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FILTRATION MEDIA & FILTRATION SYSTEMS

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ADVANTEC group is the first manufacturer of filter paper for laboratory use in Japan since 1916, and is the only manufacturer in Japan that produces all types of filtration media and filtration systems ranging from laboratory to industrial use.

We aim to serve the pharmaceutical, public health, food and beverage, health care, life sciences and electronics industries with high quality products for separation science. Our product range includes membrane filters, pre-filtration media, glass fiber and cellulose filters, qualitative and quantitative filter papers, specialty test papers, cartridge filters, industrial filter papers and an extensive range of filter holders in stainless steel, plastic, and glass for laboratory and process applications.

Customers have the right to expect the highest quality products we can produce. We manufacture our filter products to exacting standards and have established quality control specifications to assure you of product consistency, reproducibility, uniform performance and

superior product integrity. The bulk of our membrane filters, test papers, and filtration units are manufactured under a quality management system certified by Lloyd's Register QA Ltd. as ISO 9001 approved. This certification is recognized by the United Kingdom Accreditation Service (UKAS) and by the Japan Accreditation Board for Conformity Assessment (JAB).

Our goal continues to be what we have done for over 90 years: to manufacture consistent, reproducible quality products at the lowest possible cost and to provide the best possible service in their delivery.

MEMBRANE FILTERS

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Introduction

Membrane filters or “membranes” are microporous plastic films with specific pore size ratings. Also known as screen, sieve or microporous filters, membranes retain particles or microorganisms larger than their pore size primarily by surface capture. Some particles smaller than the stated pore size may be retained by other mechanisms.

Advantec membranes are produced by three different processes. Mixed Cellulose Esters and Cellulose Acetate, are reverse phase solvent cast membranes, where controlled evaporation or removal of the complex solvent system forms the porous structure. Both hydrophilic and hydrophobic PTFE are made by a patented process where the membranes are stretched biaxially to form the porous structure. Polycarbonate membranes are track etched.

Performance Characteristics of Advantec Membranes

- **Strong:** Advantec membranes are monitored for both burst (longitudinal) and tensile (lateral) strength.
- **Chemically and biologically clean:** As part of a comprehensive quality program, only high purity reagents and raw materials are used to produce Advantec membranes. Once cast, the membranes are handled in a class 1000 clean room to minimize ambient contamination. While some membranes require a small amount (0.1–3 weight %) of an aqueous wetting agent, Cellulose acetate has the lowest aqueous extractables (0.1 weight %). All Advantec membranes are Triton-free.
- **Thin membranes with high porosity:** Uniformly thin membranes (typically 150 μm) with high porosity (about 80%) provide high gas and liquid flow per unit area. High porosity also provides high surface area for adsorption or binding
- **Thermostable:** All Advantec membranes can be sterilized by autoclaving. Operating temperatures of up to 180°C can be achieved depending upon the membrane polymer (see individual membrane specifications for details). Advantec membranes exhibit minimal shrinkage at elevated temperatures

Quick Guide to Selecting Membrane Filters

- **Determine** what liquid or gas will be filtered
- **Check** which membranes are chemically compatible (following and appendix)
- **Determine** the maximum pore size required to achieve the results you want
- **Check** the membrane specifications for any unusual process conditions that might otherwise limit your choice of membrane (e.g. temperature)

For more detailed information on how to design a filtration system see the appendix, page 110.

Properties of Membrane Filters

MEMBRANE COMPARISON

Membrane polymer	Sample applications	General compatibility	Hydrophilic	Hydrophobic	Pore size range available (µm)					
					0.1	0.2	0.45	0.8	1.0	3.0
Mixed Cellulose Esters (MCE)	General purpose Microbiology Particle Analysis	Aqueous solutions	✓		[Red bar from 0.1 to 5.0]					
Cellulose Acetate	General filtration Cytology Binding studies	Aqueous solutions	✓		[Red bar from 0.2 to 3.0]					
Coated Cellulose Acetate	Clarify solutions Prefilter	Aqueous solutions	✓		[Red bar from 0.8 to 10]					
Hydrophilic PTFE	HPLC solutions Clarify or sterilize aqueous/organic mixtures	Aqueous and organic solutions	✓		[Red bar from 0.1 to 1.0]					
Hydrophobic PTFE	Gas venting Clarify or sterilize	Non-aqueous solvents			[Red bar from 0.1 to 3.0]					
Hydrophobic PTFE with supported PP net	strong acids or solvents		✓		[Red bar from 0.1 to 1.0]					
Polycarbonate	Microscopy Beverage testing	Aqueous solutions	✓		[Red bar from 0.1 to 8.0]					

ORDERING INFORMATION: MEMBRANE FILTER NOMENCLATURE

The membrane filter nomenclature specifies the required information for correctly ordering membranes. The nine digit code specifies type, pore size, surface/type, diameter and packaging as illustrated below.

EXAMPLE A 020 A 293 C

Quantity per Package

A = 100	E = 5	R = 1 roll
B = 50*	H = 25 with 60 mm center hole	Y = 200
C = 25	K = HE ind pack WG, 100	W = 1000
D = 10	J = HE ind pack WP, 100	

*B = Opticlear MF, 100

Diameter (mm)

13 = 013	47 = 047	142 = 142	Sheets/Rolls (cm)
25 = 025	82 = 082	293 = 293	20 x 20 = 204
37 = 037	90 = 090		22 x 22 = 224
			30 x 30 = 304
			33 cm x 3 m = 330

Surface/Type

Packaging	Non-Sterile Packages				Pre-Sterilized Packages					
	10 x 10 (Autoclavable)		10 x 10		Individually Wrapped					
Pad	No Pad	No Pad	Pad	Pad	Pad	No Pad	Pad	No Pad		
Surface	Plain	Grid	Plain	Grid	Plain	Grid	Plain	Grid		
MF Color			S	T	C	D***	E	G	F	H
White	A, X**	B, X**								
White HE*	J	K								
Black	N	P					Q		M	R
Green	U	V								W

*HE = Hydrophobic Edge **Opticlear MF ***D Type: 10 x 20, No pad

Membrane Pore Size (µm)

5.00 = 500	1.00 = 100	0.50 = 050	0.20 = 020	Y = Coated Cellulose Acetate (Nominal µm)
3.00 = 300	0.80 = 080	0.45 = 045	0.10 = 010	10 = 100
	0.65 = 065	0.30 = 030		2 = 020
				0.8 = 008

Type of Filter

A = Mixed Cellulose Esters	H = Hydrophilic PTFE	K = Polycarbonate
C = Cellulose Acetate	J = Hydrophobic PTFE, polypropylene backing	Y = Coated Cellulose Acetate
S = Cellulose Nitrate	T = Hydrophobic PTFE	

Mixed Cellulose Esters (MCE)

- **Composition:** Mixed cellulose esters including cellulose nitrate and cellulose acetate, also known as nitrocellulose
- **High porosity** provides superior flow rates
- **High protein binding** can be blocked by pretreatment or utilized in applications
- **High purity:** Triton-free
- **Autoclavable:** Withstands autoclaving temperatures up to 130°C without adversely affecting bubble point, flow rate or microbiological recovery
- **Rapid wetting time:** <3 seconds to wet a 47 mm diameter disc with aqueous 1% methylene blue

APPLICATIONS

- Standard membranes for many laboratory applications including filter sterilizing biological fluids, microbiology, contamination analysis and air monitoring
- Can be transparentized to view collected particles
 - using compatible liquid (immersion oil, toluene),
- OR
 - select Opticlear membranes for the “hot block” acetone vapor method
- Gridded filters available for quantifying microbial growth
- Available non-sterile or sterilized by ethylene oxide (EtO)

SPECIFICATIONS FOR MIXED CELLULOSE ESTERS (MCE), CODE A

Pore Size (µm)	Color	Surface	Bubble Point* ¹		Flow Rate* ²		Porosity* ³ (%)	Thickness (µm)
			MPa	psi	Water (mL/min/cm ²)	Air (L/min/cm ²)		
0.10	White	Plain	≥0.24	≥35.3	2.7	0.67	65	110
0.20	White	Plain	≥0.37	≥54.5	17.5	2.4	73	133
0.30	White	Plain	≥0.28	≥41.2	30	3.7	75	140
0.45	White	Plain	≥0.24	≥35.0	45	5.0	78	145
0.45	White	Grid	≥0.16	≥24.2	80	8.0	79	142
0.65	White	Plain	≥0.14	≥21.3	120	11.2	79	150
0.80	White	Plain	≥0.11	≥16.4	165	15.0	80	150
1.00	White	Plain	≥0.096	≥13.9	220	20.4	80	150
3.00	White	Plain	≥0.070	≥10.2	300	28.3	81	155
5.00	White	Plain	≥0.058	≥8.5	400	40.9	81	160
0.45	Black	Grid	≥0.22	≥32.7	50	5.0	78	135
0.80	Black	Grid	≥0.10	≥14.9	170	15	80	145
0.45	Green	Grid	≥0.22	≥32.7	50	5.0	78	135
0.80	Green	Grid	≥0.10	≥14.9	170	15	80	145

- Refractive index = 1.50
- Maximum operating temperature = 130°C
- Ash content 2 ~ 5 µg/cm²

Definitions:

*1. Bubble point is the minimum pressure required to force air through a membrane which has been prewet with water (0.1 µm membranes prewet with isopropylalcohol)

*2. Flow Rate indicates initial flow rate at 10 psi using a KGS 47 filter holder

Water: using water prefiltered to 0.1 µm pore size

Air: using 25°C air at 10 psi

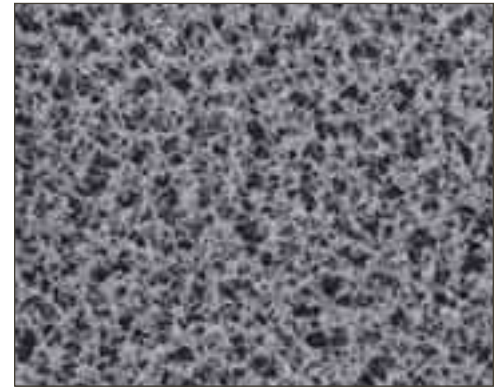
*3. Porosity refers to the percent open area

Metal Content of White Plain MCE Membrane Filters (ppm)

Al	<2.0	K	6.0	Ni	<5.0
Ca	140.0	Li	<1.0	Pb	<1.0
Cd	<0.5	Mg	10.0	Si	<20.0
Cr	8.0	Mn	<0.5	Sn	<5.0
Cu	<1.0	Mo	<1.0	Ti	<1.0
Fe	<5.0	Na	10.0	Zn	<1.0

ORDERING INFORMATION: MIXED CELLULOSE ESTERS – NON-STERILE**Plain White, package of 100 discs**

Pore Size (μm)	Diameter			
	13 mm	25 mm	37mm	47 mm
0.10	A010A013A	A010A025A	A010A037A	A010A047A
0.20	A020A013A	A020A025A	A020A037A	A020A047A
0.30	A030A013A	A030A025A	A030A037A	A030A047A
0.45	A045A013A	A045A025A	A045A037A	A045A047A
0.65	A065A013A	A065A025A	A065A037A	A065A047A
0.80	A080A013A	A080A025A	A080A037A	A080A047A
1.00	A100A013A	A100A025A	A100A037A	A100A047A
3.00	A300A013A	A300A025A	A300A037A	A300A047A
5.00	A500A013A	A500A025A	A500A037A	A500A047A



Mixed Cellulose Esters

Plain White, package of 25 discs

Pore Size (μm)	Diameter		
	90 mm	142 mm	293 mm
0.10	A010A090C	A010A142C	A010A293C
0.20	A020A090C	A020A142C	A020A293C
0.30	A030A090C	A030A142C	A030A293C
0.45	A045A090C	A045A142C	A045A293C
0.65	A065A090C	A065A142C	A065A293C
0.80	A080A090C	A080A142C	A080A293C
1.00	A100A090C	A100A142C	A100A293C
3.00	A300A090C	A300A142C	A300A293C
5.00	A500A090C	A500A142C	A500A293C

ORDERING INFORMATION (CONTINUED): MIXED CELLULOSE ESTERS – NON-STERILE**Gridded White, package of 100 discs**

Pore Size (μm)	Diameter			
	13 mm	25 mm	37 mm	47 mm
0.45	A045B013A	A045B025A	A045B037A	A045B047A
0.80	A080B013A	A080B025A	A080B037A	A080B047A

0.8 μm MF has green grid lines on white background, 0.45 μm has black grid lines.

Sheets, Gridded White

Pore Size (μm)	Qty/pkg	Size
		300 mm x 300 mm
0.45	25	A045B304C

Hydrophobic Edge, 47 mm discs, package of 100 discs

Pore Size (μm)	Surface	
	Plain	Grid
0.20	A020J047A	A020K047A
0.45	A045J047A	A045K047A

Opticlear, package of 100 discs

Pore Size (μm)	Surface	Diameter		
		25 mm	37 mm	47 mm
0.80	Plain	A080X025A	A080X037A	A080X047A
	Grid	A080X025B	A080X037B	A080X047B

Black, package of 100 discs

Pore Size (μm)	Surface	Diameter			
		13 mm	25 mm	37 mm	47 mm
0.45	Plain	A045N013A	A045N025A	A045N037A	A045N047A
0.45	Grid	A045P013A	A045P025A	A045P037A	A045P047A
0.80	Plain	A080N013A	A080N025A	-	A080N047A
0.80	Grid	A080P013A	A080P025A	-	A080P047A

Green, package of 100 discs

Pore Size (μm)	Surface	Diameter		
		13 mm	25 mm	47 mm
0.45	Plain	A045U013A	A045U025A	A045U047A
0.45	Grid	A045V013A	A045V025A	A045V047A
0.80	Grid	-	-	A080V047A

Additional sizes available by special order.

Also available in:

- Sterile packaging for microbiology.
- Disposable syringe units.

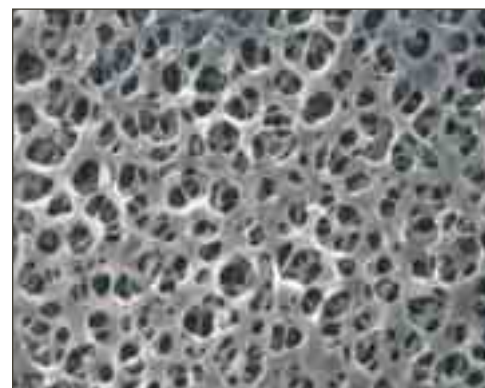
For Pure Nitrocellulose for Blotting, see page 8.



MCE membrane filters

Cellulose Acetate

- **Composition:** Mixture of cellulose triacetate and diacetate
- **Characteristics:** Low static charge and high strength
- **Autoclavable:** Withstands autoclaving temperatures up to 130°C without adversely affecting bubble point, flow rate or micro-biological recovery
- **Clean:** Lowest aqueous extractables (0.1 wt%) of all Advantec membranes
- Relative to MCE (Mixed Cellulose Esters, Nitrocellulose):
 - improved solvent resistance to low molecular weight alcohols
 - better heat resistance
 - lower protein binding



Cellulose Acetate

APPLICATIONS

- Enhanced recovery of fastidious gram positive organisms
- Filtration of enzyme solutions
- Diagnostic cytology
- Receptor binding studies

Note: Should not be prewet prior to loading into a holder and autoclaving.

SPECIFICATIONS: WHITE PLAIN CELLULOSE ACETATE, CODE C

Pore Size (µm)	Bubble Point ^{*1}		Flow Rate ^{*2}		Porosity ^{*3} (%)	Thickness (µm)
	MPa	psi	Water (mL/min/cm ²)	Air (L/min/cm ²)		
0.20	≥0.25	≥37.1	16	2	66	125
0.45	≥0.17	≥25.9	35	4	68	125
0.80	≥0.068	≥10.0	160	14	72	125
3.00	≥0.034	≥5.0	500	54	78	135

- Wetting time: <3 seconds to wet a 47 mm diameter disc with aqueous 1% methylene blue
- Refractive index = 1.47
- Maximum operating temperature = 180°C
- Ash content 1.5–3.5 µg/cm²

Definitions:

- *1. Bubble point is the minimum pressure required to force air through a membrane which has been prewet with water
- *2. Flow Rate indicates initial flow rate at 10 psi using a KGS 47 filter holder
Water: using water prefiltered to 0.1 µm pore size
Air: using 25°C air at 10 psi
- *3. Porosity refers to the percent open area

Metal Content of White Plain Cellulose Acetate Membrane Filters (ppm)

Al	<5.0	K	2.0	Ni	<0.5
Ca	36.4	Li	<0.5	Pb	<0.5
Cd	<0.1	Mg	1.9	Si	7.8
Cr	2.2	Mn	<0.5	Sn	<0.5
Cu	1.2	Mo	<0.5	Ti	<5.0
Fe	1.6	Na	5.9	Zn	0.6

ORDERING INFORMATION: CELLULOSE ACETATE – NON-STERILE

Plain White, package of 100 discs

Pore Size (µm)	Diameter			
	13 mm	25 mm	37mm	47 mm
0.20	C020A013A	C020A025A	C020A037A	C020A047A
0.45	C045A013A	C045A025A	C045A037A	C045A047A
0.80	C080A013A	C080A025A	C080A037A	C080A047A
3.00	C300A013A	C300A025A	C300A037A	C300A047A

Plain White, package of 25 discs

Pore Size (µm)	Diameter		
	90 mm	142 mm	293 mm
0.20	C020A090C	C020A142C	C020A293C
0.45	C045A090C	C045A142C	C045A293C
0.80	C080A090C	C080A142C	C080A293C
3.00	C300A090C	C300A142C	C300A293C

Rolls, Plain White, 330 mm x 3 m

Pore Size (µm)	Roll
0.20	C020A330R
0.45	C045A330R
0.80	C080A330R

Also available in:

- Cartridge format (TCR)
- Disposable syringe filter units

Pure Nitrocellulose for Blotting and Hybridization

- **Pure esters of nitrocellulose**, free of acetate and other esters
- **Maximal protein/nucleic acid binding**, up to 80-100 $\mu\text{g}/\text{cm}^2$
- **Low background**
- **Two pore sizes** available: 0.45 μm is suitable for most blotting applications, 0.20 μm sizes for lower molecular weights

ORDERING INFORMATION: NITROCELLULOSE

	Quantity per package	0.20 μm	0.45 μm
Sheets (Dimensions in mm)			
220 x 220	10	-	S045A224D
300 x 300	10	S020A304D	S045A304D
Rolls			
330 mm x 3 m	1	-	S045A330R
Discs (Diameter in mm)			
82	25	-	S045A082C



Pure Nitrocellulose and Blotting Paper.

Blotting/Chromatography Paper

APPLICATIONS

- Chromatography
- Electrophoresis and blotting
- Separation of heavily loaded solutes

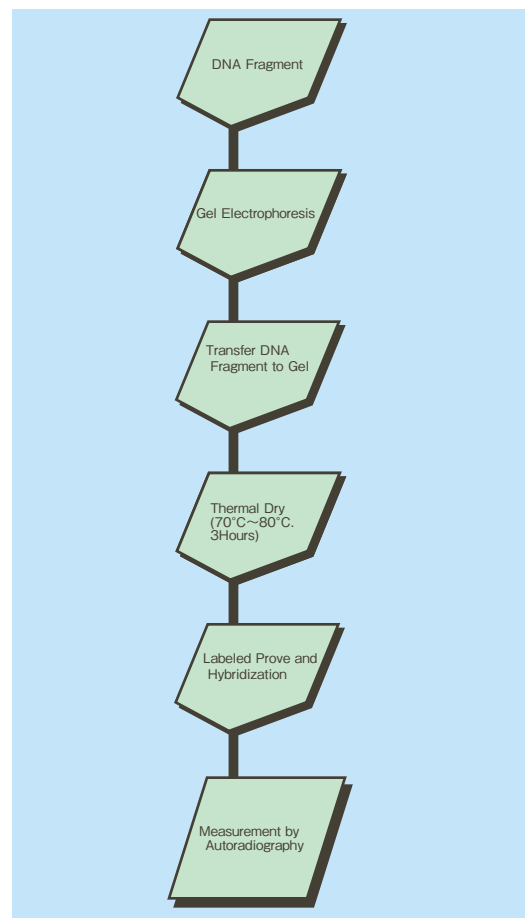
SPECIFICATIONS AND CONVERSION GUIDE

Grade	Weight (g/m^2)	Thickness (mm)	Absorption Speed*1 (cm)	Wet Strength*2 (kPa)	Ash (%)	Whatman equivalent
No. 50	140	0.25	6.0	8	0.1	20 Chr
No. 51A	87	0.18	7.5	7	0.01	4 Chr
No. 51B	87	0.17	7.0	5	0.06	1 Chr
No. 514A	185	0.32	7.5	8	0.06	3MM Chr
No. 526	325	0.70	11	29	0.1	17 Chr

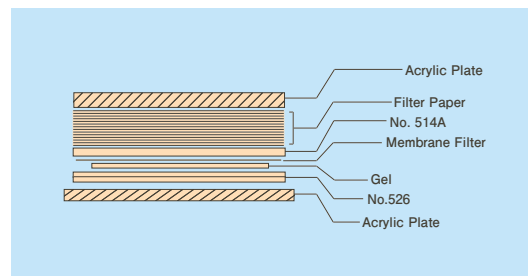
*1. Absorption speed is the distance in cm that water will travel in an upright strip of filter paper in ten (10) minutes at 20°C.

*2. Wet strength is measured by Mullen Burst Strength tester after soaking the sample with water in accordance with JIS P8112.

SOUTHERN BLOTTING



EXAMPLE OF TRANSFER METHOD



Hydrophobic PTFE

- **Properties:** Thin, highly porous, behaves as an absolute retentive membrane
- **Inert** to most chemically aggressive solvents, strong acids and bases
- **Operating Temperature Range:** -120 ~ 260°C
- **Autoclavable**

APPLICATIONS

- Sterilize gases: traps aqueous aerosols
- Air and gas venting: allows gases to pass freely while blocking aqueous liquids, protect vacuum pumps and critical samples
- Sterilize and clarify strong acids and many other solvents incompatible with other membranes



Hydrophobic PTFE

SPECIFICATIONS: HYDROPHOBIC PTFE MEMBRANE, CODE T

Pore Size (µm)	Bubble Point ^{*1}		Flow Rates ^{*2}		Porosity ^{*3} (%)	Maximum Operating Temperature (°C)	Thickness (µm)
	MPa	psi	Acetone (mL/min/cm ²)	Air (L/min/cm ²)			
0.10	≥0.12	≥17.4	27.0	-	68	260	70
0.20	≥0.091	≥13.2	55.0	-	74	260	80
0.50	≥0.063	≥9.1	100	-	78	260	75
0.80	≥0.039	≥5.7	200	-	76	260	75
1.00	≥0.031	≥4.5	300	-	79	260	75
3.00	≥0.013	≥1.9	750	-	83	260	75

Definitions:

*1. Bubble point is the minimum pressure required to force air through a membrane which has been prewet with isopropylalcohol

*2. Flow rates determined under constant vacuum 0.7 kg/cm² (10 psi)

*3. Porosity refers to the percent open area

ORDERING INFORMATION: HYDROPHOBIC PTFE – NON-STERILE

Plain White discs

Pore Size (µm)	Diameter					
	13 mm	25 mm	47 mm	90 mm	142 mm	293 mm
	Package of 100			Package of 25		Package of 10
0.10	T010A013A	T010A025A	T010A047A	T010A090C	T010A142C	T010A293D
0.20	T020A013A	T020A025A	T020A047A	T020A090C	T020A142C	T020A293D
0.50	T050A013A	T050A025A	T050A047A	T050A090C	T050A142C	T050A293D
0.80	T080A013A	T080A025A	T080A047A	T080A090C	T080A142C	T080A293D
1.00	T100A013A	T100A025A	T100A047A	T100A090C	T100A142C	T100A293D
3.00	T300A013A	T300A025A	T300A047A	T300A090C	T300A142C	T300A293D

Metal Content (ppm)

Al	0.001	K	<0.1
Ca	0.001	Mg	0.005
Cr	0.001	Mn	<0.001
Cu	0.01	Na	<0.05
Fe	<0.001	Ni	0.005

Hydrophobic PTFE with Supported PP Net

- **Properties:** Thin, highly porous, behaves as an absolute retentive membrane
- **Supported:** polypropylene laminated to one side to improve handling
- **Inert** to most chemically aggressive solvents, strong acids and bases
- **Thermostable:** can be used up to 100°C
- **Operating Temperature Range:** -35 ~ 130°C
- **Autoclavable**



Hydrophobic PTFE

APPLICATIONS:

- **Sterilize gases:** traps aqueous aerosols
- **Air and gas venting:** allows gases to pass freely while blocking aqueous liquids, protect vacuum pumps and critical samples
- **Sterilize and clarify** strong acids and many other solvents incompatible with other membrane

SPECIFICATIONS: HYDROPHOBIC PTFE MEMBRANE, SUPPORTED, CODE J

Pore Size (µm)	Bubble Point ^{*1}		Flow Rates ^{*2}		Porosity ^{*3} (%)	Maximum Operating Temperature (°C)	Water Break Through		Thickness (µm)
	MPa	psi	Acetone (mL/min/cm ²)	Air (L/min/cm ²)			MPa	psi	
0.10	≥0.14	≥20.3	39.1	2.5	72	130	>0.40	>58.0	130
0.20	≥0.097	≥14.1	61.4	4.5	72	130	0.28	40.0	130
0.50	≥0.058	≥8.5	110	7.5	74	130	0.14	20.1	120
1.00	≥0.029	≥4.3	445	17	76	130	0.05	7.0	90

Definitions:

- *1. Bubble point is the minimum pressure required to force air through a membrane which has been prewet with isopropylalcohol
- *2. Flow rates determined under constant vacuum 0.7 kg/cm² (10 psi)
- *3. Porosity refers to the percent open area

ORDERING INFORMATION: HYDROPHOBIC PTFE, SUPPORTED – NON-STERILE

Plain White discs

Pore Size (µm)	Diameter					
	13 mm	25 mm	47 mm	90 mm	142 mm	293 mm
	Package of 100			Package of 25		Package of 10
0.10	J010A013A	J010A025A	J010A047A	J010A090C	J010A142C	J010A293D
0.20	J020A013A	J020A025A	J020A047A	J020A090C	J020A142C	J020A293D
0.50	J050A013A	J050A025A	J050A047A	J050A090C	J050A142C	J050A293D
1.00	J100A013A	J100A025A	J100A047A	J100A090C	J100A142C	J100A293D

Also available in:

- Cartridge format
- Capsule format
- Disposable syringe filter units

Hydrophilic PTFE

- **Characteristics:** Maximum chemical and pH resistance
- **High flow rates** with minimal aqueous extractables (<0.3 wt%)
- **Optically clear** when wet with water
- **Non-supported**
- **Thermostable:** can be used up to 100°C

APPLICATION

- Ideal for HPLC and other mixtures of aqueous and organic solvents

Note: Hydrophilic PTFE membrane filters are not autoclavable.



Hydrophilic PTFE

SPECIFICATIONS: HYDROPHILIC PTFE MEMBRANE, CODE H

Pore Size (µm)	Bubble Point ^{*1}		Flow Rates ^{*2}		Porosity ^{*3} (%)	Thickness (µm)	Maximum Operating Temperature (°C)
	MPa	psi	Water (mL/min/cm ²)	Air (L/min/cm ²)			
0.10	≥0.38	≥55.1	14	1.6	71	35	100
0.20	≥0.24	≥34.8	21	2.1	71	35	100
0.50	≥0.14	≥20.3	39	2.9	79	35	100
1.00	≥0.083	≥12.0	73	5.7	83	35	100

Definitions:

- *1. Bubble point is the minimum pressure required to force air through a membrane which has been prewet with water
- *2. Flow rate indicates initial flow rate at 10 psi using a KGS 47 filter holder
Water: using water prefiltered to 0.1 µm pore size
Air: using 25°C air at 10 psi
- *3. Porosity refers to the percent open area

Metal Content (ppm)

Al	15	K	8
Ca	13	Mg	1
Cr	<1	Mn	0.1
Cu	0.5	Na	20
Fe	<10	Ni	0.9

ORDERING INFORMATION: HYDROPHILIC PTFE – NON-STERILE

Plain White discs

Pore Size (µm)	Diameter					
	13 mm	25 mm	47 mm	90 mm	142 mm	293 mm
	package of 100			package of 25		package of 10
0.10	H010A013A	H010A025A	H010A047A	H010A090C	H010A142C	H010A293D
0.20	H020A013A	H020A025A	H020A047A	H020A090C	H020A142C	H020A293D
0.50	H050A013A	H050A025A	H050A047A	H050A090C	H050A142C	H050A293D
1.00	H100A013A	H100A025A	H100A047A	H100A090C	H100A142C	H100A293D

Also available in:

- Cartridge format
- Capsule format
- Disposable syringe filter units

Coated Cellulose Acetate

- **Composition:** Cellulose acetate cast onto a non-woven polyester support
- **Characteristics:** Non-fiber releasing
- **Low protein binding** relative to nitrocellulose
- **Low static charge** matrix with enhanced chemical compatibility to low molecular weight alcohols
- **Autoclavable**

APPLICATION

- Use as a clarifying filter or prefilter



Coated Cellulose Acetate

SPECIFICATIONS: COATED CELLULOSE ACETATE (CMF), CODE Y

Nominal Rating (µm)	Bubble Point* ¹		Flow Rate* ²		% Latex Particle Retention (particle size in µm)							
	MPa	psi	Water (mL/min/cm ²)	Air (L/min/cm ²)	0.48	0.65	0.80	1	2	3	5	10
0.80	≥0.088	≥12.8	100	10	99	99	>99.9	-	-	-	-	-
2.00	≥0.049	≥7.1	290	32	96	99	99	99	>99.9	-	-	-
10.00	≥0.017	≥2.6	750	80	-	-	-	-	98	99.9	99.9	>99.9

Definitions:

*1. Bubble point is the minimum pressure required to force air through a membrane which has been prewet with water.

