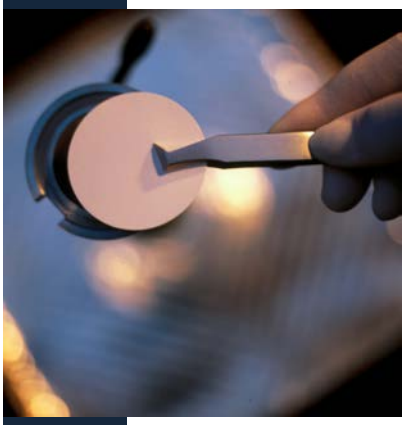
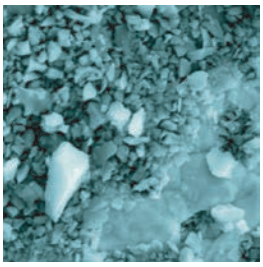
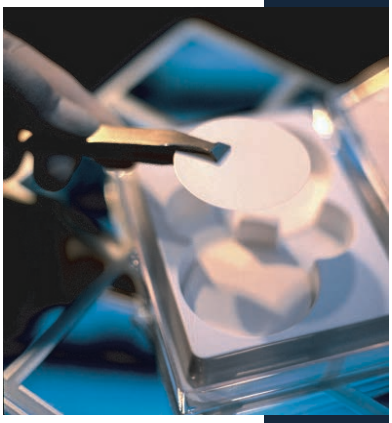
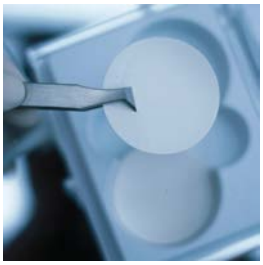
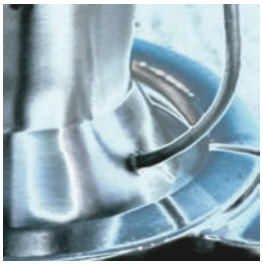
PRODUCT CATALOG

STERLITECH
Corporation

FOR MORE INFORMATION

Call Sterlitech Corporation at
Tel: 877-544-4420 or 1-253-437-0844
or visit www.sterlitech.com

COMPANY INTRODUCTION

Mission: To provide filtration products to scientists, entrepreneurs, and visionaries alike to transform ideas into reality.

Vision: Elevate quality of life by being part of the solution to big science problems.

Sterlitech Corporation's portfolio covers an array of unparalleled filtration products designed to push the boundaries of:

- **Execution of routine methods**
- **Membrane development**
- **Application innovation**
- **Small-scale Processing**

Our aim is to equip scientists, entrepreneurs, and visionaries with the means to transform ideas into reality.

Sterlitech is an industry leader focused in unique micro and sub-micron filtration products. We strive to support our customers by keeping them at the forefront of their industries, tailoring solutions to individualized needs, responding to the demands of emerging technologies and aligning with their visions including:

- **Membrane filters to improve workers' environments**
- **Systems to recover and reuse high value waste streams**
- **Disease detection devices and diagnostic tools**
- **Desalination and water resource conservation**

Located in Kent, Washington USA, Sterlitech was founded in 2001. Its founders have over 90 years of combined experience in membrane and microfiltration technology. The company has developed a strong global brand recognition serving a vast number of end markets in over 125 countries.

GENERAL CORPORATE INFORMATION

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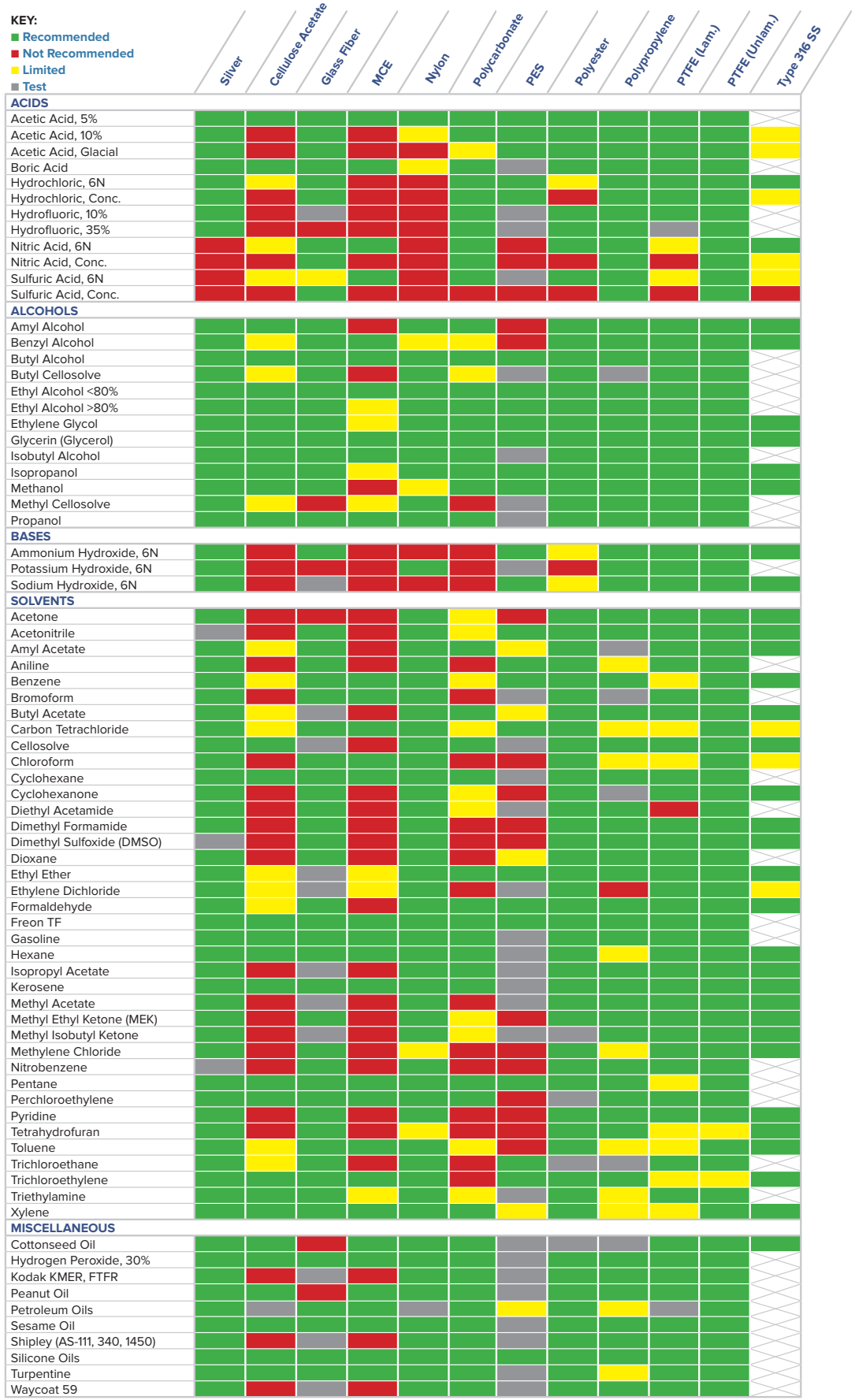
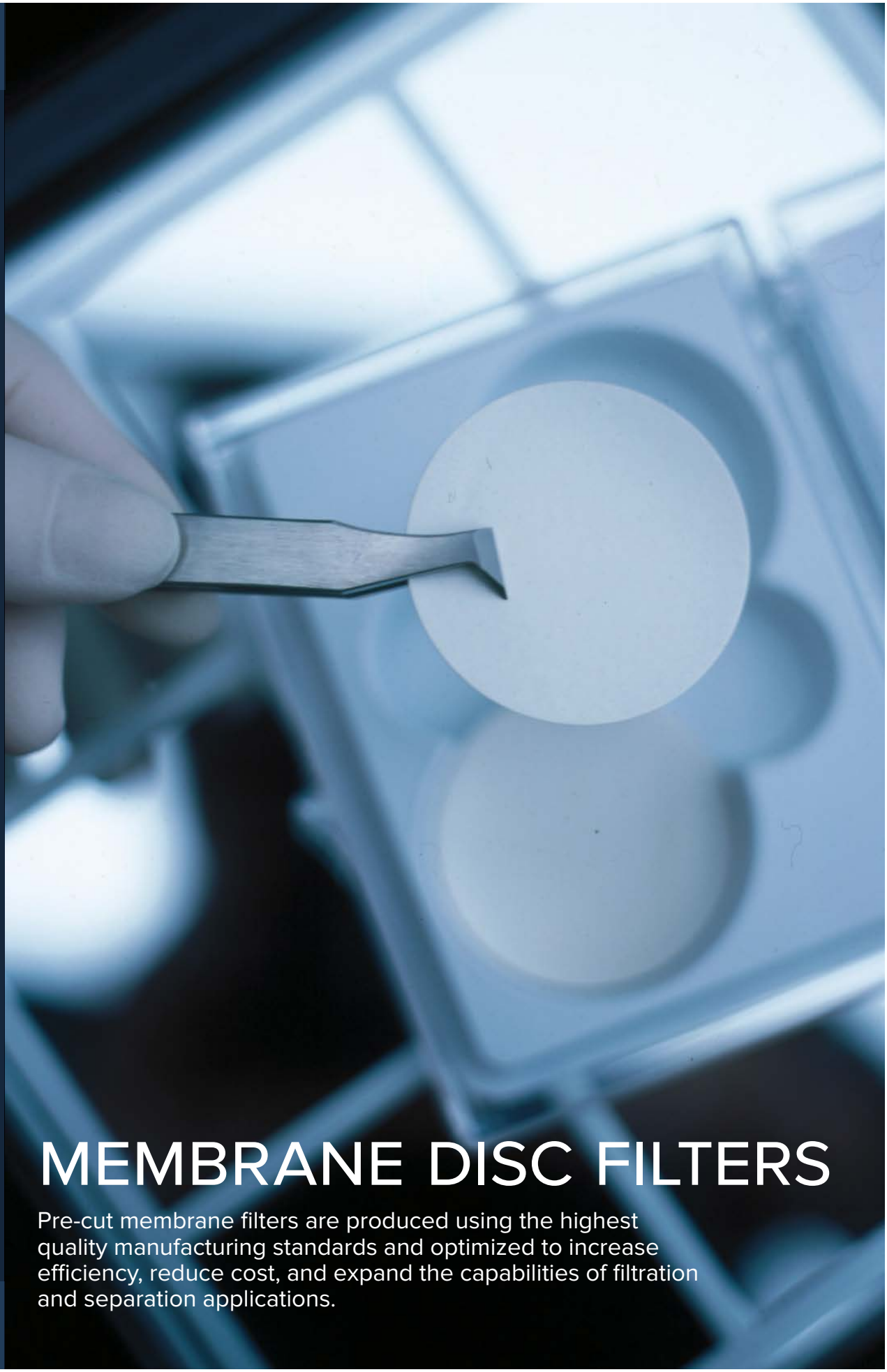
CONTENTS

THE FILTRATION SPECTRUM

CHEMICAL COMPATIBILITY CHART

KEY:
- Recommended
- Not Recommended
- Limited
- Test





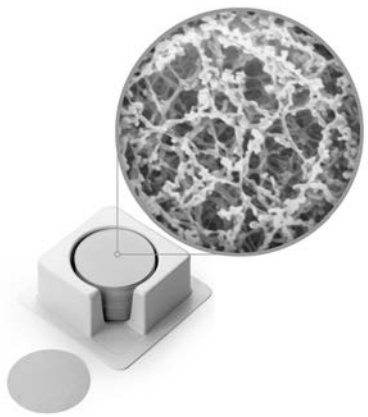
MEMBRANE DISC FILTERS

Pre-cut membrane filters are produced using the highest quality manufacturing standards and optimized to increase efficiency, reduce cost, and expand the capabilities of filtration and separation applications.

CELLULOSE ACETATE MEMBRANE FILTERS

Cellulose acetate (CA) membrane filters are hydrophilic, durable, and extremely low protein binding; ideal for applications requiring maximum protein recovery and minimal extractables.

Pure cellulose acetate filters are internally supported by an inert polyester web for exceptional dimensional strength. Along with naturally low binding characteristics, this design facilitates high throughputs and reduces the need for filter changes, effectively decreasing both cost and process time. Rigorous quality standards met during production ensure that pore sizes and material properties are consistent from lot to lot, providing predictable flow rates, analytical precision, and repeatable results across a wide range of samples and applications, including proteinaceous solutions, rigorous or automated processes, and thermal/pressure intensive conditions.



SPECIFICATIONS

GENERAL	
Sterilization	Gamma Irradiation, EtO, Autoclave
USP Class VI Testing	Passed
Nominal Thickness	65-110 µm (135 µm for Pore Size: 3.0 µm)
BSA Protein Binding	3.8 µg/cm² (26.8 µg/cm² for Pore Size: 3.0 µm)
Max Operating Temp.	274°F (135°C)

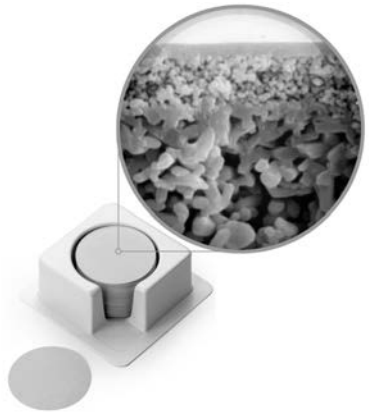
PERFORMANCE BY PORE SIZE		
	H_2O Flow Rate[1]	**Bubble Point (psi)**
0.22 µm	16.1	50
0.45 µm	54.7	30
0.65 µm	70.9	18
0.80 µm	81.3	14
1.20 µm	180	11
3.00 µm	500	5
5.00 µm	375	6

[1] Measured as mL/min/cm² at 10 psi (0.7 kg/ cm²)

APPLICATIONS

- Protein/enzyme filtration and sterilization
- Biological fluid filtration and sterilization
- Tissue culture media sterilization
- Diagnostic cytology
- Receptor binding studies
- Enhanced recovery of fastidious gram-positive organisms

CERAMIC MEMBRANE FILTERS



Inorganic, hydrophilic ceramic membrane filters are ideally suited for use with extreme operating processes that require longevity and resistance to aggressive solvents and temperatures.

Ceramic filters provide maximum durability across a range of laboratory-scale microfiltration, ultrafiltration, dead-end, and crossflow applications. These filters are adapted for each filtration category and feature customized active layers based on respective molecular weight cutoff (MWCO) levels. These ceramic filters feature titania (TiO_2) support layers, are inert to most chemicals and solvents, have a wide pH tolerance range, and exhibit remarkable performance under demanding thermal conditions. Ceramic membranes can withstand many repeated autoclave and/or chemical (EtO) sterilization cycles and are built for maximum operational longevity; often retaining functionality for many years beyond their organic, polymeric counterparts. Additionally, these filters provide resistance against high backwash velocity, high levels of flux, and reduce fouling tendency.

Ceramic membrane disc holders are made of stainless steel and designed for dead-end filtration with the use of a pressure vessel. These filter holders support both 47 and 90 mm ceramic discs, are compatible with Viton, EPDM, and silicone O-rings, and include inlet and outlet connections for serrated tubes.

APPLICATIONS:

- Sterile concentrations
- Purification of cells, yeast, proteins, bacteria, serums, broth, and enzymes
- General separations
- Fine UF, UF, and MF processes

CERAMIC DISC HOLDERS	
Body	Stainless Steel
Membrane Dia.	47 or 90 mm
Filtration Area	***47 mm:*** 13 cm^2 (2 in^2) ***90 mm:*** 56 cm^2 (8.7 in^2)
O-Rings	Viton, EPDM, Silicone
Connections	6 mm Hose Barb, 1/8 in (3.2 mm) NPTF
Pressure Inlet	58 psi (4 bar)
Max. Temp.	266°F (130°C)

GENERAL SPECIFICATIONS	
Sterilization	EtO, Autoclave
Nominal Thickness	2.5 mm
Max. Pressure	58 psi (4 bar)
Max. Operating Temp.	662°F (350°C)

PERFORMANCE BY PORE SIZE			
	Designation	**pH Range**	**Active Layer**
1 kDa	Fine UF[1]	2-14	TiO_2
3 kDa	Fine UF	2-14	TiO_2
5 kDa	Fine UF	2-14	TiO_2
8 kDa	Fine UF	2-14	TiO_2
15 kDa	UF	0-14	ZrO_2
50 kDa	UF	0-14	ZrO_2
150 kDa	UF	0-14	ZrO_2
300 kDa	UF	0-14	ZrO_2
0.14 µm	MF	0-14	ZrO_2-TiO_2
0.22 µm	MF	0-14	ZrO_2-TiO_2
0.45 µm	MF	0-14	ZrO_2-TiO_2
0.80 µm	MF	0-14	ZrO_2-TiO_2
1.40 µm	MF	0-14	ZrO_2-TiO_2

[1] Fine UF membranes are shipped dry, but must be stored wet after first use. To prevent microbial growth, it is recommended to use a solution of 1% sodium metabisulfite in ultrapure water and store the wetted membranes in a zip-closure bag.

MIXED CELLULOSE ESTER (MCE) MEMBRANE FILTERS

Hydrophilic MCE membranes utilize a mixture of cellulose nitrate/acetate fibers to deliver superior flow rates and high protein binding; ideal for particle monitoring, diagnostic kit manufacturing, and microbiology applications.

Mixed cellulose ester (MCE) membrane filters are optimized for use with a variety of sample media and volumes because they have a uniform pore structure, consistent thickness, and a smoother surface than their pure nitrocellulose counterparts. These membranes are designed for quick and easy identification of surface-retained particles, which decreases eye fatigue. These filters are available with a variety of custom features, including white discs to observe changes in color; black discs that contrast microorganisms, yeast, and mold, while facilitating manual counting without a counter-stain; and gridded options for both colors to accurately quantify microbial growth/colonies. Sterile membranes are also available for use with critical samples.

