



Sartorius Biotechnology
Filter Cartridges

Sartorius filter products – designed for the pharmaceutical industry



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 $\text{cm}^2/0.15 \text{ ft}^2$ filtration area to capsules with up to 0.45 m^2 (5 ft^2) filter area, all the way to our standard filter cartridge systems and MaxiCaps with up to 1.8 m^2 (18 ft^2) 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:

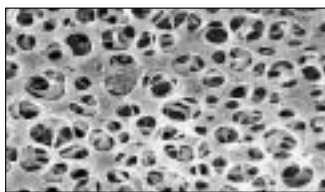
- General Filtration Theory
- Integrity Testing
- Crossflow Filtration and Technology
- Process Design
- Validation of Filtration Systems

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



Sterilizing grade pharmaceutical filter cartridge for low unspecific adsorption

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
- 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

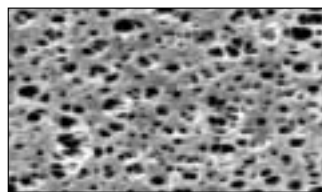
Filtration Area

0.6 m² (6 ft²) per 10" element

Basic Order Number

523...P

Sartopore® 2



Sterilizing grade pharmaceutical filter cartridge with broad chemical compatibility

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
- Mycoplasma removal from serum and cell culture media (0.1 µm)
- Substerile filtration for enhanced sterility assurance (0.1 µm)

Cartridge Construction

- Protective polypropylene layer
- Asymmetric polyethersulfone membrane
- 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

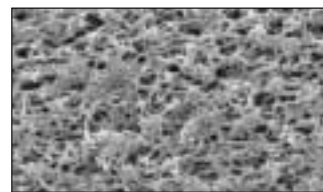
Filtration Area

0.6 m² (6 ft²) per 10" element

Basic Order Number

544...

Sartolon®



Sterilizing grade pharmaceutical filter cartridge with reinforced Nylon membrane for broad solvent compatibility

Applications

- Sterile filtration of solvents
- Sterile filtration of antibiotics
- Sterile filtration of parenteral solutions
- Sterile filtration of bulk pharmaceuticals

Cartridge Construction

- Protective polypropylene layer
- Reinforced Nylon membrane
- 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)

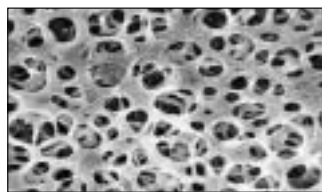
Filtration Area

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
- Particle removal in water systems

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 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