*2. Flow Rate indicates initial flow rate at 10 psi using a KGS-47 filter holder.

Water: using water prefiltered to 0.1 µm pore size

Air: using 25°C air at 10 psi

ORDERING INFORMATION: COATED CELLULOSE ACETATE – NON-STERILE

Plain White, package of 100 discs

Nominal Rating (µm)	Diameter							
	35 mm	47 mm	76 mm	90 mm	124 mm	142 mm	257 mm	293 mm
0.80	Y008A035A	Y008A047A	Y008A076A	Y008A090A	Y008A124A	Y008A142A	Y008A257A	Y008A293A
2.00	Y020A035A	Y020A047A	Y020A076A	Y020A090A	Y020A124A	Y020A142A	Y020A257A	Y020A293A
10.00	Y100A035A	Y100A047A	Y100A076A	Y100A090A	Y100A124A	Y100A142A	Y100A257A	Y100A293A

Also available in:

- Cartridge format (TCY and TCYE)

Polycarbonate

- **Characteristics:** Low non-specific binding and optically translucent, extremely uniform, cylindrical pores
- **Thin screen-type membranes** minimize entrapment within the filter structure; resulting in surface capture of particles on the membrane
- **Stable:** excellent chemical resistance, good thermal stability, non-hygroscopic and extremely weight stable
- **Autoclavable:** at 121° C, 30 min.

APPLICATIONS

- Epifluorescence microscopy: available in black for this method
- Electron microscopy: smooth surface is ideal for observing captured particles
- Light microscopy: easily transparentized for optical illumination
- Beverage and sterility testing



Polycarbonate

SPECIFICATIONS: POLYCARBONATE MEMBRANE, CODE K

Pore Size (μm)	Bubble Point* ¹		Flow Rate		Nominal Thickness (μm)
	MPa	psi	Water* ² (mL/min/cm ²)	Air* ³ (L/min/cm ²)	
0.10	≥ 0.22	≥ 30	5	2	6
0.20	≥ 0.13	≥ 20	15	4	10
0.40	≥ 0.082	≥ 12	50	10	10
0.80	≥ 0.048	≥ 7	130	20	9
8.00	≥ 0.0048	≥ 0.7	1,000	40	7

Maximum operating temperature = 140°C

Definitions:

*1. Bubble point is the minimum pressure required to force air through a membrane which has been prewet with isopropylalcohol

*2. Initial flow rates using prefiltered water at 10 psid (0.7 kg/cm²)

*3. Initial flow rates using prefiltered air at 10 psid (0.7 kg/cm²)

ORDERING INFORMATION: POLYCARBONATE – NON-STERILE

Plain White, package of 100 discs

Pore Size (μm)	Diameter		
	13 mm	25 mm	47 mm
0.10	K010A013A	K010A025A	K010A047A
0.20	K020A013A	K020A025A	K020A047A
0.40	K040A013A	K040A025A	K040A047A
0.80	K080A013A	K080A025A	K080A047A
8.00	K800A013A	K800A025A	K800A047A

Plain Black, package of 100 discs

Pore Size (μm)	Diameter	
	25 mm	47 mm
0.20	K020N025A	K020N047A
0.40	K040N025A	K040N047A

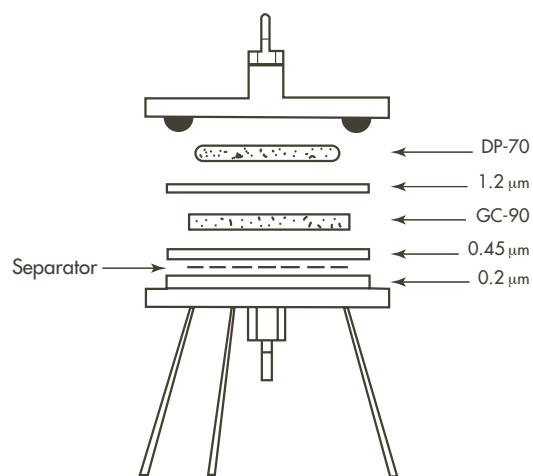
Prefilters for Membrane Filters

The term “prefilter” refers to any type of filter that precedes the final barrier. This type of filter is often prepared from depth-type media, a random matrix of glass, cellulose, quartz or PTFE fibers. This fiber matrix may or may not include binder to maintain integrity. Because these filters trap particles within the matrix, they have a very high particle loading capacity. However, this type of filter does not have a clearly defined pore rating, only a nominal designation.

Not all depth-type filters are used as prefilters: these can be used in a wide variety of applications, such as water and air pollution analysis, liquid clarification, and cell harvesting.

Generally, a prefilter should be slightly smaller than the membrane filter it is preceding, but full sized prefilters are recommended if used alone.

Filter Holder Model	Recommended Prefilter Diameter (mm)	
	used upstream of membrane	used alone
Vacuum Type:		
KG-25, KGS-25	16	25
KG-47, KGS-47, KSF-47, KGS-47-TF	35	47
KG-90, KGS-90	70	90
Pressure Type:		
KS-13	8	13
KS-25, KS-25F, PP-25	21	25
KS-47, KST-47, KS-47F	35	47
PP-47, PFA-47	42	47
LS-25	25	25
LS-47	47	47
LS-47-HP	38	47



A typical serial stack incorporating Prefilters, Membranes and Polyester Mesh Separators.

Polyester Mesh Separators

- **Prevent pore blinding** by placing a polyester mesh separator between two membranes in series
- **Improve performance:** Increase liquid flow rate and throughput
- **Mesh Size:** 28 mesh

Note: Order same size recommended for prefilters.

ORDERING INFORMATION: POLYESTER MESH SEPARATORS

Diameter (mm)	35	76	124	257
Catalog No.	48141035	48141076	48141124	48141257
Quantity per package	50	25	25	25

Disposable Syringe Filter Units – DISMIC/LABODISC

- **Minimum sample hold-up:** Unit housings are specifically designed to maximize sample recovery
- **High purity:** Non-pigmented housing and integral filter sealing assure that filtrates will not be adulterated due to pigment, dye, or adhesives leaching into the filtrate
- **Convenient:** Each unit is clearly marked with an identifying code to denote pore size, membrane material and housing polymer
- **Sterile:** Units can be purchased pre-sterilized and individually packaged, or non-sterile in bulk pack
- All polypropylene can be autoclaved
Acrylic can not be autoclaved



3, 13, 25, and 50 mm disposable syringe filter units.

SPECIFICATIONS

Diameter		DISMIC				LABODISC
		3 mm	13 mm	25 mm		50 mm
Housing material	-	PP	PP	PP	Acrylic	PP
Filtration Area	cm ²	0.06	0.9	4.0	4.0	19.6
Hold-up Volume	mL	≤0.01	≤0.03	≤0.1	≤0.1	≤3.0
Suggested capacity per filter unit	mL	<2 mL	<10 mL	<100 mL	<100 mL	>100 mL
Pressure limit	MPa	0.51	0.51*	0.51*	0.51	0.34
	psi	74	74*	74*	74	49
Maximum Operating Temperature	°C	60	60	60	45	60
	°F	140	140	140	113	140
Connections	-	Inlet: female luer-lock outlet: male luer slip				7–13.5 mm hose barb with male luer slip

*13HP, 25HP; Pressure Limit = 0.39 MPa (57 psi)

Mixed Cellulose Esters (MCE)

- Properties: A hydrophilic membrane
- Higher protein binding than cellulose acetate for most proteins
- High porosity provides a high flow rate

Cellulose Acetate (Acetate)

- Standard: A commonly used hydrophilic membrane
- Low protein binding, suitable for aqueous protein solutions
- Nitrate-free, suitable for groundwater filtration
- Housing material: polypropylene (3, 13, 50 mm) or styreneacrylonitrile (25 mm)

PTFE, hydrophilic

- Versatile: Good chemical resistance
- Compatible with many solvent mixtures used in HPLC, e.g. Acetonitrile/Water

PTFE, hydrophobic

- Application: use as vent

For ordering information, see page 16.

Diameter	Membrane material	Housing material	Pore size	Filter surface	Sterile
25 ··· 25mm	A ··· Mixed Cellulose Esters(MCE)	S ··· Acrylic	020 ··· 0.20µm	A ··· White Plane	S ··· Pre-Sterilized
13 ··· 13mm	C ··· Cellulose Acetate	P ··· Polypropylene	045 ··· 0.45µm		N ··· Non-Sterile
03 ··· 3mm	H ··· PTFE, hydrophilic		050 ··· 0.50µm		
	J ··· PTFE, hydrophobic		080 ··· 0.80µm		

ORDERING INFORMATION DISPOSABLE SYRINGE FILTER UNITS

DISMIC

Diam.	Membrane material	Pore size (µm)	Housing material	Quantity per package	Non-Sterile	Sterile
3	Cellulose Acetate	0.20	Polypropylene	100	03CP020AN	03CP020AS
		0.45	Polypropylene	100	03CP045AN	03CP045AS
	PTFE, Hydrophobic	0.50	Polypropylene	100	03JP050AN	-

3mm



13	Cellulose Acetate	0.20	Polypropylene	100	13CP020AN	13CP020AS
		0.45	Polypropylene	100	13CP045AN	13CP045AS
	PTFE, Hydrophilic	0.20	Polypropylene	100	13HP020AN	-
		0.45	Polypropylene	100	13HP045AN	-
	PTFE, Hydrophobic	0.20	Polypropylene	100	13JP020AN	-
		0.50	Polypropylene	100	13JP050AN	-

13mm



25	MCE	0.20	Acrylic	50	25AS020AN	25AS020AS
		0.45	Acrylic	50	25AS045AN	25AS045AS
		Cellulose Acetate	0.20	Acrylic	50	25CS020AN
	0.45		Acrylic	50	25CS045AN	25CS045AS
	0.80		Acrylic	50	25CS080AN	25CS080AS
	PTFE, Hydrophilic	0.20	Polypropylene	100	25HP020AN	-
		0.45	Polypropylene	100	25HP045AN	-
	PTFE, Hydrophobic	0.20	Polypropylene	50	25JP020AN	-
		0.50	Polypropylene	50	25JP050AN	-

25mm Acrylic



25mm PP



LABODISC

50	Cellulose Acetate	0.20	Polypropylene	10	50CP020AN	50CP020AS
		0.45	Polypropylene	10	50CP045AN	50CP045AS
	PTFE, Hydrophobic	0.20	Polypropylene	10	50JP020AN	-
		0.50	Polypropylene	10	50JP050AN	-

50mm



MICROBIOLOGY SUPPLIES

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Cellulose Acetate (White)	20
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Membranes for Microbiology – Introduction

- **Made from Mixed Cellulose Esters (MCE) or Cellulose Acetate:** MCE is a mixture of nitrocellulose and other cellulose esters.
- **Available with grid lines:** Contrasting grid lines facilitate counting colonies on the filter surface and are tested to assure freedom from grid line inhibition. 3.1 mm squares represent 1/100 of the filtration area of a 47 mm diameter filter (9.6 cm²)
- **Convenient packaging:** Membranes are available individually wrapped for optimum sterility and also in 10-packs
- **Specially tested for microbiology:** All 0.45 µm white gridded membranes are tested for Coliform, Fecal Streptococci and *Serratia marcescens*. All 0.65 µm white gridded membranes are tested for complete retention and optimal recovery of Fecal Coliform and *Saccharomyces cerevisiae*. Black and Green membranes are tested for optimal recovery of yeast and total bacteria. All membranes are also tested for uniform wetting, freedom from grid line inhibition and optimal color reactions on appropriate test media
- **Membrane certification** for individual lot numbers is available on request.

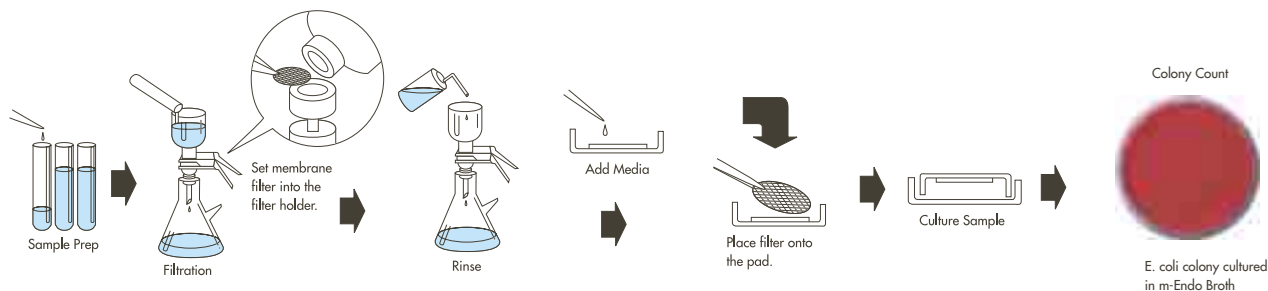


Membrane Filters for Microbiology

APPLICATIONS

- **Applications** include microbiological analysis of water, wastewater, pharmaceuticals and beverages

Sample Filtration and Growth Procedures



Sample Growth Results

A045H047A
E. coli cultured in
m-Endo Broth



A045W047A
Lactic acid bacteria
cultured in growth media

A045H047A
Fecal *Streptococcus*
cultured in KF-Agar



A045F047A
Fecal *E. coli* cultured
in m-FC media

A080R047A
Saccharomyces cultured
in m-Green Yeast and
Mold Broth



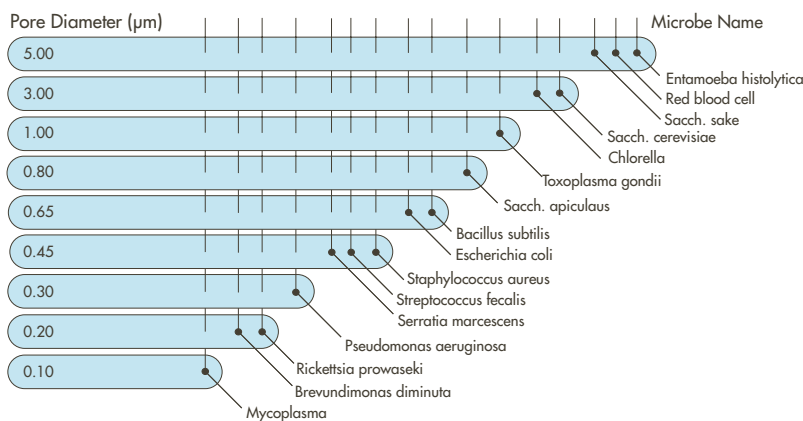
White Mixed Cellulose Esters

- **Standard** for microbiological analysis of water, wastewater, and beverages
- **Convenient:** Available in individual or 10-pack, pre-sterilized by EtO or autoclavable

Available in plain or gridded discs, package of 100 (except where noted)

Pore Size (µm)	Diameter (mm)	Plain or Grid	Individual Pack with Pad (Pre-Sterilized)	Individual Pack without Pad (Pre-Sterilized)	Multipack 10 Packs of 10 Membranes per Pack with Pad (Pre-Sterilized)	Multipack 20 Packs of 10 Membranes per Pack without Pad (Pre-Sterilized)
0.20	47	Plain	-	A020G047A	-	-
		Grid	A020F047A	A020H047A	-	-
0.45	47	Plain	A045E047A	A045G047A	-	-
		Plain-HE	-	A045G047J	-	-
		Grid	A045F047A	A045H047A	A045D047A	A045D047Y
				A045H047W (1,000/pk)		
	Grid-HE	-	A045H047K	-	-	
	50	Plain	-	A045G050A	-	-
Grid		-	A045H050A	-	-	
0.65	47	Plain	-	A065G047A	-	-
		Grid	A065F047A	A065H047A	-	-
0.8	47	Plain	-	A080G047A	-	-
		Grid	A080F047A	A080H047A	-	-

Relationship of Pore Size and Microbe Retention to Membrane Filters



Combination of colors of membrane filter and grid line

MF Color	Pore Size	Grid Line Color
White	0.20, 0.45, 0.65 µm	Black
White	0.80 µm	Green
Black	0.45, 0.80 µm	Black
Green	0.45, 0.80 µm	Green

Black Mixed Cellulose Esters – Sterile

- **Maximum** contrast between colonies and the filter without counterstaining
- **Applications:** Use to enumerate yeast and bacteria in carbonated beverages, wines and water

Available in gridded 47 mm discs, package of 100

Pore Size (µm)	Diameter (mm)	Individual Pack with Pad	Individual Pack without Pad
0.45	47	A045M047A	A045R047A
0.80	47	A080M047A	A080R047A

Green Mixed Cellulose Esters – Sterile

- **Pale green background** enables viewing of black, white, and colorless particles on one filter
- **Minimizes eye fatigue**

Available in gridded 47 mm discs, package of 100

Pore Size (µm)	Diameter (mm)	Individual Pack without Pad
0.45	47	A045W047A

Cellulose Acetate (White) – Sterile

- **Lower protein binding** (relative to MCE)
- **Improved solvent resistance** to low molecular weight alcohols (relative to MCE)
- **Application:** May enhance recovery of fastidious gram positive organisms in culture

Available in plain 47 mm discs, package of 100

Pore Size (µm)	Diameter (mm)	Individual Pack without Pad
0.20	47	C020G047A
0.45	47	C045G047A

Petri Dishes

- **Polystyrene dishes** suitable for culturing microorganisms on 47 mm diameter membrane filters
- **Convenient:** Snug fit prevents drying during incubation. Squared edges and a raised ridge for ease of handling and secure stacking
- **Available with or without pad:** 47 mm absorbent cellulose pad (0.85 ± 0.17 mm thick, absorbs 1.8-2.2 mL liquid)
- **Manufacturer's certification of compliance** available upon request



Petri Dishes

Model	Description	Catalog No.	Size	Package
PD-47A	Sterile Petri Dishes	42004010	OD54 X 11mm	100 / pack (5 sleeves of 20)
PD-47B	Sterile Petri Dishes with Pads	42004020		

Pre-Sterilized Absorbent Pads

- **Cellulose pads:** 47 mm plain white discs fit into standard petri dishes
- **Routinely tested** for absorption of 1.8 – 2.2 mL of Culture media, pH neutral
- **Convenient Packaging:** 100 individual pre-sterilized packages per box

Model	Package
B200G047A	Box of 100 Individual Sterile Packages



Pre-sterilized Absorbent Pads

Filterceps

- **Forceps** of polished type 304 stainless steel are ideally designed for handling membranes
- **Tips are beveled and unserrated** to minimize the risk of damaging membrane filters
- **Non-slip handle** allows Filterceps to be held securely and flamed without risk of burning one's fingers

Model	Length	Material
FS-1	115 mm	SUS 304



Filterceps

37 mm Monitors for Microbial and Contamination Analysis

Pre-assembled 2- and 3-piece units contain a built-in membrane filter and a support pad. Monitors are suitable for field collection and transportation of samples as well as analysis in the laboratory. Samples collected on the press-fit membrane can then be cultured in place or removed for further analysis.

Monitor Sets include a 2-piece monitor, plugs, sampling tube, and 3-way connector. Individually packaged sets are pre-sterilized and are ideal for field sampling.

SPECIFICATIONS

Monitor Type	2-piece	3-piece
Housing	Styrene Acrylonitrile	
Membrane	Mixed Cellulose Esters (Nitrocellulose)	
Support Pad	Pure Cotton Cellulose	
Internal Dimensions	ø34 x 9 mm	ø34 x 18 mm
External Dimensions	ø42 x 29 mm	ø42 x 39 mm
Filtration Area	9.0 cm ² (6.7 cm ² for Hydrophobic Edge Type)	
Internal Volume	8 mL	16 mL
Maximum Operating Temperature	45°C	

ORDERING INFORMATION

3-Piece Monitors

Membrane			Quantity	Sterile
Pore Size (µm)	Color	Surface		
0.45	White	Gridded	50/pk	37AS345BS
0.45	Black	Gridded	50/pk	37AS345PS
0.80	White	Gridded	50/pk	37AS380BS

2-Piece Monitors

Membrane			Quantity	Sterile	Sterile Hydrophobic Edge
Pore Size (µm)	Color	Surface			
0.45	White	Gridded	50/pk	37AS245BS	37AS245BS-HE
0.45	Black	Gridded	50/pk	-	37AS245PS-HE

2-Piece Monitor Sets

Membrane			Quantity	Sterile Hydrophobic Edge
Pore Size (µm)	Color	Surface		
0.45	White	Gridded	20/pk	37ASA45BS-HE
0.45	Black	Gridded	20/pk	37ASA45PS-HE



37 mm Monitors.



37 mm Monitor Sets.

Qualitative Filter Papers

- **100% alpha cotton cellulose**
- **pH tolerant:** 0 to 12
- **Thermostable:** up to 120°C
- **Wide selection** – seven types
- **Ash Content:** 0.1%

APPLICATIONS

- Clarify and remove precipitates
- Preparation for qualitative analysis

ORDERING INFORMATION

See page 26.



Qualitative filter papers

CHARACTERISTICS AND APPLICATIONS: CONVERSIONS – QUALITATIVE PAPERS

Grade	Comments	Weight (g/m ²)	Thickness (mm)	Flow Time* ¹ (sec)	Absorption speed* ² (cm)	Wet Strength* ³ (kPa)	Nominal Rating (µm)	Collection Efficiency (%; 0.3 µm DOP)	Conversion* ⁴	
									Whatman	ex-Schleicher & Schuell
No. 1	Retains large crystalline particles and gelatinous precipitates. Fast flow rate, smooth surface, normal hardness	90	0.20	45	9.0	7	6 (Coarse)	65	4	410 or 1450cv
No. 2	Retains medium crystalline precipitates, fast flow rate, smooth surface, normal hardness	125	0.26	80	8.0	8	5 (Medium)	80	-	604
No. 231	Retains crystalline precipitates, moderate flow rate, smooth surface, normal hardness	95	0.18	130	7.5	-	(Medium)	-	2	-
No. 232	Retains medium to medium-fine particulates, slow flow rate, smooth, normal hardness	90	0.18	250	5.0	-	(Med./Med.-Fine)	-	6	-
No. 131	High retention efficiency for fine crystalline precipitates like barium sulfate, slow flow rate, smooth surface, normal hardness	140	0.25	240	6.0	8	3 (Med.-Fine)	90	3	597
No. 235	Highest retention efficiency, retains very fine particulates, very slow flow rate, smooth	95	0.17	1,200	4.0	-	(Very Fine)	-	5	-
No. 101	Seed germination, retains large particles	80	0.21	50	8.0	34	5 (Coarse and gelatinous)	-	91	-

*1. Flow time is the time in seconds required to filter 100 mL of distilled water at 20°C under pressure supplied by a 10 cm water column through a 10 cm² section of filter paper.

*2. Absorption speed is the distance in cm that water will travel in an upright strip of filter paper in ten (10) minutes at 20°C.

*3. Wet strength is the pressure measured by Mullen Burst Strength Tester after soaking in water.

*4. Conversions between manufacturers are not absolute. Use these conversions as a guideline.

Quantitative/Hardened Filter Papers

- **Highest quality** alpha cotton cellulose
- **Ash Content:** 0.01%(Except No.4A 0.025%)
- **Acid washed:** Double acid washed in hydrochloric then hydrofluoric acid (No. 3, 5A, 5B, 5C, 6), then rinsed with ultrapure water to neutralize. No. 4A is further treated with nitric acid before washing

APPLICATIONS

- Gravimetric analysis
- Environmental monitoring



Quantitative filter papers

CHARACTERISTICS AND APPLICATIONS: CONVERSIONS – QUANTITATIVE PAPERS

Grade	Comments	Weight (g/m ²)	Thickness (mm)	Flow Time* ¹ (sec)	Absorption speed* ² (cm)	Wet Strength* ³ (kPa)	Nominal Rating (µm)	Collection Efficiency (%; 0.3 µm DOP)	Conversion* ⁴	
									Whatman	ex-Schleicher & Schuell
No. 3 Ashless	Medium retention (5-10 µm), fast flow rate Analysis of soils, fertilizers, cement, and minerals	113	0.23	130	7.5	12	5 (Medium)	80	43	593-A
No. 5A Ashless	Fast flow rate, retains coarse particulates and gelatinous precipitates (>10 µm). Filter hydroxides and metallic aerosols, environmental monitoring, determine silica content in steel	97	0.22	60	9.5	10	7 (Coarse and gelatinous)	75	41	589-IH
No. 5B Ashless	Retains medium particles (5-10 µm) such as CaCO ₃ , PbSO ₄ , CaCO ₄ , MnCO ₃ , ZnCO ₃ , ZnS, AgCl	108	0.21	195	7.0	12	4 (Medium)	90	40	589 / 6 Green
No. 5C Ashless	Collect fine precipitates (<5 µm) such as SrSO ₄ , BaSO ₄ , HgCrO ₄ , and colloidal dispersions; gravimetric analysis	118	0.22	570	6.0	12	1 (Fine)	93	44	589 / 3 Blue
No. 6 Ashless	Retains medium-fine particulates (2-10 µm), trace and precious metals	103	0.20	300	6.0	12	3 (Medium Fine)	90	-	589 / 2 White
No. 7 Ashless	Highest purity for retaining medium particles (5-10 µm), precise gravimetric analysis	87	0.18	200	7.0	10	4 (Medium)	85	-	-
No. 4A Hardened	High wet strength, suitable for use under high pressure, high chemical and pH resistance, retains fine crystalline precipitates (<5 µm), slow flow	96	0.12	915	4.0	52	1 (Very Fine)	90	50	-

Footnotes: See facing page

Ash content of Quantitative Papers (mg per disc)

mm	No. 3	No. 5A	No. 5B	No. 5C	No. 6	No. 7
55	0.03	0.02	0.03	0.03	0.02	0.02
70	0.04	0.04	0.04	0.05	0.04	0.03
90	0.07	0.06	0.07	0.08	0.07	0.06
110	0.11	0.09	0.10	0.11	0.10	0.08
125	0.14	0.12	0.13	0.15	0.13	0.11
150	0.20	0.17	0.19	0.21	0.18	0.15
185	0.30	0.26	0.29	0.32	0.28	0.23

Metal Content

(µg/g)	Si	Na	K	Ca	Mg	Fe	Pb	Cu	Mn	Ni	Al	Zn	Cd
Qualitative	46	62	3	140	17	<5	<1	<1	<1	<1	<2	1	<0.5
Quantitative	32	<10	<2	<10	<1	8	<1	<1	<0.5	<1	2	<1	<0.5

ORDERING INFORMATION: QUALITATIVE PAPERS

- Available in discs in the following diameters (mm): 55, 70, 90, 110, 125, 150, 185, 240, 285, 300, 330, 360, 400, 500, 600
- Additional sizes available upon request.
- Order by specifying first the grade of filter then the diameter, e.g. (No.1, 125 mm), (No.232, 55 mm)
- Package of 100

ORDERING INFORMATION: QUANTITATIVE PAPERS

- Available in discs in the following diameters (mm): 55, 70, 90, 110, 125, 150, 185, 240, 285, 300, 330, 360, 400, 500
- Additional sizes available upon request.
- Order by specifying first the grade of filter then the diameter, e.g. (No.5A, 125 mm), (No.6, 55 mm)
- Package of 100

Chromatography Papers

- **High quality papers** are carefully tested for spot formation, capillary action, water flow rate and absorption speed to assure uniformity and reproducibility
- **Better resolution** with slower flow rate papers

APPLICATIONS

- Chromatography
- Electrophoresis and blotting
- Separation of heavily loaded solutes

SPECIFICATIONS AND CONVERSION GUIDE

Grade	Weight (g/m ²)	Thickness (mm)	Absorption Speed* ¹ (cm)	Wet Strength* ²	Ash (%)	Whatman equivalent
No. 50	140	0.25	6.0	8	0.1	20 Chr
No. 51A	87	0.18	7.5	7	0.01	4 Chr
No. 51B	87	0.17	7.0	5	0.06	1 Chr
No. 514A	185	0.32	7.5	8	0.06	3MM Chr
No. 526	325	0.70	11.0	29	0.1	17 Chr
No. 590	285	0.93	18	10	0.1	17 Chr

*1. Absorption speed is the distance in cm that water will travel in an upright strip of filter paper in ten (10) minutes at 20°C.