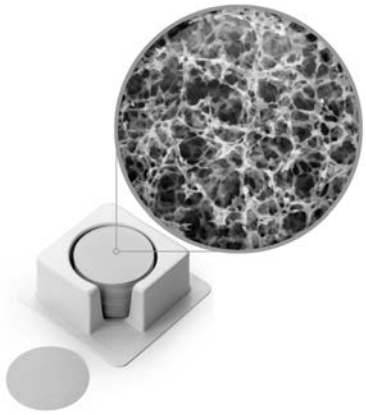
GENERAL SPECIFICATIONS[1]

Sterilization	Gamma Irradiation, EtO, Autoclave
USP Class VI Testing	Passed
BSA Protein Binding	108 µg/cm² (160 µg/cm² for 8.0 µm)
Extractables	<4%
Max. Operating Temp.	356°F (180°C)
Sealing Compatibility	Ultrasonic, Heat, Radio Frequency, Insert Molding

PERFORMANCE BY PORE SIZE

	Air Flow Rate[2]	H_2O Flow Rate[3]	Bubble Point (psi)
0.10 µm	0.67	2.7	35.3
0.22 µm	2.4	17.5	54.5
0.45 µm	5.0	45.0	35.0
0.65 µm	11.2	120.0	21.3
0.80 µm	15.0	165.0	16.4
1.00 µm	20.4	220.0	13.9
3.00 µm	28.3	300.0	10.2
5.00 µm	40.9	400.0	8.5
8.00 µm	Not Tested	2316.0	4.0

[1] Measurements for gridded membranes will differ
[2] Measured as L/min/cm²
[3] Measured as mL/min/cm²



APPLICATIONS

MCE Non-Sterile Membrane Filter

General Filtration
- Sterilizing biological fluids
- Contamination analysis (sterile preferred)

Medical Assays
- hCG
- Chlamydia
- Strep A
- HIV
- Drugs of abuse
- Environmental contaminants
- Pathogenic microorganisms

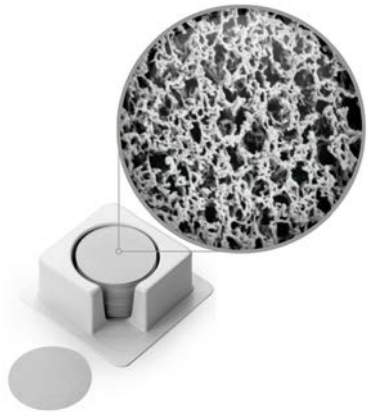
Detection Methods
- Immunochromatographic Assays
- Lateral flow Immunoassays w/ Latex Beads
- Capillary Immunoassays w/ Colloidal Gold
- Latex Agglutination Assays

Immobilizations
- Dot/Slot Blotting
- Direct Spotting
- Direct-line Applications with a Sprayer
- Immersion and Drying

MCE Sterile Membrane Filter

Water and Wastewater Industry:
Capturing/culturing microorganisms using the MF Technique
- Test Method 9222 B: Total Coliforms (0.45 µm)
- Test Method 9222 D: Fecal Coliforms (0.45 µm)
- Test Method 9230 C: Fecal Coliforms (0.45 µm)
- Test Method 9215 D: Total Bacteria (0.22 µm/0.45 µm)
- Test Method 9260 B: Salmonella (0.45 µm)
- Test Method 9213: Pseudomonas sp (0.22 µm)
- Test Method 9213 E: Psedomonas aeruginosa (0.80 µm)

NYLON MEMBRANE FILTERS



Hydrophilic nylon membrane filters provide high protein binding, solvent resistance, and dimensional stability for HPLC sample preparation, biological/buffer sterilization, medical assays, and high temperature applications.

Nylon membrane filters are specifically designed to wet-out evenly and retain membrane integrity without cracking, tearing, curling, or breaking. Internally supported by an inert web of polyester, these membranes can withstand aggressive handling and use with automated equipment. In addition to their compatibility with most aqueous and alcoholic solvents and solutions, these filters can also be used for vacuum degassing. The properties of nylon eliminate the need to use wetting agents that interfere with biological processes and provide a large surface area for the effective immobilization of antigens, antibodies, DNA, RNA, and many other proteins. Nylon membranes are also designed to support high diffusion and low-flow resistance with an impressive 70-85% void volume.

APPLICATIONS

- General filtration
- Medical assays
- HPLC sample preparation
- Sterilization and clarification of aqueous and organic solvent solutions

<u>0.80 µm Only:</u>

- Recommended for use in **ASTM D6217:** Standard Test Method for Particulate Contamination in Middle Distillate Fuels by Laboratory Filtration.
- Recommended for use in **ASTM D5304:** Standard Test Method for Assessing Middle Distillate Fuel Storage Stability by Oxygen Overpressure

SPECIFICATIONS

GENERAL	
Sterilization	Gamma Irradiation, EtO, Autoclave
USP Class VI Testing	Passed
BSA Protein Binding	~120 µg/cm^2
Max. Operating Temp.	356°F (180°C)
Sealing Compatibility	Ultrasonic, Heat, Radio Frequency, Insert Molding

PERFORMANCE BY PORE SIZE		
	H_2O Flow Rate[1]	**Bubble Point (psi)[2]**
0.10 µm	4.0	70.0
0.22 µm	9.9	50.0
0.45 µm	26.9	35.0
0.65 µm	59.3	18.0
0.80 µm	80.5	13.0
1.20 µm	180.0	11.0
5.00 µm	331.0	6.0

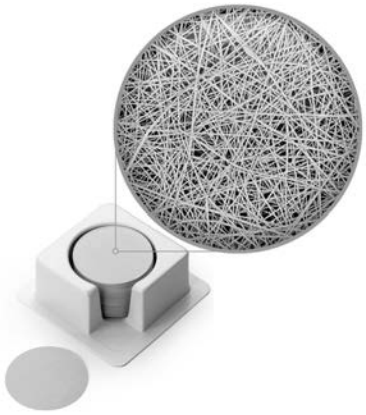
[1] Measured as mL/min/cm^2 at 10 psi (520 mmHg)/20°C (68°F)

[2] Pressure at which air is first forced through the pores of a methanol-wet membrane

POLYACRYLONITRILE (PAN) MEMBRANE FILTERS

Polyacrylonitrile (PAN) membranes combine excellent selectivity, high flow rates and low pressure requirements which helps laboratories simplify their filtration setups while maintaining quality and efficient workflow.

PAN's unique nanofiber mesh construction combines extremely fine pores with ample open space to allow easy liquid flow while trapping particulates up to 0.2 µm in width. These membranes are created by extruding fine PAN nanofibers onto a polyester support substrate. The nanofibers' tight mesh filters out particles, colloids, and bacteria larger than 0.2 µm. The mesh's structure allows both water and aqueous solutions to quickly pass through with little applied pressure.



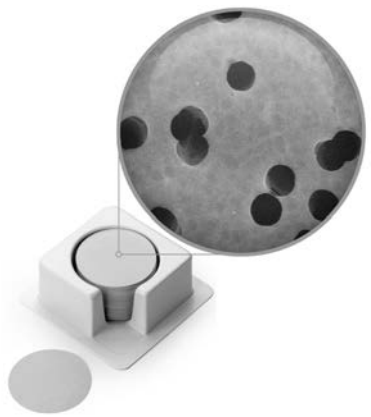
SPECIFICATIONS

GENERAL	
Pore Size	0.2 µm equivalent
Membrane Material	PAN Nanofibers on PET Support Substrate
Avg. Bubble Point	>60 psi (>4.1 bar)
Max. Operating Temp.	212°F (100°C)
Avg. Thickness	180-200 µm
Retention (log reduction)	6 (*E.Coli, R.Terrigena, B.Diminuta)*

APPLICATIONS

- Water, biopharmaceutical, and process fluid purification
- Food and beverage filtration: wine, bottled water, beer, dairy
- Drinking water: gravity-fed purifiers, RO post-filters, under-sink systems, refrigerator filters, bottled water coolers

POLYCARBONATE TRACK ETCH (PCTE) MEMBRANE FILTERS



With controlled pores, low extractable and binding levels, and a smooth surface, these durable polycarbonate track etch (PCTE) membrane filters allow for rapid cell migration, microbial growth, and reduced incubation times.

PCTE membranes are available with a variety of configurations: **Hydrophilic PCTE** membranes are coated with PVP to enhance the filter's ability to process aqueous and alcoholic samples. **Hydrophobic PCTE** filters are PVP-free and ideal for chemotaxis, cell studies, and venting applications.

AOX PCTE membranes are ideally suited for the detection of man-made pollution in groundwater and wastewater (organic halide adsorption determination) due to exceptionally low protein-binding/extractable levels and precisely defined pores. These filters are also suited for a wide range of microbiology, petroleum, and chemical applications.

APPLICATIONS

- Chemotaxis (PVP-Free)
- Epifluorescence
- Cytology
- Cell biology (PVP-Free)
- Venting (PVP-Free)
- Microscopy
- Erythrocyte deformability
- Organic halide adsorption determination (AOX)

SPECIFICATIONS

GENERAL

Sterilization	Gamma Irradiation, EtO, Autoclave
USP Class VI Test	Passed
Nominal Thickness	3- 24 µm
BSA Protein Binding	<5 µg/cm^2
Max. Operating Temp.	284°F (140°C)
Burst Strength	10 psi (0.7 bar)
pH Range	4-8
Sealing Compatibility	Ultrasonic, Heat, Radio Frequency, Insert Molding

PERFORMANCE BY PORE SIZE

	Air Flow Rate[1]	H_2O Flow Rate[2]	Bubble Point (psi)[3]
0.01 µm	0.0075	0.1	NA
0.03 µm	0.075	0.2	NA
0.05 µm	0.37	0.4	50.0
0.08 µm	0.75	0.6	38.0
0.10 µm	1.50	2.5	30.0
0.22 µm	3.00	10	20.0
0.40 µm	8.50	45 (33 AOX)	32.0
0.60 µm	7.50	60	9.0
0.80 µm	18.00	90	7.0
1.00 µm	20.00	130	6.0
2.00 µm	16.50	300	3.0
3.00 µm	37.50	440	2.0
5.00 µm	30.00	700	1.2
8.00 µm	30.00	1,000	0.7
10.00 µm	34.50	1,150	0.5
12.00 µm	63.50	1,250	0.4
14.00 µm	63.50	1,400	0.2
20.00 µm	11.00	1,000	<1.0
25.00 µm	33.00	<1,000	Not Tested
30.00 µm	50.00	<1,200	Not Tested

[1] Measured as L/min/cm^2 ; ≤ 2 µm at 10 psi (0.7 kg/cm^2), ≥ 3 µm at 5 psi (0.35 kg/cm^2)

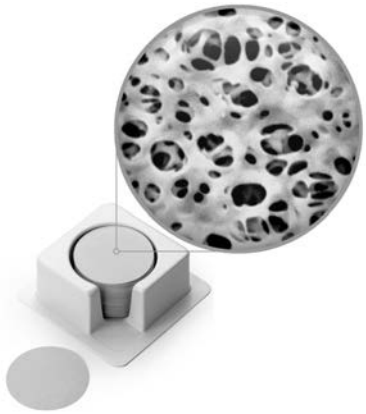
[2] Measured as mL/min/cm^2 at 10 psi (0.7 kg/cm^2)

[3] Measured with isopropanol (IPA)

POLYETHERSULFONE (PES) MEMBRANE FILTERS

Hydrophilic, low binding, polyethersulfone (PES) membrane filters are ideal for general filtration, tissue culture media sterilization, and life science/bio-fluid applications.

During general filtration, inherent, asymmetric pores allow PES membranes to efficiently remove particulates from solutions. The high burst strength and durability offered by these filters allow for their use with aggressive handling and automated equipment. Low extractable levels eliminate the need for wetting agents, thereby reducing interference with analyses and providing fluid purification.



APPLICATIONS

- Blood glucose testing
- Lateral flow assays
- Particulate removal
- Serum cholesterol testing
- Prefiltration
- Sterile solution preparation (0.22 µm)

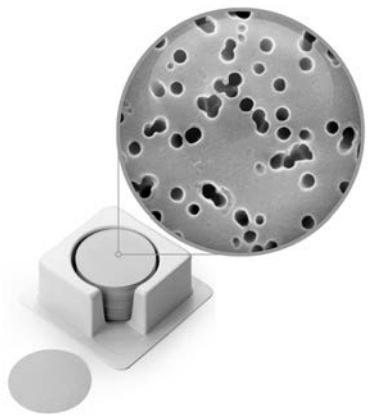
SPECIFICATIONS

GENERAL	
Sterilization	Gamma Irradiation, EtO, Autoclave
USP Class VI Testing	Passed
Nominal Thickness	110-150 µm
BSA Protein Binding	<20 µg/cm²
Extractables	<2%
Max. Operating Temp.	266°F (130°C)
Sealing Compatibility	Ultrasonic, Heat, Radio Frequency, Insert Molding

PERFORMANCE BY PORE SIZE		
	H_2O Flow Rate[1]	**Bubble Point (psi)**
0.03 µm	5.5	90
0.10 µm	11.7	70
0.22 µm	33.2	50
0.45 µm	58.2	35
0.65 µm	95.5	21
0.80 µm	117.0	13
1.20 µm	143.0	11
5.00 µm	186.0	6

[1] Measured as mL/min/cm² at 10 psi (0.7 kg/cm²)

POLYESTER MEMBRANE FILTERS



Hydrophilic polyester track etch (PETE) membranes are made from a thin, translucent, microporous, polyester film and are ideal for use in blood assays, microscopic analysis, and general filtration.

The surface of **PETE membranes** is smooth and flat (excellent for particle visibility and quicker analysis) with pores capable of capturing all particles larger than their precise diameters. In comparison to their PCTE counterparts, PETE membranes have similar material characteristics and applications, but feature greater resistance to solvents.

Polyester filters are also available with nominal pore sizes. **Polyester drain discs** are typically used as a spacer between stacked membranes; they are ideal for increasing flow rates in PCTE and PETE membranes. The polyester spun-bound "drain" type disc prevents "pore blinding", or blockage of the capillary pores, in screen membranes, which results in higher flow rates and increased throughput. These discs also increase flow by lifting off of screen supports and exposing all the pores, ensuring efficient performance when placed between two filters in a serial filtration stack.

APPLICATIONS

- Precise general filtration and prefiltration
- Removal of red blood cells from plasma
- Flow control of reagents through assay

SPECIFICATIONS

GENERAL	
Sterilization	Gamma Irradiation, EtO, Autoclave
USP Class VI Testing	Passed
Nominal Thickness	6-11 µm
BSA Protein Binding	<5 µg/cm²
Max. Operating Temp.	284°F (140°C)
Burst Strength	10 psi (0.7 bar)
Sealing Compatibility	Ultrasonic, Heat, Radio Frequency, Insert Molding

PERFORMANCE BY PORE SIZE			
	Bubble Point (psi)[1]	**H_2O Flow Rate[2]**	**Air Flow Rate[3]**
0.10 µm	30.0	2.5	1.5
0.22 µm	20.0	10.0	3.0
0.40 µm	12.0	33.0	7.5
0.80 µm	7.0	90.0	18.0
1.00 µm	6.0	130.0	20.0
2.00 µm	3.0	300.0	16.5
3.00 µm	2.0	440.0	37.5
5.00 µm	1.2	700.0	30.0
8.00 µm	0.7	1000.0	30.0
10.00 µm	0.5	1150.0	34.5

[1] Measured as L/min/cm²; 3-10 µm at 10 psi, 0.1-2.0 µm at 5 psi

[2] Measured as mL/min/cm² at 10 psi (520 mmHg)

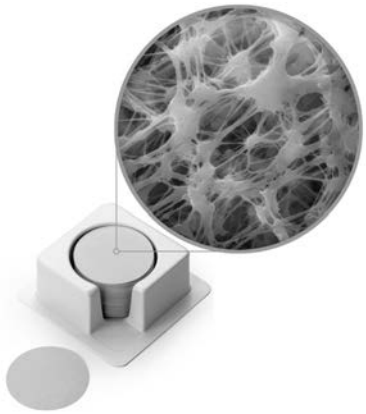
[3] Measured with isopropanol (IPA)

POLYPROPYLENE MEMBRANE FILTERS

Hydrophobic, low extractable, low binding, polypropylene membrane filters are the preferred medium for HPLC applications with low detection levels and help prolong column life in ion chromatography.

Pure **polypropylene filters** are durable, flexible, and resistant to distortion, tearing, and breaking, making them suitable for rough handling or forceps use. Their absolute pore sizes provide fast flow rates and consistent, accurate results, while their high thermal stability allows for autoclave sterilization and significantly higher post-sterilization throughputs than cellulose acetate membranes. With their broad chemical and pH tolerance, these membranes are designed for use with aggressive, non-aqueous samples. Due to extremely low extractable levels and high-purity analytical results, these membranes are used in many biological applications, such as cell growth, tissue culture media sterilization, and pharmaceuticals.

Also available are biologically/chemically inert, retentive, **polypropylene prefilters**, suited for the prefiltrition of most solvent, acid, and aqueous solutions. These nominal filters are designed to extend the life of a final membrane filter in a series or to serve as final filters for noncritical samples, reducing costs and increasing process efficiency.



APPLICATIONS

- Organic solvent filtration
- HPLC sample preparation requiring low detection levels
- Ion chromatography
- Total digest for heavy metals

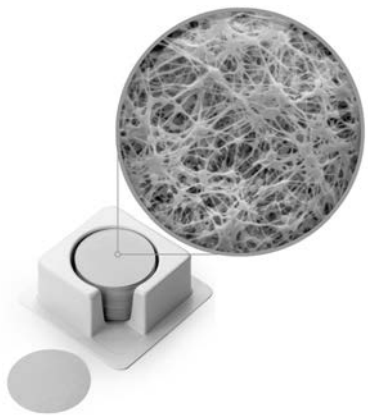
SPECIFICATIONS

GENERAL	
Sterilization	Gamma Irradiation, EtO, Autoclave
USP Class VI Testing	Passed
pH Range	1-14
Max. Operating Temp.	131°F (55°C)

PERFORMANCE BY PORE SIZE		
	Nominal Thickness	**Bubble Point (psi)**
0.10 µm	51 µm	28.5
0.22 µm	110 µm	15.4
0.45 µm	110 µm	11.5
10.0 µm[1]	152 µm	0.5

[1] Nominally-rated pore size

PTFE MEMBRANE FILTERS



PTFE membranes are available in hydrophilic, hydrophobic, supported, and unsupported options for a wide range of applications involving strong/aggressive acids, bases, and solvents incompatible with most other filtration media.

