Filtration process audits can also be performed to assure the maximum performance of your filtration systems.

Training Seminars
Sartorius offers a comprehensive training program for filter users. This seminar series covers topics including:

- General Filtration Theory
- Integrity Testing
- Crossflow Filtration and Technology
- Process Design
- Validation of Filtration Systems

These are available at your site for the training and continued education of personnel in your facility.

For more information or immediate assistance, contact your local Sartorius representative.
### Sartobran® P

**Applications**
- Sterile filtration of parenteral solutions
- Sterile filtration of vaccines, biologicals and antibiotics
- Sterile filtration of serum and plasma fractions
- Sterile filtration of tissue culture media, diagnostic reagents, therapeutic agents, preparations containing proteins, vitamins and preservatives
- Substerile filtration (0.1 µm)

**Cartridge Construction**
- Protective polypropylene layer
- Reinforced cellulose acetate membrane
- Polypropylene drainage layer
- Polypropylene outer cage, core and end caps
- Silicone O-rings standard – optional EPDM, Viton

**Available Pore Size Combinations**
- 0.65 + 0.45 µm
- 0.45 + 0.2 µm
- 0.45 + 0.1 µm

**Adapter Types**
- 21, 25, 27, 28

**Filtration Area**
- 0.6 m² (6 ft²) per 10" element

**Basic Order Number**
- 523...P

### Sartopore® 2

**Applications**
- Sterile filtration of parenteral solutions with high or low pH
- Sterile filtration of highly viscous products, e.g. ophthalmics
- Sterile filtration of disinfectants
- Sterile filtration of buffers and media
- Sterile filtration for enhanced sterility assurance (0.1 µm)

**Cartridge Construction**
- Protective polypropylene layer
- Asymmetric polyethersulfone membrane
- Polypropylene drainage layer
- Polypropylene outer cage, core and end caps
- Silicone O-rings standard – optional EPDM, Viton

**Available Pore Size Combinations**
- 0.8 + 0.45 µm
- 0.45 + 0.2 µm
- 0.2 + 0.1 µm

**Adapter Types**
- 21, 25, 27, 28

**Filtration Area**
- 0.6 m² (6 ft²) per 10" element

**Basic Order Number**
- 544...

### Sartolon®

**Applications**
- Sterile filtration of parenteral solutions
- Sterile filtration of vaccines, biologicals and antibiotics
- Sterile filtration of serum and plasma fractions
- Sterile filtration of tissue culture media, diagnostic reagents, therapeutic agents, preparations containing proteins, vitamins and preservatives
- Substerile filtration (0.1 µm)

**Cartridge Construction**
- Protective polypropylene layer
- Reinforced Nylon membrane
- Polypropylene drainage layer
- Polypropylene outer cage, core and end caps
- Silicone O-rings standard – optional EPDM, Viton

**Available Pore Size Combinations**
- 0.45 + 0.2 µm

**Adapter Types**
- 21, 25, 27, 28

**Filtration Area**
- 0.6 m² (6 ft²) per 10" element

**Basic Order Number**
- 510...
Sartofluor® GA|LG

Pharmaceutical grade hydrophobic PTFE membrane filter cartridge

Applications
- Sterile venting of tanks
- Sterile air filtration for filling equipment
- Fermentation air filtration
- Sterile filtration of gases
- Bioreactor inlet and outlet streams
- Sterile filtration of aggressive media and solvents (LG)

Cartridge Construction
- Protective polypropylene layer
- PTFE membrane filter
- Polypropylene drainage layer
- Polypropylene outer cage, core and end caps
- Silicone O-rings standard – optional EPDM, Viton

Available Pore Sizes
0.2 µm (GA) | 0.45 µm (LG)
0.1 µm (GA) | 0.2 µm (LG)
0.1 µm (LG)

Adapter Type
25 (GA)
25, 28 (LG)

Filtration Area
0.75 m² (7.5 ft²) per 10" element (GA)
0.5 m² (5 ft²) per 10" element (LG)

Basic Order Number
518...GA
518...LG

Sartoclean® CA

Pharmaceutical grade membrane prefilter cartridge

Applications
- Prefiltration of parenteral solutions
- Prefiltration of serum and plasma
- Biological products and vaccines
- Prefiltration of cell culture media
- Fermentation feed solutions
- Cell removal from fermentation processes
- Clarification prior to column chromatography

Cartridge Construction
- Protective polypropylene layer
- Reinforced cellulose acetate membrane(s)
- Polypropylene drainage layer
- Polypropylene outer cage, core and end caps
- Silicone O-rings, standard – optional: EPDM, Viton

Available Pore Size Combinations
3 + 0.8 µm
0.8 + 0.65 µm
0.45 µm
0.2 µm

Adapter Types
21, 25, 27, 28

Filtration Area
0.6 m² (6 ft²) per 10" element

Basic Order Number
562...