*2. Wet Strength is the pressure measured by Mullen Burst Strength Tester after soaking in water.

ORDERING INFORMATION

All grades above are available in the following size (mm) and quantities:

Size	Qty / Pkg
20 x 400	100 / Pkg
200 x 200	50 / Pkg
600 x 600	50 / Pkg

Order by specifying first the grade of paper then the size, e.g. (No. 51A, 20 mm x 400 mm)

Extraction Thimbles

High purity, seamless filters with a characteristic thimble shape. Applications include analysis of fats, oils, grease, pesticides, pollutants, other organics and additives in plastics and rubber materials.

Cellulose Thimbles – No. 84

- Suitable for Soxhlet extractions of organic components
- Dust sampling
- Lipid content <0.1% by weight

Glass Fiber Thimbles – No. 86R

- Borosilicate glass
- High temperature extractions or dust monitoring ($\leq 500^{\circ}\text{C}$)
- Acid resistant (except hydrofluoric)

Quartz Fiber Thimbles – No. 88R and 88RH

- Use up to $1,000^{\circ}\text{C}$
- No. 88RH is treated at 900°C to stabilize the weight prior to use

PTFE Fiber and PTFE/Quartz Fiber Thimbles – No. 89 and 89S

- Durable, temperature-resistant
- Non-adsorptive with respect to acid gases
- PTFE is inherently hydrophobic
- Little or no trace metal contamination



Thimbles

SPECIFICATIONS

Grade	Material	Nominal Rating (μm)	Thickness (mm)	Weight (g per 25 x 90 thimble)	Pressure drop (kPa at 5L/min.)	Collection Efficiency (%; 0.3 μm DOP)	Max. operating temp ($^{\circ}\text{C}$)	Heating loss rate (%)	Conversion	
									Whatman	ex-Schleicher & Schuell
No. 84	Cellulose	8	1.5	3.6	0.25	89	120	-	2800	603
No. 86R	Glass Fiber	1	1.6	1.8	0.30	>99.9	500	0.2	2814	603G
No. 88R	Quartz Fiber	-	2.2	1.6	0.44	>99.9	1,000	-	-	-
No. 88RH	Quartz Fiber	-	2.2	1.6	0.44	>99.9	1,000	0.1	2812	-
No. 89	PTFE Fiber	-	1.8	11.0	4.5	>99.9	260	-	-	-
No. 89S	PTFE/Quartz Fiber	-	1.6	6.0	0.54	>99.9	400	0.07	-	-

ORDERING INFORMATION

INTERNAL DIAMETER (mm) X HEIGHT (mm). 25 THIMBLES PER PACKAGE

Size	19 x 90	22 x 65	22 x 80	25 x 60	25 x 80	25 x 90	25 x 100	28 x 100	30 x 80	30 x 100	33 x 80	33 x 100	43 x 123
Grade													
No. 84	○	○	○	○	○	○	○	○	○	○	○	○	○
No. 86R	-	-	-	-	-	○	○	-	○	○	-	-	○
No. 88R	-	-	-	-	-	-	○	-	○	○	-	-	-

EXTERNAL DIAMETER (mm) X HEIGHT (mm). 25 THIMBLES PER PACKAGE

Size	20 x 90	22 x 90	25 x 90	28 x 100	30 x 100	33 x 120	35 x 120	40 x 150	45 x 150	53 x 150	60 x 200	75 x 210
Grade												
No. 84	○	○	○	○	○	○	○	○	○	○	○	○
No. 86R	○	○	○	○	○	○	○	○	○	○	○	○
No. 88R	○	○	-	○	○	○	○	○	○	○	○	○

EXTERNAL DIAMETER (mm) X HEIGHT (mm). 10 THIMBLES PER PACKAGE

Size	25 x 90
Grade	
No. 88RH	○
No. 89	○
No. 88R	○
No. 89S	○

Glass Fiber Filters

- **Highly resistant** to chemical attack, biologically inert
- **Autoclavable**
- **Thermostable:** Can be used up to 500°C for non-binder type.
- **Store indefinitely:** Unaffected by humidity

APPLICATIONS

- Use as a prefilter to extend membrane life
- Water/air pollution analysis
- Liquid clarification



Eleven grades of glass fiber filters are available in diameters from 21–150 mm.

ORDERING INFORMATION

Size	DP-70	GA-55	GA-100	GA-200	GB-100R	GB-140	GC-50	GC-90	GD-120	GF-75	GS-25
	Quantity/package										
21–150 mm diameter discs	50	100	100	50	100	100	100	100	50	100	100
300 x 300 mm sheets	10	10	10	10	10	10	10	10	10	10	10

Available in discs in the following diameters (mm): 21, 24, 25, 26, 37, 45, 47, 55, 70, 90, 110, 125, 150.

Order by specifying first the grade of filter then the diameter, e.g. GC-50 90mm, GA-55 47mm.

Quartz Fiber Filters

- **Highly resistant** to chemical attack, biologically inert
- **High Purity:** Very low trace metal content, does not adsorb NO_x and SO_x dioxides; Grade QR-100 is pre-fired at 1,000°C for 2 hours to reduce organic contamination
- **Easily sterilized:** Can be baked or autoclaved
- **Store indefinitely:** Unaffected by humidity

APPLICATIONS

- Sample acidic gases at high (>500°C) temperatures
- Air pollution analysis

ORDERING INFORMATION

Size	QR-200	QR-100
	Quantity/package	
21 – 150 mm diameter discs	50	100
8 x 10 inch sheets	S	50

S = Special order

Available in discs in the following diameters (mm): 21, 24, 26, 37, 45, 47, 55, 70, 90, 110, 125, 150.

Order by specifying first the grade of filter then the diameter, e.g. QR-200 125mm, QR100 21mm.

Composite Filter

- **Composite Filter PG-60** is specially developed for the measurement of dust concentration in the air
- **PTFE coated:** Naturally hydrophobic and unaffected by humidity

APPLICATIONS

- Air pollution analysis
- Air dust analysis

Note: Cannot be used for liquid filtration

ORDERING INFORMATION

Size	Quantity/package
21 – 70 mm diameter discs	100
90 – 150 mm diameter discs	50
300 x 300 mm sheets	10

Available in discs in the following diameters (mm): 21, 24, 25, 26, 37, 45, 47, 55, 70, 90, 110, 125, 150

Order by specifying first the grade of filter then the diameter, e.g. PG-60 90mm, PG-60 125mm.



Quartz fiber filters



Composite filters

SPECIFICATIONS: GLASS/QUARTZ FIBER FILTERS

Grade	Applications/Characteristics	Weight (g/m ²)	Thickness (mm)	Nominal Rating (µm)	Water Flow Time* ¹ (sec)
GA-55	Thin filter recommended for clarifying filtration Air pollution monitoring	55	0.21	0.6	23
GF-75	Highest collection efficiency grade offered Collection of very fine particles	75	0.35	0.3	84
GA-100	Faster filtration speed recommended for filtering viscous fluids	110	0.44	1.0	11
GA-200	Thick filter with high dust holding capacity recommended for filtering viscous fluids	175	0.74	0.8	15
GB-100R	High and low volume aerosols for airborne dust and metal contaminants Low trace metal contents	95	0.38	0.6	15
GB-140	High dust holding capacity recommended for SS(Suspended Solid) analysis	140	0.56	0.4	58
GC-50	Thin filter with high collection efficiency Prefilter for membrane filter Scintillation counting	48	0.19	0.5	28
GC-90	Filter with organic binder recommended for fine particles and aerosols Prefilter for membrane filter	100	0.30	0.5	20
GD-120	Medium collection efficiency grade Prefilter for membrane filter	123	0.51	0.9	14
GS-25	Filter with organic binder recommended for SS(Suspended Solid) analysis Higher strength and lower released fibers compared with no-binder grades	70	0.21	0.6	15
DP-70	Filter with organic binder recommended for high concentrated liquid of protein and other substances Prefilter for membrane filter	170	0.52	0.6	20
QR-200	Thick quartz fiber filter with inorganic binder Low adsorption Monitor airborne particulates	200	1.0	-	-
QR-100	Quartz fiber filter without binder Superior chemical resistance, does not adsorb acid gases	85	0.38	-	-

*1. Flow time is the time in seconds to filter 1,000 mL of distilled water at 20 °C under differential pressure of 39 kPa through a 9.6 cm² section of filter.

Collection Efficiency (%, 0.3 µm DOP)	Pressure Drop (kPa at 5 cm/sec)	Binder*	Maximum Operating Temperature (°C)	Conversion				
				Whatman	ex-Schleicher & Schuell	Pall	Millipore	Ahlstrom
99.9	0.33	None	500	934AH	31		APFA	111
99.999	1.67	None	500	GF/F	20		GFCP	151
96	0.20	None	500					
99.9	0.35	None	500					
99.99	0.30	None	500	EPM2000	1HV	A/E (Use for air)	AP40	
99.99	1.11	None	500	GF/B	32		APFB	121
99.99	0.52	None	500	GF/C 934 AH	30/25	A/E (Use for water)	AP40/ APFC	131
99.99	0.42	Organic	120				AP15	
97	0.17	None	500	GF/D	40		APFD	141
99.9	0.32	Organic	120	-			AP20	164
-	0.52	Organic	120	-			AP25	
99.9	0.34	Inorganic	1,000					
99.99	0.45	None	1,000	QM-A		Micro Quartz		

*Binder 1. Organic – Acrylic Acid Ester Emulsion

2. Inorganic – Alumina

PTFE Filters

- **Pure PTFE fibers are sintered** to improve handling characteristics and to minimize fiber slough-off for minimal downstream contamination
- **Hydrophobic**
- **Porosity:** High air permeability with minimal pressure drop
- **Operating temperature range:** -120°C~260°C
- **Autoclavable**

APPLICATIONS

- Filter hot oils and strong solvents
- Venting air and gases
- Collection of airborne particulates



PTFE filters

SPECIFICATIONS

Grade	Weight (g/m ²)	Thickness (mm)	Porosity (%)	Pressure Drop (kPa at 5cm/sec.)	Pressure Drop (psi)	Collection Efficiency (% 0.3µm DOP)	Nominal Rating (µm)
PF100	500	1.00	77	0.059	0.00856	70	10
PF060	240	0.50	75	0.069	0.01001	75	6
PF050	210	0.36	73	0.26	0.0377	85	5
PF040	500	0.95	75	0.21	0.03045	95	4
PF020	500	0.54	54	1.6	0.232	99.9	2

ORDERING INFORMATION: PTFE FILTERS

Size	PF100	PF060	PF050	PF040	PF020
	Quantity/package				
55 – 90 mm diameter discs	20	20	20	10	10
110 – 150 mm diameter discs	10	10	10	5	5
300 x 300 mm sheets	5	5	5	5	5

- Discs: Available in the following diameters (mm): 55, 70, 90, 110, 125, 150
- Sheets: Available in 300 x 300 mm sheets
- Additional sizes available upon request
- Order by specifying first the grade of filter then the size, e.g. PF040 55mm

See also Phase Separating Filters on page 35.

SPECIALTY PRODUCTS

Paper Discs	34
Milk Sediment Discs	34
Blaine Test Paper	34
Blood Sampling Paper (Nobuto's)	35
Phase Separating Filters	35
Disposable Ultrafilter Units	36

PAPER DISCS

- Made of pure cellulose fibers
- High absorbency
- Three types are available for following applications
 - Antibiotic assay
 - Detection of Antimicrobial substances in Carcass
 - Detection of Benzylpenicillin in meat

ORDERING INFORMATION

	Catalog No.	Diameter(mm)		Package
Paper Disc for Antibiotic Assay	49005010	Thick	8	1,000
	49005020	Thin	8	1,000
	49005040		6	1,000



Paper Discs

	Catalog No.	Diameter (mm)	Thickness (mm)	Absorbing Capacity (mL/disc)	Package
Paper Disc for Antimicrobial Substances	49006010	10	1.1	0.07~0.08	1,000
Paper Disc for Benzylpenicillin	49007010	10	1.5	0.2	100

Milk Sediment Discs

- Made of long refined cotton fibers

APPLICATION

- Detection of contaminant in dairy products

Grade	Catalog No.	Diameter	Color	Package
No. 1026	49015010	33 mm	White	50
No. 1026-B	49015020	33 mm	Black	50



Milk Sediment Discs

Blaine Test Paper

- Standard for testing cement using the Blaine air permeation test
- 12.7 mm diameter discs

ORDERING INFORMATION

	Catalog No.	Package
Blaine Test paper	01511012	250



Blaine Test Papers

Blood Sampling Paper(Nobuto's)

- Collect blood on the narrow end of the strip and allow to dry on the convenient drying rack for easy and efficient sample handling
- Strip holds approximately 0.1 mL of blood or 0.04 mL of serum
- High purity cellulose paper yields a fine, textile like structure ideal for uniform sampling
- Dried samples can be analyzed, stored, or mailed without refrigeration

Typical blood collection applications:

- Toxoplasmosis (HA)
- Hanta Virus
- New Castles Disease (HI)
- Canine Distemper (VN)
- Measles (Rubeola) (HI)
- Japanese Encephalitis (HI, VN)
- Mycoplasmosis (AG)
- Hog Cholera (VN)

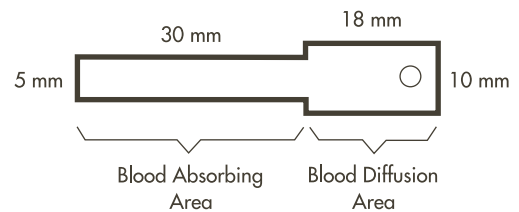
ORDERING INFORMATION

	Catalog No.	Package
Blood Sampling Paper (Nobuto's)	49010010	100
Filter Strip Drying Rack	49010520	Each



Nobuto Blood Filter Strips and Drying Rack.

Nobuto Strip: Actual Size



Phase Separating Filters

- **Separate** aqueous and non-aqueous phases of mixtures
- **Hydrophobic** filters retain aqueous phase while non-aqueous phase passes through
- **Choice of materials:** Grade No. 2S is silicone treated cellulose
Grade PF is pure PTFE

SPECIFICATIONS

Grade	Substrate	Weight (g/m ²)	Thickness (mm)	Nominal Rating (µm)	Collection Efficiency (% , 0.3 µm DOP)
No. 2S	Silicone Treated Cellulose	120	0.26	5	-
PF020	PTFE	500	0.54	2	99.9
PF040	PTFE	500	0.95	4	95.0
PF050	PTFE	210	0.36	5	85.0
PF060	PTFE	240	0.50	6	75.0
PF100	PTFE	500	1.00	10	70.0

ORDERING INFORMATION

Grade No. 2S:

- Available in discs in the following diameters (mm): 55, 70, 90, 110, 125, 150, 185, 240, 270
- Packages of 100
- Order by specifying first the grade of paper then the diameter, e.g. (No. 2S, 110 mm)

PTFE Filter – all grades:

- Available in discs in the following diameters (mm): 55, 70, 90, 110, 125, 150
- Available in sheets: 300 x 300 mm

Order by specifying first the grade of paper then the diameter, e.g. PF040, 55mm.

Disposable Ultrafilter Units

- **Concentrate** samples with built-in polysulfone ultrafilter
- **Easy to use** units require only syringe pressurization and do not require a centrifuge
- **Clear** housings enable visual confirmation of the filtration process
- **Low adsorption** for maximum sample recovery
- **Disposable** units for simple operation and clean-up

SPECIFICATIONS

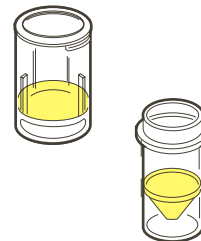
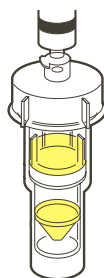
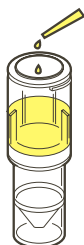
- Molecular weight cut off 10,000(USY-1), 50,000(USY-5) and 200,000(USY-20)
- Filter diameter: 16mm
- Cell capacity: 2mL
- Maximum temperature: 50°C
- Material: Polysulfone (Filter), Acrylic(Cells) and Polypropylene(Caps)
- Sterilization: 25% Ethanol or 5% Formalin
- Effective filtration area: 2.0cm²
- Minimum recovery volume: 0.5mL
- Maximum pressure: 0.29MPa



USY Series Ultrafilter Units

OPERATION INFORMATION

1. Prepare unit for use. Dispense sample (approx. 1-2 mL) into the retentive cell by pipet.
2. Place cap on the retentive cell. Using a syringe, pressurize the unit with air.
3. Disassemble unit when filtration is complete: concentrated sample and/or filtrate can be analyzed.



SAMPLE COLLECTION DATA

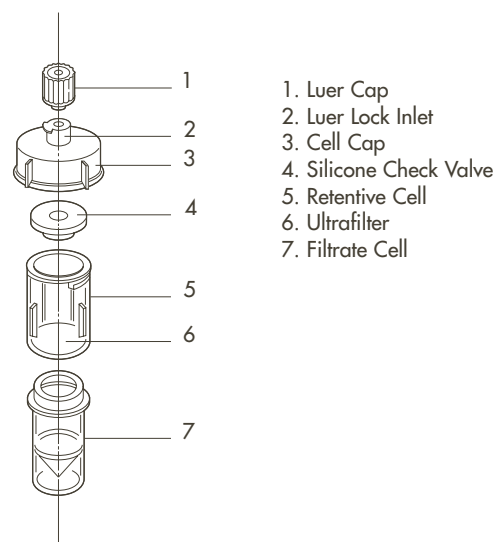
Grade		USY-1	USY-5	USY-20
Molecular Weight Cut Off		10,000	50,000	200,000
Solute	Molecular weight			
Lysozyme	14,800	>98	50	-
Myoglobin	16,800	>95	40	-
α-Chymotrypsin	24,500	>98	85	-
β-Lactoglobulin	35,000	>98	85	10
Ovalbumin	44,000	>98	95	60
Albumin (0.01%)	64,000	>98	>98	-
Bovine Albumin	67,000	>98	>90	60
β-Globulin	110,000	>98	>98	>95
γ-Globulin	160,000	>98	>98	>90

ORDERING INFORMATION

Grade	USY-1	USY-5	USY-20
Catalog No.	39651001	39651005	39651020
Quantity per Package*	24	24	24

*Luer cap, Cell Cap and Silicone Check Valve are contained 4 each.

USY Series Unit Assembly



TEST PAPERS

pH Test Paper-Rolls	38
pH Test Paper-Booklets	39
pH Test Paper-Strips	39
Litmus Paper-Booklets	40
Ion Test Papers	40
Chlorine Test Papers	40

pH Test Paper-Booklets

- Narrow pH Unit Graduation: 0.2~0.4 (except UNIV)
- Can be used for severe pH measuring (except UNIV)
- Size: 7x70mm (20 leaves/booklet, 10 booklets/box)

Type		Catalog No.	Measuring Range pH
CR	Cresol red	07010010	0.4 ~ 2.0, 7.2 ~ 8.8
TB	Thymol blue	07010020	1.4 ~ 3.0, 8.0 ~ 9.6
BPB	Bromophenol blue	07010030	2.8 ~ 4.4
PB	Phenol blue	07010090	3.2 ~ 5.6
PP	Phenol purple	07010130	3.4 ~ 6.4
BCG	Bromocresol green	07010040	4.0 ~ 5.6
CPR	Chlorophenol red	07010100	5.0 ~ 6.6
MR	Methyl red	07010050	5.4 ~ 7.0
BCP	Bromocresol purple	07010140	5.6 ~ 7.2
BTB	Bromothymol blue	07010060	6.2 ~ 7.8
PR	Phenol red	07010150	0.0 ~ 1.6, 6.6 ~ 8.2
AZY	Alizarin yellow	07010070	10.0 ~ 12.0
ALB	Alkali blue	07010080	11.0 ~ 13.6
UNIV	Universal	07010120	1.0 ~ 11.0
No.20	MR & BTB	07010110	5.0 ~ 8.0



pH Test Paper-Strips

- Packed in Plastic Bottle
- Size: 7mm x 40mm
(PB: 200 strips/bottle, BTB and AZY: 300 strips/bottle)

Type		Catalog No.	Measuring Range pH
PB	Phenol blue	08001040	3.2 ~ 5.6
BTB	Bromothymol blue	08001100	6.2 ~ 7.8
AZY	Alizarin yellow	08001120	10.0 ~ 12.0



Litmus Paper-Booklets

- Detecting Acid (Blue) and Alkali (Red)
- High sensitivity

Type	Catalog No.	Size (mm)	Package
Litmus Paper (Red)	07020020	7 x 70	20 leaves/booklet, 10 booklets / box
Litmus Paper (Blue)	07020010	7 x 70	20 leaves/booklet, 10 booklets / box



Ion Test Papers

- Detecting Ion and its concentration
- Measuring pH

Type	Measuring for	Measuring Range	Color	pH	Catalog No.	Package (strips/box)
Almi Check	Al ³⁺	0 ~ 100mg/L	Peach to Red	3 ~ 6	07030010	100
Copper Check	Cu ²⁺	0 ~ 500mg/L	Bark to Black and Blue	3 ~ 5	07030020	100
Copper Check A	Cu ⁺ , Cu ²⁺	0 ~ 50mg/L	White to Purple	1 ~ 6	07030030	100
Chrome Check	Cr ⁶⁺	0 ~ 200mg/L	Light peach to Purple	1 ~ 4	07030041	25
Chrome Check A	Cr ⁶⁺	0 ~ 50mg/L	Light peach to Purple	1 ~ 9	07030051	25
Iron Check	Fe ²⁺	0 ~ 1,000mg/L	White to Red	1 ~ 6	07030060	100
Nickel Check	Ni ²⁺	0 ~ 1,000mg/L	Grey to Red	2 ~ 7	07030070	100
Silver Check	Ag ⁺ in fixing Solution	0 ~ 10g/L	Yellow to Dark Brown	-	07030080	100
Cyanogen Check	CN ⁻	0 ~ 1,000mg/L	White to Bark	7 ~ 9	07030100	100

Chlorine Test Papers

- Detecting the concentration of residual chlorine in sodium hypochlorite solution (NaClO) or hypochlorous acid (HClO)
- Two types are available

Type	Catalog No.	Size (mm)	Package (strips/box)
Chlorine Test Paper (10 ~ 50ppm)	08010010	7 x 40	300
Chlorine Test Paper (25 ~ 200ppm)	08010020	7 x 40	300

Note: Cannot be used for the detection of Chlorine Ion.



Advantec Industrial Filter Papers are versatile, strong, and cost-effective. 6 types are available classified by strength, thickness, retentivity, creping, and holding capacity. Please refer to the application guide for additional information.

Standard Filter Papers

Features and Applications

- Standard filter papers for a wide variety of applications
- Use for qualitative filtration analysis, efficient retention of 1-6 μm particles in horizontal and vertical flow systems, and suitable for applications in many fields

Grades

- No. 1** • Qualitative filter paper, for coarse filtration
- No. 2** • Qualitative filter paper, for mid-grade filtration
- No. 131** • Qualitative filter paper, for fine particle filtration
- No. 26** • Standard grade for general purpose
- No. 27** • For mid-fine filtration
- No. 28** • For fine filtration

Fine Particle Filter Papers

Features and Applications

- Highest particle retention of industrial filter papers
- Fibers won't separate or slough off suitable for removal of fine particles

Grades

- No. 1640** • 0.4 mm thick, retaining 1 μm particles while preserving a fast flow rate
- No. 1650** • Highest grade filter paper

Creped Filter Papers

Features and Applications

- Uniformly creped surface with cellulose fiber pre-coat for a larger, more effective surface area
- Increased surface area for higher flow rates than standard filters
- High flow rates can be maintained while effectively filtering, so filtration of high viscosity or high particle concentration fluids can be performed

Grades

- No. 101** • Qualitative filter paper useful for many applications
- No. 102** • Grade with highest flow rate; useful for airborne particle retention
- No. 107** • Reduced thickness filter
- No. 126** • Increased thickness for more strength; especially good for viscous liquids

Grade	Standard Filter Paper						Fine Particle Filter		Creped Filter Paper			
	No. 1	No. 2	No. 131	No. 26	No. 27	No. 28	No. 1640	No. 1650	No. 101	No. 102	No. 107	No. 126
Weight (g/m ²)	90	125	140	320	325	360	170	300	80	100	80	300
Thickness (mm)	0.20	0.26	0.25	0.74	0.68	0.70	0.40	0.57	0.21	0.3	0.21	0.9
Flow Time (s)*1	45	80	240	80	220	350	90	810	50	28	50	35
Burst Strength (kPa)*2	79	122	147	378	370	445	196	286	127	122	127	364
Nominal Rating (μm)*3	6	5	3	3	1.5	1	1	0.8	5	3	5	4
Surface	Smooth								Creped			
Color	White											

*1. Flow Time is the time in seconds required to filter 100mL of distilled water at 20°C under pressure supplied by a 10cm water column through a 10 cm² section of filter paper measured by Herzberg Tester in accordance with JIS P3801.

*2. Burst Strength is determined by Mullen Burst Strength Tester in accordance with JIS P8112.

*3. Nominal Rating is determined by the particle size of the precipitated Barium Sulfate through the filter by gravity filtration in accordance with JIS P3801.

Wet Strength Filter Papers

Features and Applications

- For special applications requiring high wet strength
- For high pressure filtration or filter press, use to perform filtration on a variety of liquids
- No. 26-3, 28-3, 126-3, and 424-3 are reduced thickness filters

Grades

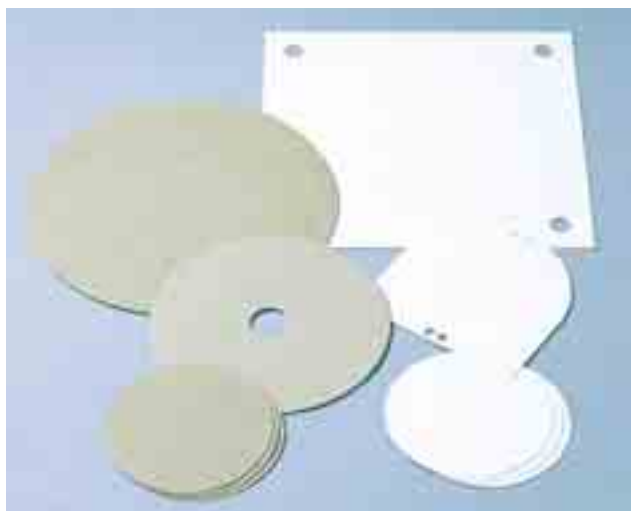
- No. 26-3** • Thinner and higher wet strength compared with No.26, but retention efficiency is equal to No.26
- No. 28-3** • Thinner and higher wet strength compared with No.28, but retention efficiency is equal to No.28
- No. 126-3** • Thinner and higher wet strength compared with No.126, but retention efficiency is equal to No.126
- No. 327** • Comparable to No. 27; good for maintaining high flow rates
- No. 408** • Mid-grade wet strength filter
- No. 412** • Comparable to No. 2; high wet strength
- No. 424** • Comparatively thick filter paper; good for quick filtration of high viscosity fluids
- No. 424-3** • Comparable to No. 424; high wet strength, good for filtering high viscosity fluids
- No. 431** • Comparable to No. 131; high wet strength, good for applications requiring fine particle retention
- No. 434** • Creped light brown filter with soft surface; high filtration rate
- No. 436** • Creped brown filter with high wet strength

Grade	Wet Strength Filter Paper										
	No. 26-3	No. 28-3	No. 126-3	No. 327	No. 408	No. 412	No. 424	No. 424-3	No. 431	No. 434	No. 436
Weight (g/m ²)	260	310	250	285	92	120	380	325	140	290	250
Thickness (mm)	0.58	0.60	0.75	0.60	0.27	0.25	1.00	0.83	0.25	0.95	0.80
Flow Time (s)* ¹	80	350	35	220	15	80	50	50	250	30	70
Burst Strength (kPa)* ²	299	382	326	401	50	109	687	670	124	212	294
Nominal Rating (μm)* ³	3	1	4	1.5	8	1.5	4	4	3	5	2
Surface	Smooth		Creped	Smooth						Creped	
Color	White									Lt.Brown	Brown

*1. Flow Time is the time in seconds required to filter 100mL of distilled water at 20°C under pressure supplied by a 10cm water column through a 10 cm² section of filter paper measured by Herzberg Tester in accordance with JIS P3801.