APPLICATIONS

Laminated Hydrophobic
- Clarification and sterilization of aggressive chemicals
- Gas sterilization
- Venting gas from aqueous solutions (when pre-wetted w/methanol)
- Aerosol sampling
- Phase separations

Unlaminated Hydrophobic
- Filtration of high temperature acids and solvents
- Strong acid and aggressive solution filtration

Advantec Hydrophilic
- HPLC separations
- Organic and aqueous mixtures

Aspire Laminated Hydrophobic
- Medical and life science venting
- Surgical suction and smoke filtration
- Protection of renal dialysis transducers
- Phase separations
- Aerosol sampling
- Strong acid and aggressive solution filtration

PERFORMANCE BY PORE SIZE

		Air Flow Rate[1]	H_2O Flow Rate[2]	Bubble Point (psi)[3]
0.10 µm	**Laminated Hydrophobic**	2.5	39.1 (acetone)	>25.0
	Advantec Hydrophilic	1.6	14.0	≥ 55.1
	Aspire Laminated ePTFE	NA	NA	> 25.0
0.22 µm	**Laminated Hydrophobic**	2.5	61.4 (acetone)	>20.0
	Unlaminated Hydrophobic	3.4	19.4	19.0-26.0
	Advantec Hydrophilic	2.1	21.0	≥ 34.8
	Aspire Laminated ePTFE	NA	NA	>17.0-20.0
0.45 µm	**Laminated Hydrophobic**	4.8	110 (acetone)	>10.0
	Advantec Hydrophilic	2.9	39.0	≥ 20.3
	Aspire Laminated ePTFE	NA	NA	>11.0
1.00 µm	**Laminated Hydrophobic**	9.0	445 (acetone)	>8.0
	Unlaminated Hydrophobic	NA	300.0	IPA: 4.1 EtOH: 1.2
	Advantec Hydrophilic	5.7	73.0	≥ 12.0
	Aspire Laminated ePTFE	NA	NA	> 2.0
3.00 µm	**Aspire Laminated ePTFE**	NA	NA	> 1.0
5.00 µm	**Unlaminated Hydrophobic**	NA	120.0-300.0	1.0 ± 0.2
	Aspire Laminated ePTFE	NA	NA	> 0.5
20.0 µm	**Unlaminated Hydrophobic**	NA	420.0-620.0	0.25-0.40

[1] Measured as L/min/cm² ; ≤ 2 µm at 10 psi (0.7 kg/cm²), ≥ 3 µm at 5 psi (0.35 kg/cm²)

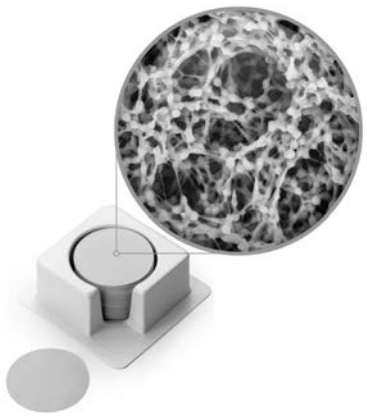
[2] Measured as mL/min/cm² at 10 psi (0.7 kg/cm²)

[3] Measured with isopropanol (IPA)

PVDF MEMBRANE FILTERS

Hydrophilic, extremely low extractable/protein binding, polyvinylidene difluoride (PVDF) membrane filters provide high flow rates and throughputs for aggressive, solvent-based mobile phase applications, biological sterilization/clarification, and HPLC/analytical sample preparation.

PVDF membranes do not require the use of wetting agents, transmitting negligible extractables and increasing sample purity during sterilization or clarification procedures. Broad chemical compatibility allows these filters to accommodate a wide range of applications (especially those requiring high flow rates/throughput), including aggressive/non-aggressive acids, alcohols, and solvents in mobile phase.



SPECIFICATIONS

GENERAL	
Sterilization	Gamma Irradiation, EtO, Autoclave
USP Class VI Testing	Passed
Nominal Thickness	110-125 µm
BSA Protein Binding	4 µg/cm^2
Max. Operating Temp.	185°F (85°C)

PERFORMANCE BY PORE SIZE			
	H_2O Flow Rate[1]	**Air Flow Rate[2]**	**Bubble Point (psi)**
0.22 µm	7.0	2.0	56.0
0.45 µm	29.0	4.0	25.0

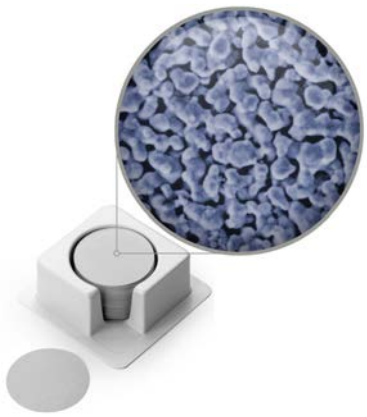
[1] Measured as mL/min/cm^2 at 10 psi

[2] Measured as L/min/cm^2 at 10 psi

APPLICATIONS

- Biological and aggressive solvent sterilization and clarification
- HPLC sample preparation
- Removal of uHPLC contaminants to prevent column plugging
- Gas chromatography sample preparation and clean-up
- Mobile-phase solvents

SILVER MEMBRANE FILTERS



Silver metal membrane filters are used in a variety of filtration applications. Their ability to withstand extreme chemical and thermal stress makes them ideal laboratory filtration equipment for applications involving aggressive fluids and/or high temperatures.

Silver metal filters are constructed with pure metallic silver (99.97%) and are specified in a National Institute for Occupational Safety and Health (NIOSH) standard for the analysis of crystalline and amorphous silica, lead sulfide, boron carbide, and chrysotile asbestos. Silver metal membranes can be used as the collection media and subsequent x-ray diffraction substrate for quantifying unknown minerals and compounds.

APPLICATIONS

- X-ray diffraction
- Scanning electron microscopy (SEM)
- Removal of air-borne contaminants according to NIOSH industrial hygiene standards
- Respirable combustible dust (RCD) sampling and analysis
- High-temperature venting
- HPLC sample preparation
- Clarification, polishing, and sterilization of liquid samples
- USGS organic carbon, inorganic, and suspended sediment water analysis
- Soil and clay analysis
- Chlorine monitoring
- ERDA fly ash sampling
- Bacteria sampling

SPECIFICATIONS

GENERAL	
Sterilization	Air, Steam, Autoclave
Nominal Thickness	50 µm
BSA Protein Binding	Not Tested
Coefficient of Thermal Expansion	18.8 x 106 per °C
Resistivity	1.59 x 10-8 Ωm at 68°F (20°C)
Specific Heat	0.448 cal/g at 68°F (20°C)

PERFORMANCE BY PORE SIZE				
Pore Size[a]	**H_2O Flow Rate**[b]	**Air Flow Rate**[c]	**Bubble Point**[d]	**Max. Operating Temp.**[e]
0.22 µm	17	350	13	400°F (204°C)
0.45 µm	40	670	9	400°F (204°C)
0.80 µm	340	1400	7	400°F (204°C)
1.20 µm	460	2000	5	400°F (204°C)
3.00 µm	690	2900	3	800°F (427°C)
5.00 µm	870	5200	2	800°F (427°C)

[a] *Particle retention verified by bubble point pressure*

[b] *Using pre-filtered H_2O at ΔP of 10 psid (0.7 bar); pre-wetted w/methanol*

[c] *Initial flow rates w/pre-filtered air at 10 psi (0.7 kg/cm²)*

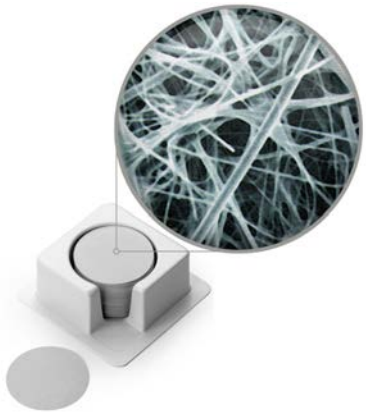
[d] *Measured using methanol*

[e] *Silver membranes provide excellent filtration performance at temperatures up to 427°C (800°F)*

GLASS FIBER FILTERS

Glass fiber filters are made of pure borosilicate fibers and are available in a wide range of flow rates and nominal pore sizes. The glass filter membranes below are available with or without binder resins and each membrane disc filter can be sterilized by EtO, gamma, or autoclave.

Qualitative and quantitative **cellulose filter papers** (see p. 20) are offered in a variety of grades for different separation applications. Quantitative papers are most often used to perform gravimetric analysis while the qualitative filter papers are used to determine particulates in liquid and gas samples.



GLASS FIBER FILTER SPECIFICATIONS

Grade	Pore Size	Thickness	Weight (g/m^2)	H_2O Flow[a]	Gas Collection Efficiency	Pressure Drop[b]	Max. Operating Temp.	Binder	Applications/Features
Sterlitech Filters									
A	1.5 µm	0.30 mm	55	12 s	-	-	550°C	NONE	Precipitate proteins, cell filtration
B	1.0 µm	0.65 mm	140	30 s	-	-	550°C	NONE	Collection of biochemical polymers, prefiltration
A-E	1.0 µm	0.33 mm	60	15 s	-	-	550°C	NONE	Suspended solids, air monitoring
934-AH®	1.5 µm	0.43 mm	64	47 s	-	-	550°C	NONE	Suspended solids standard and related measures (SM 2540D, EPA Methods 160.2)
C	1.1 µm	0.28 mm	50	25 s	-	-	550°C	NONE	RIA procedures, harvesting lymphocytes
D	2.6 µm	0.50 mm	120	5 s	-	-	500°C	NONE	High-volume and repetitive lab filtration
E	1.3 µm	0.35 mm	70	12 s	-	-	550°C	NONE	Suspended particle analysis in H_2O, cell harvesting, prefiltration, air monitoring
F	0.7 µm	0.40 mm	80	80 s	-	-	550°C	NONE	Diluted aq. solutions (strong oxidizing/acidic/alkaline), laser spectroscopy
TSS	1.5 µm	0.25 mm	55	-	-	-	500°C	NONE	Total suspended solids; SM 2540D, EPA Method 160.2
VSS	1.5 µm	0.25 mm	55	-	-	-	550°C	NONE	Volatile suspended solids; SM2450E/C/D, EPA Method 1602
Advantec Filters									
DP-70	0.6 µm	0.52 mm	170	20 s	-	53	120°C	ORGANIC	High wet-strength, high loading capacity
GA-55	0.6 µm	0.21 mm	55	23 s	99.9%	34	500°C	NONE	General purpose paper
GA-100	1.0 µm	0.44 mm	110	11 s	96%	20	500°C	NONE	General purpose paper
GA-200	0.8 µm	0.75 mm	175	15 s	99.99%	36	500°C	NONE	Thick filter
GB-100R	0.6 µm	0.40 mm	95	15 s	99.99%	30	500°C	NONE	Low trace metal content of As, Pb, and Cd
GB-140	0.4 µm	0.56 mm	140	58 s	99.99%	113	500°C	NONE	***vs. GB-100R:*** Thicker, greater wet-strength, slower filtration speed
GC-50	0.5 µm	0.19 mm	48	28 s	99.99%	53	500°C	NONE	Prefilter
GC-90	0.5 µm	0.30 mm	100	20 s	99.99%	42	120°C	ORGANIC	High wet-strength
GD-120	0.9 µm	0.51 mm	123	14 s	97%	17	500°C	NONE	High wet-strength, high loading capacity
GF-75	0.3 µm	0.35 mm	75	84 s	99.999%	170	500°C	NONE	Most retentive grade
GS-25	0.6 µm	0.22 mm	70	15 s	99.9%	32	120°C	ORGANIC	Limited dirt-holding capacity, high wet-strength
TCLP	-	-	-	-	-	-	-	-	Binder-free, meets US EPA requirements for TCLP
Weighing Paper	-	-	-	-	-	-	-	-	Powdered samples, nitrogen-free, folds easily
QR-100	-	1.0 mm	85	-	99.99%	46	1,000°C	NONE	Quartz fiber filter
QR-200	-	0.38 mm	200	-	99.99%	35	1,000°C	INORGANIC	Quartz fiber filter

[a] The time in seconds (s) to filter 100 mL of distilled H_2O at 20°C under pressure supplied by a 10 cm water column through a 10 cm^2 section of filter
[b] Measured as mm H_2O/5 cm/s
® 934-AH is a trademark of Whatman, Inc.

CELLULOSE FILTER PAPERS

QUALITATIVE FILTER PAPER SPECIFICATIONS

Grade	Retention Characteristics (µm)	Thickness	Weight (g/m^2)	H_2O Flow[a]	Collection Efficiency[b]	Wet Strength[c]	Adsorption Speed[d]	Applications/Features
Sterlitech Filter Papers								
CFP 1	11	0.20 mm	86	MEDIUM	-	-	-	Medium retention (~11 µm) for separating $PbSO_4$, $CaCO_3$, CaC_2O_4 precipitates. Medium flow rate.
CFP 2	8	0.17 mm	101	MED-SLOW	-	-	-	Medium retention (~8 µm) for absorbent conveyance, plant growth trials, and air/gas monitoring. Med.-slow flow rate.
CFP 3	6	0.32 mm	190	SLOW	-	-	-	Medium retention (~6 µm) for high volumes and as a sample conveyance substrate. Slow flow rate.
CFP 4	25	0.21 mm	94	FAST	-	-	-	Low retention (~25 µm) for multi-stage filtration, organic extractions, and bio-fluid separations. Fast flow rate.
Advantec Filter Papers								
No. 1	6-Coarse	0.20 mm	90	45 s	65%	14.3	9.0 cm	Retains large crystalline particles/gelatinous precipitates. Fast flow rate, smooth surface, normal hardness.
No. 2	5-Medium	0.26 mm	125	80 s	80%	17.3	8.0 cm	Retains medium crystalline precipitates. Fast flow rate, smooth surface, normal hardness.
No. 231	Medium	0.18 mm	95	130 s	-	-	7.5 cm	Retains crystalline precipitates. Moderate flow rate, smooth surface, normal hardness.
No. 232	Med./Med.-Fine	0.18 mm	90	250 s	-	-	5.0 cm	Retains medium to med.-fine particulates. Slow flow rate, smooth surface, normal hardness.
No. 131	3-Med.-Fine	0.25 mm	140	240 s	90%	19.4	6.0 cm	High retention efficiency for fine crystalline precipitates. Slow flow rate, smooth surface, normal hardness.
No. 235	Very Fine	0.17 mm	95	1200 s	-	-	4.0 cm	Highest retention efficiency for extremely fine particulates. Slow flow rate, smooth surface.
No. 101	6-7-Coarse and gelatinous	0.21 mm	80	50 s	-	14.3	8.0 cm	Seed germination, retains large particles.

QUANTITATIVE FILTER PAPER SPECIFICATIONS

Grade	Retention Characteristics (µm)	Thickness	Weight (g/m^2)	H_2O Flow[a]	Collection Efficiency[b]	Wet Strength[c]	Adsorption Speed[d]	Applications/Features
Sterlitech Filter Papers								
CFP 40	8	0.20 mm	185	MEDIUM	–	–	–	Medium retention/flow rate for environmental, gas, and liquid food testing.
CFP 41	20	0.22 mm	85	FAST	–	–	–	Fast flow rate/loose retention characteristics for initial separation of gelatinous precipitates.
CFP 42	2.5	0.17 mm	140	SLOW	–	–	–	Extremely high retention rate for any gravimetric analysis of fine precipitates.
CFP 43	15-17	0.21 mm	85	MEDIUM	–	–	–	Medium retention/flow rate for gravimetric analysis, surface water testing, and air sample monitoring.
CFP 44	3	0.165 mm	85	SLOW	–	–	–	Wider retention rate than CFP 42; for the analysis of samples requiring separation of fine precipitates.
Advantec Filter Papers								
No. 3	5-Medium	0.23 mm	113	130 s	80%	19.4	7.5 cm	Medium retention (5-10 µm) for analysis of soils, fertilizers, cement, and minerals. Fast flow rate.
No. 5A	7-Coarse and gelatinous	0.22 mm	97	60 s	75%	14.3	9.5 cm	Retains coarse particles/gelatinous precipitates (>10 µm) for hydroxides/metallic aerosols, environmental monitoring, silica content in steel. Fast flow rate.
No. 5B	4-Medium	0.21 mm	108	195 s	90%	19.4	7.0 cm	Retains medium particles (5-10 µm) such as: $CaCO_3$, $PbSO_4$, $CaCO_4$, $MnCO_3$, $ZnCO_3$, ZnS, AgCl.
No. 5C	1-Fine	0.22 mm	118	570 s	93%	24.5	6.0 cm	Collects fine precipitates (<5 µm) such as: $SrSO_4$, $BaSO_4$, $HgCrO_4$, colloidal dispersions, gravimetric analysis.
No. 6	3-Medium Fine	0.20 mm	103	300 s	90%	14.3	6.0 cm	Medium-fine retention (2-10 µm) for analysis of trace and precious metals.
No. 7	4-Medium	0.18 mm	87	200 s	85%	11.2	7.0 cm	Highest purity for retaining medium particles (5-10 µm) for precise gravimetric analysis.
No. 4A	1-Very Fine	0.12 mm	96	915 s	90%	89.7	4.0 cm	Retains fine crystalline precipitates (<5 µm). Slow flow rate. High pressure, chemical, and pH resistance.

[a] The time in seconds (s) to filter 100 mL of distilled H_2O at 20°C under pressure supplied by a 10 cm water column through a 10 cm^2 section of filter
[b] Measured as mmH_2O/5 cm/s

EXTRACTION THIMBLES

Extraction thimbles are available in cellulose, glass microfiber, or PTFE.

Features:

- Available in most Soxhlet extractor sizes
- Consistent wall thickness
- High purity glass binderless microfiber
- High purity cellulose fibers

EXTRACTION THIMBLE SPECIFICATIONS

Grade	Filter Material	Thickness	Max. Operating Temp.	Applications/Features
Sterlitech Extraction Thimbles				
CT5-0	Cellulose	1, 1.5, 2 mm	120°C	–
CT5-1	Cellulose	1.5 mm	120°C	Fast Flow Format
CT5-2	Cellulose	1.5 mm	120°C	with Lid
CT5-4	Cellulose	1.5 mm	120°C	Extra Density Format
CT5-5	Cellulose	–	120°C	Collar and Recesses Format
GT9-1	Glass Fiber	1, 1.5, 2 mm	500°C	–
GT9-5	Glass Fiber	–	120°C	Collar and Recesses Format
Advantec Extraction Thimbles				
No. 84	Cellulose	1.5 mm	–	Soxhelt-type extractions or dust samplings. Lipid content: <0.1% / weight.
No. 86R	Glass Fiber	1.6 mm	<500°C	Resistant to most acids.
No. 88R	Quartz/Silica Fiber	1.6 mm	<1,000°C	Tapered for easy stack sampler loading.
No. 88RH	Quartz/Silica Fiber	1.6 mm	<1,000°C	Tapered for easy stack sampler loading.
No. 89	PTFE Fiber	1.8 mm	–	Durable, temperature-resistant, minimal trace metals.

[a]
[b]

APPLICATIONS

Cellulose

- Fat determination of meat and dairy products
- Determination of PCB in fish products
- Determination of free fats in food products
- Determination of pesticide residues in food products
- Extraction of plasticizers from PVC
- Extraction of dioxins
- Solid particle such as dust collection in air flows
- Evaluation of liquid content in concrete slurry

Glass Microfiber

- Gravimetric methods for hot environments
- Gravimetric methods for acidic gasses
- Extraction methods common to biochemical analysis

SYRINGE & CAPSULE FILTERS

Disposable syringe filters provide fast and efficient filtration of aqueous and organic solutions for use with pharmaceutical, environmental, biotechnology, food/ beverage, and agricultural testing applications.

CELLULOSE ACETATE SYRINGE FILTERS

Cellulose acetate syringe filters are hydrophilic, durable, and exhibit low protein-binding properties to achieve maximum sample recovery.

These high-throughput syringe filters are ideal for viscous protein, cell culture media, enzyme filtrations, tissue culture media sterilization, biological fluid filtration, and other critical filtration applications. Filters can be ordered with or without borosilicate prefilters in either pre-sterilized or non-sterile packs.

SPECIFICATIONS	
Prefilter Available	Yes
Sterile Options Available	Yes
Autoclavable	Yes (Polypropylene housing only)
Water Affinity	Hydrophilic
Housing	Acrylic (13, 25mm); Polypropylene (17, 30mm)
Connections	Female Luer Lok-Male Luer Lok (13, 25 mm); Female Luer Lok-Male Luer Slip (17, 30 mm)
Diameters Available [mm]	3, 13, 17, 25, 30
Pore Sizes Available [µm]	0.22, 0.45, 0.8, 1.2, 5

APPLICATIONS

- Sterilization of biological fluids, serum, or media additives
- Sample preparation of aqueous and protein-based HPLC solutions
- Tissue culture media filtration
- Background reduction through filter probe and hybridization solutions

GLASS FIBER SYRINGE FILTERS

Glass fiber syringe filters are hydrophilic, have excellent wet-strength, and can increase membrane longevity as viscous sample prefilters.