Sartoclean® GF

Prefilter cartridge for pharmaceutical liquids containing colloids and high bioburdens

Applications
- Prefiltration of serum and plasma fractions
- Prefiltration of biological products and vaccines
- Prefiltration of cell culture media
- Cell removal from fermentation processes
- Clarification prior to column chromatography

Cartridge Construction
- Protective polypropylene layer
- Non-woven glass fiber material
- Reinforced cellulose acetate membrane
- Reinforced cellulose acetate membrane
- Polypropylene drainage layer
- Polypropylene outer cage, core and end caps
- Silicone O-rings, standard – optional: EPDM, Viton

Available Pore Sizes
3 + 0.8 µm (double layer)
0.8 + 0.65 µm (double layer)
0.45 µm (single layer)
0.2 µm (single layer)

Adapter Types
21, 25, 27, 28

Filtration Area
0.6 m² (6 ft²) per 10" element

Basic Order Number
560...
Sartopure® PP2

Particle removing polypropylene depth filter cartridge

Applications
• Prefiltration of parenteral solutions
• Particle removal from DI water systems
• Particle removal from chemicals and solvents
• Particle removal from air and compressed gases
• Prefiltration of biological solutions

Cartridge Construction
• Protective polypropylene layer
• Multiple polypropylene layers with progressively finer retention ratings
• Polypropylene drainage layer
• Polypropylene outer cage, core and end caps
• Silicone O-rings, standard – optional: EPDM, Viton

Available Nominal Retention Ratings
- 50 µm
- 20 µm
- 8 µm
- 5 µm
- 3 µm
- 1.2 µm
- 0.65 µm

Adapter Types
21, 25, 27, 28

Filtration Area
0.6 m² (6 ft²) per 10” element

Basic Order Number
559...

Sartopure® GF2

High capacity prefilter cartridge with glass fiber enhanced adsorptive characteristics

Applications
• Prefiltration of pharmaceutical products
• Prefiltration of serum products
• Prefiltration of blood products
• Prefiltration of cell culture media
• Prefiltration of water

Cartridge Construction
• Protective polypropylene layer
• Multiple non-woven glass fiber layers with progressively finer retention ratings
• Polypropylene drainage layer
• Polypropylene outer cage, core and end caps
• Silicone O-rings standard – optional: EPDM, Viton

Available Nominal Retention Ratings
- 3 µm
- 1.2 µm
- 0.65 µm

Adapter Types
21, 25, 27, 28

Filtration Area
0.6 m² (6 ft²) per 10” element

Basic Order Number
557...

Sartofine® PP

High dirt loading prefilter cartridge validated for pharmaceutical applications

Applications
• Particle and cell removal from fermentation feed solutions
• Prefiltration of serum products, tissue culture media, diagnostic sera
• Clarification of solvents
• Particle removal from solvents, acids, bases and chemicals
• Utility filtration for cleaning machine and steam lines
• Capture of DI resin particles from water systems

Cartridge Construction
• 14 mm thick multilayer construction of wound non-woven polypropylene with up to eight progressively finer filter zones
• Polypropylene outer cage, core and end caps
• Silicone O-rings standard – optional EPDM, Viton

Available Retention Ratings
- 70 µm
- 40 µm
- 20 µm
- 15 µm
- 10 µm
- 5 µm
- 3 µm
- 1 µm
- 0.7 µm
- 0.5 µm

Adapter Types
00 (knife edge), 03, 05, 07, 08

Filtration Area
0.05 m² (0.5 ft²) surface by 14 mm depth filter material

Basic Order Number
558...
### Ordering information for standard cartridges

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Please replace the blanks with the appropriate two-letter combination for the adapter type.
### Order code information