*2. Burst Strength is determined by Mullen Burst Strength Tester in accordance with JIS P8112.

*3. Nominal Rating is determined by the particle size of the precipitated Barium Sulfate through the filter by gravity filtration in accordance with JIS P3801.



High Purity Filter Papers

Features and Applications

- Use for quantitative filtration analysis
- Contains low ash content and very low of levels pyrogens: especially good for high purity filtration applications
- Retains fine particles without affecting filtration speed

Grades

- No. 5A** • For high speed, relatively coarse filtration
- No. 5B** • For medium-fine quantitative filtration
- No. 5C** • For fine filtration

High Viscosity Fluid Filter Papers

Features and Applications

- Thick, high and low-density filter papers designed for fast filtration of viscous fluids

Grades

- No. 63** • 1 mm thick filter paper; standard type for a variety of filtration applications
- No. 63F** • 1.35 mm thick, high density filter for increased particle retention than No. 63
- No. 63G** • For filtration of high viscosity liquids with fine particle suspensions; can be used in high pressure systems
- No. 60, 65, 462** • Thinner, lower density filter papers for gentle filtration of high viscosity fluids

Grade	High Viscosity Filter Paper						High Purity Filter Paper		
	No. 63	No. 63F	No. 63G	No. 60	No. 65	No. 462	No. 5A	No. 5B	No. 5C
Weight (g/m ²)	350	525	525	125	143	168	97	108	118
Thickness (mm)	1.00	1.35	1.35	0.56	0.55	0.53	0.22	0.21	0.22
Flow Time (s)* ¹	26	25	90	7	9	15	60	195	570
Burst Strength (kPa)* ²	196	139	218	49	59	98	61	75	92
Nominal Rating (µm)* ³	4	3	1.5	25	15	8	7	4	1
Surface	Smooth								
Color	White								

*1. Flow Time is the time in seconds required to filter 100mL of distilled water at 20°C under pressure supplied by a 10cm water column through a 10 cm² section of filter paper measured by Herzberg Tester in accordance with JIS P3801.

*2. Burst Strength is determined by Mullen Burst Strength Tester in accordance with JIS P8112.

*3. Nominal Rating is determined by the particle size of the precipitated Barium Sulfate through the filter by gravity filtration in accordance with JIS P3801.



Application Guide for Industrial Filter Papers

Grade Application	HIGH PURITY			STANDARD				HIGH WET STRENGTH				FINE		CREPED			HIGH VISCOSITY												
	No. 5A	No. 5B	No. 5C	No. 1	No. 2	No. 131	No. 26/26-3	No. 27	No. 28/28-3	No. 327	No. 408	No. 412	No. 424/424-3	No. 431	No. 434	No. 436	No. 1640	No. 1650	No. 101	No. 102	No. 107	No. 126/126-3	No. 63	No. 63F	No. 63G	No. 60	No. 65	No. 462	
FERMENTED PRODUCTS																													
Sake			○		○	○	○	○	○														○						
Fruit Liquors			○				○	○	○																				
Whiskey, Brandy								○	○																				
Soy Sauce												○	○	○					○										
FOOD & BEVERAGE																													
Soft Drink Syrup							○												○	○									
Carbonated Beverages						○	○	○	○														○						
Mineral Water			○		○	○	○	○	○																				
Fruit Juices							○					○											○						
Cooking and Salad Oils	○				○	○	○	○	○			○	○										○	○					
Concentrated Fructose							○																○						
CHEMICALS																													
Industrial Organic Solvents							○	○	○	○		○	○				○	○	○										
Food Coloring	○	○	○	○	○	○							○		○				○	○									
Galvanizing Liquids					○	○					○	○						○											
Photographic Sensitizer					○	○			○											○			○	○					
Photographic Fixer									○	○									○	○			○						
Photographic Developer									○	○									○	○			○						
Photo Resists																							○						
Synthetic Resins					○	○	○		○			○	○	○					○	○				○					
Silicone									○			○	○									○	○	○					
Paints, Varnishes					○	○	○	○	○			○	○	○											○	○			
Ink					○	○						○	○						○	○			○	○	○				
Rayon (viscose)							○																○	○	○		○	○	
Liquid Cellulose Acetate																							○	○	○	○	○	○	
PHARMACEUTICALS																													
Cod Liver Oil							○					○	○										○						
Cough Syrups	○						○						○						○				○						
Eye Drops			○		○	○													○	○									
Infusions			○		○	○													○	○									
Medical Saline			○		○	○													○	○									
Culture Media	○	○			○	○														○	○								
Oils for Pharmaceuticals	○				○	○	○					○	○	○															
Antibiotics			○		○	○													○	○									
Serum			○		○														○										
COSMETICS																													
Hair Care Products						○									○								○			○	○	○	
Moisturizer					○		○					○								○							○	○	
Toner	○	○	○	○	○	○						○	○	○					○										
PETROLEUM PRODUCTS																													
Light Oil					○		○					○											○						
Heavy Oil					○		○					○		○						○	○								
Kerosene								○	○	○			○		○	○							○	○					
Lubricants						○	○	○	○				○			○								○		○			
Hydraulic Oil						○	○					○		○	○									○	○	○			
Transformer Oil						○	○	○	○	○			○													○			
Wax					○										○												○	○	

Industrial Filter Pads

These pads are produced from refined cellulose fibers and diatomaceous earth. The diatomaceous earth has been treated to improve absorption which, in combination with the depth retention characteristics of cellulose fibers, increases overall retention efficiency. These pads can be sterilized by autoclave or in-line within a system by steam, hot water, or chemical sterilization. Primary uses of standard pads are sterilization and clarification of fluids, but are also well suited to applications requiring good surface and depth retention.

NA Standard Filter Pads

Features and Applications

- Zeta-Potential Plus filter pads exhibiting high surface and internal retention efficiency
- Suited for filtering beer, wine, sake and other fluids such as fermented beverages with high particle loads

Grades

- NA-10** • For fast filtration retaining 1 μm particles
- NA-12** • Medium grade pad retaining 0.8 μm particles
- NA-16** • Standard type
- NA-17** • High grade pad suitable as a final filter

NA Long-Life Filter Pads

Features and Applications

- Increased thickness, density and strength for comparatively longer life than NA Standard Types
- For filtering fluids with high particle loads over an extended period of time

Grades

- NA-050** • High flow rate filter for retention of relatively coarse particles
- NA-100** • Long-life filter comparable to the NA-10 for fast filtration
- NA-300** • Long-life filter comparable to the NA-12 for medium grade pad
- NA-500** • High retention efficiency pad for fine filtration
- NA-600** • Long-life filter comparable to the NA-16 for fine filtration
- NA-900** • Highest density and particle retention efficiency among NA filter pads

Grade	NA Standard Type				NA Long-Life Type					
	NA-10	NA-12	NA-16	NA-17	NA-050	NA-100	NA-300	NA-500	NA-600	NA-900
Weight (g/m ²)	1,300	1,340	1,310	1,500	1,340	1,290	1,220	1,410	1,490	1,700
Thickness (mm)	3.5	3.5	3.5	3.5	3.6	3.6	3.5	3.7	3.6	3.8
Water Flow Rate (kL/h·m ²)* ¹	4.9	2.8	1.1	0.7	11.4	8.1	5.1	1.8	0.8	0.4
Burst Strength (MPa)* ²	0.58	0.29	0.29	0.39	0.49	0.49	0.49	0.49	0.39	0.29
Nominal Rating (μm)* ³	1	0.8	0.4	0.3	3	1	0.8	0.5	0.4	0.2
pH Range* ⁴	1 ~ 12				1 ~ 12					

*1. Water Flow Rate is determined by the filtration of 0.20 μm membrane filter passed water at 25°C under 10kPa differential pressure.

*2. Burst Strength is determined by Mullen Burst Strength Tester in accordance with JIS P8112.

*3. Nominal Rating is determined by the particle size of the precipitated Barium Sulfate through the filter by gravity filtration in accordance with JIS P3801.

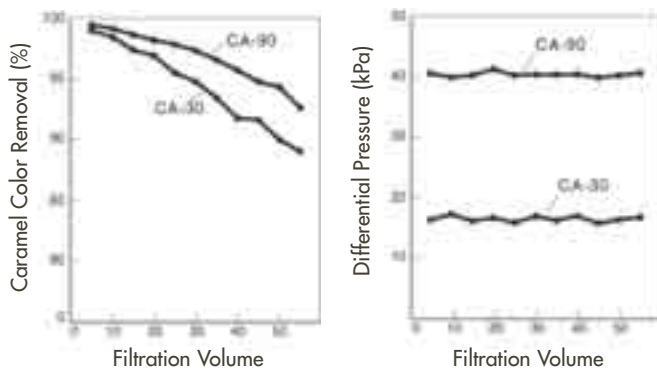
*4. pH range : May vary by changes in pressure, duration of filtration, or temperature, so please make adjustments accordingly.

Activated Carbon Filter Pads

Activated carbon filter pads can be used to remove most organic and some inorganic contaminants from the fluid being filtered. Made of cellulose fibers impregnated with activated carbon particles.

General Grade

- For decolorization and deodorization of gasses or liquids
- CA-30** • Thick pad with high flow rate for fast filtration
- CA-90** • High density and thickness for high-pressure applications



Pharmaceutical Grade

- Specially made for high purity applications
- CA-1000** • Very high density and thickness for applications requiring high levels of purity

Example of Pyrogen Removal Ability

Vol. L.P.S. added (ng / mL)	0.9% NaCl	5% Glucose
100	(-)	(-)
150	(-)	(-)
200	(-)	(-)
600	(+)	(+)

L.P.S. Test : E-coli UKT-B strain was filtered at 2 mL/min·cm², over an effective filtration area of 50 cm². Detection was by LAL Test method.

Cellulose Filter Pads for Support and Purification

Features and Applications

- Made of natural cellulose fibers
- Most useful as a support for diatomaceous earth
- Pad thickness increases depth retention efficiency resulting in pure liquid filtrates

Grades

- No. 1034-2** • 1.8 mm thick, lightweight and low density pad
- No. 1034-3A** • 3.2 mm thick, for maintaining a fast flow rate
- No. 1034-3B** • 3.2 mm thick, for high pressure resistance. Washable

Grade	Activated Carbon			Cellulose for Purification & Support		
	CA-30	CA-90	CA-1000	No. 1034-2	No. 1034-3A	No. 1034-3B
Weight (g/m ²)	1,050	1,130	2,500	700	950	1,000
Thickness (mm)	4.0	4.0	8.0	1.8	3.2	3.2
Water Flow Rate (KL/h.m ²)* ¹	13.2	7.2	-	46.9	3.16	29.8
Burst Strength (MPa)* ²	0.27	0.39	0.019	0.58	1.17	1.27

*1. Water Flow Rate is determined by the filtration of 0.20µm membrane filter passed water at 25°C under 10kPa differential pressure.

*2. Burst Strength is determined by Mullen Burst Strength Tester in accordance with JIS P8112.

Application guide for Industrial Filter Pads

Grade Application	STANDARD				LONG-LIFE						ACTIVATED CARBON			PUR/SUPP CELLULOSE		
	NA-10	NA-12	NA-16	NA-17	NA-050	NA-100	NA-300	NA-500	NA-600	NA-900	CA-30	CA-90	CA-1000	No. 1034-2	No. 1034-3A	No. 1034-3B
FERMENTED PRODUCTS																
Beer								o	o					o	o	o
Sake	o	o	o			o	o	o						o	o	o
Water for Dilution	o				o											
Fruit Liquors		o	o	o		o	o	o	o	o					o	o
Brandy		o	o			o	o	o	o							
Vinegar		o	o			o	o		o	o				o	o	o
Soy Sauce	o				o	o								o	o	o
FOOD & BEVERAGE																
Soft Drink Syrup	o	o			o	o	o	o	o		o	o	o			
Mineral Water	o				o	o	o				o	o	o	o	o	o
Fruit Juices					o	o	o	o								
Cooking and Salad Oils	o	o	o		o	o					o	o				
Concentrated Fructose	o	o	o		o	o	o				o	o	o		o	o
CHEMICALS																
Industrial Organic Solvents	o	o			o	o		o			o	o		o	o	o
Food Coloring		o	o					o	o						o	o
Galvanizing Fluids	o				o									o	o	o
Synthetic Resins	o	o			o	o									o	o
Silicone					o	o									o	o
Paints, Varnishes	o	o			o	o								o	o	o
Ink					o	o	o									
PHARMACEUTICALS																
Cod Liver Oil	o	o			o	o	o									
Cough Syrups	o				o										o	o
Eye Drops											o	o				
Infusions	o	o	o	o		o	o	o	o	o		o	o			
Medical Saline			o	o				o	o	o		o	o			
Culture Media	o	o				o	o	o	o						o	o
Oils for Pharmaceuticals		o	o					o	o				o			
Antibiotics			o	o				o	o	o						
Serum	o		o	o			o	o	o	o						
COSMETICS																
Hair Care Products	o				o	o									o	o
Moisturizer	o	o			o	o										
Toner	o	o	o				o	o	o			o				
PETROLEUM PRODUCTS																
Heavy Oil	o				o	o									o	o
Kerosene	o				o	o									o	o
Lubricants	o	o					o								o	o
Hydraulic Oil	o	o			o	o	o								o	o
Transformer Oil	o				o	o									o	o

CAPSULES AND CARTRIDGES

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Capsules – Introduction

- All-polypropylene housing is sturdy and chemically compatible
- Three membrane-type media and two depth-type media
- Wide range of retentive pore sizes
- All types available in three different lengths
- Diameter is a standard 78 mm
- Selected media available pre-sterilized by ethylene oxide (EtO)

APPLICATIONS

- Filter tissue culture media, fermentation broth, and ground water
- Can be set in serial mode to maximize throughput volumes
- Point-of-use sterile filtration
- Use capsules for pilot/prototype studies, scale up to the same media in the cartridge format
- Cannot be used for gas filtration

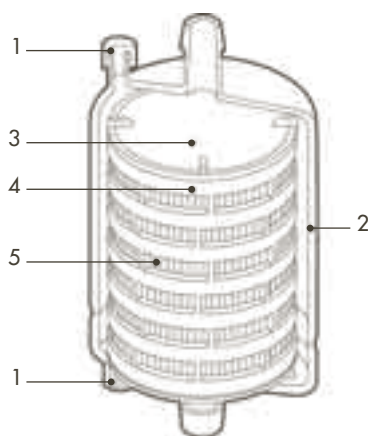


Five different filter media are available in the capsule format.

Model	Media	Characteristic	Media Type	Pore Size or Nominal Rating (µm)	Membrane Layers	Filtration Area per Capsule (cm ²)
CCS	PES	Hydrophilic	Membrane	0.20 – 0.45	Double	Up to 1,800
CCF	PTFE	Hydrophobic	Membrane	0.05 – 1.0	Single/Double	Up to 3,600
CCFH	PTFE	Hydrophilic	Membrane	0.20	Single	Up to 3,600
CCP	Polypropylene	Hydrophobic	Depth-type	0.8 – 30	N/A	Up to 2,600
CCG	Glass	-	Depth-type	0.45 – 1.0	N/A	Up to 1,200

For detailed chemical compatibility information, see page 116.

When ordering length code "C", end fixture code "D" is not available.



1. Vent/drain (1/8" NPT)
2. Housing
3. End cap
4. Outer sleeve
5. Pleated filter media



B
1/4" NPTM



D
1/2" NPTM



H
3/8" hose barb
(O.D.13mm)



N
1-1/2" sanitary fitting

PES Capsule Filter (CCS)

- Can be sterilized by autoclaving (121°C, 30 min) or treatment with ethylene oxide (EtO)
- Available pre-sterilized (EtO) or pre-rinsed (recommended when filtering high purity water)

APPLICATIONS

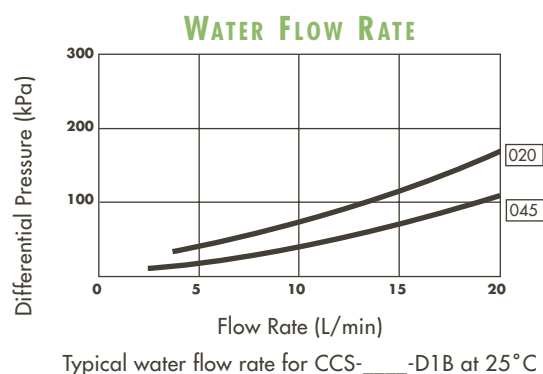
- Filter pure water, high purity chemicals, pharmaceuticals, cosmetics, and tissue culture media
- Remove bacteria or sub-micron particulates
- Cannot be used for gas filtration

SPECIFICATIONS

Maximum Inlet Pressure	0.39 MPa (57 psi)
Maximum Operating Temperature	60°C (140°F)

		CCS-020	CCS-045
Layers		Double	Double
Pore Size (µm)		0.20	0.45
Bubble Point (water)		≥0.39 MPa (57 psi)	≥0.29 MPa (43 psi)
LRV / Organism		≥7 B. diminuta	≥7 S. marcescens
Length Code	Length (mm)*	Filtration Area (cm ²)	
C	102	450	
D	129	900	
E	201	1,800	

*Length given is for capsule with end fixture H.



ORDERING INFORMATION



Pore Size (µm)	Pore Size Code	Length (mm)	Length Code	End Fixture (Inlet and Outlet)	End Fixture Code
0.20	020	102	C	1/4" NPTM	B
0.45	045	129	D	1/2" NPTM	D ^{*3}
		201	E	3/8" hose barb	H
				1 1/2" sanitary fitting	N

*1. When ordering sterile units, specify "S" in the last position of the catalog number.

*2. When ordering Pre-rinsed units, specify "R" in the last position of the catalog number.

*3. When ordering length code "C", end fixture code "D" is not available.

PTFE Capsule Filters – Hydrophobic (CCF) and Hydrophilic (CCFH)

- Compatible: solvent and pH-resistant
- Hydrophobic:
 - Supported membrane except CCF-A10 and CCF-005
 - Single layer except CCF-A10 and CCF-005 which has double layer
 - 5 pore sizes
 - Can be sterilized by autoclaving (121°C, 30 min) or treatment with ethylene oxide (EtO).

- Hydrophilic:
 - Polyester membrane support
 - Single layer
 - 0.2 µm pore size

Note: Autoclaving or allowing membrane to dry will render it hydrophobic.

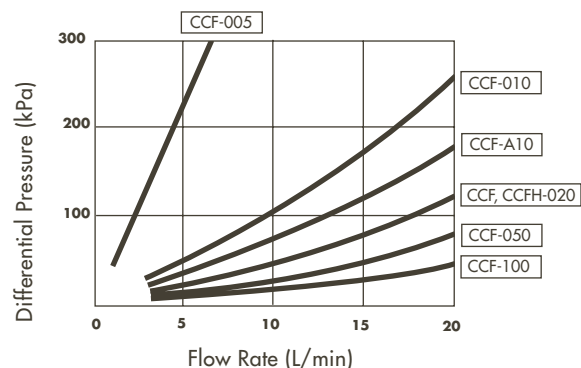
APPLICATIONS

- Use serially as prefilter and final filter
- Corrosive fluids and gases, photoresists, and both alkalis and acids
- Hydrophobic:
 - Solvent filtration
- Hydrophilic:
 - Solvents with higher surface tension
 - Heterogeneous fluid mixtures
- Cannot be used for gas filtration

SPECIFICATIONS

Maximum Inlet Pressure	0.39 MPa (57 psi)
Maximum Operating Temperature	60°C (140°F)

WATER FLOW RATE

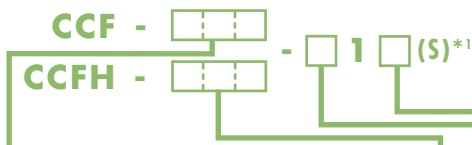


Typical water flow rate for CCF/CCFH-___-D1B at 25 °C

	CCF-005	CCF-A10	CCF-010	CCF-020	CCF-050	CCF-100	CCFH-020	
	Hydrophobic						Hydrophilic	
Layers	Double	Double	Single	Single	Single	Single	Single	
Pore Size (µm)	0.05	0.10	0.10	0.20	0.50	1.0	0.20	
Bubble Point (IPA) MPa (psi)	≥0.16 (23)	≥0.15 (22)	≥0.13 (20)	≥0.09 (13)	≥0.05 (7)	≥0.03 (4)	-	
Length Code	Filtration Area (cm ²)							
C	102	900	900	570	570	570	570	900
D	129	1,800	1,800	1,150	1,150	1,150	1,150	1,800
E	201	3,600	3,600	2,300	2,300	2,300	2,300	3,600

*Length given is for capsule with end fixture H.

ORDERING INFORMATION



Pore Size (µm)	Pore Size Code	Pore Size (µm)	Pore Size Code	Length (mm)	Length Code	End Fixtures (Inlet and Outlet)	End Fixture Code
0.05	005	0.2	020	102	C	1/4" NPTM	B
0.10	A10			129	D	1/2" NPTM	D*2
0.10	010			201	E	3/8" hose barb	H
0.20	020					1 1/2" sanitary fitting	N
0.50	050						
1.00	100						

*1. When ordering sterile units, specify "S" in the last position of the catalog number.

*2. When ordering length code "C", end fixture code "D" is not available.

Polypropylene Capsule Filter (CCP)

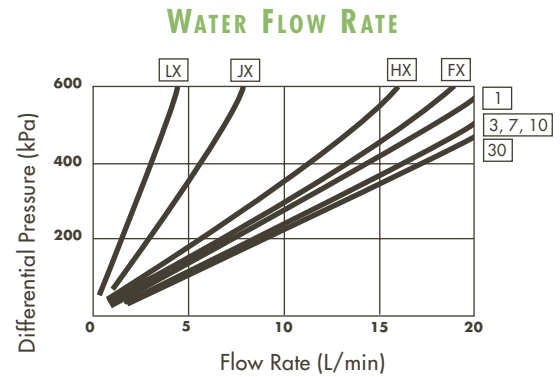
- Depth-type matrix: high dirt holding capacity, superior retention
- Compatible with aqueous solutions and solvents
- Thermally welded to prevent fiber slough-off and minimize changes in pore size during filtration
- Wide range of particle size cut-offs
- Can be sterilized by autoclaving (121°C, 30 min) or treatment with ethylene oxide (EtO).

APPLICATIONS

- High purity water filtration
- Prefiltration to a final membrane filter such as PES or PTFE (CCS, CCF, or CCFH)
- Ultracleaning
- Filtration of process chemicals
- Cannot be used for gas filtration

SPECIFICATIONS

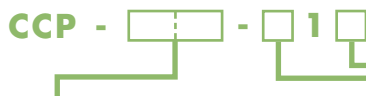
Maximum Inlet Pressure	0.39 MPa (57 psi)
Maximum Operating Temperature	60°C (140°F)



		CCP-								
		LX	JX	HX	FX	1	3	7	10	30
Particle Retention	Particle Size (µm)	0.8	1.0	2.0	3.0	2 – 5	5 – 10	10 – 20	10 – 20	20 – 30
	(%)	>99	>99	>99	>99	94	98	98	92	97
Length Code	Length* (mm)	Filtration Area (cm ²)								
C	102	400	500	500	550	500	600	500	550	650
D	129	800	1,000	1,000	1,100	1,000	1,200	1,000	1,100	1,300
E	201	1,600	2,000	2,000	2,200	2,000	2,400	2,000	2,200	2,600

*Length given is for capsule with end fixture H.

ORDERING INFORMATION



Retention Characteristic Code	Length (mm)	Length Code	End Fixtures (Inlet and Outlet)	End Fixture Code
LX	102	C	1/4" NPTM	B
JX	129	D	1/2" NPTM	D
HX	201	E	3/8" hose barb	H
FX			1 1/2" sanitary fitting	N
1				
3				
7				
10				
30				

*. When ordering length code "C", end fixture code "D" is not available.

Glass Fiber Capsule Filter (CCG)

- Depth-type matrix of borosilicate glass fiber
- Large dirt holding capacity
- Resistant to most fluids except strong acids
- Contains a small amount of acrylic resin binder to enhance wet strength
- Can be sterilized by autoclaving (121°C, 30 min) or treatment with ethylene oxide (EtO).

APPLICATIONS

- Sea water filtration
- Aquaculture
- Prefiltration to a final membrane filter such as PES or PTFE (CCS, CCF, or CCFH)
- Cannot be used for gas filtration

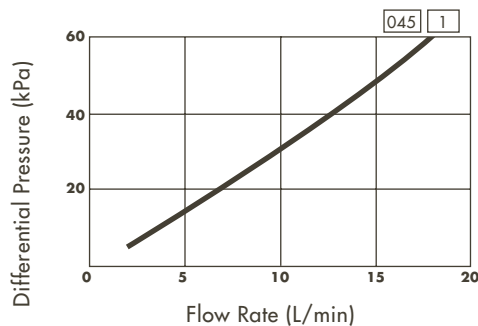
SPECIFICATIONS

Maximum Inlet Pressure	0.29 MPa (43 psi)
Maximum Operating Temperature	60°C (140°F)

		CCG-045	CCG-1
Particle Retention	Particle Size (µm)	1 – 1.5	1.5 – 2.0
	(%)	99.9	
Length Code	Length* (mm)	Filtration Area (cm ²)	
C	102	300	
D	129	600	
E	201	1,200	

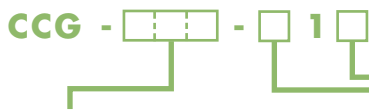
*Length given is for capsule with end fixture H.

WATER FLOW RATE



Typical water flow rate for CCG-____-D1B at 25°C.

ORDERING INFORMATION



Nominal Rating (µm)	Nominal Rating Code	Length (mm)	Length Code	End Fixtures (Inlet and Outlet)	End Fixture Code
0.45	045	102	C	1/4" NPTM	B
1.0	1	129	D	1/2" NPTM	D
		201	E	3/8" hose barb	H
				1 1/2" sanitary fitting	N

*. When ordering length code "C", end fixture code "D" is not available.

Cartridges – Introduction

- Available in a wide variety of media and end fixture configurations
- Media can be mixed and configured in serial format to maximize throughput volumes, flow rates, and cartridge life
- Fit many commercially available filter housings

APPLICATIONS

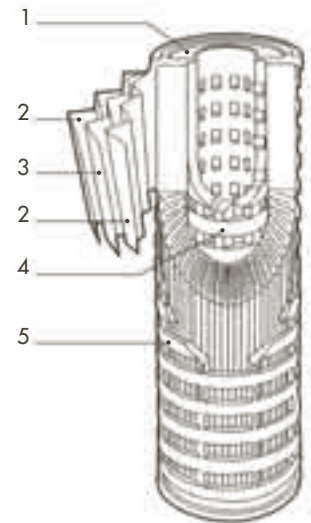
- Large surface area permits large throughput volumes and higher flow rates
- Suitable for both prefiltration and final filtration of fluids in chemical, food, beverage, and electronics industries
- Wide choice of media and core enables use in many chemical and thermal conditions



Eleven different filter media are available in cartridge format.