These syringe filters are ideally suited for use with difficult samples, such as tissue culture media, large particulate loads, water/air pollution analysis, liquid clarification, and cell harvesting.

SPECIFICATIONS	
Prefilter Available	Yes
Sterile Options Available	Yes
Autoclavable	Yes
Water Affinity	Hydrophilic
Housing	Polypropylene
Connections	Female Luer Lok-Male Luer Slip
Diameters Available [mm]	25, 30
Pore Sizes Available [µm]	0.7, 1, 3.1

APPLICATIONS

- Water and air pollution analysis
- Liquid clarification
- Cell harvesting

MIXED CELLULOSE ESTER (MCE) SYRINGE FILTERS

MCE syringe filters are hydrophilic, easily blocked (for a low background), and designed for efficient clarification and filtration of aqueous samples.

These filters are constructed from a high-quality nitrocellulose polymer (cellulose nitrate and cellulose acetate) and are commonly used in medical assays and environmental contaminant testing. MCE syringe filters are available in non-sterile and individually packed sterile options.

APPLICATIONS

- Aqueous and organic solution filtration
- Analytical sample preparation for uHPLC
- Chromatography
- Clarification

SPECIFICATIONS	
Prefilter Available	No
Sterile Options Available	Yes
Autoclavable	Yes
Water Affinity	Hydrophilic
Housing	Polypropylene
Connections	Female Luer Lok-Male Luer Slip
Diameters Available [mm]	13, 17, 25, 30
Pore Sizes Available [µm]	0.22, 0.45

NYLON SYRINGE FILTERS

Nylon syringe filters are hydrophilic, have exceptionally low extractable levels, and are used to sterilize and clarify aqueous and solvent samples for analytical and research applications.

These filters do not require the use of wetting agents and are ideally suited to filter low hold-up volume samples for direct injection into HPLC sample loop systems. Nylon syringe filters can be ordered with borosilicate prefilters to improve sample volume throughput and are available in either pre-sterilized or non-sterile packs.

APPLICATIONS

- Viscous aqueous and organic solution filtration for HPLC
- Filtration and clarification of solvents
- High particulate load sample filtration

SPECIFICATIONS	
Prefilter Available	Yes
Sterile Options Available	Yes
Autoclavable	Yes
Water Affinity	Hydrophilic
Housing	Polypropylene
Connections	Female Luer Lok-Male Luer Slip
Diameters Available [mm]	3, 13, 17, 25, 30
Pore Sizes Available [µm]	0.1, 0.22, 0.45, 1.2, 5

POLYETHERSULFONE (PES) SYRINGE FILTERS

PES syringe filters are hydrophilic, low protein-binding, have high throughputs, and are ideally suited for maximum sample recovery in life science applications.

These filters are designed to maintain high throughputs while sterilizing and clarifying highly viscous, proteinaceous solutions and aqueous samples. PES syringe filters are available in non-sterile and individually packed sterile options.

SPECIFICATIONS	
Prefilter Available	Yes
Sterile Options Available	Yes
Autoclavable	Yes
Water Affinity	Hydrophilic
Housing	Polypropylene
Connections	Female Luer Lok-Male Luer Slip
Diameters Available [mm]	13, 17, 25, 30
Pore Sizes Available [µm]	0.22, 0.45

APPLICATIONS

- Sterilization of biological fluids, serum, or tissue culture media additives
- Sample preparation of aqueous and protein-based HPLC solutions
- Background reduction through filter probe and hybridization solutions

POLYPROPYLENE SYRINGE FILTERS

Polypropylene syringe filters are hydrophobic, highly resistant to chemicals, have high throughputs, and are suitable for a diverse range of applications in the pharmaceutical, environmental, biotech, and agricultural industries.

These filters are designed for fast flow rates, low levels of extractables, and low hold-up volumes to optimize performance during both aqueous and organic solvent-based samples.

SPECIFICATIONS	
Prefilter Available	Yes
Sterile Options Available	No
Autoclavable	Yes
Water Affinity	Hydrophobic
Housing	Polypropylene
Connections	Female Luer Lok-Male Luer Slip
Diameters Available [mm]	17, 30
Pore Sizes Available [µm]	0.22, 0.45

APPLICATIONS

- Aqueous and organic solution filtration
- Sample preparation of HPLC solutions requiring low detection levels
- Ion chromatography
- Inorganic ion analysis

PTFE SYRINGE & VENT FILTERS

PTFE syringe and vent filters are naturally hydrophobic (hydrophilic options available), chemically and biologically inert, and highly resistant to aggressive solvent, acid, and base samples.

PTFE syringe filters can withstand harsh temperatures and are ideally suited for the preparation of organic solutions prior to chromatography and other instrument analyses. Hydrophilic PTFE syringe filters do not require pre-wetting and have extremely low levels of extractables, making them an excellent choice for uHPLC and LC/MS analysis. In addition to venting applications, PTFE vent filters are commonly used to filter gas, organic HPLC solvents, and aggressive solutions.

APPLICATIONS

Hydrophobic Syringe Filters

- Filtration of aggressive solutions/acids
- Venting applications
- Phase separations
- Aerosol sampling

Hydrophilic Syringe Filters

- Drug development, discovery, and testing
- Environmental and food safety monitoring
- Molecular identification
- Structural/oil composition determination
- Pharmacokinetics

Vent Filters

- Sterile venting of filling vessels/carboys
- Autoclave venting
- Low volume, non-aqueous fluid filtration
- Air/gas in-line sterilization/particulate removal

SPECIFICATIONS	
Prefilter Available	Yes
Sterile Options Available	Yes (Vent filter only)
Autoclavable	Yes
Water Affinity	Hydrophobic or Hydrophilic
Housing	Polypropylene
Connections	***Syr:*** Female Luer Lok-Male Luer Slip ***Vent:*** Stepped Barb or NPT
Diameters Available [mm]	13, 17, 25, 30, 50
Pore Sizes Available [µm]	0.22, 0.45, 0.5

PVDF SYRINGE FILTERS

PVDF syringe filters are hydrophilic, low protein-binding, highly resistant to chemicals, and provide fast flow rates for biological solution aqueous sample filtration applications.

These filters ideally suited for sterilizing and clarifying biological solution filtrations, performing HPLC applications, and working with aqueous samples. PVDF syringe filters offer excellent chemical compatibility, but are not recommended for strong bases, DMF, or DMSO.

APPLICATIONS

- Aqueous and solution filtration
- HPLC applications
- Aggressive alcohol and acid sample filtration
- Clarification and sterilization of biological solutions

SPECIFICATIONS	
Prefilter Available	No
Sterile Options Available	No
Autoclavable	Yes
Water Affinity	Hydrophilic
Housing	Polypropylene
Connections	Female Luer Lok-Male Luer Slip
Diameters Available [mm]	13, 17, 25, 30
Pore Sizes Available [µm]	0.22, 0.45

CAPSULE FILTERS

Disposable capsule filters are designed for the removal of particles or bacteria from aqueous or solvent solutions and gas streams. They are ready to use, eliminating the need to disassemble, clean, and reassemble filter housings. These capsules contain no glue or surfactants and feature serial layer filter design for increased throughput and extended life. Two upstream vents are included to facilitate venting in any position. All capsules containing membrane media are pre-flushed with purified water to reduce extractables. Additionally, these capsule filters pass USP Class VI toxicology testing and are integrity tested prior to shipment.

DIMENSIONS (EXCEPT GLASS FIBER)		
Diameter	3.5 in (9 cm)	
	Length	**Filtration Area**
Small	3.5-5.0 in (9-13 cm)	0.8 ft² (748 cm²)
Medium	7.6-9.1 in (19-23 cm)	3.0 ft² (2806 cm²)
Large	11.5-13.0 in (29-33 cm)	5.9 ft² (5500 cm²)
OPERATING CONDITIONS		
Max. Pressure	Liquid: 80 psi (5.5 bar) Gas: 55 psi (3.8 bar)	at 70°F (21°C)
Differential Pressure	60 psi (4.1 bar)	
Max. Temp.	110°F (43°C) at ≤ 30 psi (2.1 bar)	
Autoclave	Up to 5 cycles; 30 min at 121°C	

CAPSULE FILTER CHARACTERISTICS BY MATERIAL

	Features	Applications	
Glass Fiber	• Broad chemical compatibility	• General particulate • Severe particulate loads	
Nylon	• Hydrophilic • Polyester microfiber support • Polyester housing • Polypropylene cage, core, and end caps	• Solvents • Fine chemicals • Ink jets • Process water • Beverages • Cosmetics	• Parts cleaning • Electronics • Pharmaceuticals • Biologics • Dyes • Lacquers
PES	• Hydrophilic • Polyester microfiber support • Polyester housing • Polypropylene cage, core, and end caps	• Acids • Bases • Solvents • Fine chemicals • Plating solutions • Process water • Beverages	• Ink jets • Electronics • Pharmaceuticals • Biologics • Dyes • Lacquers • Parts cleaning
Polypropylene	• Hydrophobic • Polypropylene microfiber support • Polypropylene housing • Polypropylene cage, core, and end caps	• Etchants • Photoresists • Developers • Solvents • Acids	• Bases • Fine chemicals • Vent/process air filtration
PTFE	• Hydrophobic • Polypropylene microfiber support • Polypropylene housing • Polypropylene cage, core, and end caps	• Acids • Bases • Solvents • Fine chemicals • Plating solutions • Process water • Beverages	• Ink jets • Electronics • Pharmaceutical/ sterile venting • Biologics • Dyes • Lacquers • Parts cleaning

STERILE DISPOSABLE FILTER SYSTEMS

AUTOFIL DISPOSABLE STERILE BOTTLE-TOP FILTERS

A disposable, sterile, and vacuum-operated system, the Autofil™ Laboratory Filtration System can be used for the preparation of buffers, tissue culture media, and other biological fluids. The disposable bottle-top filters are also available as stand-alone filter funnels to fit on any bottle with a 45 thread.

	15 mL	50 mL	250 mL	500 mL	1000 mL
Membrane Dia.	40 mm	40 mm	66 mm	90 mm	90 mm
Membrane Material	Asymmetric Polyethersulfone (PES)				
Pore Size	0.22 or 0.45 µm				
Toxicity	Component material meets USP Class VI Biological Test for Plastics; non-cytotoxic				
Pyrogens	<20 EU per System				
Operating Vacuum	***Max:*** 20 inHg (508 mmHg) ***Recommended:*** 15 inHg (381 mmHg)				
Temp. Range	***Operating:*** 39-98°F (4-37°C) ***Storage:*** -20-122°F (-29-50°C)				
Flammability	UL94 Flame Rating				
Bacterial Retention	***0.22 µm:*** 1 x 10^7 cfu/cm^2 (*Brevundimonas diminuta, Serratia marcescens)*				
Membrane Bubble Point	***0.22 µm:*** 62.4 psi (4.3 bar) ***0.45 µm:*** 43.5 psi (3 bar)				
Sterilization	Individually bagged and sterilized by gamma irradiation				

AUTOFIL PEDESTAL STAND

The Autofil™ stand is designed to achieve hands-free filtration when used with the Autofil™ line of filtration systems. This stand has a pedestal base for stability and provides a vacuum hose connection for easy set-up, spill prevention, and avoiding tissue culture hood contamination.

FEATURES

- Facilitates hands-free filtration
- Provides on/off vacuum flow control
- Minimizes set-up time via permanent hose connection
- Supports 15 - 1000 mL Autofil™ systems

PETRI DISHES

Polystyrene Petri dishes are convenient, sterile and fit all commercially available block incubators.

Product Benefits:

- Use Petri dishes for culturing microorganisms on 47 mm membrane filters
- Snug fit prevents drying during incubation
- Squared edges and raised ridge for ease of handling and secure stacking
- All Petri dishes sterilized by gamma irradiation
- Standard sizing to fit all commercially available aluminum block incubators 50 x 11 mm
- With or without pad (47mm absorbent cellulose pad is 0.85 +/- 0.17 mm thick and absorbs 1.8 - 2.2 ml liquid)
- Manufacturer's certification of compliance available upon request

DISPOSABLE MICROBIOLOGICAL FILTER FUNNELS

These microbiological monitors are low-cost, disposable, pre-sterilized units capable of both filtering and incubating samples while eliminating preparation and assembly time. The "all-in-one" sterile construction of these filter funnels makes them ideal for microbiological analysis tests, testing of food/beverages, raw material tests, sterility testing, and examining finished product quality. Because no flaming is required, and the filtration unit converts easily into a petri dish, there is minimal risk of cross-contamination.

FEATURES

- Pre-sterilized
- Cellulose nitrate membrane
- 0.2 µm and 0.45 µm pore size options
- 47 mm diameter; 100 mL capacity

FILTER HOLDERS

Vacuum and pressure filtration process holders and devices are designed to maximize flow rates and minimize holder resistance. Filter holders are available in a variety of configurations, allowing you to find the filter holder that has the appropriate size and chemical compatibility for your application.

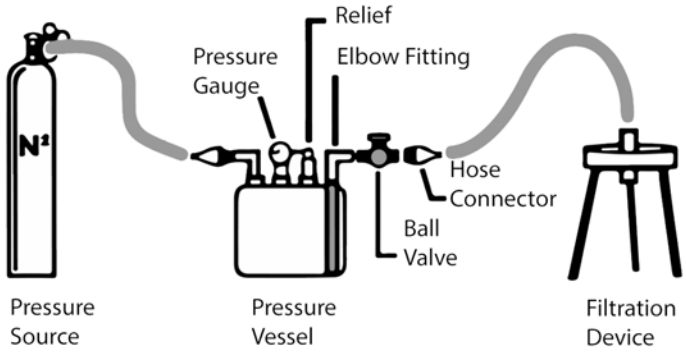
PRESSURE FILTRATION VESSELS

Pressure filtration vessels are designed to contain process fluids that will be filtered through membranes held by pressure filter holders.

These units come complete with a main vessel as well as a base, a closure assembly, a dip tube assembly, and other necessary pressure filtration vessel parts, including fittings, valves, and gauges. An electropolished finish provides a surface that is smooth, releasable, and easily cleaned.

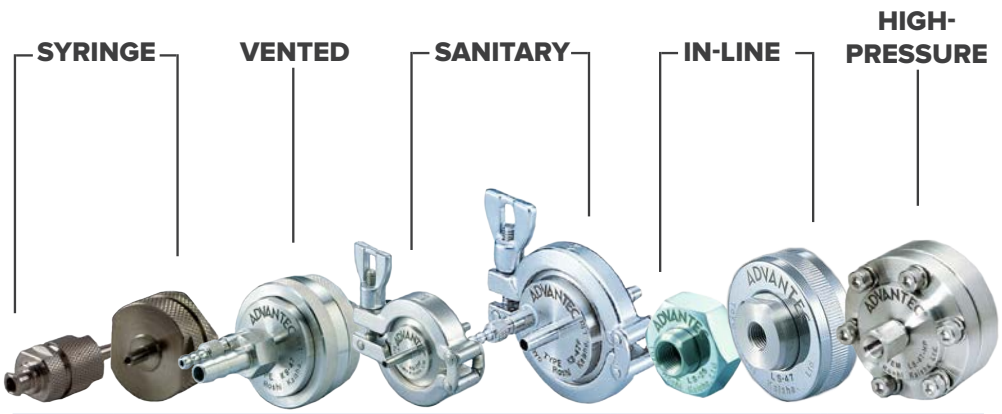
SPECIFICATIONS	
Body	Type 316L Stainless Steel
O-Rings	EPDM
Inlet Connection	1/4 in (6.4 mm) NPTF
Outlet Connection	1/4 in (6.4 mm) NPTF
Autoclavable	No
Max. Operating Temp.[1]	300°F (149°C) at 155 psi (10.7 bar) 200°F (93°C) at 165 psi (11.4 bar) 100°F (38°C) at 165 psi (11.4 bar)
Inner Diameter	9 in (23 cm)
Height	**1 Gal:** 9.25 in (23.5 cm) **3 Gal:** 15 in (38 cm) **5 Gal:** 22.25 in (56.5 cm)

[1]Maximum operating temp. and pressure may be limited by vent relief valve amx. pressure, o-ring max. temp., rubber skirt max. temp., or other factors



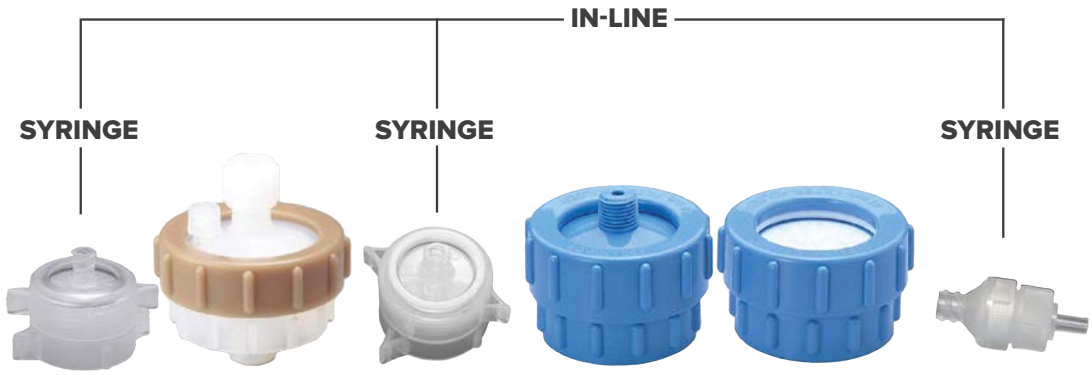
PRESSURE FILTER HOLDERS (IN-LINE)

In-line pressure filter holders are designed for use in pressure applications, either in batch or continuous filtration processes. **Stainless steel** gas-line holders preserve ultra-clean air and other gases. High-pressure stainless steel in-line holders are compatible with several aggressive liquids and gases.