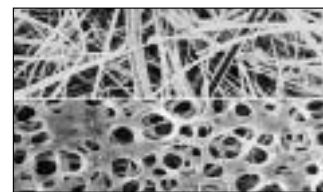
Filtration Area

0.74 m² (7.4 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 Size

Combinations
3 + 0.8 µm
0.8 + 0.65 µm

Adapter Types

21, 25, 27, 28

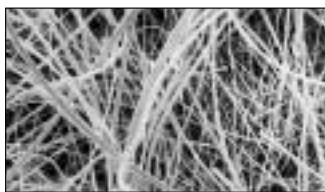
Filtration Area

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

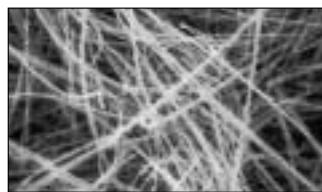
Filtration Area

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

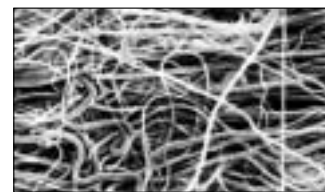
Filtration Area

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

Cartridge Type	Adapter Type (■■)	Pore Size μm	1-high (10")	2-high (20")	3-high (30")	4-high (40")
Sartobran P	21, 25, 27, 28	0.45	523 ■■ 06D1 P	523 ■■ 06D2 P	523 ■■ 06D3 P	
		0.2	523 ■■ 07H1 P	523 ■■ 07H2 P	523 ■■ 07H3 P	
		0.1	523 ■■ 58H1 P	523 ■■ 58H2 P	523 ■■ 58H3 P	
Sartopore 2	21, 25, 27, 28	0.45	544 ■■ 06G1	544 ■■ 06G2	544 ■■ 06G3	
		0.2	544 ■■ 07H1	544 ■■ 07H2	544 ■■ 07H3	
		0.1	544 ■■ 58K1	544 ■■ 58K2	544 ■■ 58K3	
Sartofluor GA	25	0.2	518 ■■ 07T1 GA	518 ■■ 07T2 GA	518 ■■ 07T3 GA	
		0.1	518 ■■ 58T1 GA	518 ■■ 58T2 GA	518 ■■ 58T3 GA	
Sartofluor LG	25, 28	0.45	518 ■■ 06T1 LG	518 ■■ 06T2 LG	518 ■■ 06T3 LG	
		0.2	518 ■■ 07T1 LG	518 ■■ 07T2 LG	518 ■■ 07T3 LG	
		0.1	518 ■■ 58T1 LG	518 ■■ 58T2 LG	518 ■■ 58T3 LG	
Sartoclean CA	21, 25, 27, 28	0.8	562 ■■ 04E1	562 ■■ 04E2	562 ■■ 04E3	
		0.65	562 ■■ 05G1	562 ■■ 05G2	562 ■■ 05G3	
		0.45	562 ■■ 06A1	562 ■■ 06A2	562 ■■ 06A3	
		0.2	562 ■■ 07A1	562 ■■ 07A2	562 ■■ 07A3	
Sartoclean GF	21, 25, 27, 28	3	560 ■■ 02P1	560 ■■ 02P2	560 ■■ 02P3	
		0.8	560 ■■ 04E1	560 ■■ 04E2	560 ■■ 04E3	
		0.65	560 ■■ 05G1	560 ■■ 05G2	560 ■■ 05G3	
Sartopure PP2	21, 25, 27, 28	50	559 ■■ 50P1	559 ■■ 50P2	559 ■■ 50P3	559 ■■ 50P4
		20	559 ■■ 20P1	559 ■■ 20P2	559 ■■ 20P3	559 ■■ 20P4
		8	559 ■■ 01P1	559 ■■ 01P2	559 ■■ 01P3	559 ■■ 01P4
		5	559 ■■ 42P1	559 ■■ 42P2	559 ■■ 42P3	559 ■■ 42P4
		3	559 ■■ 02P1	559 ■■ 02P2	559 ■■ 02P3	559 ■■ 02P4
		1.2	559 ■■ 03P1	559 ■■ 03P2	559 ■■ 03P3	559 ■■ 03P4
		0.65	559 ■■ 05P1	559 ■■ 05P2	559 ■■ 05P3	559 ■■ 05P4
Sartopure GF2	21, 25, 27, 28	1.2	557 ■■ 03P1	557 ■■ 03P2	557 ■■ 03P3	557 ■■ 03P4
		0.65	557 ■■ 05P1	557 ■■ 05P2	557 ■■ 05P3	557 ■■ 05P4
Sartofine PP	00, 03, 05, 07, 08	70	558 ■■ 70W1	558 ■■ 70W2	558 ■■ 70W3	558 ■■ 70W4
		40	558 ■■ 40W1	558 ■■ 40W2	558 ■■ 40W3	558 ■■ 40W4
		20	558 ■■ 20W1	558 ■■ 20W2	558 ■■ 20W3	558 ■■ 20W4
		15	558 ■■ 15W1	558 ■■ 15W2	558 ■■ 15W3	558 ■■ 15W4
		10	558 ■■ 10W1	558 ■■ 10W2	558 ■■ 10W3	558 ■■ 10W4
		5	558 ■■ 42W1	558 ■■ 42W2	558 ■■ 42W3	558 ■■ 42W4
		3	558 ■■ 02W1	558 ■■ 02W2	558 ■■ 02W3	558 ■■ 02W4
		1	558 ■■ 03W1	558 ■■ 03W2	558 ■■ 03W3	558 ■■ 03W4
		0.7	558 ■■ 05W1	558 ■■ 05W2	558 ■■ 05W3	558 ■■ 05W4
		0.5	558 ■■ 06W1	558 ■■ 06W2	558 ■■ 06W3	558 ■■ 06W4