SPECIFICATIONS

Model	Material	Media type	Format	Absolute/ Nominal	Pore Size or Rating (µm)
TCR	Cellulose Acetate	Membrane	Pleated, Internal Prefilter	Absolute	0.20 – 0.80
TCS	Polyethersulfone (PES)	Membrane	Pleated, Internal Prefilter	Absolute	0.20 – 0.45
TCS-G	Polyethersulfone (PES)	Membrane	Pleated, Internal Prefilter	Absolute	0.20 – 0.65
TCS-E	Polyethersulfone (PES)	Membrane	Pleated, Internal Prefilter	Absolute	0.20 – 0.45
TCF	Hydrophobic PTFE	Membrane	Pleated	Absolute	0.05 – 1.0
TCFH	Hydrophilic PTFE	Membrane	Pleated	Absolute	0.10 – 1.0
TCY	Coated Cellulose Acetate	Membrane	Pleated, Dual Layer	Nominal	0.21 – 2.0
TCYE	Coated Cellulose Acetate	Membrane	Pleated, Single Layer	Nominal	0.21 – 10
TCP	Polypropylene	Non-woven	Pleated, Multiple Layers	Nominal	0.8 – 3.0
TCP/TCPE	Polypropylene	Non-woven	Pleated, Single Layer	Nominal	1 – 30
TCPD	Polypropylene, Multigrade	Non-woven	Spirally Wound	Nominal	1 – 70
TC	Cellulose with Epoxy Resin	Filter Paper	Pleated	Nominal	1 – 30
TCG	Glass Fiber	Glass Fiber Filter	Pleated	Nominal	0.45 – 1
TCW	Polypropylene, Cotton	Yarn	Wound	Nominal	0.5 – 150



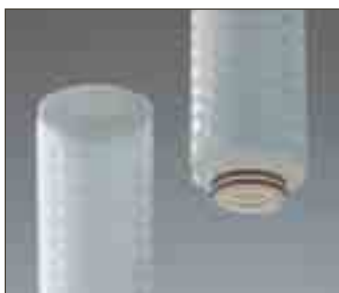
1. End cap
2. Support media
3. Final membrane
4. Core tube
5. Outer sleeve

Gasket/O-ring Polymer	Gasket/O-ring Code	Autoclavable	Max Temp. (°C)
EPR	E	○	150
EPDM	D	○	150
Chloroprene	N	X	120
NBR	B	X	130
Silicone	S	○	230
FPM	V	○	260
PTFE (Gasket only)	H	○	260
FEP Encapsulated (O-ring only)	F	○	260

○ – Recommended X – Not recommended

For detailed chemical compatibility information, see page 118.
Filter housings are available – call to discuss your particular needs.

End Fixture Configurations



H Size 222 Heat-Resistant O-ring, Flat Closed
Standard O-ring: Silicone
Note: Autoclavable



M Size 222 O-ring, Flat Closed
Standard O-ring: EPR
Note: Non-Autoclavable



L Size 222 O-ring with Internal Stainless Steel Support, Flat Closed
Available for TCR-type only
Note: Autoclavable



K Size 222 Heat-Resistant O-ring, Spear Closed
Standard O-ring: Silicone
Note: Autoclavable



R Size 222 O-ring, Spear Closed
Standard O-ring: EPR
Note: Non-Autoclavable



S Size 222 O-ring with Tabs and Internal Stainless Steel Support, Spear Closed
Available for TCR-type only
Note: Autoclavable



J Size 226 Heat-Resistant O-ring with Tabs, Spear Closed
Standard O-ring: Silicone
Note: Autoclavable



P Size 226 O-ring with Tabs, Spear Closed
Standard O-ring: EPR
Note: Non-Autoclavable



Q Size 226 O-ring with Tabs and Internal Stainless Steel Support, Spear Closed
Available TCR-type only
Note: Autoclavable



F Flat Gasket
Standard Gasket: EPR
Note: Non-Autoclavable



N Size 120 O-ring
Standard O-ring: Silicone
Note: Autoclavable



C Flat Gasket
Standard Gasket: Chloroprene (for PP) or NBR (for SS)
Note: Non-Autoclavable

Cellulose Acetate Membrane (TCR)

- Dual cellulose acetate membranes provide internal prefiltration by placing a larger pore size membrane upstream of final rated pore size membrane
- Polyester membrane support is almost no fiber releasing
- Low protein binding

APPLICATIONS

- Filter ultra-pure water, rinse water, cosmetics, and beverages (beer and wine)

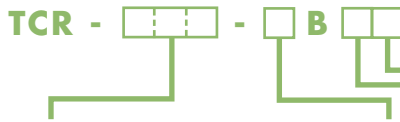
SPECIFICATIONS

	TCR-020	TCR-045	TCR-080
Pore Size (µm)	0.20	0.45	0.80
Dual Membranes:			
Upstream (µm)	0.80	0.80	5.0
Downstream (µm)	0.20	0.45	0.80
Challenge Organism	<i>B. diminuta</i>	<i>S. marcescens</i>	<i>S. cerevisiae</i>
LRV (Log Reduction Value)	≥7	≥7	≥7
Bubble Point (MPa)	≥0.294	≥0.235	≥0.088
Filtration Area per Single Length	4,200 cm ²		
Max. Differential Pressure (25°C)	0.39 MPa (57 psi)		
Max. Operating Temperature	80°C (176°F)		

Materials:

End Cap	Polybutyleneterephthalate (PBT)
Sealing Material	Medical Grade Polyurethane
Support Media	Polyester
Prefilter Membrane	Cellulose Acetate
Final Membrane	Cellulose Acetate
Core Tube	Polypropylene
Outer Sleeve	Polypropylene

ORDERING INFORMATION



Pore Size (µm)	Pore Size Code
0.20	020
0.45	045
0.80	080

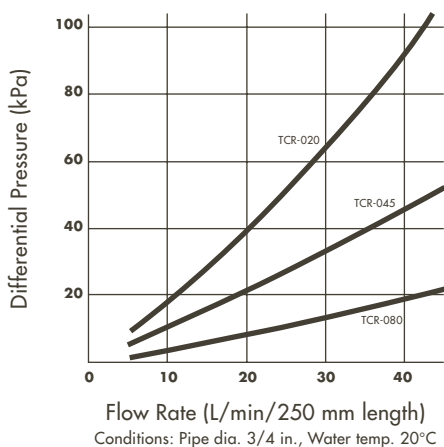
Length (mm)	Length Code
250 (single)	S
500 (double)	D
750 (triple)	T
1,000 (quad)	Q

End Fixture Code	
F	R
N	S
M	P
L	Q

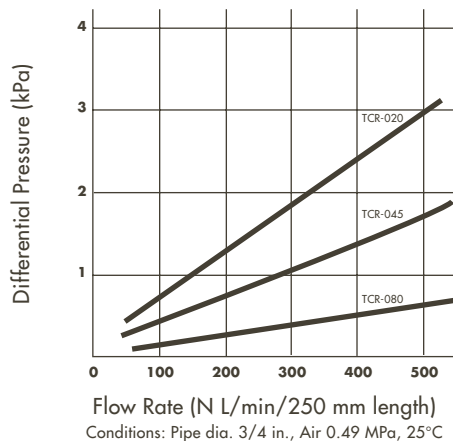
Gasket/O-ring Polymer	Gasket/O-ring Code
EPR	E (standard)
EPDM	D
Chloroprene	N
NBR	B
Silicone	S
FPM	V

Note: Codes N, L, Q, and S are autoclavable at 121°C, 30 min.

TYPICAL WATER FLOW RATE



TYPICAL AIR FLOW RATE



Polyethersulfone (PES) Membrane (TCS)

- Dual Polyethersulfone (PES) membranes provide internal prefiltration by placing a larger pore size membrane upstream of final rated pore size membrane
- Low extractables
- Enhanced chemical compatibility
- Quick rinse down
- Low protein binding
- 100% integrity tested during manufacturing

APPLICATIONS

- Filtration for electronics, cosmetics, and beverage industries

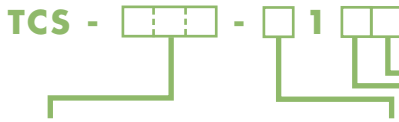
SPECIFICATIONS

	TCS-020	TCS-045
Pore Size	0.20 μm	0.45 μm
Dual Membranes:		
Upstream	0.45 μm	0.65 μm
Downstream	0.20 μm	0.45 μm
Challenge Organism	B. diminuta	S. marcescens
LRV (Log Reduction Value)	≥ 7	≥ 7
Filtration Area per Single Length	4,000 cm^2	
Max. Differential Pressure (25°C)	0.39 MPa (57 psi)	
Max. Operating Temperature	80°C (176°F)	

Materials:

End Cap	Polypropylene
Support Media	Polypropylene
Prefilter Membrane	Polyethersulfone (PES)
Final Membrane	Polyethersulfone (PES)
Core Tube	Polypropylene
Outer Sleeve	Polypropylene

ORDERING INFORMATION



Pore Size (μm)	Pore Size Code
0.20	020
0.45	045

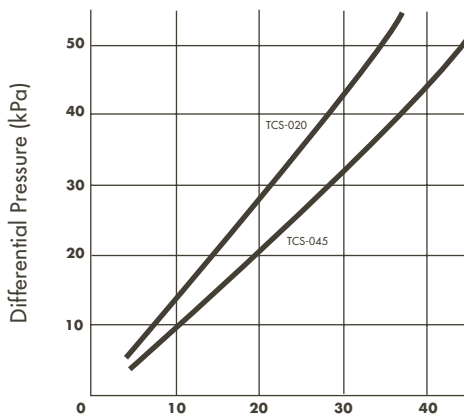
Length (mm)	Length Code
250 (single)	S
500 (double)	D
750 (triple)	T
1,000 (quad)	Q

End Fixture Code	
F	R
N	K
M	P
H	J

Gasket/O-ring Polymer	Gasket/O-ring Code
EPR	E (standard)
EPDM	D
Chloroprene	N
NBR	B
Silicone	S
FPM	V

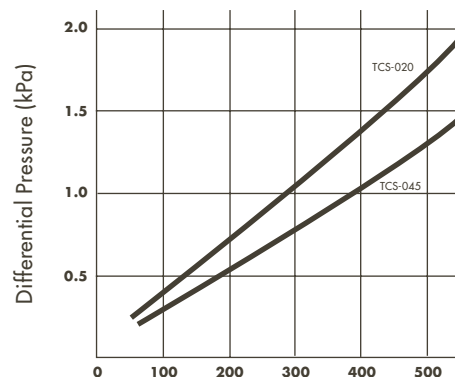
Note: Codes H, J, K, and N are autoclavable at 121°C, 30 min.

TYPICAL WATER FLOW RATE



Flow Rate (L/min/250 mm length)
Conditions: Pipe dia. 3/4 in., Water temp. 20°C

TYPICAL AIR FLOW RATE



Flow Rate (N L/min/250 mm length)
Conditions: Pipe dia. 3/4 in., Air 0.49 MPa, 25°C

Polyethersulfone (PES) Membrane for the Food and Beverage Industries (TCS-G)

- Dual Polyethersulfone (PES) membranes provide internal prefiltration by placing a larger pore size membrane upstream of final rated pore size membrane
- Low extractables
- Enhanced chemical compatibility
- Quick rinse down
- Low protein binding
- 100% integrity tested during manufacturing
- Selected types can be hot water sanitized

APPLICATIONS

- Food and beverage industries

SPECIFICATIONS

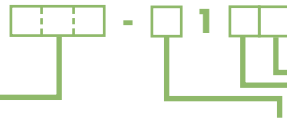
	TCS-G020	TCS-G045	TCS-G065
Pore Size	0.20 µm	0.45 µm	0.65 µm
Challenge Organism	B.diminuta	S.marcescens	S.cerevisiae
LRV (Log Reduction Value)	≥7	≥7	≥7
Max. Differential Pressure (25°C)	0.39 MPa [57 psi]		
Max. Operating Temperature	80°C (176°F)		
Filtration Area (with 250 mm)	6,600 cm ²		
Diffusion Rate (with 250 mm)	≤55 mL/min at 0.326 MPa	≤53 mL/min at 0.206 MPa	≤40 mL/min at 0.100 MPa

Materials:

End Cap	Polypropylene
Support Media	Polypropylene
Prefilter Membrane	Polyethersulfone (PES)
Final Membrane	Polyethersulfone (PES)
Core Tube	Polypropylene
Outer Sleeve	Polypropylene

ORDERING INFORMATION

TCS-G



Pore Size (µm)	Pore Size Code
0.20	020
0.45	045
0.65	065

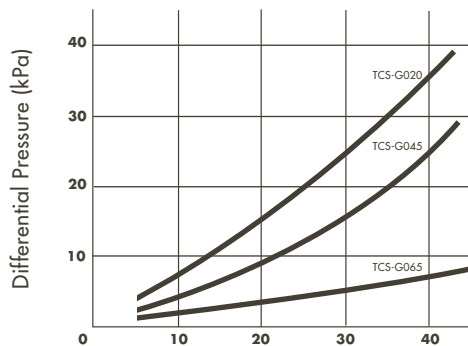
Length (mm)	Length Code
250 (single)	S
500 (double)	D
750 (triple)	T
1,000 (quad)	Q

End Fixture Code	
F	R
M	K
H	P
	J

Gasket/O-ring Polymer	Gasket/O-ring Code
EPR	E
EPDM	D
Chloroprene	N
NBR	B
Silicone	S (standard)
FPM	V

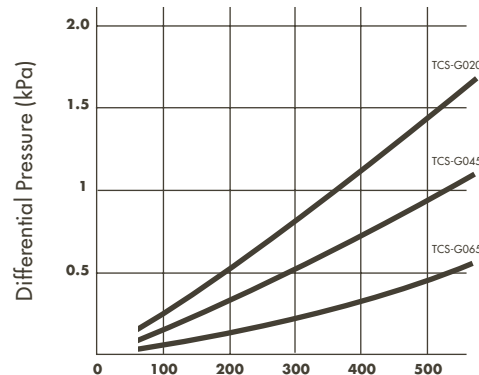
Note: Codes H, K, and J can be hot water sanitized at 85°C for 30 min, up to 100 times.

TYPICAL WATER FLOW RATE



Flow Rate (L/min/250 mm length)
Conditions: Pipe dia. 3/4 in., Water temp. 20°C

TYPICAL AIR FLOW RATE



Flow Rate (N L/min/250 mm length)
Conditions: Pipe dia. 3/4 in., Air 0.49 MPa, 25°C

Polyethersulfone (PES) Membrane for the Electronics Industry (TCS-E)

- Dual Polyethersulfone (PES) membranes provide internal prefiltration by placing a larger pore size membrane upstream of final rated pore size membrane
- Low extractables
- Enhanced chemical compatibility
- Quick rinse down
- 100% integrity tested during manufacturing
- Superior recovery of resistivity and TOC since cartridges are individually flushed with pure water in the manufacturing process

APPLICATIONS

- Filtration for electronics industry

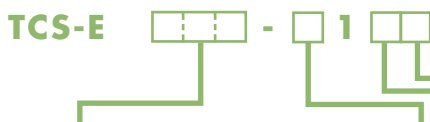
SPECIFICATIONS

	TCS-E020	TCS-E045	TCS-E045S
Pore Size	0.20 μm	0.45 μm	0.45 μm
Filtration Area (with 250 mm)	6,700 cm^2		8,800 cm^2
Max. Differential Pressure (25°C)	0.39 MPa [57 psi]		
Max. Operating Temperature	80°C (176°F)		

Materials:

	TCS-E-020/045	TCS-E-045S
End Cap	Polypropylene	Polypropylene
Support Media	Polypropylene	Polypropylene
Prefilter Membrane	Polyethersulfone (PES)	-
Final Membrane	Polyethersulfone (PES)	Polyethersulfone (PES)
Core Tube	Polypropylene	Polypropylene
Outer Sleeve	Polypropylene	Polypropylene

ORDERING INFORMATION



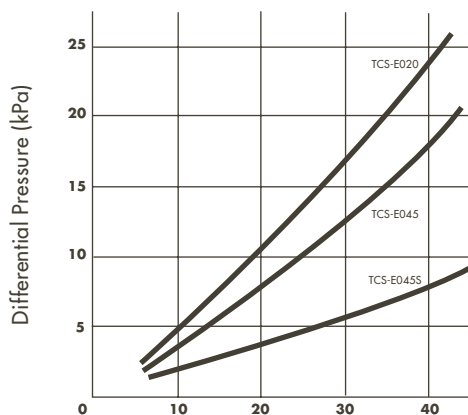
Pore Size (μm)	Pore Size Code
0.20	020
0.45	045
0.45	045S

Length (mm)	Length Code
250 (single)	S
500 (double)	D
750 (triple)	T
1,000 (quad)	Q

End Fixture Code	
F	R
M	P

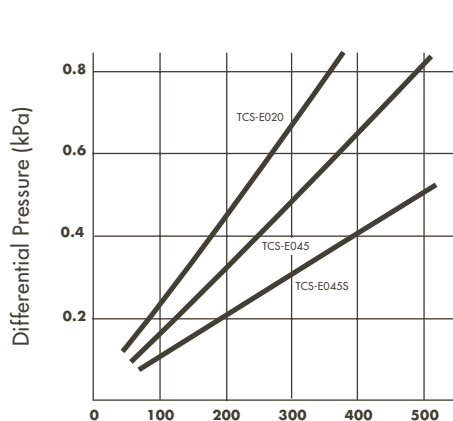
Gasket/O-ring Polymer	Gasket/O-ring Code
EPR	E (standard)
EPDM	D
Chloroprene	N
NBR	B
Silicone	S
FPM	V

TYPICAL WATER FLOW RATE



Flow Rate (L/min/250 mm length)
Conditions: Pipe dia. 3/4 in., Water temp. 20°C

TYPICAL AIR FLOW RATE



Flow Rate (N L/min/250 mm length)
Conditions: Pipe dia. 3/4 in., Air 0.49 MPa, 25°C

Hydrophobic PTFE Membrane (TCF)

- Enhanced chemical resistance
- Selected types can be in-line steam sterilized (126°C, 30 min) or autoclaved (121°C, 30 min)

APPLICATIONS

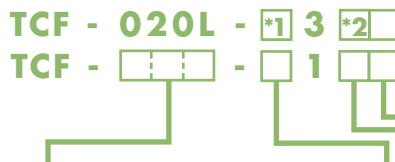
- Filtration of photo resists and organic solvents
- Uses in the electronics industry and in chemical manufacturing
- Filtering gases and venting tanks

Note: Process fluids must have a surface tension of ≤ 32 mN/m (dyne/cm) to properly wet the filter and to achieve optimized flow rates and performance characteristics. For fluids with a surface tension ≥ 32 mN/m (dyne/cm), use hydrophilic PTFE (TCFH-type cartridges).

SPECIFICATIONS

	TCF-005	TCF-010	TCF-020	TCF-050	TCF-100	TCF-050L	TCF-020L
Pore Size	0.05 μm	0.10 μm	0.20 μm	0.50 μm	1.00 μm	0.50 μm	0.20 μm
Filtration Area per Single Length	9,200 cm^2	9,200 cm^2	7,000 cm^2	7,000 cm^2	7,000 cm^2	17,600 cm^2	16,400 cm^2
Max. Differential Pressure (25°C)	0.39 MPa (57 psi)						0.25 MPa (36 psi)
Max. Operating Temperature	80°C (176°F)						40°C (104°F)

ORDERING INFORMATION



Pore Size (μm)	Pore Size Code
0.05	005
0.10	010
0.20	020
0.50	050
1.00	100
0.50	050L

Length (mm)	Length Code
250 (single)	S
500 (double)	D
750 (triple)	T
1,000 (quad)	Q

*1 Available with length codes S, D, and T.

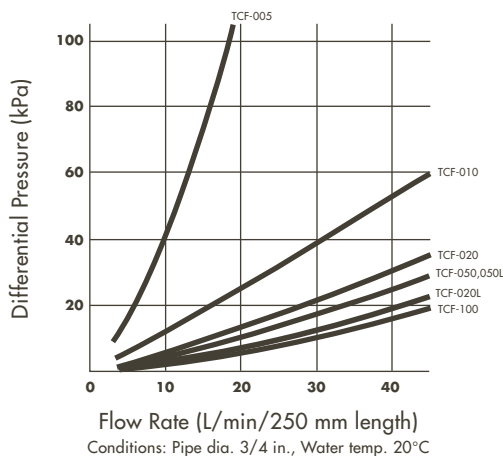
End Fixture Code	
F	R
N	K
M	P
H	J

Note: Codes H, J, K, and N are autoclavable at 121°C, 30 min., or can be steam sterilized at 126°C for 30 min.

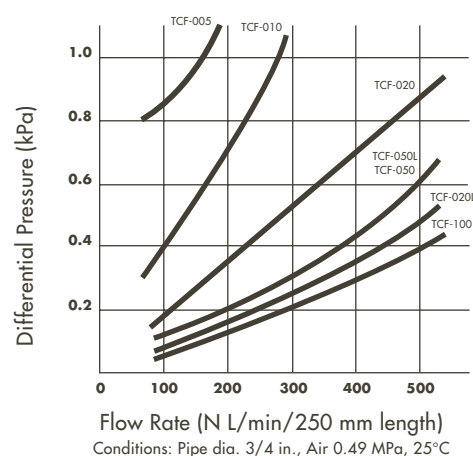
*2 Available with end fixture codes F, M, R, and P.

Gasket/O-ring Polymer	Gasket/O-ring Code
EPR	E (standard)
EPDM	D
Chloroprene	N
NBR	B
Silicone	S
FPM	V
PTFE	H (Gasket only)
FEP Encapsulated	F (O-ring only)

TYPICAL WATER FLOW RATE



TYPICAL AIR FLOW RATE



Materials:

End Cap	Polypropylene
Support Media	Polypropylene
Membrane	PTFE
Core Tube	Polypropylene
Outer Sleeve	Polypropylene

Hydrophilic PTFE Membrane (TCFH)

- Unsupported PTFE membrane has been treated to render the matrix hydrophilic

Note: This cartridge is not autoclavable.

APPLICATIONS

- Strong acid and strong alkali solutions
- Photo resists
- Chemically aggressive liquids with a surface tension ≥ 32 mN/m (dyne/cm)

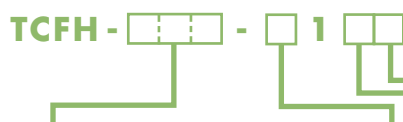
SPECIFICATIONS

	TCFH-010	TCFH-020	TCFH-050	TCFH-100	TCFH-020L
Pore Size	0.10 μm	0.20 μm	0.50 μm	1.00 μm	0.20 μm
Filtration Area per Single Length	9,800 cm^2				21,600 cm^2
Max. Differential Pressure (25°C)	0.39 MPa (57 psi)				0.39 MPa (57 psi)
Max. Operating Temperature	80°C (176°F)				60°C (140°F)

Materials:

End Cap	Polypropylene
Support Media	Polypropylene
Membrane	Hydrophilic PTFE
Core Tube	Polypropylene
Outer Sleeve	Polypropylene

ORDERING INFORMATION



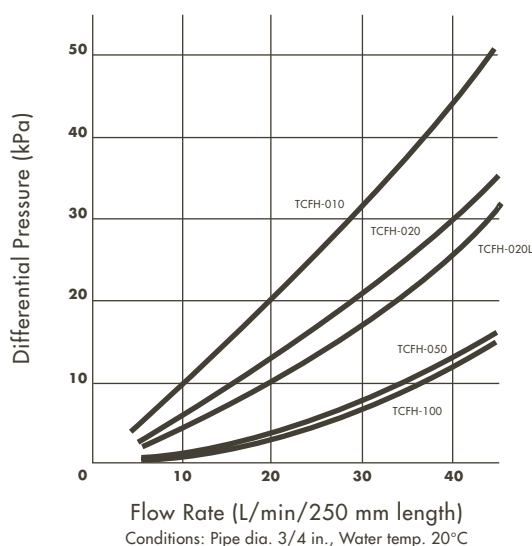
Pore Size (μm)	Pore Size Code
0.10	010
0.20	020/020L
0.50	050
1.00	100

Length (mm)	Length Code
250 (single)	S
500 (double)	D
750 (triple)	T
1,000 (quad)	Q

End Fixture Code	
F	R
N	P
M	

Gasket/O-ring Polymer	Gasket/O-ring Code
EPR	E (standard)
EPDM	D
Chloroprene	N
NBR	B
Silicone	S
FPM	V
PTFE	H (Gasket only)
FEP Encapsulated	F (O-ring only)

TYPICAL WATER FLOW RATE



Coated Cellulose Acetate Membrane (TCY)

- Dual layer of coated cellulose acetate membrane
- Low protein binding
- Excellent dirt holding characteristics, superior particle retention
- Excellent water and air flow rates

APPLICATIONS

- Use as a prefilter to a final membrane cartridge
- Filter protein-containing solutions for the food, cosmetic and pharmaceutical industries
- Purify process waters

SPECIFICATIONS

	TCY-ND, -LD, -HD
Filtration Area per Single Length	5,500 cm ²
Max. Differential Pressure (25°C)	0.49 MPa (71 psi)
Max. Operating Temperature	80°C (176°F)

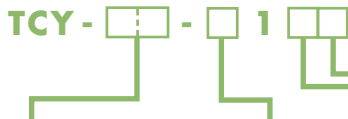
Materials:

End Cap	Polypropylene
Support Media	Polypropylene
Prefilter Membrane	Coated Cellulose Acetate
Final Membrane	Coated Cellulose Acetate
Core Tube	Polypropylene
Outer Sleeve	Polypropylene

Model	Particle Size						
	0.21 µm	0.3 µm	0.48 µm	0.65 µm	0.8 µm	1.0 µm	2.0 µm
	Particle Retention (%)						
TCY-ND	99.9	99.9	99.9	>99.9			
TCY-LD		99	99.9	99.9	>99.9		
TCY-HD			99	99.9	99.9	99.9	>99.9

Test Criteria: Single length (250 mm) cartridge, flow rate 10 L/min.

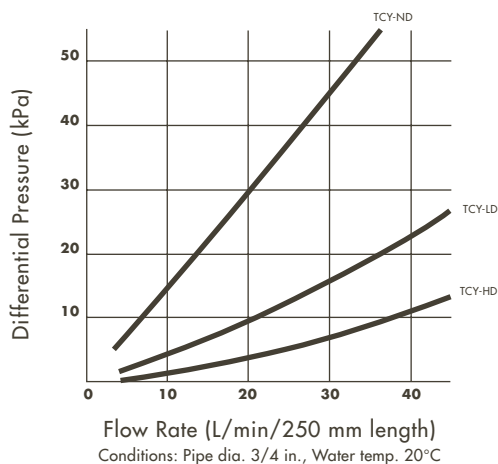
ORDERING INFORMATION



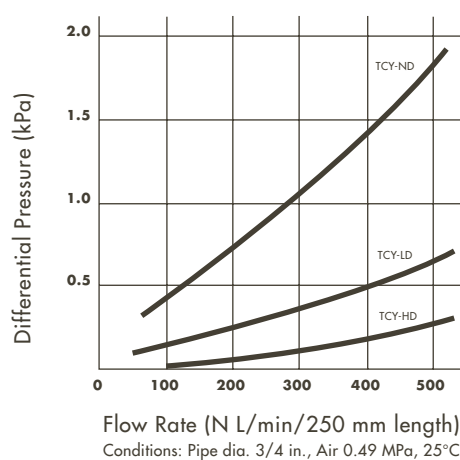
Retention Characteristic Code	Length (mm)	Length Code	End Fixture Code		Gasket/O-ring Polymer	Gasket/O-ring Code
			F	R		
ND	250 (single)	S	N	K	EPR	E (standard)
LD	500 (double)	D	M	P	EPDM	D
HD	750 (triple)	T	H	J	Chloroprene	N
	1,000 (quad)	Q			NBR	B
					Silicone	S
					FPM	V

Note: Codes H, J, K, and N are autoclavable at 121°C, 30 min.

TYPICAL WATER FLOW RATE



TYPICAL AIR FLOW RATE



Single Layer Coated Cellulose Acetate Membrane (TCYE)

- High efficiency single layer of coated cellulose acetate
- Economical
- Excellent particle retention
- Low protein binding
- Excellent water and air flow rates

APPLICATIONS

- Filter process waters for the food, cosmetic and pharmaceutical industries

SPECIFICATIONS

	TCYE-NS, -LS, -HS, -BS
Filtration Area per Single Length	6,200 cm ²
Max. Differential Pressure (25°C)	0.49 MPa (71 psi)
Max. Operating Temperature	80°C (176°F)

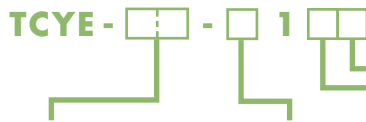
Materials:

End Cap	Polypropylene
Support Media	Polypropylene
Membrane	Coated Cellulose Acetate
Core Tube	Polypropylene
Outer Sleeve	Polypropylene

Model	Particle Size									
	0.21 µm	0.3 µm	0.48 µm	0.65 µm	0.8 µm	1.0 µm	2.0 µm	3.0 µm	5.0 µm	10 µm
	Particle Retention (%)									
TCYE-NS	99	99.9	99.9	>99.9						
TCYE-LS		98	99	99	>99.9					
TCYE-HS			96	99	99	99	>99.9			
TCYE-BS							98	99.9	99.9	>99.9

Test Criteria: Single length (250 mm) cartridge, flow rate 10 L/min.