	KS 13	KS 25	KS 47	KS 25 F	KS 47 F	LS 25	LS 47	LS 47 HP
Body Material	304 Stainless Steel		304 or 316 SS	304 Stainless Steel				
O-Ring	PTFE		FPM, Silicone			PTFE	Silicone	FPM
Inlet	F Luer-Lock		1/4 in (6.4) NPTM to 3/8 in (9.5 mm) hose barb	6 mm OD barb	8 mm OD barb	1/4 in (6.4 mm) NPTF w/3/8 in (9.5 mm) hose barb fitting		1/4 in (6.4 mm) NPTF
Outlet	M Luer-Slip		1/4 in (6.4) NPTM to 3/8 in (9.5 mm) hose barb	6 mm OD barb	8 mm OD bar	1/4 in (6.4 mm) NPTM w/3/8 in (9.5 mm) hose barb fitting		1/4 in (6.4 mm) NPTF
Pressure Inlet	99 psi (6.8 bar)		99 psi (6.8 bar)	71 psi (4.9 bar)				1,420 psi (98 bar)
Pressure Differential	42 psi (2.9 bar)			29 psi (2 bar)				276 psi (19 bar)
Membrane Size	13 mm	25 mm	47 mm	25 mm	47 mm	25 mm	47 mm	47 mm
Prefilter Size	8 mm	21 mm	35 mm	21 mm	35 mm	25 mm	47 mm	38 mm
Weight	0.25 lbs (0.1 kg)	0.38 lbs (0.2 kg)	1.8 lbs (0.8 kg)	1 lb (0.45kg)	2 lbs (0.9 kg)	0.6 lbs (0.3 kg)	1.8 lbs (0.8 kg)	4.1 lbs (2.7 kg)
Filtration Area	0.9 cm^2 (0.14 in^2)	3.8 cm^2 (0.6 in^2)	12.5 cm^2 (1.9 in^2)	3.8 cm^2 (0.6 in^2)	12.5 cm^2 (1.9 in^2)	3.8 cm^2 (0.6 in^2)	12.5 cm^2 (1.9 in^2)	11.2 cm^2 (1.3 in^2)
Max. Temp.	O-Ring Dependant							
Max. Autoclave Temp.	As Stated with Stainless Steel							

Polypropylene in-line holders and aerosol in-line holders are compatible with a wide range of chemicals and temperatures, while **PFA** in-line filter holders are ideal for use with chemically aggressive liquids and dual support screens.



PFA 25	PFA 47	PP 25	PP 47	PPO 47	SWINNEX
PFA		Polypropylene			
Perfluoroelastomer		Silicone		Silicone, PTFE	Silicone
F Luer-Lock	Combo: 1/4 in (6.4 mm) NPTM, 1/4 in (6.4 mm) tubing adapter	F Luer-Lock	Combo: 1/4 in (6.4 mm) NPTM, F Luer-Slip	Open-Face	F Luer-Lock
M Luer-Slip	Combo: 1/4 in (6.4 mm) NPTM, 1/4 in (6.4 mm) tubing adapter	M Luer-Slip	Combo: 1/4 in (6.4 mm) NPTM, F Luer-Slip	Combo: 1/4 in (6.4 mm) NPTM, F Luer-Slip	M Luer-Slip
42 psi (2.9 bar)	42 psi (2.9 bar)	71 psi (4.9 bar)	71 psi (4.9 bar)	Not Tested	40 psi (2.8 bar)
42 psi (2.9 bar)	42 psi (2.9 bar)	42 psi (2.9 bar)	71 psi (4.9 bar)	Not Tested	Not Tested
25 mm	47 mm	25 mm	47 mm	47 mm	13 mm
21 mm	42.5 mm	21 mm	42.5 mm	Not Tested	10 mm
22 g (0.8 oz)	120 g (5.2 oz)	12 g (0.41 oz) 6/Pk	47 g (1.7 oz) 6/Pk	47 g (1.7 oz) 6/Pk	Not Tested
3.5 cm^2 (0.54 in^2)	13.5 cm^2 (2.1 in^2)	3.5 cm^2 (0.54 in^2)	13.5 cm^2 (2.1 in^2)	13.5 cm^2 (2.1 in^2)	0.7 cm^2 (0.1 in^2)
250°F (121°C)	250°F (121°C)	176°F (80°C)	176°F (80°C)	176°F (80°C)	Not Tested
250°F (121°C) 15 min	250°F (121°C) 15 min	250°F (121°C) 20 min slow exhaust	250°F (121°C) 20 min slow exhaust	250°F (121°C) 20 min slow exhaust	250°F (121°C) 20 min, 15 psi

PRESSURE FILTER HOLDERS (LARGE)

Large pressure filter holders are ideal for filtering gases or liquids. **Sanitary** holders are non-threaded and can be completely disassembled for thorough cleaning. **Reservoir** filter holders are ideal for filtering small batches of liquid without the use of a pressure filtration vessel.

LARGE FILTER HOLDERS W/RESERVOIR

LARGE FILTER HOLDERS (SANITARY)

	KST 47	KST 90	KST 142	KS 90 ST	KS 142 ST
Body Material	304 or 316 Stainless Steel				
Support Screen	Photoetched 304 Stainless Steel				
O-ring	Silicone				
Gasket	PTFE				
Inlet	1/4 in (6.4 mm) NPTM w/11 mm Hose Barb Adapter	3/4 in (19 mm) NPTF to 3/8 in (9.5 mm) Hose Barb		1 1/2 in (38 mm) Sanitary Fitting to 14.3 mm Hose Barb	
Outlet	1/4 in (6.4 mm) NPTM w/10 mm Hose Barb Adapter	3/4 in (19 mm) NPTM to 3/8 in (9.5 mm) Hose Barb		1 1/2 in (38 mm) Sanitary Fitting to 14.3 mm Hose Barb	
Pressure Inlet	71 psi (4.9 bar)	99 psi (6.8 bar)			
Pressure Differential	42 psi (2.9 bar)				
Membrane Size	47 mm	90 mm	142 mm	90 mm	142 mm
Prefilter Size	35 mm	76 mm	124 mm	76 mm	124 mm
Weight	2.2 lbs (1 kg)	8.8 lbs (4 kg)	16 lbs (7.3 kg)	8.8 lbs (4 kg)	16 lbs (7.3 kg)
Filtration Area	12.5 cm^2 (1.9 in^2)	45.3 cm^2 (7 in^2)	113 cm^2 (17.5 in^2)	45.3 cm^2 (7 in^2)	113 cm^2 (17.5 in^2)

Standard stainless steel options allow you to seal the membrane by hand with tightening and locking wing nuts. **Multi-media** pressure sealing filter holders have a dual sealing system to compress the filter between the inside wall and O-ring on the outer edge.

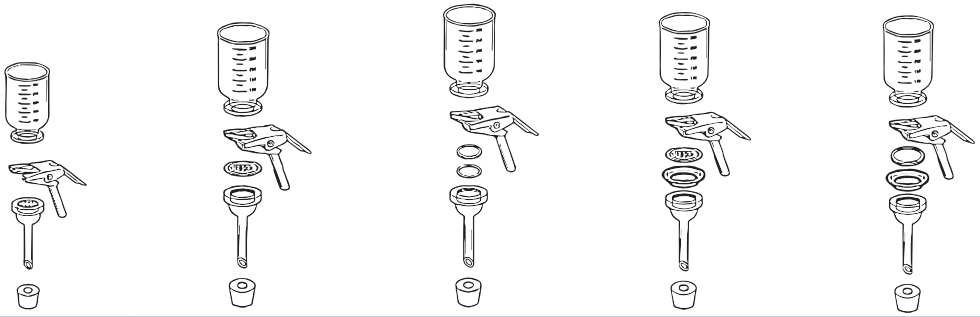
LARGE FILTER HOLDERS

MULTI-MEDIA FILTER HOLDER

KS 293 ST	KS 90	KS 142	KS 293	KS 90 UH
304 or 316 Stainless Steel				304 SS
Photoetched 304 Stainless Steel				
Silicone				
PTFE				
1 1/2 in (38 mm) Sanitary Fitting to 14.3 mm Hose Barb	1/4 in (6.4 mm) NPTM w/Ball Valve Stepped (7, 10.5, 13 mm) Hose Barb Adapter		3/4 in (19 mm) NPTF to 5/8 in (15.9 mm) Hose Barb	3/4 in (19 mm) NPTF
1 1/2 in (38 mm) Sanitary Fitting to 14.3 mm Hose Barb	3/4 in (19 mm) NPTM w/11 mm Hose Barb Adapter		3/4 in (19 mm) NPTM to 5/8 in (15.9 mm) Hose Barb	3/4 in (19 mm) NPTM
71 psi (4.9 bar)			99 psi (6.8 bar)	
42 psi (2.9 bar)				
293 mm	90 mm	142 mm	293 mm	90 mm
257 mm	76 mm	124 mm	257 mm	76 mm
19 lbs (8.6 kg)	11 lbs (5 kg)	13 lbs (6 kg)	19 lbs (8.6 kg)	9.9 lbs (4.5 kg)
530 cm^2 (82.2 in^2)	45.3 cm^2 (7 in^2)	113 cm^2 (17.5 in^2)	530 cm^2 (82.2 in^2)	45.3 cm^2 (7 in^2)

VACUUM FILTER HOLDERS

GLASS MICROANALYSIS HOLDERS



KG	KGS	KGT	KGS-TF	KGT-TF
Glass Frit	Stainless Steel	PTFE	Stainless Steel (PTFE-Coated)	PTFE (PTFE-Coated)
Nominal retention (30-50 microns) and ground glass seal. Recommended when filtering highly acidic solutions or when slower flow rates are preferred to maximize contact with the filter or reagent.	Stainless steel screen (Type 304/316, 100 mesh), ground glass seal, and PTFE gasket. Maximizes flow rate with proteinaceous or viscous solutions and does not shed particles into the filtrate.	Interchangeable with stainless steel support (0.05 in/ 1.3 mm dia. holes). Ground glass seal. Filter acidic solutions at a higher flow rate.	PTFE flange seals to PTFE-coated funnel. The all-PTFE seal prevents sticking and tearing that can occur when membrane is autoclaved in place in a ground glass assembly.	PTFE flange seals to PTFE-coated funnel. The all-PTFE seal prevents sticking and tearing that can occur when membrane is autoclaved in place in a ground glass assembly.
Diameter: 13, 25, 47, 90mm	**Diameter:** 25, 47, 90mm	**Diameter:** 47mm	**Diameter:** 47mm	**Diameter:** 47mm
Volume: 13/100, 15, 100, 150, 300, 500, 1000mL	**Volume:** 15, 100, 150, 300, 500, 1000mL	**Volume:** 100, 300, 500, 1000mL	**Volume:** 300mL	**Volume:** 300mL

ALL-GLASS ASSEMBLY

An all-glass design minimizes contamination of samples and filtrates by restricting contact with reactive surfaces like steel and rubber. A ground glass joint mounts standard 25 and 47 mm filtration funnels onto a filtration flask. Additionally, the outlet of the support base drip tube is positioned below the side arm connection to prevent the sample from aspirating into the vacuum line. All wetted surfaces are borosilicate glass; however, stainless steel and PTFE support options are also available

STAINLESS STEEL ASSEMBLY

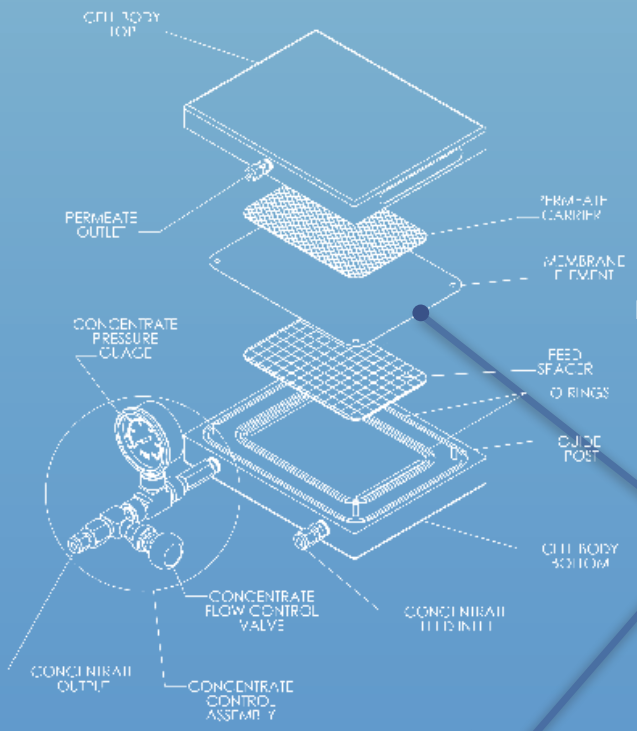
These non-breakable stainless steel units include a funnel with set pins and a locking nut to prevent twisting and tearing of membranes. This unit is autoclavable with the membrane in place and may be flame sterilized to sanitize the holder between samplings.

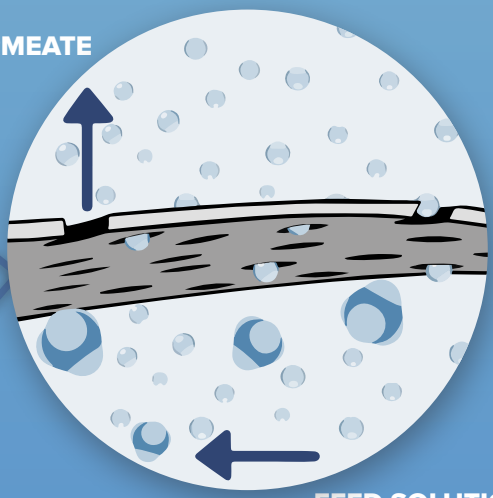
AUTOCLAVABLE POLYSULFONE FILTER FUNNELS AND UNITS

These analytical funnels are designed for one-handed use and only contain two parts; there are no clamps, wheel locks, or magnets to replace. They are durable, stable, autoclavable and use only a 47 mm depth filter disc and are made entirely of polysulfone. This material is less costly to replace than stainless steel, glass, or magnetic funnels.

VACUUM MANIFOLDS

Manifolds are available with either type 304 stainless steel or PVC bodies/branches and a choice of standard cups (accepts #8 and #8b stoppers) or exterior tapers (40/35 male joints). Standard cups are configured with a 2-way valve and exterior tapers are configured with a 3-way valve to maintain a vacuum when venting is required. Stainless steel vacuum manifolds are autoclavable; however, PVC vacuums cannot be autoclaved and must be sterilized with ethanol or formaldehyde. PVC units are acid resistant, lightweight, and feature a broad base for added stability.





MEMBRANE/PROCESS DEVELOPMENT

Bench Test Systems enable researchers and engineers to evaluate the performance of flat sheet and spiral wound element membranes by simulating the hydrodynamic conditions of the larger commercially available systems. Bench Test Systems are ideal for research and development, feasibility studies and small batch processing.

1812 SANITARY ELEMENTS

Operated as a cross/tangential flow system, 1812 spiral wound membrane elements are perfect for scaling up from flat sheets or as more complete test before pilot scale. They are also good for small-scale production, feasibility studies, and product or process development. These elements may be operated under a wide combination of feed flow rates, permeate flux, and operating pressure or temperature in order to mimic operating conditions that are representative of full size membrane filtration systems.

1812 spiral wound membrane elements from GE, Nanostone, Sydner, and TriSep in a wide range of MWCO, membrane material and surface properties.

Stainless steel 316 housing for the 1812 spiral wound membrane elements has a standard design that can be used with commercially available standard 1812 spiral wound elements from different manufacturers. Maximum operating pressure is 600 psi (41 bar).

Typical applications:

- Feasibility or pilot studies
- Process development
- Product development
- Small to average scale production
- Small to average scale treatment
- Residential water treatment systems

CROSS/TANGENTIAL FLOW CELLS

Membrane/process development test cells are designed for cross/tangential flow filtration processes and are most commonly used for reverse osmosis, nanofiltration, ultrafiltration, and microfiltration applications. The feed solution passes tangentially to the membrane and molecules (or materials) which are smaller than the crossflow membrane's molecular weight cut-off (MWCO) (or porosity) pass through the membrane as permeate and the remainder is retained on the feed side of the membrane as retentate.

Typical applications:

- Biological or biopharmaceutical processing
- Concentration of fruit juices and extracts
- Food and beverage processing
- Desalination of brackish water or seawater
- Purification of rinse water in electroplating tanks
- Municipal or industrial water and wastewater purification
- Produced water remediation

SEPA CF CELL

GENERAL SPECIFICATIONS	
Body Material	316 Stainless Steel
Effective Membrane Area	140 cm^2 (22 in^2)
Active Area Dimensions	9.7 x 14.7 cm (3.81 x 5.78 in)
Outer Dimensions	16.51 x 21.3 x 5 cm (6.5 x 8.4 x 2 in)
Hold-Up Volume	70 mL (2.4 oz)
Slot Depth	1.9 mm (0.075 in)
Max. Pressure	1,000 psig (69 bar)
Max. Temperature	Membrane Dependent
O-rings	Viton, EPDM, PTFE

FEATURES

- Accepts any flat sheet membrane
- Laminar or turbulent flow
- Minimal exposure
- Judicious membrane use

CROSS/TANGENTIAL FLOW CELLS

CF042 CELL

GENERAL SPECIFICATIONS	
Body Material	See Below
Effective Membrane Area	42 cm^2 (6.5 in^2)
Active Area Dimensions	9.2 x 14.6 cm (3.6 x 1.8 in)
Outer Dimensions	12.7 x 10.0 x 8.3 cm (5 x 4 x 3.25 in)
Hold-Up Volume	17 mL (0.6 oz)
Slot Depth	0.23 cm (0.09 in)
Max. Pressure	See Below
Max. Temperature	Membrane Dependent
O-rings	Buna-N or Viton
Support Membrane	20 µm Sintered Stainless Steel

	CF042D	CF042A	CF042SS	CF042P
Body Material	Acetal (Delrin)	Acrylic	316 Stainless Steel	Virgin PTFE
Torque Settings	60 in· lb	70 in· lb	Not Tested	15 in· lb
Max. Pressure	1,000 psig (69 bar)	400 psig (27.6 bar)	1,000 psig (69 bar)	400 psig (27.6 bar)
Max. Temp.	180°F (82°C)	170°F (77°C)	190°F (88°C)	500°F (260°C)

FORWARD OSMOSIS CELLS

Forward Osmosis (FO) systems operate as cross/tangential flow membrane test cells but require less energy and lower pressure to function, which means better fouling resistance. FO cells are most frequently used for desalination and water and wastewater treatment in a variety of industrial processes.

MEMBRANE TEST SKIDS

Operated as a tangential flow (crossflow) system, Membrane Test Skids are perfect for small-scale production, feasibility studies, and product or process development.

Test skids may be operated under a wide combination of feed flow rates, permeate flux, and operating pressure or temperature in order to mimic operating conditions that are representative of full size membrane filtration systems.

Membrane Test Skids are equipped with crossflow/ tangential flow test cells such as Sepa CF, CF042, and 1812 housings or a combination of these.

Membrane Test Skids may be analog or digital, and can be customer made to the customer requirements.

Membrane Test Skids are equipped with a full monitoring system: pressure, flow rate, temperature, conductivity, and weight; and system controls for pressure, feed flow, and temperature.

VALISETTE CERAMIC TEST CELL KIT

The Valisette ceramic test cell kit includes a 316L stainless steel housing and is designed for choosing the best crossflow/tangential flow ceramic membrane for your separation procedure. Each test kit includes:

- 1 Stainless Steel Tubular Housing, 250 x 10 mm ID
- 6 gaskets; 2 each of Viton, EPDM, & Silicone
- 2 clamp ends, DN 38 Specification
- Slots for storing up to 8 tubular ceramic membranes
- Choice of 4 ceramic membranes (Sold Separately)

The Valisette ceramic test cell unit is designed to work with tubular ceramic membranes at a recommended re-circulating flow rate between 200 and 600 liters/hour. Additional laboratory filtration equipment required includes a feed flow pump, tubing, and a storage tank.