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

Order code information

Code	Cartridge Type	Code	Pore Size Final Filter	Code	Configuration
5 2 3	Sartobran P	7 0	= 70 µm	1	Standard Cartridges
5 4 4	Sartopore 2	5 0	= 50 µm	2	10" (250 mm)
5 1 8	Sartofluor GA LG	4 0	= 40 µm	3	20" (500 mm)
5 6 2	Sartoclean CA	2 0	= 20 µm	4	30" (750 mm)
5 6 0	Sartoclean GF	1 5	= 15 µm	4	40" (1,000 mm)
5 5 9	Sartopure PP2	1 0	= 10 µm		Mini Cart. Capsules
5 5 2	Sartopure GF2	0 1	= 8 µm	4	0.015 m ² (0.15 ft ²)
5 5 8	Sartofine PP	4 2	= 5 µm	5	0.03 m ² (0.3 ft ²)
		0 2	= 3 µm	7	0.05 m ² (0.5 ft ²)
		0 3	= 1.20 µm	8	0.1 m ² (1 ft ²)
		0 4	= 0.80 µm	9	0.2 m ² (2 ft ²)
		0 5	= 0.65 µm	0	0.45 m ² (5 ft ²)
		0 6	= 0.45 µm		
		0 7	= 0.20 µm		
		5 8	= 0.10 µm		
Code	Adapter	Code	Pore Size Prefilter	Code	O-Rings Standard Cartridges
	Standard Cartridges: (Ø 71 mm)	A	No prefilter	- -	Silicone
2 1	Double open end	P	Only polypropylene layer	- E	EPDM
2 5	2-flange bayonet type	T	Only one PTFE (Teflon®) membrane	- V	Viton
2 7	Double-O-ring	W	Multilayer (Sartofine)		
2 8	3-flange bayonet type	E	3.00 µm	Code	Capsule Connectors
	Standard Cartridges: (Ø 63 mm)	G	0.80 µm	O O	1/2" hose barb in/out
	(only Sartofine-PP)	D	0.65 µm	S S	Sanitary flange in/out
0 0	Knife edge type (03, 05, 07, 08 see 21, 25, 27, 28)	H	0.45 µm		
	Mini Cartridges: (Ø 56 mm)				
1 5	Bayonet type				
1 8	Double O-ring type				
1 3	MaxiCap & Capsules				
				Code	Application
				P	Pharmaceutical grade
				G A	Optimized for gas filtration
				L G	Optimized for liquid filtration
				Code	Pack size
				V	box of 2
				A	box of 4
				B	box of 5

How to order: Sartobran P, Adapter 25, 0.2 µm, 10"

5 2 3 2 5 0 7 H 1 - - - - P -

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 ½" 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.

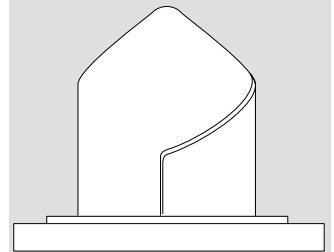
Scale Up with Sartorius

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.

Adapter Types, top:



25, 28, 05, 08



27, 07

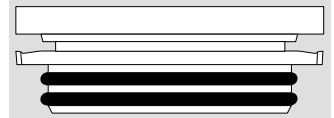


21, 03

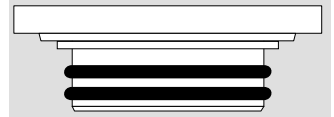
Adapter Types, bottom:



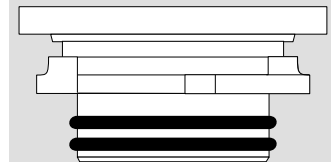
21, 03



25, 05



27, 07



28, 08

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