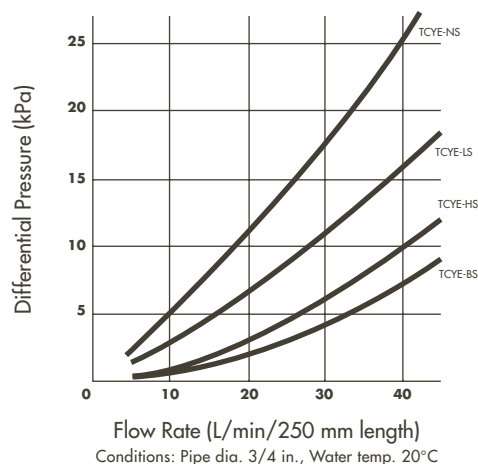
ORDERING INFORMATION



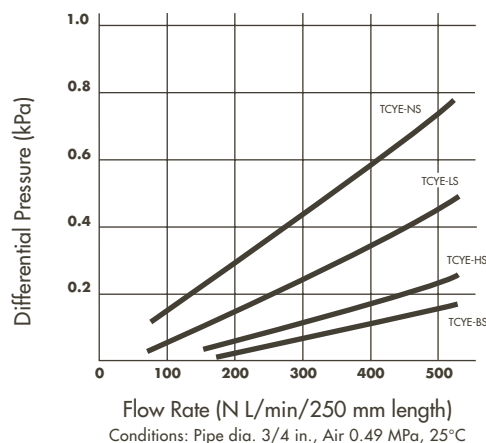
Retention Characteristic Code	Length (mm)	Length Code	End Fixture Code		Gasket/O-ring Polymer	Gasket/O-ring Code
			F	R		
NS	250 (single)	S	F	R	EPR	E (standard)
LS	500 (double)	D	N	K	EPDM	D
HS	750 (triple)	T	M	P	Chloroprene	N
BS	1,000 (quad)	Q	H	J	NBR	B
					Silicone	S
					FPM	V

Note: Codes H, J, K, and N are autoclavable at 121°C, 30 min.

TYPICAL WATER FLOW RATE



TYPICAL AIR FLOW RATE



Polypropylene (TCP)

- Multiple layers of nonwoven polypropylene maximize filtration efficiency
- Maximal throughput volumes and retention ratings
- Thermally bonded to minimize fiber releasing
- Minimize extractables
- Supported both upstream and downstream (TCP-HX, FX only)

APPLICATIONS

- Filter process waters for the food, cosmetic and pharmaceutical industries

SPECIFICATIONS

	TCP-LX	TCP-JX	TCP-HX	TCP-FX	TCP-O2AM
Filtration Area per Single Length	3,300 cm ²	4,500 cm ²	4,200 cm ²	5,100 cm ²	2,900 cm ²
Max. Differential Pressure (25°C)	0.49 MPa (71 psi)				
Max. Operating Temperature	80°C (176°F)				

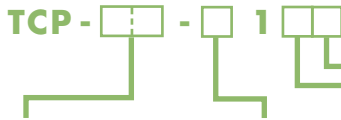
Materials:

End Cap	Polypropylene
Support Media	Polypropylene
Membrane	Polypropylene
Core Tube	Polypropylene
Outer Sleeve	Polypropylene

Model	Particle Size							% Retention (0.3 µm DOP)
	0.2 µm	0.48 µm	0.65 µm	0.8 µm	1.0 µm	2.0 µm	3.0 µm	
	Particle Retention (%)							
TCP-LX	45	90	98	>99				99.9999
TCP-JX		60	80	94	>99			99.999
TCP-HX				70	93	>99		99.99
TCP-FX				30	60	95	>99	99.84
TCP-O2AM				43	77	>99		-

Test Criteria: Single length (250 mm) cartridge, flow rate 10 L/min.

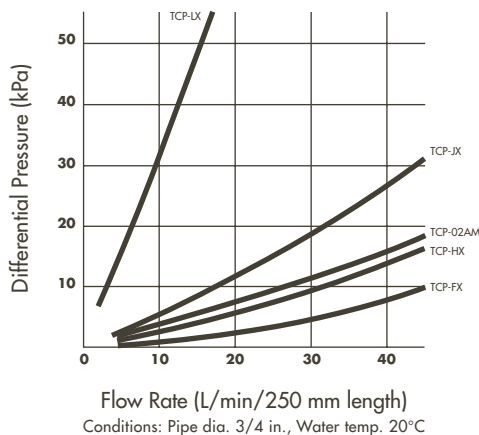
ORDERING INFORMATION



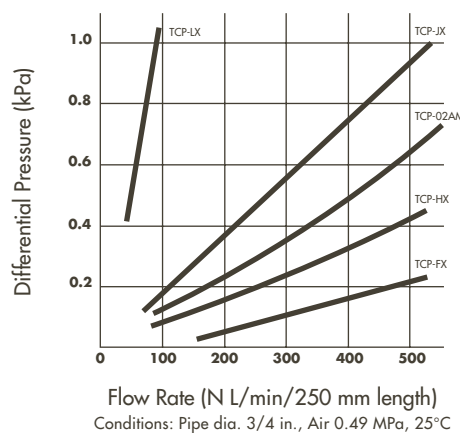
Retention Characteristic Code	Length (mm)	Length Code	End Fixture Code		Gasket/O-ring Polymer	Gasket/O-ring Code
			F	R		
LX	250 (single)	S	F	R	EPR	E (standard)
JX	500 (double)	D	N	K	EPDM	D
HX	750 (triple)	T	M	P	Chloroprene	N
FX	1,000 (quad)	Q	H	J	NBR	B
O2AM					Silicone	S
					FPM	V
					PTFE	H (Gasket only)
					FEP Encapsulated	F (O-ring only)

Note: Codes H, J, K, and N are autoclavable at 121°C, 30 min., or can be steam sterilized at 126°C for 30 min.

TYPICAL WATER FLOW RATE



TYPICAL AIR FLOW RATE



Single Layer Polypropylene (TCP/TCPE)

- All-polypropylene construction, medium is single layer of thermally bonded polypropylene
- Pore size range 1 – 30 µm
- TCP
 - Upstream and downstream support
 - Larger effective filtration area
- TCPE
 - Thicker grade of polypropylene is stronger and does not require support
 - Less effective filtration area

APPLICATIONS

- Filter process waters for the food, cosmetic and pharmaceutical industries
- Use as a prefilter in series upstream of a final membrane to clarify solutions
- Applications that require chemical resistance

SPECIFICATIONS

	TCP-1	TCP-3	TCP-7	TCP-10	TCP-30	TCPE-3	TCPE-10	TCPE-30
Nominal Rating	1 µm	3 µm	7 µm	10 µm	30 µm	3 µm	10 µm	30 µm
Filtration Area per Single Length	4,200 cm ²	5,600 cm ²	4,200 cm ²	5,000 cm ²	6,200 cm ²	3,700 cm ²		
Max. Differential Pressure (25°C)	0.49 MPa (71 psi)							
Max. Operating Temperature	80°C (176°F)							

ORDERING INFORMATION

TCP - [] - [] 1 [] []

TCPE - [] - [] 1 [] []

Nominal Rating Code (TCP)	Nominal Rating Code (TCPE)	Length (mm)	Length Code
1	3	250 (single)	S
3	10	500 (double)	D
7	30	750 (triple)	T
10		1,000 (quad)	Q
30			

End Fixture Code	
F	R
N	K
M	P
H	J

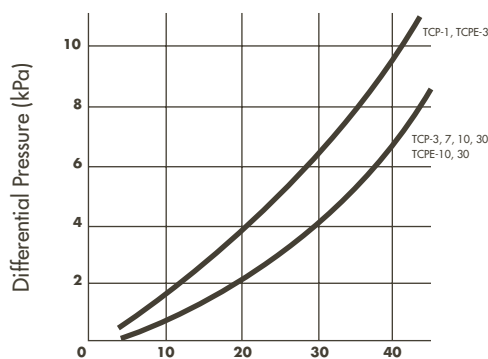
Note: Codes H, J, K, and N are autoclavable at 121°C, 30 min., or can be steam sterilized at 126°C for 30 min.

Gasket/O-ring Polymer	Gasket/O-ring Code
EPR	E (standard)
EPDM	D
Chloroprene	N
NBR	B
Silicone	S
FPM	V
PTFE	H (Gasket only)
FEP Encapsulated	F (O-ring only)

Materials:

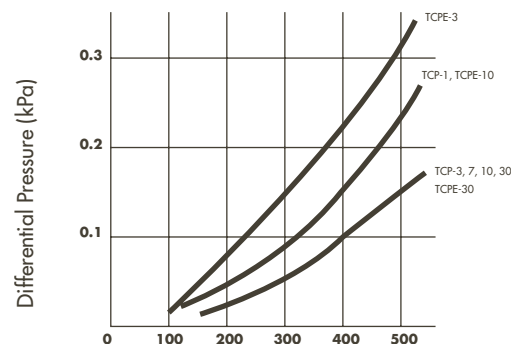
End Cap	Polypropylene
Support Media (TCP)	Polypropylene
Membrane	Polypropylene
Core Tube	Polypropylene
Outer Sleeve	Polypropylene

TYPICAL WATER FLOW RATE



Flow Rate (L/min/250 mm length)
Conditions: Pipe dia. 3/4 in., Water temp. 20°C

TYPICAL AIR FLOW RATE



Flow Rate (N L/min/250 mm length)
Conditions: Pipe dia. 3/4 in., Air 0.49 MPa, 25°C

Multigrade Polypropylene (TCPD)

- Spirally wound multigrade all-polypropylene construction
- Increasing depth retention gradient: as fluid flows through the cartridge, retention efficiency increases

APPLICATIONS

- Ideal for viscous fluids and fluids that have a heterogeneous particle population
- Prefilter or clarifying filter
- Filtration of pure or rinse waters, magnetized paint coatings, synthetic resins, high viscosity resins, plating solutions, etching solutions and strong alkali solutions

SPECIFICATIONS

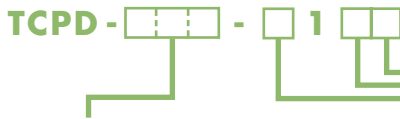
	TCPD-01A, -02A, -03A, -05A, -1, -3, -7, -10, -30
Max. Differential Pressure (25°C)	0.49 MPa (71 psi)
Max. Operating Temperature	80°C (176°F)

Materials:

End Cap	Polypropylene
Support Media	Polypropylene Net
Filter	Polypropylene
Core Tube	Polypropylene

Model	Particle Size									
	0.6 µm	1.0 µm	2 µm	3 µm	5 µm	10 µm	20 µm	30 µm	40 µm	70 µm
	Particle Retention (%)									
TCPD-01A	90	>99.9								
TCPD-02A		>99	>99.9							
TCPD-03A		95	>99	>99.9						
TCPD-05A			95	>99	>99.9					
TCPD-1			90	95	>99					
TCPD-3				70	90	>99				
TCPD-7					40	80	>99			
TCPD-10						60	90	95	>99	
TCPD-30							60	90	95	>99

ORDERING INFORMATION



Nominal Rating Code	
01A	1
02A	3
03A	7
05A	10
	30

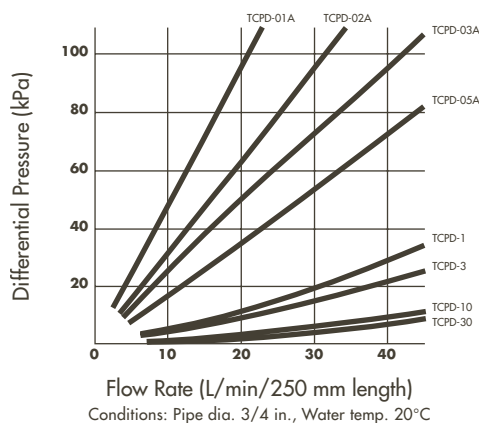
Length (mm)	Length Code
250 (single)	S
500 (double)	D
750 (triple)	T
1,000 (quad)	Q

End Fixture Code	
F	R
N	K
M	P
H	J

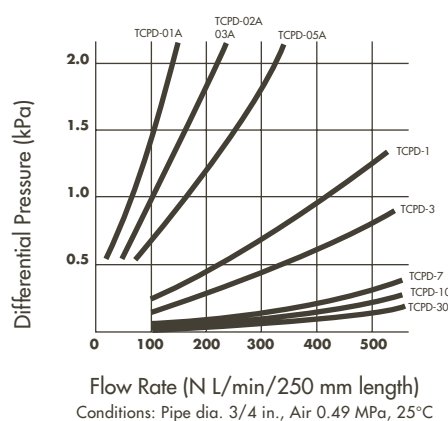
Gasket/O-ring Polymer	Gasket/O-ring Code
EPR	E (standard)
EPDM	D
Chloroprene	N
NBR	B
Silicone	S
FPM	V
PTFE	H (Gasket only)
FEP Encapsulated	F (O-ring only)

Note: Codes H, J, K, and N are autoclavable at 121°C, 30 min., or can be steam sterilized at 126°C for 30 min.

TYPICAL WATER FLOW RATE



TYPICAL AIR FLOW RATE



Epoxy Cellulose (TC)

- Cellulose fiber filter paper saturated by epoxy resin to minimize fiber release
- Available with standard polypropylene core or with stainless steel core (type 304, single length only) for high temperature applications
- See Glass Fiber (TCG) for smaller nominal pore sizes

APPLICATIONS

- Filter high viscosity liquids such as syrups
- Filter fuels, oils, cutting oils and resins
- Purify industrial and rinse water

Note: TC-type are not autoclavable.

SPECIFICATIONS

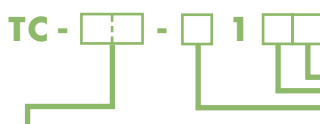
	TC type				TC- _ -S4C_			
Molded Material	Polypropylene				Stainless Steel			
	1	3	10	30	1	3	10	30
Nominal Rating	1 µm	3 µm	10 µm	30 µm	1 µm	3 µm	10 µm	30 µm
Filtration Area per Single Length	4,000 cm ²				3,400 cm ²			
Max. Differential Pressure (25°C)	0.49 MPa (71 psi)				0.49 MPa (71 psi)			
Max Temperature	80°C (176°F)				150°C (302°F)			

Materials:

End Cap	Polypropylene Stainless Steel (Seal Material: Silicone)
Filter	Epoxy Cellulose
Core Tube	Polypropylene or Stainless Steel

ORDERING INFORMATION

Polypropylene molded material



Nominal Rating (µm)	Nominal Rating Code
1	1
3	3
10	10
30	30

Length (mm)	Length Code
250 (single)	S
500 (double)	D
750 (triple)	T
1,000 (quad)	Q*

End Fixture Code	
F	R
N	P
M	C

Gasket/O-ring Polymer	Gasket/O-ring Code
EPR	E
Chloroprene	N (standard)
NBR	B
Silicone	S
FPM	V

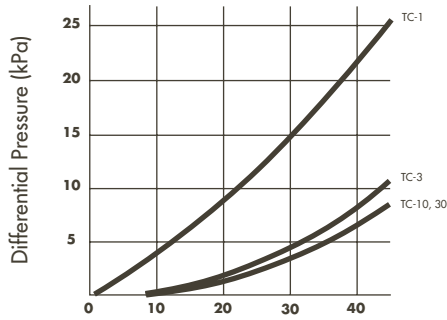
ORDERING INFORMATION

Stainless steel molded material



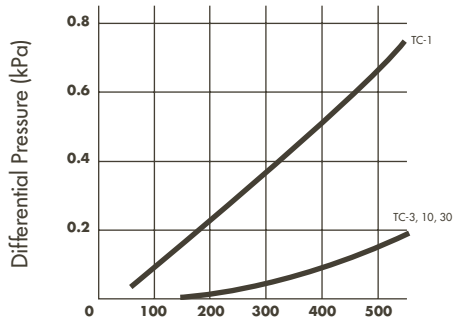
Nominal Rating (μm)	Nominal Rating Code	Gasket/O-ring Polymer	Gasket/O-ring Code
1	1	NBR	B (standard)
3	3	EPR	E
10	10	Silicone	S
30	30	FPM	V

TYPICAL WATER FLOW RATE



Flow Rate (L/min/250 mm length)
Conditions: Pipe dia. 3/4 in., Water temp. 20°C

TYPICAL AIR FLOW RATE



Flow Rate (N L/min/250 mm length)
Conditions: Pipe dia. 3/4 in., Air 0.49 MPa, 25°C

Glass Fiber (TCG)

- A glass fiber filter with acrylic resin supported by Polypropylene
- For larger pore size retention see Epoxy Cellulose (TC)

Note: TCG-type cartridges are not autoclavable.

APPLICATIONS

- Filter high viscosity liquids such as syrups
- Filter fuels, oils, cutting oils and resins
- Purify industrial and rinse water

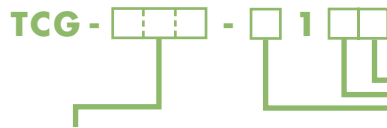
SPECIFICATIONS

	TCG-045	TCG-1
Nominal Rating	0.45 μm	1 μm
Filtration Area per Single Length	3,300 cm^2	
Max. Differential Pressure (25°C)	0.49 MPa (71 psi)	
Max. Operating Temperature	80°C (176°F)	

Materials:

End Cap	Polypropylene
Upstream Support	Polypropylene
Filter	Glass Fiber
Downstream Support	Polypropylene
Core Tube	Polypropylene
Outer Sleeve	Polypropylene

ORDERING INFORMATION



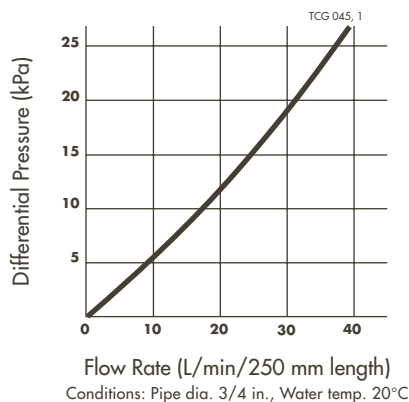
Nominal Rating (μm)	Nominal Rating Code
0.45	045
1	1

Length (mm)	Length Code
250 (single)	S
500 (double)	D
750 (triple)	T
1,000 (quad)	Q

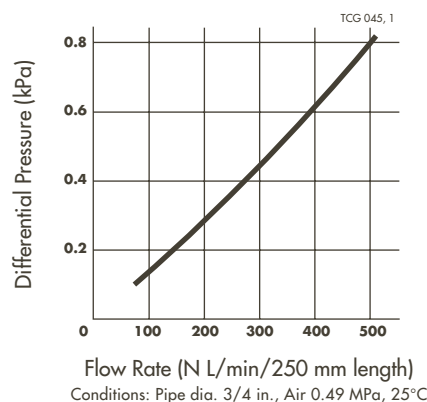
End Fixture Code	
F	R
N	P
M	

Gasket/O-ring Polymer	Gasket/O-ring Code
EPR	E
EPDM	D
Chloroprene	N (standard)
NBR	B
Silicone	S
FPM	V

TYPICAL WATER FLOW RATE



TYPICAL AIR FLOW RATE



Wound-Polypropylene (TCW)

- All-polypropylene construction: melt blown polypropylene filaments are spun into a gradient density media, maximizing particle retention
- Excellent flow rates
- Double open end: Compression seal eliminates the need for O-rings or gaskets

APPLICATIONS

- Prefilter upstream of a final pleated cartridge
- Moderate differential pressures and temperatures

SPECIFICATIONS

		TCW- □N-PP	TCW- □N-PS
Nominal Rating (µm)		05, 0.8, 1, 3, 5, 10, 25, 50, 75, 100, 150	
Max. Operating Pressure (25°C)		0.49 MPa (71 psi)	
Max. Operating Temperature		80°C (176°F)	
Material	Media	Polypropylene	
	Core Tube	Polypropylene	SUS304

ORDERING INFORMATION



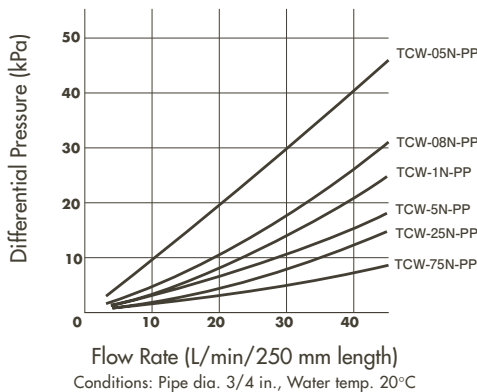
Nominal Rating (µm)	Nominal Rating Code
0.5	05
0.8	08
1	1
3	3
5	5
10	10
25	25
50	50
75	75
100	100
150	150

Core	Core Code
Polypropylene	P
SUS304	S

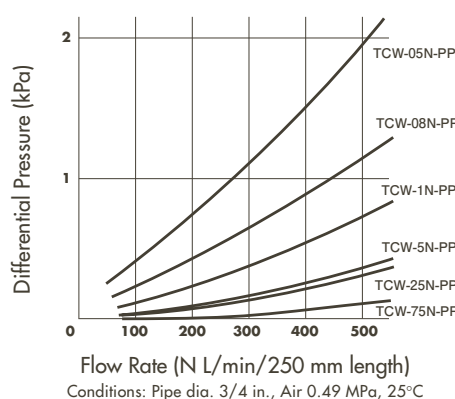
Length (mm)	Length Code
250(single)	S
500(double)	D*
750(triple)	T*

*500 (double) and 750 (triple) are not available in core code S

TYPICAL WATER FLOW RATE



TYPICAL AIR FLOW RATE



Wound - Cotton (TCW)

- All-polypropylene construction: melt blown polypropylene filaments are spun into a gradient density media, maximizing particle retention
- Excellent flow rates
- Double open end: Compression seal eliminates the need for O-rings or gaskets

APPLICATIONS

- Prefilter upstream of a final pleated cartridge
- Moderate differential pressures and temperatures

SPECIFICATIONS

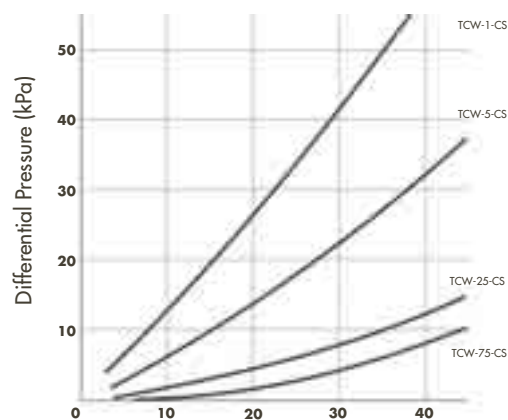
		TCW-□-CS
Nominal Pore Size (µm)		1,3,5,10,25,50,75,100,150
Max. Operating Pressure (25°C)		0.49 MPa (71 psi)
Max. Operating Temperature		150°C (Wet)
Material	Media	Cotton
	Core Tube	SUS304

ORDERING INFORMATION

TCW - □□□ - CS□

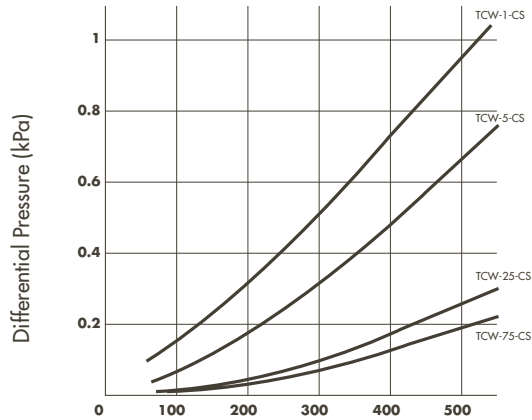
Nominal Rating (µm)	Nominal Rating Code	Length (mm)	Length Code
1	1	250(single)	S
3	3	500(double)	D
5	5	750(triple)	T
10	10		
25	25		
50	50		
75	75		
100	100		
150	150		

TYPICAL WATER FLOW RATE



Flow Rate (L/min/250 mm length)
Conditions: Pipe dia. 3/4 in., Water temp. 20°C

TYPICAL AIR FLOW RATE



Flow Rate (N L/min/250 mm length)
Conditions: Pipe dia. 3/4 in., Air 0.49 MPa, 25°C

Stainless Steel Cartridge Housing – ITS Type

- Stainless steel housing for 1 pc cartridge filter, consisting of body and head with center post
- Easily perform cartridge filter replacement by loosening the cap nut and removing the housing head
- Choose from 3/4" PT or 1" PT inlet/outlet
- Designed for use with end fixture codes F, C and TCW
- Mounting accessories available

SPECIFICATIONS

Model		ITS	ITS-2	ITS-B	ITS-2B
Cartridge Capacity		250 mm x 1	500 mm x 1	250 mm x 1	500 mm x 1
Cartridge Compatibility		End Fixture Codes: F, C and TCW			
Inlet/Outlet		3/4" PT		1" PT	
Dimensions (mm)	Height	366	619	369	622
	Diameter	121	121	123	123
Max. Operating Pressure		0.69 MPa (100 psi)			
Composition		Head: SCS14		Body: SUS316	
				Gasket: FPM, PTFE	
Weight (kg)		2.0	4.0	2.4	4.4

Note: Use thread-sealing tape on tapered inlet and outlet.

ORDERING INFORMATION

Model	ITS	ITS-2	ITS-B	ITS-2B
Catalog No.	26804010	26804020	26804040	26804030

OPTIONAL ACCESSORIES

Model	ITS, ITS-B Stand	Mounting Kit
Composition	SUS304	Galvanized Steel
Catalog No.	28804030	28804055



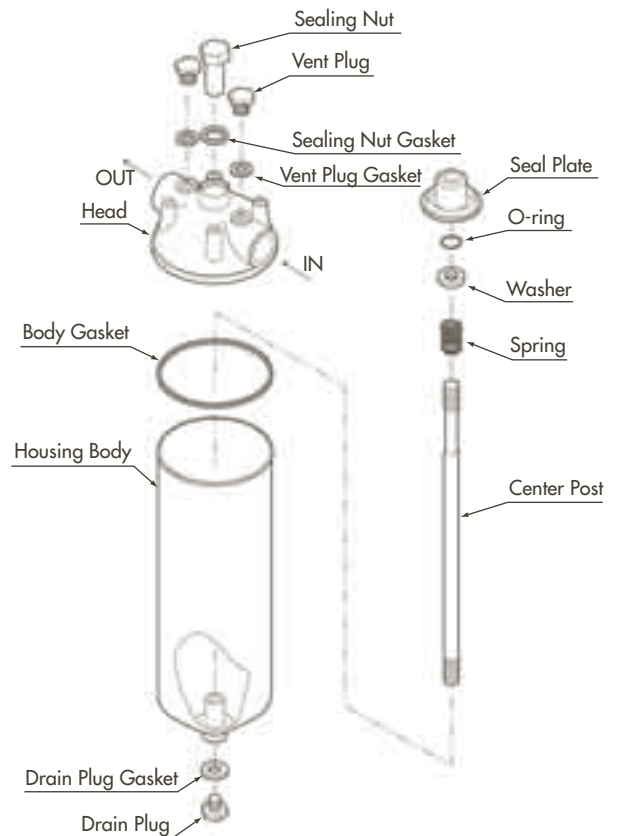
ITS, ITS-2



Stand



Unit with Mounting Kit



Stainless Steel Cartridge Housing – 1TM Type

- 2-part stainless steel housing for 1 pc cartridge filter, consisting of body and head with clamp
- Easily perform cartridge filter replacement by loosening the sealing clamp and removing the housing head
- Few components allows for simple maintenance, and easy operation
- Lightweight housing can be cleaned by a washing machine
- Designed for use with end fixture codes M, H, and L

SPECIFICATIONS

Model		1TM-1S-MV	1TM-2S-MV
Cartridge Capacity		250 mm x 1	500 mm x 1
Cartridge Compatibility		End Fixture Codes: M, H, L	
Inlet/Outlet		1" PT	
Dimensions (mm)	Height	451	704
	Diameter	181	
Max. Operating Pressure		0.49 MPa (71 psi)	
Composition		O-ring: FPM	Head, Body: SUS304
Weight (kg)		1.8	2.2

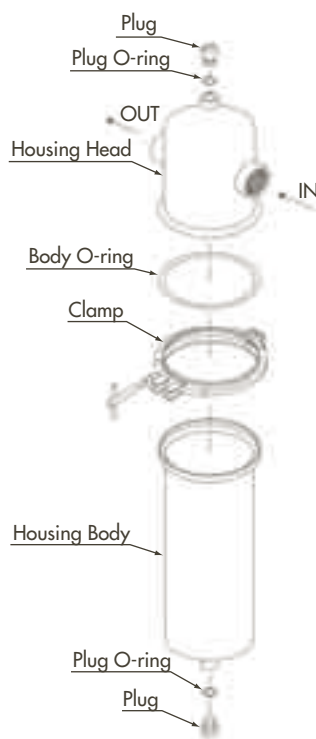
Note: Use thread-sealing tape on tapered inlet and outlet.