The Valisette ceramic test cell kit can be used with the Inside Ceram (active layers vary by porosity) or Filtanium (titaniam oxide) ceramic membranes. Additional membranes are also sold separately in customizable packs of four. A combination of cutoffs is optimal. These ceramic membranes are available in microfiltration, ultrafiltration, and nanofiltration varieties.

APPLICATIONS

- Concentration or sterilization for: cells, yeast, fungi, bacteria, enzymes, or amino acids
- Separations of: micro-organisms and culture medium or active ingredients.
- Continuous fermentation

STIRRED CELLS

Tangential flow stirred cells, high pressure stirred cells, and magnetic and hotplate-stirrers are designed for durability and chemical resistance. Stirred cells extend membrane life and optimize throughput. Polycarbonate and acrylic stirred cells have non-metal contact surfaces, come with a pressure relief valve, and have removable caps to add samples during filtration.

APPLICATIONS

- Desalting and concentrating proteins, enzymes, virus, and other biological samples
- Pressure filtration of fluids that contain a heavy particle burden, e.g. bacteria, silts
- Membrane analysis

	HP4750	HP4750X	POLYCARBONATE AND ACRYLIC
Membrane Size	dia. 47 mm (1.85 in)	dia. 47 mm (1.85 in)	25-150 mm (1-5.9 in)
Active Membrane Area	14.6 cm^2 (2.26 in^2)	14.6 cm^2 (2.26 in^2)	3.5-162 cm^2 (0.5-25 in^2)
Processing Volume	Up to 300 mL	Up to 300 mL	10-2,000 mL
Hold-Up Volume	1 mL	1 mL	1.5-170 mL
Max. Pressure	1000 psig (69 bar) w/high-pressure clamps	2500 psig (172 bar)	73 psi (5 bar)
Max. Temp.	250°F (121°C) at 800 psig (55 bar)	400°F (205°C) at 2,000 psig (138 bar)	104°F (40°C)
Connections	**Permeate Outlet:** ⅛ in (3.2 mm) dia. 316L SS tubing; **Pressure Inlet:** ¼ in (6.4 mm) FNPT	**Permeate Outlet:** ⅛ in (3.2 mm) dia. 316L SS tubing; **Pressure Inlet:** ¼ in (6.4 mm) FNPT	**Pressure Inlet:** 10 mm Screw (Female)
Cell Body	316L Stainless Steel	316L Stainless Steel	Polycarbonate or Acrylic
O-Rings	Buna-N (others available)	Viton or PTFE	Silicone
Gasket	Buna-N (others available)	Viton or PTFE	Not Tested
Stir Bar	PTFE	Not Tested	PTFE-Coated
Cell Diameter	5.1 cm (2 in)	7 cm (2.75 in)	6.1-19.5 cm (2.4-7.7 in)
Cell Height	19.9 cm (7.8 in)	22.4 cm (10 in)	13.3-26.5 cm (5.2-10.4 in)
Cell Width	14.6 cm (5.7 in) w/high-pressure couplings	Not Tested	Various

SDI KITS

Collecting accurate, consistent measurements of the Silt Density Index (SDI) of water and wastewater reduces membrane fouling and allows process systems to become more efficient.

Manual SDI kits are an economical way to find the amount of particulate matter in water and clarified effluent samples. Auto SDI kits are also available for applications with little tolerance for manual error and faster silt density readings.

FLAT SHEET MEMBRANES

Flat sheet membranes are designed for use in process filtration units and other bench scale test equipment, including the HP4750 stirred cell, CF042 Cell, or the Sepa CF Cell. These polymeric membranes are also ideal for any process requiring the testing of a variety of separation techniques. Flat sheet membranes are available for RO, NF, UF, MF, and FO applications in rectangles, squares, or sheets pre-cut to fit specific process filtration units.

PROCESS	BRANDS	APPLICATIONS	
Reverse Osmosis MWCO ~100	• GE Osmonics • Toray • Trisep • DOW Filmtec	• Desalination • Acid concentration • Antibiotic concentration • Reactive silica removal • Evaporator condensate	• Dyehouse wastewater reclamation • Laundry wastewater reclamation • Fruit juice concentration • Starch/sugar
Nanofiltration MWCO 500	• GE Osmonics • Trisep • DOW Filmtec • Synder • Nanostone	• Acid purification • Cheese whey desalting • Alcohol purification • Antibiotic concentration • Heavy metal removal • Sugar fractionation	• Water softening • Detergent • BOD/COD reduction • Dextrose purification • Plating waste
Ultrafiltration MWCO 800,000	• GE Osmonics • Trisep • Synder • Nanostone	• Organics purification • Protein separation • Colloidal silica removal • Dye purification • Quenchant recovery • Suspended solids removal	• Oil/water separations • Enzyme concentration • Whey concentration • Organics fractionation • Cell harvesting
Microfiltration MWCO 0.3 µm	• GE Osmonics • Trisep • Synder • Nanostone	• Cell harvesting • Lysate clarification • Oil/water separations	• RO/NF pretreatment • Suspended solids removal
Forward Osmosis	• Aquaporin Inside	• Water reclamation from oil and gas exploration • Landfill wastewater • Carpet manufacturing wastewater • Pressure Retarded Osmosis (PRO) to generate electricity	• Alternative energy/biogas wastewater • Medical/dental wastewater • Membrane bioreactors • Seawater desalination • Radioactive wastewater

LABORATORY EQUIPMENT

Choose from Sterlitech's selection of lab-ware, equipment, and supplies for small research and analytical laboratories; including pumps, fluid transfer/storage systems, sterilization units, centrifuges, hotplates, mixers/stirrers, rockers, and more.

CARBOYS



	Polypropylene	HDPE	Amber HDPE
2.5L	**NS:** 80mm Cap, 3in Sanitary Neck	**NS:** 80mm Cap	**NS:** 80mm Cap
5L	**NS:** 80mm Cap, **S:** 80mm Cap	**S:** 80mm Cap	**NS:** 80mm Cap
10L	**NS:** 80mm Cap, 3in Sanitary Neck, **S:** 80mm Cap	**NS:** 80mm Cap, **S:** 80mm Cap	**NS:** 80mm Cap
20L	**NS:** 120mm Cap, **S:** 120mm Cap	**NS:** 120mm Cap, S, 120mm Cap	**NS:** 120mm Cap
40L	**NS:** 120mm Cap, 3in Sanitary Neck, **S:** 120mm Cap	**NS:** 120mm Cap, **S:** 120mm Cap	**NS:** 120mm Cap
75L	**NS:** 120mm Cap	**NS:** 120mm Cap	NA

The EZgrip™ Carboy is the most advanced fluid storage and transfer system available today. Its innovative design is the culmination of an extensive two-year study of end-users to create the ideal carboy for use in life sciences, bioprocesses, and pharmaceutical manufacturing. Easy to handle, space-efficient, and durable, the EZgrip™ Carboy is manufactured in four chemically resistant materials: HDPE, Polypropylene, Copolyester, and PFA. These carboys are available in sizes ranging from 2.5–75 L and can be fitted with a variety of caps, spigots, or barbs to handle any laboratory application.

STORAGE APPLICATIONS

- Buffers
- Solutions
- Powders
- Solids
- Reagents

VersaBarbs

225-	4002-SC	4003-SC	4004-SC	4005-SC	4006-SC
Hose Barb Size	1/4 in	3/8 in	1/2 in	3/4 in	3/4 in Sanitary Connector
Thread Dia.	1 1/8 in	1/ 1/8 in	1 1/8 in	1 1/8 in	1 1/8 in

VersaCaps

205-	1004-RLS	5001-RLS	5002-RLS	2004-RLS	4003-RLS	4005-RLS	4007-RLS
Cap Size	80 mm	80 mm	80 mm	120 mm	120 mm	120 mm	120 mm
Hose Barb Size	NA	1/4 in	1/2 in	NA	3/8 in	3/8 in	3/8 in
Quick Connects	0	0	0	0	2	3	4

CENTRIFUGES

Quiet operation, simplistic design, and maximized capacity for everyday sample preparation, benchtop centrifuges conserve energy and time spent on processing. Mini and Micro variations are ideal for use in physical and chemical analysis, biochemistry, cellular and microbiology, and research applications.

Scilogex

	D1008	D2012	D3024	D3024R
Max. Speed	7,000 rpm	15,000 rpm	15,000 rpm	15,000 rpm
Max. RCF [×g]	2,680	15,100	21,380	21,380
Dimensions	15 x 15 x 13 cm (6 x 6 x 5 in)	25.5 x 24.5 x 14 cm (10 x 9.6 x 5.5 in)	28 x 36.4 x 26.6 cm (11 x 14.3 x 10.5 in)	33.8 x 58 x 32.4 cm (13.3 x 22.8 x 12.8 in)
Weight	2.1 lbs (1 kg)	13.2 lbs (6 kg)	26.5 lbs (12 kg)	66.1 lbs (30 kg)
Max. Capacity	8 x 1.5/2.0mL microtubes	12 x 0.2/0.5/1.5/2mL	18 x 5mL; 24 x 0.2/0.5/1.5/2mL; 36 x 0.5mL; 4 x PCR8	18 x 5mL; 24 x 0.2/0.5/1.5/2mL; 36 x 0.5mL; 4 x PCR8
Electrical	100-240V, 60/50Hz	100-240V, 60/50Hz	100-240V, 60/50Hz	100-240V, 60/50Hz

Benchmark

	BSC1006	MyFuge 8	MC-12	MyFuge 12	StripSpin
Max. Speed	6,600 rpm	6,000 rpm	15,500 rpm	5,500 rpm	5,500 rpm
Max. RCF [×g]	2,200	2,000	16,100	2,000	2,000
Dimensions	12.6 x 13.8 x 10 cm (5 x 5.4 x 3.9 in)	14 x 15 x 11.4 cm (5.5 x 5.9 x 4.5 in)	27 x 22 x 15 cm (10.6 x 8.7 x 5.9 in)	14 x 20 x 11.2 cm (5.5 x 7.9 x 4.4 in)	14 x 20 x 11.2 cm (5.5 x 7.9 x 4.4 in)
Weight	3.3 lbs (1.5 kg)	2.2 lbs (1 kg)	10.5 lbs (4.8 kg)	2.2 lbs (1 kg)	2.2 lbs (1 kg)
Max. Capacity	6 x 1.5/2.0mL tubes; 2 x 8 PCR Strips; 16 x 0.2mL PCR tubes	8 x 1.5/2mL tubes; 16 x 2mL PCR tubes; 2 x PCR Strips (8 x 0.2mL)	12 x 1.5/2mL	12 x 1.5/2mL tubes; 32 x 0.2mL tubes; 4 x PCR Strips	48 x 0.2mL tubes; 4 x 8 or 12 PCR Strips
Electrical	115-230V, 60/50Hz	100-240 V, 60/50Hz	115-230V, 60/50Hz	100-240V, 60/50Hz	115-230V, 60/50Hz

OVERHEAD STIRRERS

An essential staple in every lab, Digital Overhead Mixers guarantee accurate speed control and precision. Available in standard and pro models, applications involving emulsions, suspensions, and water or oil mixtures requiring high torque and speed are easily managed in a range of volumes. Additional accessories including shafts, propellers, and stands are also available.




Model	OS20-Pro	OS20-S	OS40-Pro	OS40-S
Manufacturer	Scilogex	Scilogex	Scilogex	Scilogex
Display	LCD	LED	LCD	LED
Capacity	20 L	20 L	40 L	40 L
Speed [rpm]	50-2200	50-2200	50-2200	50-2200
Max. Torque	40Ncm	40Ncm	60Ncm	60Ncm
Max. Viscosity	10,000mPas	10,000mPas	50,000mPas	50,000mPas
Dimensions	8.3 x 22.1 x 18.5 cm (3.3 x 8.7 x 7.3 in)	8.3 x 22.1 x 18.5 cm (3.3 x 8.7 x 7.3 in)	8.3 x 22.1 x 18.5 cm (3.3 x 8.7 x 7.3 in)	8.3 x 22.1 x 18.5 cm (3.3 x 8.7 x 7.3 in)
Weight	5.5 lbs (2.5 kg)	5.5 lbs (2.5 kg)	5.5 lbs (2.5 kg)	5.5 lbs (2.5 kg)
Electrical	110-220V, 60/50Hz	110-220V, 60/50Hz	110-220V, 60/50Hz	110-220V, 60/50Hz

SAMPLE TEMPERATURE REGULATION

Conserve bench space with digital dry block heaters, available in single, double, and four block capacity. All units feature a digital touchpad capable of real time monitoring to continuously maintain the selected temperature within notable accuracy. Dry blocks are designed to accommodate test tubes, microcentrifuge tubes, 96 well plates, PCR plates, and tube strips.

Dry Baths




Model	BSH1001	BSH1002	BSH1004	MyBlock HL
Manufacturer	Benchmark	Benchmark	Benchmark	Benchmark
Temp. Range	41-302°F (5-150°C)	41-302°F (5-150°C)	41-266°F (5-130°C)	41-212°F (5-100°C)
Block Dimensions	76 x 95 x 50 mm (3 x 3.75 x 2 in)	76 x 95 x 50 mm (3 x 3.75 x 2 in)	76 x 95 x 50 mm (3 x 3.75 x 2 in)	47 x 71 x 32 mm (1.85 x 2.8 x 1.25 in)
Dimensions	20 x 23 x 8 cm (7.8 x 9 x 3.2 in)	22 x 26 x 8 cm (8.7 x 10.3 x 3.2 in)	22 x 36 x 8 cm (8.7 x 14 x 3.2 in)	10 x 15 x 11 cm (4 x 6 x 4.5 in)
Electrical	120/230V, 60/50Hz	120/230V, 60/50Hz	120/230V, 60/50Hz	100-240V, 60/50Hz

Microplate Coolers

The CoolCube is designed to store samples safely on the lab bench by preventing degradation due to temperature variations. After placing the CoolCube in a freezer overnight, it is capable of keeping samples cold (but not frozen); approximately 0°C for up to 4 hours.

SHAKERS

These shakers are used in both chemical and biological applications to stir or agitate liquids. The liquids to be mixed can be used with a variety of vessels and placed on various platform options and shaken. Samples in a lab shaker or rocker can be agitated via a linear/reciprocal motion or orbital motion.





Model	MultiTherm H	SK-L180-Pro	SK-L330-Pro	SK-O180-Pro	SK-O180-Pro
Manufacturer	Benchmark	Scilogex	Scilogex	Scilogex	Scilogex
Speed [rpm]	200-1500	100-350	100-350	100-800	100-500
Motion	Orbit (3 mm)	Linear (20 mm)	Linear (10 mm)	Orbit (4 mm)	Orbit (10 mm)
Temp. Range	41-212°F (5-100°C)	-4-212°F (-20-100°C)	39-104°F (4-40°C)	39-104°F (4-40°C)	39-104°F (4-40°C)
Dimensions	21 x 29 x 21 cm (8.25 x 11.5 x 8.25 in)	36 x 30.5 x 13 cm (14 x 12 x 5 in)	43 x 38 x 13 cm (17 x 15 x 5 in)	43 x 30.5 x 13 cm (17 x 12 x 5 in)	43 x 38 x 30.5 cm (17 x 15 x 12 in)
Weight	18 lbs (8 kg)	19 lbs (8.6 kg)	30 lbs (13.6 kg)	19 lbs (8.6 kg)	30 lbs (13.6 kg)
Electrical	115/230V, 60/50Hz	100-240V, 60/50Hz	100-240V, 60/50Hz	100-240V, 60/50Hz	110-230V, 60/50Hz

MIXERS

Vortex mixers are designed to mix small amounts of liquid in laboratory containers for biochemical, microbiological, and other applications. They are available in both analog and digital versions; options include fixed or variable speeds, touch or hands-free operation, and various voltages.






Model	Vornado	BenchMixer	Mortexer	BenchMixer XL	MS-S	MX-F
Manufacturer	Benchmark	Benchmark	Benchmark	Benchmark	Scilogex	Scilogex
Speed [rpm]	2800	200-3200	200-3400	500-2500	0-2500	2500
Motion	Orbit (4 mm)	Orbit (3 mm)	Orbit (3 mm)	Orbit (3.6 mm)	Orbit (4 mm)	Orbit (4 mm)
Temp. Range	39-113°F (4-45°C)	39-113°F (4-45°C)	39-149°F (4-65°C)	–	41-104°F (5-40°C)	–
Dimensions	9 x 10 x 7 cm (3.7 x 3.9 x 2.6 in)	13 x 16 x 17 cm (5 x 6.3 x 6.7 in)	13 x 16 x 17 cm (5 x 6.3 x 6.7 in)	38 x 23 x 42 cm (15 x 9.2 x 16.5 in)	15 x 15 x 18 cm (6 x 6 x 7 in)	15 x 15 x 18 cm (6 x 6 x 7 in)
Weight	1 lb (0.4 kg)	8.4 lbs (3.8 kg)	8.4 lbs (3.8 kg)	29 lbs (13 kg)	7.7 lbs (3.5 kg)	6 lbs (2.7 kg)
Electrical	100-240V, 60/50Hz	115/230V, 60/50Hz	115/230V, 60/50Hz	100-240V, 60/50Hz	110-240V, 60/50Hz	110-240V, 60/50Hz

ROCKERS

These rockers are designed to provide the precise speeds and tilt angles required for a broad range of molecular and biological mixing applications. The user can adjust both parameters to match the vessel size and the volume of liquid being mixed, yielding optimum results.