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<td>= 0.10 µm</td>
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</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Adapter</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 1</td>
<td>Double open end</td>
</tr>
<tr>
<td>2 5</td>
<td>2-flange bayonet type</td>
</tr>
<tr>
<td>2 7</td>
<td>Double-O-ring type</td>
</tr>
<tr>
<td>2 8</td>
<td>3-flange bayonet type</td>
</tr>
<tr>
<td>0 0</td>
<td>Standard Cartridges:</td>
</tr>
<tr>
<td></td>
<td>(⌀ 71 mm)</td>
</tr>
<tr>
<td></td>
<td>Only Sartofine-PP</td>
</tr>
<tr>
<td>1 5</td>
<td>Mini Cartridges:</td>
</tr>
<tr>
<td></td>
<td>(⌀ 56 mm)</td>
</tr>
<tr>
<td>1 8</td>
<td>Bayonet type</td>
</tr>
<tr>
<td>1 3</td>
<td>Double O-ring type</td>
</tr>
<tr>
<td>1 3</td>
<td>MaxiCap ET Capsules</td>
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</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Pore Size Prefilter</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>No prefiler</td>
</tr>
<tr>
<td>P</td>
<td>Only polypropylene</td>
</tr>
<tr>
<td>T</td>
<td>Only one PTFE (Teflon®)</td>
</tr>
<tr>
<td>W</td>
<td>Multilayer (Sartofine)</td>
</tr>
<tr>
<td>E</td>
<td>3.00 µm</td>
</tr>
<tr>
<td>G</td>
<td>0.80 µm</td>
</tr>
<tr>
<td>D</td>
<td>0.65 µm</td>
</tr>
<tr>
<td>H</td>
<td>0.45 µm</td>
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</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>O-Rings</th>
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<tbody>
<tr>
<td></td>
<td>Standard Cartridges</td>
</tr>
<tr>
<td></td>
<td>Silicone</td>
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<tr>
<td></td>
<td>EPDM</td>
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<tr>
<td></td>
<td>Viton</td>
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<table>
<thead>
<tr>
<th>Code</th>
<th>Capsule Connectors</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0 O 1/2&quot; hose barb in/out</td>
</tr>
<tr>
<td></td>
<td>S S Sanitary flange in/out</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>P</td>
<td>Pharmaceutical grade</td>
</tr>
<tr>
<td>G A</td>
<td>Optimized for gas filtration</td>
</tr>
<tr>
<td>L G</td>
<td>Optimized for liquid filtration</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Pack size</th>
</tr>
</thead>
<tbody>
<tr>
<td>V</td>
<td>box of 2</td>
</tr>
<tr>
<td>A</td>
<td>box of 4</td>
</tr>
<tr>
<td>B</td>
<td>box of 5</td>
</tr>
</tbody>
</table>

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**How to order:** Sartobran P, Adapter 25, 0.2 µm, 10"
Filter Capsules and Mini Cartridges
Sartorius offers filter capsules that are constructed in all filter types. Small surface area membrane and depth filters, hydrophilic filters for aqueous solutions, filters with increased chemical resistance and hydrophobic vent filters are available and identical in materials of construction.

Even the pleating geometry is the same as our large filter cartridges. Working with small surface area filter capsules will allow for easy optimization of your filtration process and easy scale-up as production requirements increase.

The following filter types are available in capsule formats:

- Sartobran P (523…)
- Sartopore 2 (544…)
- Sartolon (510…)
- Sartofluor GA (518…)
- Sartoclean CA (562…)
- Sartoclean GF (560…)
- Sartopure PP2 (559…)
- Sartopure GF2 (557…)
- Sartofine PP (558…)

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

The filter capsules have a plastic housing incorporated into the construction, allowing for use without any set-up of filter housings and installation of Mini cartridges. In order to accommodate various processing systems, these filters are available with the following inlet and outlet connectors:

- 1 to 1½" sanitary flange
- ½" hose barb
- ¼ to ¾" stepped hose barb (available on 300 cm² capsules only)

There are also a number of filter types available as Mini cartridges. These can be utilized in systems, where the filters may be in-line steam sterilized, or under other process conditions which require the use of a stainless steel filter housing. For the availability of certain types of Mini cartridges, consult the part number table in this brochure.

Scale Up with Sartorius
Filter efficiency testing and the selection of the proper filter combinations, when processing hard-to-filter solutions has never been easier. Small scale and pilot testing can be performed with capsule filters without investing in stainless steel hardware in the early stages of product development or for filtration of small volumes of product. And during validation testing, the test can be performed with small surface area pleated devices so data from small scale validation testing can be used for fulfillment of regulatory requirements necessary for cGMP production.

You reduce costs and minimize validation requirements when you scale up with Sartorius.