ORDERING INFORMATION

Model	1TM-1S-MV	1TM-2S-MV
Catalog No.	26805010	26805020



1TM-1S-MV, 1TM-2S-MV



Sanitary Stainless Steel Cartridge Housing – 1TVA Type

- Sanitary stainless steel housing for 1 pc cartridge filter, with sanitary ferrule type inlet, outlet, and seal for easy inspection and cleaning
- 3½ S-clamp wraps around body and base sections, which can be easily removed for disassembly
- Designed for use with end fixture codes F, C and TCW
- 1TVA Type is compatible with applications that require vented housings

SPECIFICATIONS

Model		1TVA-1S-FS	1TVA-2S-FS	1TVA-3S-FS
Cartridge Capacity		250 mm x 1	500 mm x 1	750 mm x 1
Cartridge Compatibility		End Fixture Codes: F, C and TCW		
Inlet/Outlet		1S Sanitary Fitting		
Dimensions (mm)	Height	408	658	908
	Diameter	200		
Max. Operating Pressure		0.49 MPa (71 psi)		
Composition		Gasket: Silicone, PTFE Ball Valve: SUS316 Body, Base, Clamp: SUS304		
Weight (kg)		3.5	5.0	6.5

Note: Ball valve cannot be sterilized by autoclave.
Use thread-sealing tape on tapered inlet and outlet.

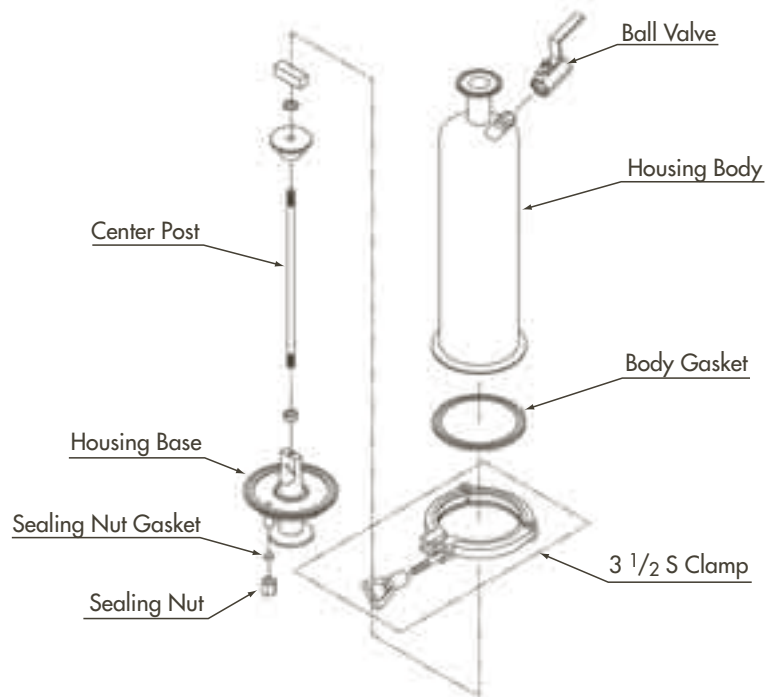
* Please contact us for information on sanitary housings compatible with other filter cartridge end fixture codes.

ORDERING INFORMATION

Model	1TVA-1S-FS	1TVA-2S-FS	1TVA-3S-FS
Catalog No.	26980101	26980102	26980103



1TVA-1S-FS



Sanitary Stainless Steel Cartridge Housing – 1TWA Type

- Sanitary stainless steel housing for 1 pc cartridge filter, with sanitary ferrule type inlet, outlet, and seal for easy inspection and cleaning
- 4S-clamp wraps around body and base sections; 3 $\frac{1}{2}$ S-nut seals the top plate and body
- Designed for use with end fixture codes F, C and TCW
- Inlet/outlet base of 1TWA Type allows unit be placed on short, straight sections of piping

SPECIFICATIONS

Model		1TWA-1S-FS	1TWA-2S-FS	1TWA-3S-FS
Cartridge Capacity		250 mm x 1	500 mm x 1	750 mm x 1
Cartridge Compatibility		End Fixture Codes: F, C and TCW		
Inlet/Outlet		1S Sanitary Fitting		
Dimensions (mm)	Height	412	667	917
	Diameter	183		
Max. Operating Pressure		0.49 MPa (71 psi)		
Composition		Gasket: Silicone Top Plate, Body, Base, Clamp: SUS304		
Weight (kg)		5.4	6.9	9.2

Note: Ball valve cannot be sterilized by autoclave.
Use thread-sealing tape on tapered inlet and outlet.

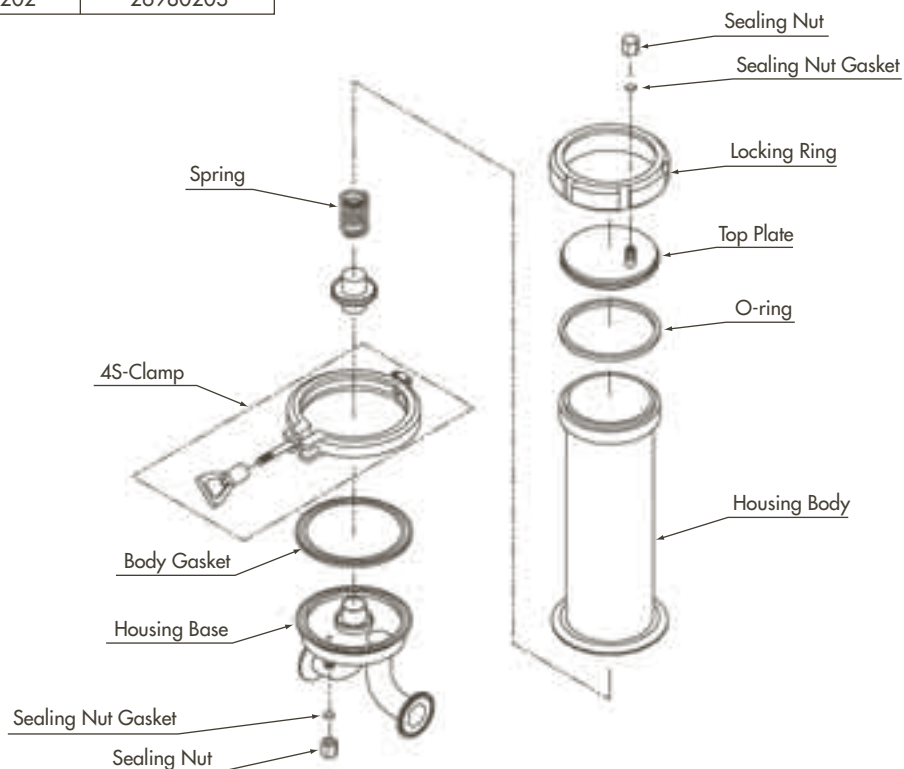
* Please contact us for information on sanitary housings compatible with other filter cartridge end fixture codes.

ORDERING INFORMATION

Model	1TWA-1S-FS	1TWA-2S-FS	1TWA-3S-FS
Catalog No.	26980201	26980202	26980203



1TWA-1S-FS



Polypropylene Cartridge Housing – 1PP Type

- Polypropylene housing for 1 pc cartridge filter, with 3/4" PTF (PT nipple) type inlet and outlet; high quality and economical
- Suitable for sanitary applications, such as pharmaceutical or high purity water filtration; smooth inner walls of housing deter adhesion and accumulation of microbes and minute particles
- Designed for use with end fixture codes F, C and TCW
- Several accessories for mounting the unit are available
- Unit head available with push-button vent

SPECIFICATIONS

Model		1PP-1-FS	1PP-2-FS
Cartridge Capacity		250 mm x 1	500 mm x 1
Cartridge Compatibility			
End Fixture Codes: F, C and TCW			
Inlet/Outlet		3/4" PTF (PT nipple)	
Dimensions (mm)	Height	340	594
	Width	200	
Max. Operating Temperature		60°C	
Max. Operating Pressure		0.49 MPa (71 psi) at 25°C, 0.19 MPa (28 psi) at 60°C	
Composition		Head, Body, Adapter, Drain Cap, Nipple: Polypropylene O-ring: Silicone, FPM, Ethylene-propylene Vent, Adapter Spring: SUS304	
Weight (kg)		0.84	1.3

Note: 1PP Type units are made for liquid filtration only and are not suitable for air filtration.
1PP Type units cannot be sterilized by autoclave.
Use thread-sealing tape on tapered inlet and outlet.

* Please contact us for information on polypropylene housings compatible with other filter cartridge end fixture codes.

ORDERING INFORMATION

Model	1PP-1-FS	1PP-2-FS
Catalog No.	43011000	43021000

OPTIONAL ACCESSORIES

Description		Catalog No.
Housing Stand (SUS304)	1PP-1K (for 1PP-1)	44801010
	1PP-2K (for 1PP-2)	44801020
Mounting Kit (SUS304)		44801030
Tightening Tools (PVC)	1PP-H (for head)	44801040
	1PP-B (for body)	44801050

Customize the unit with:

- Silicone, FPM, or Ethylene-propylene O-rings
- Inlet/outlet pressure gauges
- SUS304, PE-coated SUS304, or titanium adapter springs
- Housing available with SUS304 push-button vent or polypropylene vent (with O-ring seal).

Contact us for more information on these options.



1PP-1, 1PP-2

Acrylic Cartridge Housing – 1PA Type

- Acrylic housing for a single cartridge filter, with $\frac{3}{4}$ " PF type inlet and outlet; high quality and economical
- Transparent housing permits observation of filtration process
- Lightweight yet strong construction; can be assembled by hand
- Designed for use with end fixture codes F, C and TCW

SPECIFICATIONS

Model		1PA
Cartridge Capacity		250 mm x 1
Cartridge Compatibility		End Fixture Codes: F, C and TCW
Inlet/Outlet		$\frac{3}{4}$ " PF ($\frac{3}{4}$ " PFM x $\frac{3}{4}$ " PTM Changeable)
Dimensions (mm)	Height	345
	Width	170
Max. Operating Temperature		38°C
Max. Operating Pressure		0.5 MPa (73 psi) at 38°C
Composition		Head: Polypropylene Body: Acrylonitrile Styrene Resin (acrylic) Body O-ring: Silicone Connector O-ring: NBR
Weight (kg)		1.0

Note: - 1PA Type units are made for aqueous filtration only and are not suitable for air or organic solvent filtration.
 - 1PA Type units cannot be sterilized by autoclave.
 - Units include hand-tightening tool as standard accessory.
 - Use thread-sealing tape on tapered inlet and outlet.

ORDERING INFORMATION

Model	1PA
Catalog No.	26807000

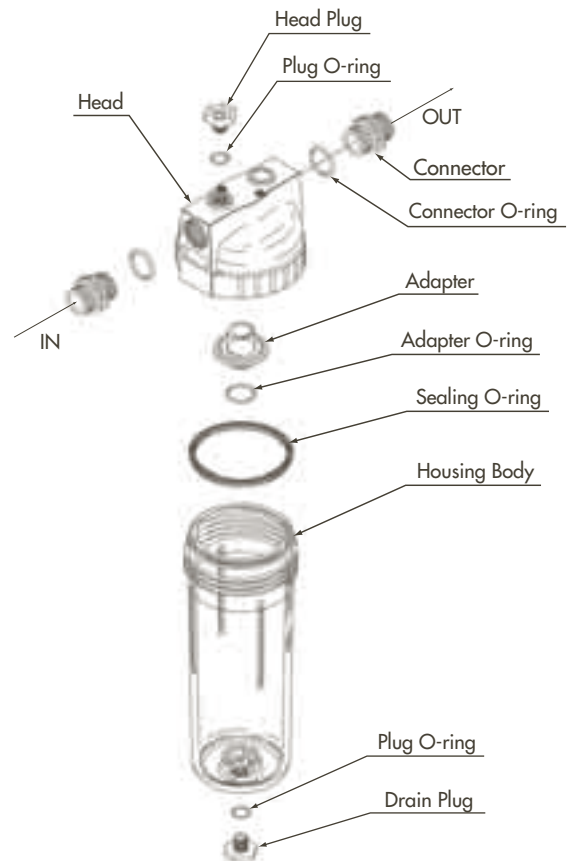
OPTIONAL ACCESSORIES



Model	15mm Hose Adapter	L-shape Mounting Kit	Housing Stand
Composition	Polypropylene	SUS304	SUS304
Catalog No.	28801011	28801022	28801012



1PA



VACUUM FILTRATION

Introduction	80
25 mm Glass Microanalysis Holders	81
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Introduction

Vacuum filtration is used primarily in microbiological and analytical procedures that involve collecting a particulate (bacteria, precipitate, etc.) from a liquid suspension. Liquid poured into a funnel passes through a filter, which retains the particulate, and filtrate can be collected into a filter flask, directly or via a vacuum manifold. Applying vacuum reduces process time compared to gravity flow.

Advantec supplies a wide range of vacuum filter holders and accessories. Select from glass, polysulfone, or stainless steel assemblies with funnels holding from 22 to 1,100 mL. See facing page for more details on supports.

Typical Applications	DNA/RNA hybridization, protein binding, receptor binding studies and gravimetric analysis	Coliform, yeast, mold, total bacteria, sterility testing	Colony hybridization, procedures requiring larger filtration area
Recommended Models			
Glass with glass frit	KG-25	KG-47	KG-90
Glass with stainless steel support	KGS-25	KGS-47	KGS-90
Glass with all-PTFE seal	-	KGS-47-TF	-
Polysulfone	-	KP-47	-
Stainless steel	-	KSF-47	-
Filter Specifications			
Membrane diameter	25 mm	47 mm	90 mm
Filtration area	2.1 cm ²	9.6 cm ² *	43 cm ²

* See individual models for exceptions.

25 mm Glass Microanalysis Holders

- Use for filtering small volumes for biological or particulate contamination
- Available with sintered glass or stainless steel support
- Use stainless steel screen when producing ultra-clean filtrate or when filtering proteinaceous solutions

SPECIFICATIONS

	KG-25	KGS-25
Materials:		
Support screen	Sintered glass	SUS316
Funnel, base	Borosilicate glass	
Stopper	Silicone rubber	
Clamp	Anodized aluminum	
Connection:		
Included	#4 stopper adapts to standard 125 mL vacuum filter flask	
Pressure:	Vacuum	
Weight:	0.19 kg (0.45 lb)	
Membrane Filter Compatibility:		
Filter size	25 mm	
Prefilter size	16 mm	
Filtration area	2.1 cm ²	
Funnel Capacity:	22 mL	



KG-25



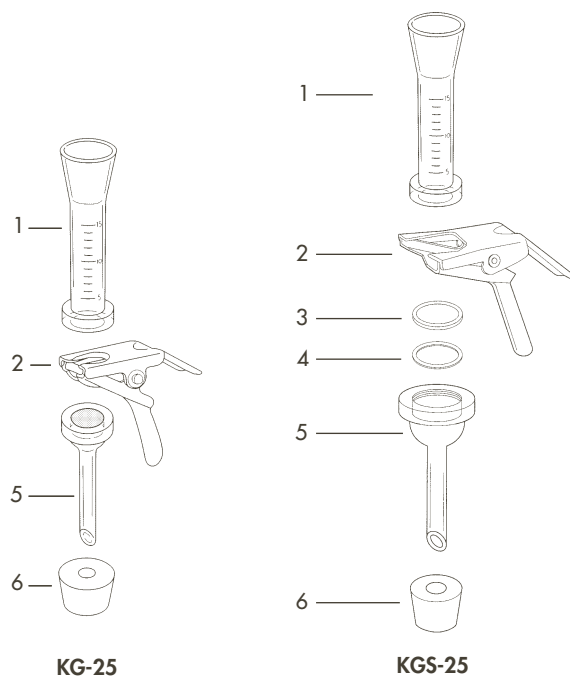
KGS-25

ORDERING INFORMATION

Model	KG-25	KGS-25
Catalog No.	17311200	17311300
Support Type	Sintered glass	Stainless steel screen

Replacement Parts

	KG-25	KGS-25
1	Funnel, 22 mL	
2	Clamp	
3	Support screen (SUS316)	-
4	Gasket (PTFE)	-
5	Base	19311302
6	Stopper, #4	



47 mm Glass Microanalysis Holders

- **Standard size** for microbiology and particulate analysis
- Available with sintered glass or stainless steel

SPECIFICATIONS

	KG-47	KGS-47
Materials:		
Support screen	Sintered glass	SUS316
Funnel, base	Borosilicate glass	
Stopper	Silicone rubber	
Clamp	Anodized aluminum	
Connections (included):	#8A stopper adapts to standard 1 L vacuum filter flask or vacuum manifold cup	
Pressure:	Vacuum	
Weight:	0.6 kg (1.2 lb)	
Membrane Filter Compatibility:		
Filter size	47 mm	
Prefilter size	35 mm	
Filtration area	9.6 cm ²	
Funnel Capacity:	320 mL	

ORDERING INFORMATION

Model	KG-47	KGS-47
Catalog No.	17311400	17311500
Support Type	Sintered glass	Stainless steel screen

Replacement Parts

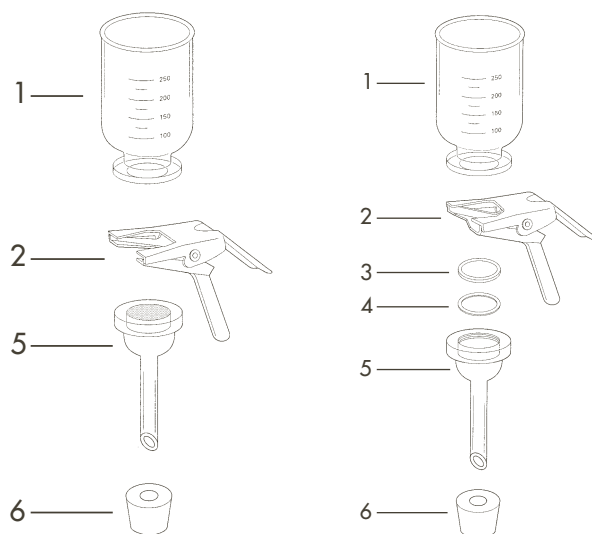
	KG-47	KGS-47
1	Funnel, 320 mL	
2	Clamp	
3	-	Support screen (SUS316)
4	-	Gasket (PTFE)
5	Base	19311502
6	Stopper, #8A	



KG-47



KGS-47



KG-47

KGS-47

47 mm Glass Microanalysis Holders – With All-PTFE Seal

- **Filter sealed between PTFE surfaces:**
 - Bottom of funnel is coated with PTFE
 - PTFE flange covers contact surface on glass base

SPECIFICATIONS

As for corresponding basic model (Page 82) with the addition of PTFE coating on bottom of funnel and PTFE flange for KGS-47-TF.

SPECIFICATIONS

		KGS-47-TF
Materials:		
Support screen		SUS316
Funnel, base		Borosilicate glass
Stopper		Silicone rubber
Clamp		Anodized aluminum
Connections (included):		#8A stopper adapts to standard 1 L vacuum filter flask or vacuum manifold cup
Pressure:		Vacuum
Weight:		0.6 kg (1.2 lb)
Membrane Filter Compatibility:		
Filter size		47 mm
Prefilter size		35 mm
Filtration area		9.6 cm ²



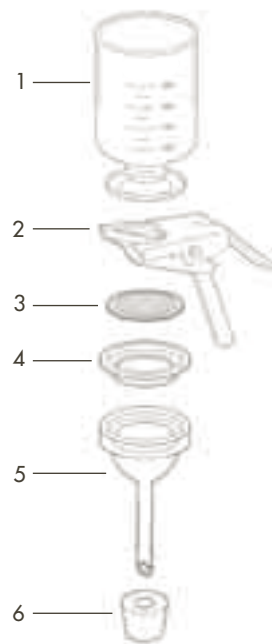
KGS-47-TF

ORDERING INFORMATION

Model	KGS-47-TF
Catalog No.	17311600
Support Type	Stainless steel screen

Replacement Parts

		KGS-47-TF
1	Funnel coated with PTFE, 320 mL	19311601
2	Clamp	19311403
3	Support screen (SUS316)	19311504
4	Flange (PTFE)	19311605
5	Base	19311602
6	Stopper, #8A	19311404



KGS-47-TF

90 mm Glass Microanalysis Holders

- **Larger filtration** area for filtering larger volumes up to 1,000 ml
- **Use for viscous samples** or those with a heavy particle or bioburden that would clog a 47 mm filter
- **Available with sintered glass or stainless steel support**

SPECIFICATIONS

	KG-90	KGS-90
Materials:		
Support screen	Sintered glass	SUS316
Funnel, base	Borosilicate glass	
Stopper	Silicone rubber	
Clamp	Anodized aluminum	
Connection (Included):	#8A stopper adapts to standard 1 L vacuum filter flask or vacuum manifold cup	
Pressure:	Vacuum	
Weight:	1.2 kg (2.82 lb)	
Membrane Filter Compatibility:		
Filter size	90 mm	
Prefilter size	70 mm	
Filtration area	43 cm ²	
Funnel Capacity:	1,100 mL	

ORDERING INFORMATION

Model	KG-90	KGS-90
Catalog No.	17312100	17312200
Support Type	Sintered glass	Stainless steel screen

Replacement Parts

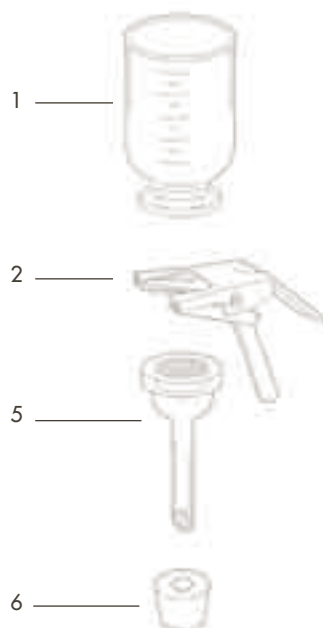
	KG-90	KGS-90
1	Funnel, 1,100 mL	
2	Clamp	
3	-	Support screen (SUS316)
5	Base	Base
6	#8A Stopper	



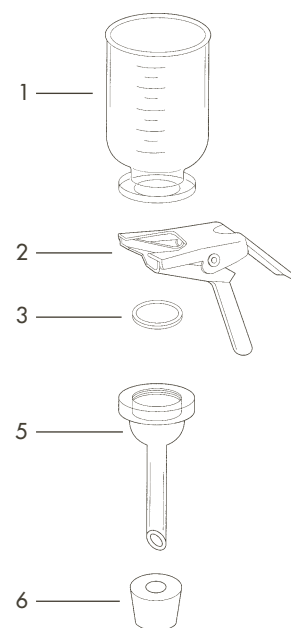
KG-90



KGS-90



KG-90



KGS-90

Stainless Steel Filter Holders – KSF-47

- **Nonbreakable stainless steel unit** may be flame sterilized to sanitize the holder
- **Set pins and a locking nut** on the funnel to help prevent twisting and tearing of the membrane
- **Autoclavable** with membrane in place

SPECIFICATIONS

KSF-47	
Materials:	
Support screen	SUS316
Funnel, base	SUS304
Stopper	Silicone rubber
Gasket	PTFE
Connections (included):	#8A stopper adapts to standard 1 L vacuum filter flask or vacuum manifold cup
Capacity:	
Funnel	500 mL
Pressure:	Vacuum
Weight:	0.5 kg (1.17 lb)
Membrane Filter Compatibility:	
Filter size	47 mm
Prefilter size	35 mm
Filtration area	9.3 cm ²



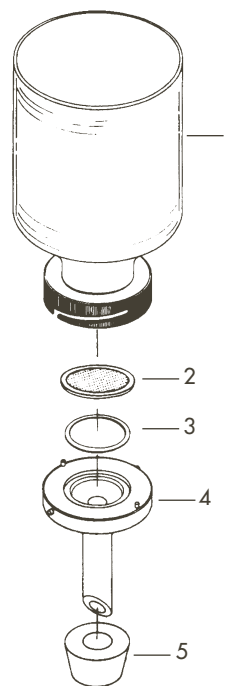
KSF-47

ORDERING INFORMATION

Model	KSF-47
Catalog No.	17312600

Replacement Parts

		KSF-47
1	Funnel	
2	Support screen	19311504
3	PTFE gasket	19311505
4	Base	
5	#8A Stopper	19311404



KSF-47

Polysulfone Filter Holders

- **Can be used aseptically**
- **Recessed filter support** provides sufficient clearance so that the membrane will not twist or tear when the funnel is secured
- **Graduated funnel** in 300 mL (standard) or 500 mL (wide mouth) capacities
- **Receiver flask** (KP-47S) is interchangeable with all other models
- **Funnel cover** can be vented aseptically using disposable syringe filter (13JP050AN, see page 16)



KP-47H



KP-47U



KP-47W



KP-47S

SPECIFICATIONS

	KP-47H	KP-47U	KP-47W	KP-47S
Materials:				
Support screen	Polypropylene			
Funnel and base	Polysulfone			
Receiver flask	-	-	-	Polysulfone
Stopper, O-rings	Silicone rubber			
Caps	-	Silicone rubber	-	Silicone rubber
Vacuum adapter	-	-	-	Polypropylene
Connection:				
Outlet	#8B stopper adapts to standard 1 L vacuum filter flask or vacuum manifold cup; KP-47S screws onto receiver flask			
Receiving flask port	-	-	-	Luer slip
Funnel cover port	-	Luer slip	-	Luer slip
Capacity:				
Funnel	300 mL	300 mL	500 mL	300 mL
Receiver	-	-	-	300 mL
Pressure:				
	Vacuum (25 in Hg maximum)			
Weight:	0.15 kg (0.33 lb.)	0.16 kg (0.36 lb.)	0.15 kg (0.33 lb.)	0.26 kg (0.58 lb.)
Membrane Filter Compatibility:				
Filter size	47 mm			
Pre-filter size	41 mm			
Filtration area	13.5 cm ²			

ORDERING INFORMATION

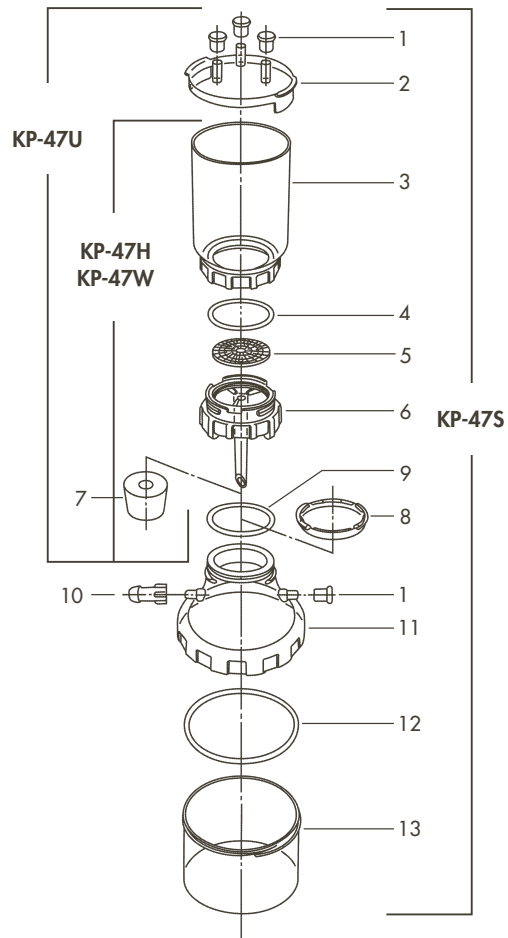
Model	Description	Main Components	Catalog No.
KP-47H	Polysulfone Filter Holder	Funnel, base	43301030
KP-47U	Polysulfone Aseptic Filter Unit	Funnel, base, cover	43301020
KP-47W	Wide Mouth Polysulfone Filter Holder	Funnel, base	43301050
KP-47S	Polysulfone Aseptic Filter System	Funnel, base, cover, receiver	43301010