2D Rockers




Model	BR1000	BR2000	BR5000	SK-R330-Pro
Manufacturer	Benchmark	Benchmark	Benchmark	Scilogex
Speed [rpm]	12 (10, 230V)	2-30	3-80	0-80
Tilt Angle	±8°	0-30°	0-20°	7° (9° max.)
Platform Size	30.5 x 30.5 cm (12 x 12 in)	35.5 x 30.5 cm (14 x 12 in)	40.6 x 30.5 cm (16 x 12 in)	25.4 x 23 cm (10 x 9 in)
Load Cap.	5 lbs (2.3 kg)	19 lbs (8.6 kg)	16.5 lbs (7.5 kg)	16.5 lbs (7.5 kg)
Temp. Range	39-113°F (4-45°C)	39-113°F (4-45°C)	32-149°F (0-65°C)	39-104°F (4-40°C)
Dimensions	34 x 30.5 x 12 cm (13.5 x 12 x 4.7 in)	35.5 x 30.5 x 16.5 cm (14 x 12 x 6.5 in)	40.6 x 33 x 15 cm (16 x 13 x 6 in)	30.5 x 28 x 13 cm (12 x 11 x 5 in)
Weight	6.5 lbs (3 kg)	7.5 lbs (3.4 kg)	20 lbs (9 kg)	9 lbs (4 kg)
Electrical	115/230V, 60/50Hz	115/230V, 60/50Hz	115/230V, 60/50Hz	100-220V, 60/50Hz

3D Rockers




Model	B3D1020/1320	B3D2300	B3D5000	SK-D3309-Pro
Manufacturer	Benchmark	Benchmark	Benchmark	Scilogex
Speed [rpm]	24 (20, 230V)	2-30	5-105	10-70
Tilt Angle	±20°	0-30°	0-10°	9°
Platform Size	30.5 x 30.5 cm (12 x 12 in)	30.5 x 30.5 cm (12 x 12 in)	34 x 33 cm (13.5 x 13 in)	33 x 30.5 (13 x 12 in)
Load Cap.	4 lbs (2 kg)	5 lbs (2.3 kg)	20 lbs (5.5 kg)	11 lbs (5 kg)
Temp. Range	39-113°F (4-45°C)	39-113°F (4-45°C)	36-140°F (2-60°C)	39-104°F (4-40°C)
Dimensions	30.5 x 30.5 x 20 cm (12 x 12 x 8 in)	30.5 x 30.5 x 20 cm (12 x 12 x 8 in)	34 x 33 x 25 cm (13.5 x 13 x 9.75 in)	43 x 38 x 30.5 cm (17 x 15 x 12 in)
Weight	4.4 lbs (2.2 kg)	7.5 lbs (3.4 kg)	12 lbs (5.5 kg)	30 lbs (13.6 kg)
Electrical	115/230V, 60/50Hz	115/230V, 60/50Hz	100-240V, 60/50Hz	100-220V, 60/50Hz

PRESSURE & VACUUM PUMPS

Vacuum pumps are an efficient, clean, quiet solution for compact laboratory applications. These pumps are available in piston-powered, oil-free and chemically resistant, diaphragm versions.

Model	TLD3000	TLD5000	Gast
Air Flow Rate	**60Hz:** 20 LPM	**60Hz:** 37 LPM **50Hz:** 31 LPM	**60Hz:** 34 **50Hz:** 34
Max. Vacuum	22 inHg	24 inHg	25 inHg
Max. Pressure	3.7 psi (0.25 bar)	2.9 psi (0.2 bar)	60 psi (4.1 bar)
Motor	1/7 HP	1/5 HP	1/8 HP
Weight	6.4 lbs (2.9 kg)	10.2 lbs (4.6 kg)	20 lbs (9.1 kg)
Tubing/Port	1/4 in (6.4 mm)Hose Barb	1/4 in (6.4 mm)Hose Barb	1/4 in (6.4 mm) NPTF - Hose Barb

LABORATORY STERILIZATION

This space-saving sterilization equipment includes compact, benchtop steam-sterilizer research autoclaves and the BactiZapper Infrared MicroSterilizer for instant sterilization of microorganisms.

BactiZapper

Model	BactiZapper
Max. Temperature	1,500℉ (815℃)
Sterilization Time	5-7 seconds
Chamber Diameter	14 mm (0.55 in)
Chamber Length	100 mm (3.94 in)
Exterior Dimensions	10.2 x 15.2 x 16.5 cm (4 x 6 x 6.5 in)
Weight	2.9 lbs (1.3 kg)
Electrical	120/230V, 60/50Hz

Autoclaves

Model	BioClave 8	BioClave 16
Chamber Volume	8 L	16 L
Chamber Dimensions	17 x 31 cm (6.7 x 12.5 in)	23 x 35 cm (9 x 13.75 in)
Tray Dimensions	12 x 24.8 cm (4.75 x 9.75 in)	16.5 x 27 cm (6.5 x 10.75 in)
Exterior Dimensions	51 x 34 x 33 cm (20 x 13.5 x 12.9 in)	56 x 44.5 x 40 cm (22 x 17.5 x 15.7 in)
Weight	74 lbs (33 kg)	89 lbs (40 kg)
Electrical	120/230V, 60/50Hz	120/230V, 60/50Hz

ROTARY EVAPORATORS

The Scilogex RE100-Pro Rotary Evaporator with vertical coiled condenser features a large, easy-to-read, digital LCD screen displaying the temperature, rotation speed, and timer.

This system holds a number of patents including a unique condenser with a cooling surface of 1,500 cm^2 providing excellent cooling. This system features a large 5L water/oil heating bath and has a temperature range from ambient to 180°C. Includes: vertical coil condenser, 5L bath, 1000ml evaporating flask: NS 24/40, and 1000ml receiving flask: KS 35/20. 110V, 60Hz.

MAGNETIC STIRRERS & HOTPLATES

Hotplates, stirrers, and combination units from Benchmark Scientific and Scilogex feature space-saving designs and durable construction. Their compact design makes them ideal for use on crowded bench tops and inside of bio-hoods.

Scilogex Hotplate-Stirrers:

	MS7-H550-Pro	S7-H550-S	MS-H-Pro+	MS-H-S	MS-H280-Pro	MS-H-S10
Dimensions of work plate [mm]	184 × 184 (7 in)	184 × 184 (7 in)	dia. 135 (5 in)	dia. 135 (5 in)	dia. 135 (5 in)	180 × 450
Work plate material	Glass-ceramic	Glass-ceramic	Ceramic-coated steel	Ceramic-coated steel	Ceramic-coated steel	S/steel w/ silicone film
Motor type	DC brushless	Shaded pole	DC brushless	DC brushless	DC	DC brushless
Motor rating input	18 W	15 W	18 W	18 W	5 W	12 W
Motor rating output	10 W	1.5 W	10 W	10 W	3 W	4 W
Stirring positions	1	1	1	1	1	10
Max. stirring quant. [H_2O]	20 L	10 L	20 L	20 L	3 L	0.4 L (ea. position)
Max. magnetic bar (L x Ø)	80 mm	80 mm	80 mm	80 mm	50 mm	40 mm
Speed range [rpm]	100-1500	0-1500	100-1500	0-1500	100-1500	0-1100
Speed display	LCD	Scale	LCD	Scale	LED	Scale
Speed display resolution [rpm]	+-1	–	+-1	–	–	–
Protection class (DIN EN60529)	IP21	IP21	IP42	IP42	IP21	IP42
Dimensions [cm]	21.5 x 36 x 11.2 (8.5 x 14 x 4.4 in)	21.5 x 36 x 11.2 (8.5 x 14 x 4.4 in)	16 x 28 x 8.5 (6.3 x 11 x 3.4 in)	16 x 28 x 8.5 (6.3 x 11 x 3.4 in)	15 x 26 x 8 (6 x 10 x 3 in)	18.2 x 55.2 x 65 (7 x 22 x 25.6 in)
Weight [kg]	11.7 lbs (5.3 kg)	10.4 lbs (4.5 kg)	6.2 lbs (2.8 kg)	4 lbs (1.8 kg)	4 lbs (1.8 kg)	7 lbs (3.2 kg)
Permissible ambient temp.	41-104°F (5-40°C)	41-104°F (5-40°C)	41-104°F (5-40°C)	41-104°F (5-40°C)	41-104°F (5-40°C)	41-104°F (5-40°C)
Permissible relative humidity	80%	80%	80%	80%	80%	80%
Heating output	1000 W	1000 W	500 W	500 W	500 W	470 W
Safety Temp.	1,075°F (580°C)	1,075°F (580°C)	680°F (360°C)	662°F (350°C)	608°F (320°C)	284°F (140°C)
Temp. display	LCD	LED	LCD	Scale	LED	Scale
Electrical	100-240V, 60/50Hz	100-240V, 60/50Hz	100-240V, 60/50Hz	100-240V, 60/50Hz	100-240V, 60/50Hz	100-240V, 60/50Hz

Scilogex Stirrers:





	MS7-Pro	MS-S	MS-PA	MS-PB	MS-M-S10
Dimensions of work plate [mm]	184 × 184 (7 in)	dia. 135 (5 in)	dia. 135 (5 in)	dia. 135 (5 in)	180 × 450
Work plate material	Glass-ceramic	Ceramic-coated steel	ABS Plastic	ABS Plastic	S/steel w/ silicone film
Motor type	DC brushless	DC brushless	DC	DC	DC brushless
Motor rating input	18 W	18 W	5 W	5 W	12 W
Motor rating output	0 W	10 W	3 W	3 W	4 W
Stirring positions	1	1	1	1	10
Max. stirring quantity [H_2O]	20 L	20 L	3 L	3 L	0.4 (ea. position)
Max. magnetic bar (L x Ø)	80 mm	80 mm	50 mm	50 mm	40 mm
Speed range [rpm]	100-1500	0-1500	100-1500	0-1500	0-1100
Speed display	LCD	Scale	LED	Scale	Scale
Speed display resolution [rpm]	1	–	–	–	–
Protection class [DIN EN60529]	IP21	IP42	IP42	IP42	IP42
Dimensions [cm]	21.5 x 36 x 11.2 (8.5 x 14 x 4.4 in)	16 x 28 x 8.5 (6.3 x 11 x 3.4 in)	15 x 26 x 8 (6 x 10 x 3 in)	15 x 26 x 8 (6 x 10 x 3 in)	18.2 x 55.2 x 65 (7 x 22 x 25.6 in)
Weight	11.7 lbs (5.3 kg)	6.2 lbs (2.8 kg)	4 lbs (1.8 kg)	4 lbs (1.8 kg)	7 lbs (3.2 kg)
Permissible ambient temp.	41-104°F (5-40°C)	41-104°F (5-40°C)	41-104°F (5-40°C)	41-104°F (5-40°C)	41-104°F (5-40°C)
Permissible relative humidity	80%	80%	80%	80%	80%
Electrical	100-240V, 60/50Hz	100-240V, 60/50Hz	100-240V, 60/50Hz	100-240V, 60/50Hz	100-240V, 60/50Hz

Benchmark:



	H4000 Stirrer	H4000 Hotplate	H4000 Hotplate-Stirrer
Dimensions of work plate	19 x 19 cm (7.5 x 7.5 in)	19 x 19 cm (7.5 x 7.5 in)	19 x 19 cm (7.5 x 7.5 in)
Work plate material	Ceramic	Ceramic	Ceramic
Stirring positions	1	–	1
Speed range [rpm]	60-1500	–	60-1500
Speed display	Analog	–	Analog
Dimensions [W x D x H]	20 x 23 x 11.5 cm (8 x 9 x 4.5 in)	20 x 23 x 11.5 cm (8 x 9 x 4.5 in)	20 x 23 x 11.5 cm (8 x 9 x 4.5 in)
Ambient Temp. Range	41-716°F (5-380°C)	41-716°F (5-380°C)	41-716°F (5-380°C)
Control	Quick Adjustment Knob	Quick Adjustment Knob	Quick Adjustment Knob
Electrical	100-240V, 60/50Hz	100-240V, 60/50Hz	100-240V, 60/50Hz

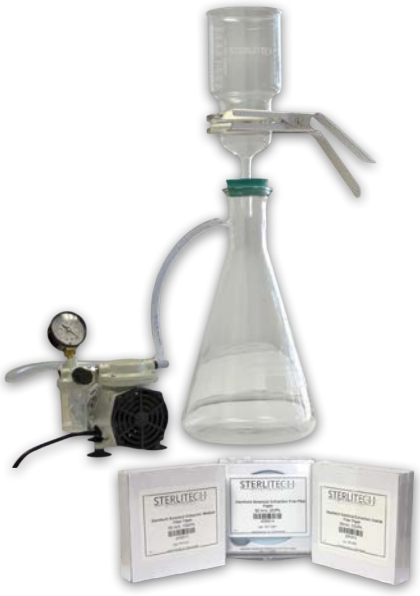
SPECIALTY PRODUCTS

Specialty equipment and devices for water/wastewater analysis and microbiology/life science both complements our industry-leading filtration product line and offers comprehensive support for your laboratory's diverse needs and applications.

BOTANICAL EXTRACTION FILTER KITS

The 90 mm BE Filter kit includes everything needed to get started with filtering solvent-extracted compounds of interest from plant-based sources.

The kit assembly includes high-quality, easy-to-clean glass filter funnels that are industry standards for quality assurance. Each kit includes three different filter types for coarse, medium, and fine filtering of extracts prior to solvent recovery. The fine filters are 0.45 µm polyethersulfone (PES); the same type used to remove the vast majority of bacteria and microorganisms in biotech applications. This kit is compatible with all 90 mm polymeric filter discs; other filter materials are available upon request.



SCHISTOSOME TEST KITS

The Schistosome Test Kit uses membrane filter technology to quantify schistosome eggs in urine and comes complete with everything needed to carry out fast, accurate tests in the field.

The Schistosome Test Kit includes 500 x 13 mm polycarbonate screen membrane filters (choice of 12, 20, or 30 µm pore size), 5 x 13 mm plastic Swinney filter holders, 2 x syringes (10 cc), a pair of forceps, and a convenient plastic case.

NOBUTO STRIPS

Collect blood on the narrow end of the strip and place on the drying rack for easy and efficient sample handling. Each strip can hold approximately 0.1 mL of blood or 0.04 mL of serum. Strips are produced with high-purity cellulose paper with a fine, textile like structure—ideal for uniform sampling. Typical blood collection applications include toxoplasmosis (HA), hanta virus, new castles disease (HI), canine distemper (VN), measles (Rubeola), Japanese encephalitis (HI, VN), mycoplasmosis (AG), and hog cholera (VN). Dried samples can be analyzed, stored, or mailed without refrigeration.

APPENDIX

MEASURING A FILTER'S PERFORMANCE

To help determine whether a filter will be suitable for your applications, manufacturers use various tests to rate the performance of the filter under certain conditions, including:

Biological Safety Test: A general term used to categorize tests performed to determine whether the filter's materials of construction are capable of including measurable degrees of systemic toxicity, localized skin irritation, sensitization reaction, or other biological responses. Either in vivo or in vitro test methods may be employed. Tests like the "United States Pharmacopoeia (USP) Biological Reactivity Test, In Vivo <88>" ensure that the filters can be exposed to the test solutions without causing an adverse reaction.

Bubble Point: A measure of the air pressure required to force liquid from the largest wetted pore of a membrane. It serves as an indication of pore size and rates the filter's ability to serve as a particle barrier. The bubble point is dependent on the liquid used to wet the membrane. For a given pore size, the bubble point will be higher in a liquid with a higher surface tension (such as water) than in a liquid with a lower surface tension (such as isopropyl alcohol). The bubble point rating is determined when the largest pore yields a bubble; the larger the pore size, the less pressure required to form a bubble. The bubble point is expressed in units of pounds per square inch (psi) or bar for membranes.

Water Breakthrough: A measure of the amount of pressure required to transmit water through the largest pore of a dry hydrophobic filter. It serves as an indication of pore size for a hydrophobic membrane, and rates a filter's ability to serve as an aqueous barrier. The larger the pore size, the less pressure is required to push water through the pore. Water breakthrough is expressed in the filtration industry in units of pounds per square inch (psi) or bar.

DOP Test: A measure of the efficiency of a filter for the removal of particulate from air, based on retention of 0.3 µm Dioctyl Phthalate (DOP) aerosol droplets, usually expressed as a percentage. A High Efficiency Particulate Air (HEPA) filter must retain at least 99.97% of 0.3 µm DOP droplets. The 0.3 µm size was chosen because particles of this size are the most difficult to retain in many air filters.

Filter Efficiency: A measure of the percentage of particles which are removed from the fluid by the filter. For liquid applications, filter efficiency is given on the basis of particles at or above a certain diameter in size. In gas filtration, efficiency is stated as including all particles, including those at the most penetrating particle size. See the DOP Test for a test of efficiency in air filtration. Some filter manufacturers will report efficiency in terms of the percentage removal of the particles by weight, which does not reveal the number of particles what may pass through the filter. This is a type of nominal filter rating (for high-efficiency filters, this is often replaced by a beta rating). Efficiency can be calculated from a beta value as follows:

% Efficiency = (B-1/B) x 100

*Filters rated as one micron or finer are often rated using titer reduction values or log reduction values.

Filter Life: A measure of how long a filter will last before requiring replacement or cleaning. It can be stated either in terms of time (e.g. 30 days between changes) or volume of fluid filtered (e.g., 10,000 liters processed between filter changes). A filter's actual life will depend on what particulates and conditions it is exposed to in actual usage, so filter life ratings from lab testing with standard contaminants can be used for comparison, but do not necessarily predict actual service life. To predict actual life, testing with the application fluid under actual operating conditions is required.

Typically, the useful life of a filter can be determined by a two-to-four fold increase of differential pressure in a constant flow system or a drop in flow rate of 50 to 80% in a constant pressure system.

PRINCIPLES OF FILTRATION

Membrane filtration is a rapidly developing science, characterized by intrinsic terminology and proprietary information. In order to better serve the diverse and expanding needs of our customers and establish a mutual understanding, we at Sterlitech Corporation have compiled this accessible reference of the basic concepts and vocabulary of laboratory-scale filtration. If you have any questions regarding the following information or how these concepts relate to your specific applications, please contact our technical support team.

We will outline some of the fundamental definitions and principles associated with filtration technology, their relationships to each other, and discuss relevant applications. We will also provide criteria to guide you through the selection of both filter media and devices that are ideally suited for your needs.

Filter performance is greatly affected by the compatibility of the various properties of filter media with certain applications and operating conditions. Selecting the ideal filter media or device for your application is a multi-factor, highly relative process that should take into consideration the important properties discussed in the following guide.

DEPTH VS. MEMBRANE FILTRATION

Despite ranging differences in filter material and production technique, there are two general categories that all filters can be classified under: depth and membrane (screen).

Depth Filters consist of a matrix of randomly oriented, bonded fibers that capture particulates within the depth of the filter, as opposed to on the surface (examples: glass fiber, cotton, sintered metals).

Advantages:

- Lower cost
- High throughputs
- High dirt-holding capacity
- Protects final filters
- Removes variety of particle sizes

Potential Disadvantages:

- Media migration (shedding)
- Normal pore size
- Particulate unloading at increased differential pressure

A **Membrane Filter** (or “Screen Filter”) performs separations by retaining particles larger than its pore size on the surface of the membrane. Particles with a diameter below the rated pore size may either pass through the membrane or be captured by other mechanisms within the membrane structure. Membrane filters are ideally suited for critical applications requiring maximum particle recovery. (Example: Polymeric Media Membranes).

Advantages:

- Absolute sub-micron pore size ratings are possible
- Can be bacteria and particle retentive (pore size dependent)
- Generally lower extractables
- Generally integrity testable

Potential Disadvantages:

- Lower flow rates than depth media
- More costly than depth media

A **Combination Filter** is a self-contained, successive filter unit that utilizes the specific properties provided by a sequence of membranes, offering an economical alternative to using individual prefilters with final filters (examples: capsule filters, syringe filters with glass fiber prefilters).

Chemical Compatibility indicates the ability of the filter media to maintain its structural integrity and function with exposure to certain chemical(s). This means the filter will not exhibit pore-structure impairment, the media will not shed particles or fibers, and extractables will not be present in the filtered sample. In addition to filter material, it is important to consider compatibility as a function of temperature, concentration, applied pressure, and the length of exposure time. Though all of our

filtration products are constructed with materials carefully selected to accommodate a wide range of chemical solutions, it is essential to understand the relationship of the properties of the sample fluid and the filter elements under actual operating conditions.

Hydrophilic filters exhibit an affinity for water (said to be “water-loving”) and can be wetted with virtually any liquid. They are the preferred material for filtration applications involving aqueous solutions as appropriate by compatibility. (Note: In contrast to some other fields, the filtration industry does not define “hydrophilic” as “a material to which water clings”).

Once wetted, hydrophilic filters do not allow the free passage of gases until the applied pressure exceeds the bubble point and the liquid is expelled from the pores of the membrane. Hydrophobic filters are water-averse and cannot be wetted with water. However, they will wet in low surface tension liquids, including organic solvents (alcohols), allowing aqueous solutions to pass through.

Hydrophobic filters are excellent for gas filtration, low surface tension solvents, and venting applications. They can also be used to overcome compatibility limitations associated with certain aqueous solutions and will allow water and aqueous solutions to pass through when the water breakthrough pressure is reached.

RATINGS

The **Pore Size Rating** refers to the size of the organisms or particles expected to be retained by the filter media under defined conditions. The pore size of the filter is defined by the diameter of the particles captured by the media matrix is usually stated in micrometers (µm). Ratings can be stated as either nominal or absolute.

Nominal filter ratings are arbitrary values for filter performance the manufacturer uses to indicate a range of particulate sizes for which a certain percentage of a specified contaminant of a given size is retained. Nominal ratings are variable between manufacturers and cannot be used as a means of comparison across manufacturers due to the substantial effect of processing conditions, such as operating pressure and particulate concentration, on the retention efficiency of the nominally-rated filters.

Absolute filter ratings are a value associated with media that exhibit precise and consistent pore sizes. It describes the cut-off point at which no particle of a certain size should be able to pass through the filter. More specifically, it indicates the diameter of the largest particle that will pass through the filter. Ratings are within the experimental uncertainty of a standard test method consistent with the intended filter usage and must specify the test organism (or particle size), challenge pressure, concentration, and detection method used to identify the contaminant.

BINDING

Binding is a measurement of a substance’s propensity for “sticking” to the filter medium or other components. High binding capacity for a certain substance indicates that a high percentage of this substance will be removed from the filtrate. Often attributed to charge, binding can be either desirable or undesirable, depending on the application. For example, it is utilized in transfer membranes to bind nucleic acid or protein, allowing them to be easily separated and identified. However, when present during general filtration, binding may contribute to a loss of valuable products.

EXTRACTABLES

Extractables are substances that may leach, or otherwise migrate, from a filtration system into the filtrate. Potential contaminants can include wetting agents, manufacturing debris, sterilization residue, adhesives, or other components of the system. The type and concentration of extractables will vary with liquid sample properties.

To minimize the effect of extractables, filters can be flushed with water (or another process-compatible solvent) prior to use or purchased as “pre-flushed” packs. However, the necessity of flushing can also be mitigated through careful manufacturing procedures.

Examples of the effect of extractables include:

- Adding extraneous peaks in HPLC analysis
- Inducing cytotoxicity (kill cells) in cell cultures
- Inhibiting growth and affecting recovery of microorganisms in microbiological analysis
- Appearing as additional contaminants in environmental analysis

THERMAL STABILITY

Thermal Stability is the ability of the filter media and device components to withstand elevated temperatures without compromising structural integrity and functionality. It is measured as the maximum operating temperature of the filter, or filter system, under specified conditions. Due to insufficient thermal stability, some filters are not suited for high-temperature sterilization processes, such as autoclaving. It should also be noted that thermal stability is related to chemical compatibility; meaning that certain filter media can be compatible with a chemical at room temperature, but incompatible at a high temperature.

FLOW RATE AND THROUGHPUT

Flow Rate and Throughput are related measurements of filter media and device performance that are affected by a number of other properties. The primary determinants of these values are:

Water Flow Rate measures the amount of water that flows through a filter, commonly expressed in milliliters/minute (mL/min), at a given pressure. It is influenced by the degree of contamination, differential pressure, total porosity, and the filter's effective filtration area.

Air Flow Rate measures the amount of air that flows through a filter, commonly expressed in liters/minute (L/min) at a given pressure. It is also influenced by the degree of contamination, differential pressure, total porosity, and the filter's effective filtration area.

Throughput is the amount of a sample that passes through a filter.

Differential Pressure (ΔP) is the difference between the upstream and downstream pressure in the system. It is the difference of pressure measurements taken before the fluid reaches the filter and after the fluid flows through the filter. Differential pressure increases as the filter begins to clog in continuous flow applications.

Viscosity measures a fluid's resistance to flow. High viscosity (at a constant temperature and pressure) lowers the flow rate through a filter (assuming also viscosity remains constant).

Porosity ("open area" or "void volume") measures open spaces (pores) in the membrane as a percentage of total membrane area. Generally, membranes have 50-90% open space and flow varies in direct proportion to membrane porosity.

Effective Filtration Area (EFA) is the area of a filter that is available for filtration; for a specific membrane, flow rates are higher (at a given differential pressure) for larger EFA's.

Filter Media and Device Configurations include a vast array of sizes and configurations. Options range from disc membranes, to small syringe filters, to large capsule filters.

Disposable Filter Devices are intended for single-use applications and provide a convenient means of filtering a variety of sample volumes. These devices are often pre-sterilized and include "ready for use" syringe filters and capsule filters that consist of a membrane integrally sealed into a polymeric housing with fittings for easy attachment to syringes, tubing, or piping on the inlet and/or outlet of the device.

Disc Filters are economical, pre-cut filters that can be integrated by the end-user into a reusable filter holder (made of stainless steel, glass, or polymeric housing material). Note that some applications may require the end-user to sterilize the filtration system prior to use.

ADDITIONAL TERMS

Anisotropic Membrane: A membrane with pore openings that are smaller near the separation surface than they are on the bottom surface.

Diffusion Test: A test that determines the integrity of a filter based upon the transition from diffusional flow to bulk flow of a gas through a wetted filter. Either the gas or the downstream liquid displaced by the gas, may be measured.

Downstream Side (of filter): The filtrate side of the filter.

Filter (n.): A device for carrying out filtration consisting of the filter medium and a suitable holder for constraining and supporting it in the fluid path.

Filter (v.): To pass a fluid containing particles through a filter medium whereby particles are removed from the fluid.

Filter Medium: The permeable material that removes particles from a fluid being filtered.

Filtrate: The fluid which has passed through a filter.

Filtration: The process by which particles are removed from a fluid by passing the fluid through a permeable material.

Integrity Test: A non-destructive test which is used to predict a filter's functional performance. Valid use of this test requires correlation to a standardized bacterial retention test (i.e. bubble point test, diffusion test, flow rate tests).

Isotropic Membrane: A membrane with pore openings of equal sizes on both sides.

Non-fiber Releasing Filter: A filter which, after any appropriate pretreatment, such as washing or flushing, will not release fibers into the filtrate of the product that is being filtered.

Particle: A discernible mass having an observable length, width, thickness, which includes particulates and bacteria.

Upstream Side (of filter): The feed side of the filter.

SALES & SERVICES

HOW TO ORDER

For pricing and ordering information on any items in this catalog and for assistance with custom orders, please contact us via one of the following methods:

Terms of Sale:

- Net 30 days with prior approval credit
- Credit cards accepted
- Drop shipments made without additional charge (FOB warehouse, Kent, WA 98032)

Pricing:

- Prices are subject to change without notice.
- When ordering from a quotation, please reference the quotation number.
- Acceptance of any order is at the sole discretion of Sterlitech Corporation.

Returned Goods Policy:

- Products shipped may not be returned without proper prior authorization
- Authorization may be obtained by calling our Customer Service Department.
- Returns are each subject to a 15% restocking fee

One Year Warranty:
Sterlitech Corporation warrants its products against defects in material or workmanship for a period of 1 year from the date of delivery when used in accordance with the instructions provided in this catalog or with the product. The liability of Sterlitech Corporation is limited to replacement, or repair, at its option of any product.

Technical Assistance:
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MEMBRANE FILTER SPECIFICATIONS

		Porosity	Pore Density	Nominal Thickness	Bubble Point	Avg. Flow Rate (H_2O)	Avg. Flow Rate (Air)	BSA Binding Capacity	Max. Temperature	Sterilization Methods[a]
		(%)	(pores/cm²)	(µm)	(psi)	(mL/min/cm²)		(µg/cm²)	(°C/°F)	(*)
Silver	0.20 µm	NT[b]	NT	50	13	17	350	NT	204/400	E, A
	0.45 µm	NT	NT	50	9	40	670	NT	204/400	E, A
	0.80 µm	NT	NT	50	7	340	1,400	NT	204/400	E, A
	1.20 µm	NT	NT	50	5	460	2,000	NT	204/400	E, A
	3.00 µm	NT	NT	50	3	690	2,900	NT	427/800	E, A
	5.00 µm	NT	NT	50	2	870	5,200	NT	427/800	E, A
Cellulose Acetate	0.22 µm	NT	NT	65-110	50	16.1	NT	3.8	135/274	G, E, A
	0.45 µm	NT	NT	65-110	30	54.7	NT	3.8	135/274	G, E, A
	0.65 µm	NT	NT	65-110	18	70.9	NT	3.8	135/274	G, E, A
	0.80 µm	NT	NT	65-110	14	81.3	NT	3.8	135/274	G, E, A
	1.20 µm	NT	NT	65-110	11	180	NT	3.8	135/274	G, E, A
	3.00 µm	NT	NT	135	5	500	5,400	26.8	135/274	G, E, A
	5.00 µm	NT	NT	65-110	6	375	NT	3.8	135/274	G, E, A
Ceramic	1 kDa	NT	NT	2,500	NT	0.025	NT	NT	350/662	E, A
	3 kDa	NT	NT	2,500	NT	0.042	NT	NT	350/662	E, A
	5 kDa	NT	NT	2,500	NT	0.067	NT	NT	350/662	E, A
	8 kDa	NT	NT	2,500	NT	0.092	NT	NT	350/662	E, A
	15 kDa	NT	NT	2,500	NT	0.12	NT	NT	350/662	E, A
	50 kDa	NT	NT	2,500	NT	0.33	NT	NT	350/662	E, A
	150 kDa	NT	NT	2,500	NT	0.42	NT	NT	350/662	E, A
	300 kDa	NT	NT	2,500	NT	0.75	NT	NT	350/662	E, A
	0.14 µm	NT	NT	2,500	NT	1.33	NT	NT	350/662	E, A
	0.20 µm	NT	NT	2,500	NT	1.66	NT	NT	350/662	E, A
	0.45 µm	NT	NT	2,500	NT	1.92	NT	NT	350/662	E, A
	0.80 µm	NT	NT	2,500	NT	2.17	NT	NT	350/662	E, A
	1.40 µm	NT	NT	2,500	NT	2.50	NT	NT	350/662	E, A
Mixed Cellulose Ester (MCE)	0.10 µm	NT	NT	110	35.3	2.7	670	108	180/356	G, E, A
	0.20 µm	NT	NT	133	54.5	17.5	2,400	108	180/356	G, E, A
	0.45 µm	NT	NT	145	35	45	5,000	108	180/356	G, E, A
	0.45 µm (B)[c]	NT	NT	150	30	51	NT	160	180/356	G, E, A
	0.65 µm	NT	NT	150	21.3	120	11,200	108	180/356	G, E, A
	0.80 µm	NT	NT	150	16.4	165	15,000	108	180/356	G, E, A
	1.00 µm	NT	NT	150	13.9	220	20,400	108	180/356	G, E, A
	3.00 µm	NT	NT	155	10.2	300	28,300	108	180/356	G, E, A
	5.00 µm	NT	NT	160	8.5	400	40,900	108	180/356	G, E, A
	8.00 µm (B)	NT	NT	150	4	2,316	NT	160	180/356	G, E, A
Nylon	0.10 µm	70-85	NT	65-125	70	5.2	NT	120	180/356	G, E
	0.20 µm	70-85	NT	65-125	50	13.5	NT	120	180/356	G, E
	0.45 µm	70-85	NT	65-125	35	32	NT	120	180/356	G, E
	0.65 µm	70-85	NT	65-125	18	80	NT	120	180/356	G, E
	0.80 µm	70-85	NT	65-125	13	120	NT	120	180/356	G, E
	1.20 µm	70-85	NT	65-125	11	190	NT	120	180/356	G, E
Polycarbonate (PCTE)	0.01 µm	<1	$6x10^8$	6	NT	0.1	7.5	<5	140/284	G, E, A
	0.03 µm	<1	$6x10^8$	6	NT	0.2	75	<5	140/284	G, E, A
	0.05 µm	1	$6x10^8$	6	50	0.4	370	<5	140/284	G, E, A
	0.08 µm	2	$4x10^8$	6	38	0.6	750	<5	140/284	G, E, A
	0.10 µm	3	$4x10^8$	6	30	2.5	1,500	<5	140/284	G, E, A
	0.20 µm	10	$3x10^8$	10	20	10	3,000	<5	140/284	G, E, A
	0.40 µm	19	$1.5x10^8$	24	32	45	8,500	<5	140/284	G, E, A
	0.60 µm	8	$3x10^7$	9	9.0	60	7,500	<5	140/284	G, E, A
	0.80 µm	15	$3x10^7$	9	7.0	90	18,000	<5	140/284	G, E, A
	1.00 µm	16	$2x10^7$	11	6.0	130	20,000	<5	140/284	G, E, A
	2.00 µm	6	$2x10^6$	10	3.0	300	16,500	<5	140/284	G, E, A

		Porosity	Pore Density	Nominal Thickness	Bubble Point	Avg. Flow Rate (H_2O)	Avg. Flow Rate (Air)	BSA Binding Capacity	Max. Temperature	Sterilization Methods[a]
		(%)	(pores/cm²)	(µm)	(psi)	(mL/min/cm²)		(µg/cm²)	(°C/°F)	(*)
Polycarbonate (PCTE)	3.00 µm	14	2x10⁶	9	2.0	440	37,500	<5	140/284	G, E, A
	5.00 µm	8	4x10⁵	10	1.2	700	30,000	<5	140/284	G, E, A
	8.00 µm	5	1x10⁵	7	0.7	1,000	30,000	<5	140/284	G, E, A
	10.0 µm	8	1x10⁵	10	0.5	1,150	34,500	<5	140/284	G, E, A
	12.0 µm	12	1x10⁵	8	0.4	1,250	63,500	<5	140/284	G, E, A
	14.0 µm	8	5x10⁴	6	0.2	1,400	63,500	<5	140/284	G, E, A
	20.0 µm	13	4x10⁴	3	<1	1,000	11,000	<5	140/284	G, E, A
	25.0 µm	5	1x10⁴	28	NT	<1,000	>5,000	NT	140/284	G, E, A
	30.0 µm	7	1x10⁴	28	NT	<1,500	>7,500	NT	140/284	G, E, A
Polyester (PETE)	0.10 µm	3	4x10⁸	6	30	2.5	1.5	<5	140/284	G, E, A
	0.20 µm	9	3x10⁸	10	20	10	3.0	<5	140/284	G, E, A
	0.40 µm	13	1x10⁸	10	12	33	7.5	<5	140/284	G, E, A
	0.80 µm	15	3x10⁷	9	7	90	18	<5	140/284	G, E, A
	1.00 µm	2	2x10⁶	11	6	130	20	<5	140/284	G, E, A
	2.00 µm	6	2x10⁶	10	3	300	16.5	<5	140/284	G, E, A
	3.00 µm	14	2x10⁶	9	2	440	37.5	<5	140/284	G, E, A
	5.00 µm	8	4x10⁵	10	1.2	700	30	<5	140/284	G, E, A
	8.00 µm	5	1x10⁵	7	7	1,000	30	<5	140/284	G, E, A
	10.0 µm	8	1x10⁵	9	5	1,150	34.5	<5	140/284	G, E, A
PES	0.03 µm	NT	NT	110-150	90	5.5	NT	<20	130/266	G, E, A
	0.10 µm	NT	NT	110-150	70	11.7	NT	<20	130/266	G, E, A
	0.22 µm	NT	NT	110-150	50	33.2	NT	<20	130/266	G, E, A
	0.45 µm	NT	NT	110-150	35	58.2	NT	<20	130/266	G, E, **A**
	0.60 µm	NT	NT	110-150	21	95.5	NT	<20	130/266	G, E, A
	0.80 µm	NT	NT	110-150	13	117	NT	<20	130/266	G, E, A
	1.20 µm	NT	NT	110-150	11	143	NT	<20	130/266	G, E, A
	5.00 µm	NT	NT	110-150	6	186	NT	<20	130/266	G, E, **A**
Polypropylene	0.10 µm	70	NT	51	28.5	NT	NT	NT	55/131	NT
	0.22 µm	85	NT	110	15.4	1.8	351	NT	55/131	NT
	0.22 µm (N)[d]	NT	NT	NT	NT	NT	NT	NT	NT	NT
	0.45 µm	85	NT	110	11.5	2.6	528	NT	55/131	NT
	0.45 µm (N)	NT	NT	NT	NT	NT	NT	NT	NT	NT
	1.20 µm (N)	NT	NT	NT	NT	NT	NT	NT	NT	NT
	5.00 µm (N)	NT	NT	152	0.79	NT	91	NT	NT	NT
	10.0 µm (N)	NT	NT	152	0.50	NT	182	NT	NT	NT
PAN	0.20 µm	NT	NT	180-200	>60	40	NT	NT	100/212	NT
PVDF	0.20 µm	NT	NT	140-250	40-60	NT	NT	4	NT	NT
	0.45 µm	NT	NT	140-250	25-40	NT	NT	4	NT	NT
PTFE	0.10 µm (L)[e]	NT	NT	152-254	>25	NT	1.5	NT	NT	E
	0.10 µm (U/H)[f]	71	NT	35	55.1	14	1.6	NT	100/212	E
	0.20 µm (L)	NT	NT	101-152	>14.5	NT	6.1-12.2	NT	NT	E
	0.20 µm (U/H)	71	NT	35	34.8	21	2.1	NT	100/212	E
	0.20 µm (U)	NT	NT	25-51	19-26	19.4	10.7	NT	NT	E, A
	0.45 µm (L)	NT	NT	76-127	>11	NT	12.2-24.4	NT	NT	E
	0.45 µm (U)	NT	NT	25-51	10-17	NT	9-21	NT	NT	E, A
	0.50 µm (U/H)	79	NT	35	20.3	39	2.9	NT	100/212	E
	1.00 µm (L)	NT	NT	76-127	>8	NT	45.7-106.7	NT	NT	E
	1.00 µm (U/H)	83	NT	35	12	73	57	NT	100/212	E
	1.00 µm (U)	NT	NT	254	1.0	110	5-6	NT	NT	E, A
	5.00 µm (U)	NT	NT	203	1.2	162	4-5	NT	NT	NT
	20.0 µm (U)	NT	NT	127	0.25-0.4	509	0.4-0.7	NT	NT	NT

[a] *G = Gamma Irradiation; E = EtO Sterilization; A = Autoclavable*

[b] *NT = Not Tested*

[c] *B = Black*

[d] *N = Nominal*

[e] *L = Laminated*

[f] *U = Unlaminated; H = Hydrophobic*

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