Replacement Parts – Funnel assembly

Model		KP-47H	KP-47U	KP-47W	KP-47S
Catalog No.		43301030	43301020	43301050	43301010
1	Rubber cap	-	44501010	-	44501010
2	Funnel cover	-	44501001	-	44501001
3	Funnel	44501002		44501102	44501002
4	Funnel O-ring	44501008			
5	Support screen	44501004			
6	Base	44501003			
7	#8B Stopper	19311008			

Replacement Parts – Receiver flask

Model		KP-47S
8	Receiver cover	44501005
9	Receiver adapter O-ring	44501009
10	Vacuum adapter	44501013
11	Receiver adapter	44501007
12	Receiver O-ring	44501015
13	Receiver flask	44501006



PVC Vacuum Manifolds

- **Lightweight**
- **Resistant to acids**
- **Cup** accepts a #8A and #8B stopper to adapt microanalysis units and other devices
- **2-way** valve with PTFE stopcock in PVC body
- Not autoclavable

SPECIFICATIONS

Materials:	
Body and branches	Polyvinylchloride (PVC)
Valves	PTFE stopcock, PVC body
Connections:	
Outlet	1/4" male PT to hose barb fitting connects main manifold to 11 mm ID vacuum tubing
Cup	Accepts #8A and #8B stopper
Temperature:	
Maximum	60°C (140°F)

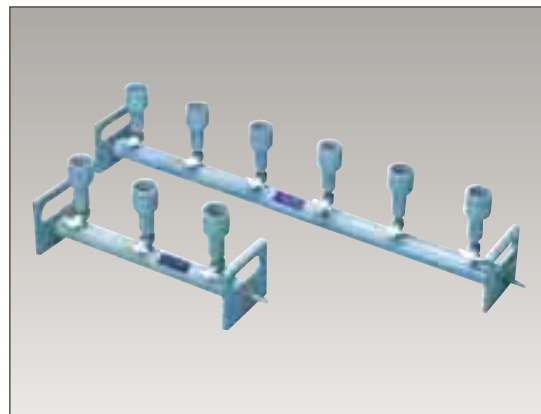
Dimensions:	L x W x H	Distance between stations (center to center)	Weight
	cm		
3 station	45.1 x 12 x 17.8	14	1.5
6 station	87.6 x 12 x 17.8	14	2.5

ORDERING INFORMATION

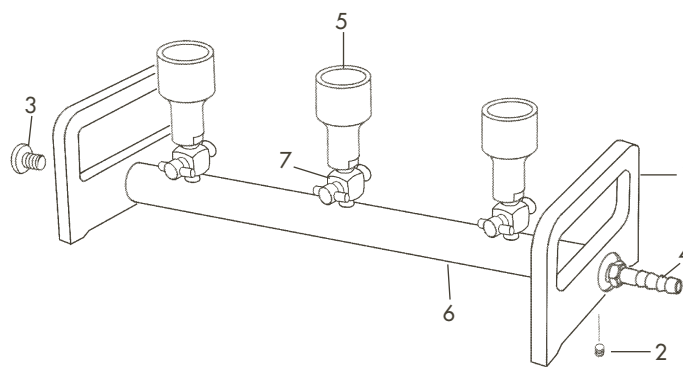
Model	KMP-3	KMP-6
Catalog No.	17313400	17313600
Number of station	3 station	6 station

Replacement Parts

1	Handle	
2	Handle set screw	
3	Pipe plug	
4	PVC Hose barb	19313411
5	Branch (Standard cup)	
6	Main manifold:	
	3 station	
	6 station	
7	Stopcock assembly, 2-way	19313405



KMP-6
KMP-3



KMP-3

Stainless Steel Vacuum Manifolds

- **Autoclavable**
- **3-way valve** is useful when the manifold is used under closed conditions and must be vented to atmosphere without breaking the vacuum connection. 3-way valve vent is female luer slip, accepts standard disposable syringe filter (Page 16) or stainless steel syringe filter holder (KS-13, page 93)
- **Cup** accepts a #8A & #8B stopper to adapt microanalysis units and other devices
- **Sterility Test Manifold** features rear mounted flushing manifold for use in bacteria retentive method

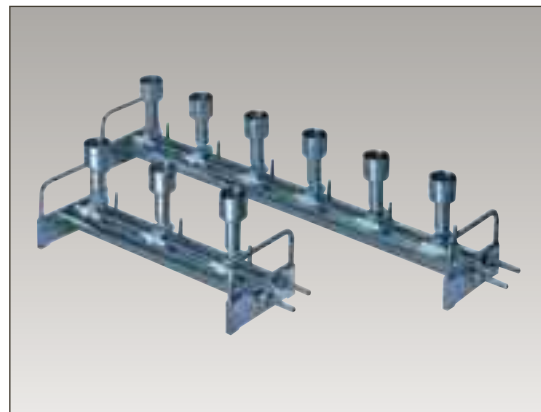
SPECIFICATIONS

Materials:	
Body and branches	Type 304 stainless steel
Valves	PTFE stopcock, chrome plated brass body
Connections:	
Outlet	1/4" male PT to hose barb fitting connects main manifold to 11mm ID vacuum tubing
Standard cup	Accepts #8A and #8B stopper

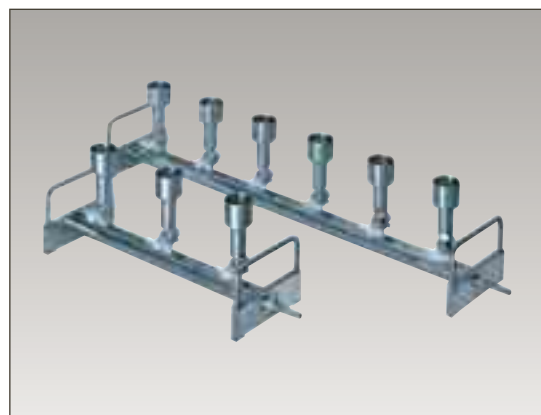
Dimensions:	L x W x H	Distance between stations (center to center)	Weight
	cm		
3 station	45.7 x 12 x 17.8	14	5.0
6 station	72.4 x 12 x 17.8	14	8.0

ORDERING INFORMATION

Model	KM-3N	KM-6N	KM-3	KM-6
Catalog No	17313100	17313300	17313000	17313200
Number of Station	3 station	6 station	3 station	6 station
Flushing Manifold	-	-	○	○



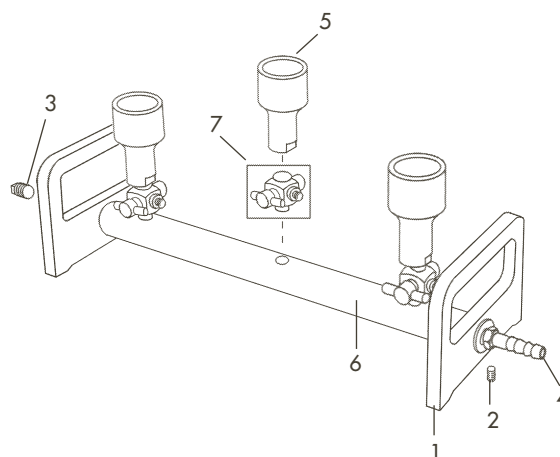
KM-3 · 6



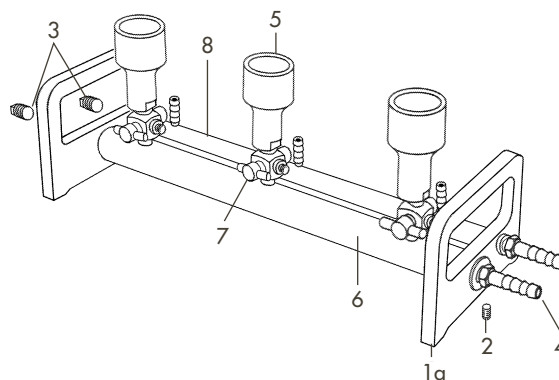
KM-3N · 6N

Replacement Parts

1	Handle standard	
1a	Handle (sterility test)	
2	Handle set screw	
3	Pipe plug	
4	Hose barb	19313011
5	Cup	
6	Main manifold:	
	3 station	
	6 station	
7	3-way stopcock assembly	19313005
8	Flushing manifold (sterility test):	
	3 station	
	6 station	



KM3-N



KM-3

PRESSURE FILTRATION

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Introduction

Pressure type filter holders can be used for ultracleaning or sterilizing liquids and gases. Advantec holders have been designed to maximize flow rates and to minimize holder resistance and can be used in either batch or continuous filtration procedures.

Advantages of Pressure Filtration

- Higher differential pressures are possible, resulting in higher flow rates. The pressure differential across the membrane is not limited to atmospheric pressure (≥ 14.7 psi)
- Unintentional contamination downstream of the membrane is minimized
- Denaturation of proteins and other biological polymers due to foaming downstream of the membrane is avoided
- Vapor accumulation and possible explosion can be avoided using an inert gas to pressurize solvents and combustible or flammable liquids

RECOMMENDED PRESSURE FILTER HOLDERS FOR TYPICAL APPLICATIONS AND VOLUMES

	Volume to be Filtered					
	<10 mL	<50 mL	<1 liter	<5 liters	<20 liters	>20 liters
Typical Applications	Enzymes, Radiolabeled samples	Proteins, enzymes, Radiolabeled samples, gases	Biological media, electrolyte solution for counters, gases	Biological media, ultrapure water, serum, gases	Biological media, ultrapure water, serum, gases	Pharmaceuticals, cosmetics, large scale biologicals
Recommended Models						
Luer Connection	KS-13	KS-25 PP-25 PFA-25	PP-47	-	-	-
Threaded Connection	-	LS-25	KS-47 LS-47 LS-47-HP PP-47 PFA-47	KS-90 KS-90-UH	KS-142 KS-142-UH	KS-293 KS-293-UH
Sanitary Connection	-	KS-25F	KS-47F	KS-90-ST	KS-142-ST	KS-293-ST
Holders with Reservoir	-	-	KST-47	KST-90	KST-142	-
Filter Specifications						
Membrane Diameter (mm)	13	25	47	90	142	293
Prefilter Diameter* ¹ (mm)	8	21 or 25	35, 38, 42 or 47	76	124	257
Filtration Area (cm ²)	0.9	3.5 or 3.8	12.5 or 13.5	45.3	113	530

*1. Prefilter size varies with model – refer to individual model specifications before choosing a prefilter.

Stainless Steel Syringe Holders

- **Can be sterilized** by standard procedures including autoclaving
- **Luer fittings** fit typical syringes
- **Can be tightened securely**, wrench set included

APPLICATIONS

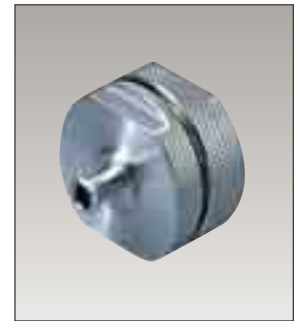
- Filter or clean small volumes of liquid such as eyewash or photoresist
- Clear turbid solutions such as serum
- Purify virus solutions

SPECIFICATIONS

	KS-13	KS-25
Materials:		
Body and support screen	SUS304	
Gasket	PTFE	
O-ring	PTFE	
Connections:		
Inlet	Female Luer-lock	
Outlet	Male Luer slip	
Dead volume	0.2 mL	0.4 mL
Pressure:		
Inlet	0.68 MPa (99 psi)	
Differential	0.29 MPa (42 psi)	
Membrane Compatibility:		
Filter size	13 mm	25 mm
Pre-filter size	8 mm	21 mm
Filtration area	0.9 cm ²	3.8 cm ²
Dimensions:		
Diameter	16 mm (0.6")	33 mm (1.30")
Length	39 mm (1.54")	36 mm (1.42")
Weight:	0.1 kg (0.25 lb)	0.2 kg (0.38 lb)



KS-13



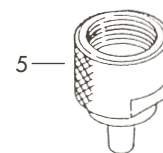
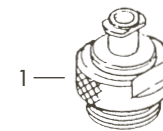
KS-25

ORDERING INFORMATION

Model	KS-13	KS-25
Catalog No.	17301000	17301200

Replacement Parts

		KS-13	KS-25
1	Inlet, male		
2	O-ring (PTFE)	19301004	19301204
3	Support screen (SUS304)	19301003	19301203
4	Gasket (PTFE)	19301002	19301202
5	Outlet, female		



KS-13

Stainless Steel Gas Line Holders

- **Female threaded locking ring** enables filter changes without removing the holder from connecting gas lines
- **Dual support screens** protect the membrane filter from reverse pressure surges and allow forward and reverse flow from either inlet or outlet

APPLICATIONS

- Ultraclean and sterilize air and other gases including compressed gases
- In-line between pressurizing source (pump or gas cylinder) and dispensing vessel



LS-25



LS-47

SPECIFICATIONS

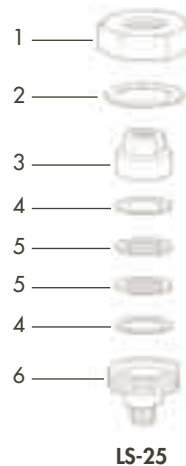
	LS-25	LS-47
Materials:		
Body and support screen	SUS304	
Locking ring	Chrome-plated brass	
Gaskets	PTFE	
O-ring (standard)	PTFE	Silicone
Connections:		
Inlet	1/4" NPTF	
Outlet	1/4" NPTM	
Pressure:		
Inlet	0.49 MPa (71 psi)	
Differential	0.19 MPa (29 psi)	
Filter Specifications:		
Filter size	25 mm	47 mm
Prefilter size	25 mm	47 mm
Filtration area	3.8 cm ²	12.5 cm ²
Dimensions:		
Diameter	38 mm (1.5")	69 mm (2.7")
Length	50 mm (2.0")	57 mm (2.2")
Weight:	0.3 kg (0.63 lb)	0.8 kg (1.75 lb)

ORDERING INFORMATION

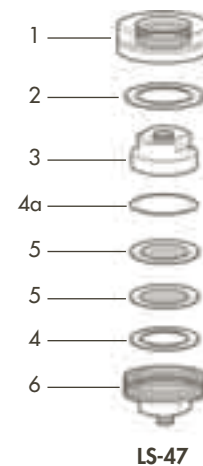
Model	LS-25	LS-47
Catalog No.	17304500	17304700

Replacement Parts, Accessories, and Optional O-rings

	LS-25	LS-47
1	Locking ring (Chrome - plated brass)	
2	19304504	19304704
3	Inlet body (1/4" NPTF)	
4	19301202	19304702
4a	-	19304712
5	19301203	19304703
6	Outlet body (1/4" NPTM)	



LS-25



LS-47

High Pressure Stainless Steel Holder

- **Operate at high pressure**, up to 9.8 MPa (1420 psi)
- **Standard Viton O-rings** compatible with many aggressive liquids and gases
- **Back pressure support screen available** to prevent membrane rupture and deflect flow at very high pressures

APPLICATIONS

- Filter liquids or gases under high pressure

SPECIFICATIONS

	LS-47-HP
Materials:	
Body and support screen	SUS304
O-rings	FPM
Connections:	
Inlet and Outlet	1/4" NPTF
Pressure:	
Inlet	9.8 MPa (1422 psi)
Differential	1.9 MPa (276 psi)
Dead volume:	
Upstream	3 mL
Downstream	6.5 mL
Membrane Compatibility:	
Membrane filter size	47 mm
Prefilter size	38 mm
Filtration area	12.5 cm ²
Dimensions:	
Diameter	88 mm (3.5")
Height (including adapters)	94 mm (3.7")
Weight:	2.7 kg (6.0 lb)

ORDERING INFORMATION

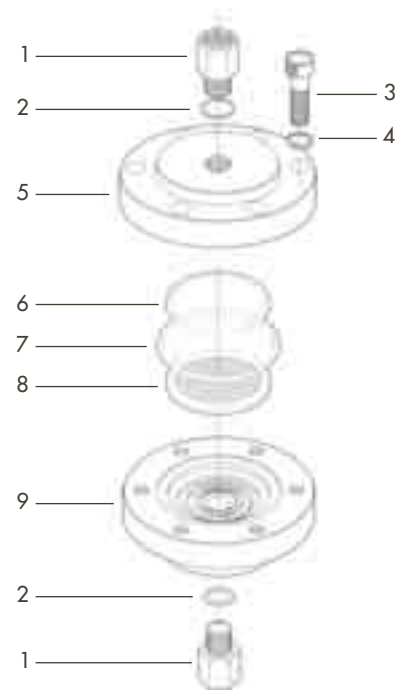
Model	LS-47-HP
Catalog No.	17304900

Replacement Parts and Accessories

	LS-47-HP	
1	Inlet/outlet adapter	
2	Adapter O-ring	19304905
3	Hex cap screw, M-8	
4	Cap screw washer	
5	Inlet plate	
6	Inner O-ring	19304906
7	Outer O-ring	19304910
8	Support screen (SUS304)	19304903
9	Outlet plate	



LS-47-HP



LS-47-HP

Polypropylene In-Line and Aerosol Holders

- **Compatible** with a wide range of chemicals and temperatures
- **Exterior locking ring** design allows the unit to be assembled quickly and efficiently without tearing the membrane

APPLICATIONS

- Ultraclean and sterilize liquids
- Aseptic sampling of liquids or gases at point-of-use
- Environmental air sampling (PPO-47)



Polypropylene In-Line and Aerosol Holders

SPECIFICATIONS

	PP-25	PP-47	PPO-47
Materials:			
Body and support screen	Polypropylene		
O-rings (standard)	Silicone		Silicone/PTFE
Connections:			
Inlet	Female Luer-Lock	Combination 1/4" NPTM, Female Luer slip	Open Face
Outlet	Male Luer slip	Combination 1/4" NPTM, Female Luer slip	Combination 1/4" NPTM, Female Luer slip
Pressure:			
Maximum operating	0.29 MPa (42 psi)	0.49 MPa (71 psi)	-
Temperature:			
Maximum operating	80°C (176°F)		
Autoclave	121°C (250°F), 15 psi, 20 min slow exhaust only		
Filter Specifications:			
Filter size	25 mm	47 mm	
Prefilter size	21 mm	42 mm	-
Filtration area	3.5 cm ²	13.5 cm ²	
Recommended volume	<50 mL	Up to 1 liter	-
Dimensions:			
Diameter	30 mm (1.2")	65 mm (2.6")	
Height	30 mm (1.2")	50 mm (2.0")	40 mm (1.6")
Weight:	0.41 oz (12g)	1.2 oz (47g)	1.4 oz (40g)

ORDERING INFORMATION

Model	PP-25	PP-47	PPO-47
Catalog No.	43303010	43303020	43305010
Package (pc/box)	6	1	

Typical initial liquid flow rates (in mL/min)

Membrane Pore size (µm)	PP-25	PP-47
0.20	35	250
0.45	80	600
1.00	320	1,700
3.00	740	2,800

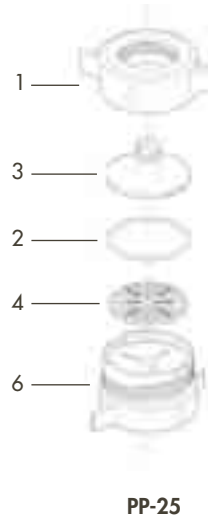
Conditions: Initial flow rates of water being filtered through a mixed cellulose esters (MCE) at a differential pressure of 1 kg/cm² (14 psi) at 20°C.

Replacement Parts and Optional O-rings

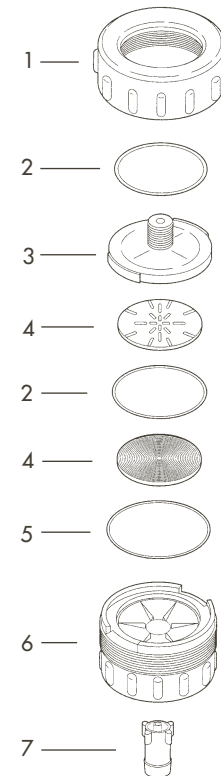
		PP-25
1	Locking ring, outer	44540101
2	Inlet cap O-ring (silicone)	44540106
3	Inlet cap	44540102
4	Support screen	44540104
6	Outlet base	44540103

		PP-47
1	Locking ring, outer	44501201
2	Inlet cap O-ring (silicone)	44501204
3	Inlet cap	44501202
4	Support screen	44501004
5	Outlet base O-ring (silicone)	44501208
6	Outlet base	44501203
7	Outlet adapter (male luer slip to hose barb)	44501013

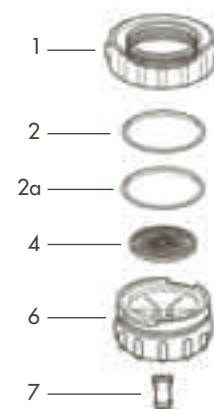
		PPO-47
1	Locking ring, outer	44501201
2	Inlet cap O-ring (silicone)	44501204
2a	Sealing O-ring (PTFE)	44501301
4	Support screen	44501004
6	Outlet base	44501203
7	Outlet adapter (male luer slip to hose barb)	44501013



PP-25



PP-47



PPO-47

PFA In-Line Filter Holders

- **Superior chemical compatibility** – can be used with chemically aggressive liquids
- **Dual support screens** allow for flow in either direction
- **Exterior locking ring** for quick assembly without tearing the membrane

APPLICATIONS

- Sterilize and ultraclean liquids under positive pressure
- Ideal for filtering small volumes of high purity acids, alkalis or organic solvents

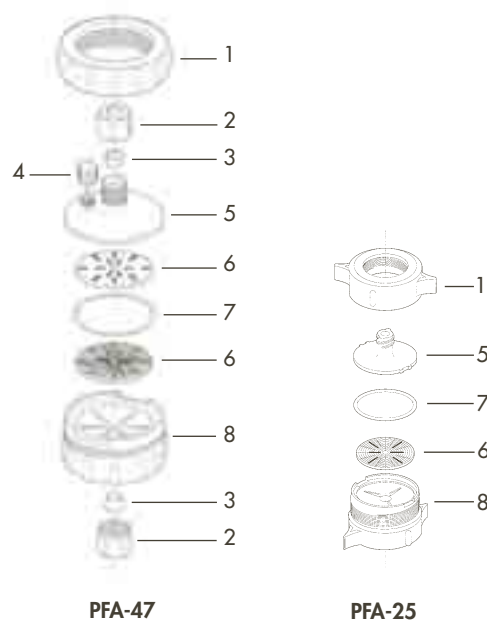
Note: PFA-47 unit has an air/bleed vent

SPECIFICATIONS

	PFA-25	PFA-47
Materials:		
Body and support screen	PFA	
O-ring (standard)	Locking ring on PFA 47: ETFE glass fiber filled PFA	
	Perfluoroelastomer	
Connections:		
Inlet	Female Luer-Lock	Combination 1/4" NPTM, 1/4" tubing adapter
Outlet	Male Luer slip	
Pressure:		
Maximum operating	0.29 MPa (42 psi)	
Temperature:		
Maximum operating	121°C (250°F)	
Autoclave	121°C (250°F), 15 min	
Weight:	0.8 oz (22g)	5.2 oz (120g)
Dimensions:		
Diameter	32 mm (1.3")	65 mm (2.6")
Height	32 mm (1.3")	70 mm (2.8")
Membrane Compatibility:		
Filter size	25 mm	47 mm
Prefilter size	21 mm	42 mm
Filtration area	3.5 cm ²	13.5 cm ²
Flow Rate:		
Pore size (PTFE membrane)	Typical methanol flow rate at 1 kg/cm ² , 20°C	
0.2 µm (T020)	60 mL/min	400 mL/min
0.5 µm (T050)	150 mL/min	700 mL/min
1.0 µm (T100)	350 mL/min	1200 mL/min



PFA-25, PFA-47



ORDERING INFORMATION

Model	PFA-25	PFA-47
Catalog No.	43307010	43307020

Replacement Parts

		PFA-25	PFA-47
1	Locking ring	44530201	44530101
2	Inlet/Outlet adapter	-	44530111
3	Tubing adapter	-	44530110
4	Vent cap	-	44530105
5	Inlet cap	44530202	44530102
6	Support screen	44530204	44530104
7	Inlet O-ring	44530206	44530106
8	Outlet	44530203	44530103

Sanitary In-Line Stainless Steel Holders

- **Sanitary inlet and outlet connections** are non-threaded and can be completely disassembled for thorough cleaning
- **47 mm holder features vent** to allow air venting on upstream side of the membrane at any time during filtration

APPLICATIONS

- Point of use filtration on sterile filling machines
- Flow decay studies for scale up to larger filtration systems
- Liquid or gas

SPECIFICATIONS

	KS-25F	KS-47F
Materials:		
Body and support screen	SUS304	
O-rings	FPM and Silicone	
Gasket	PTFE	
Connections:		
Inlet/Outlet	6 mm (0.24") OD barb	8 mm (0.32") OD barb
Pressure:		
Inlet	0.49 MPa (71 psi)	
Differential	0.29 MPa (42 psi)	
Weight:	0.45 kg (1 lb)	0.9 kg (2 lb)
Dimensions:		
Diameter (without clamp)	50 mm (2.0")	64 mm (2.5")
Length (with vent valve)	72 mm (2.8")	78 mm (3.1")
Membrane Compatibility:		
Filter size	25 mm	47 mm
Prefilter size	21 mm	35 mm (47 mm)*
Filtration area	3.8 cm ³	12.5 cm ²

* If a membrane filter is used as a prefilter, use a 47 mm filter and place a polyester mesh separator between the 2 membranes (See page 14).

ORDERING INFORMATION

Model	KS-25F	KS-47F
Catalog No.	17307000	17307200

Replacement Parts

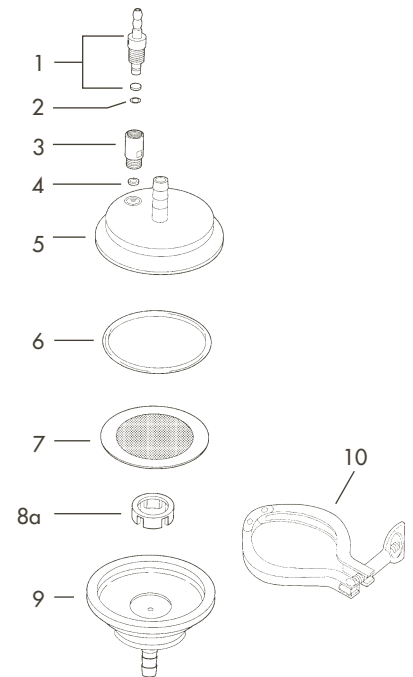
	KS-25F	KS-47F
1		
2	-	19307220
3		
4		
4	-	19307208
5	/	
6	19307003	19304712
7	19301203	19304703
8	19307004	-
8a	-	19307204
9	/	
10	19306000	19306300



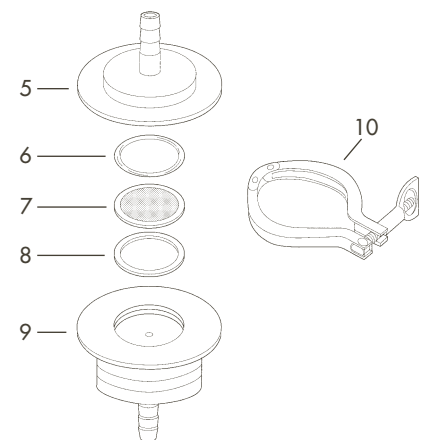
KS-25F



KS-47F



KS-47F



KS-25F

Vented In-Line Stainless Steel Holder

- **Support screen is PTFE coated** to prevent membrane sticking during autoclaving
- **Back pressure support screen** prevents membrane rupture during reverse pressure surges
- **Vent valve** in inlet body enables venting at any time during filtration

APPLICATIONS

- Sterilize and ultraclean liquids or gases under positive pressure
- Sterilize with a membrane in place for microbiological studies
- Install for point of use filtration on filling machines

Note: When using the KS-47 inline to filter gases, a second support screen should be used upstream of the membrane



KS-47

SPECIFICATIONS

		KS-47
Materials:		
Body and support screen		SUS304
O-rings (standard)		FPM and silicone
Support screen		PTFE coated stainless steel
Gasket		PTFE
Connections:		
Inlet/Outlet		1/4" PS to hose barb (9.5 mm)
Pressure:		
Inlet		0.68 MPa (99 psi)
Differential		0.29 MPa (42 psi)
Dead Volume:		
Upstream		5 mL
Downstream		2 mL
Weight:		
		0.8 kg (1.8 lb)
Membrane Compatibility:		
Filter size		47 mm
Prefilter size		35 mm (47 mm)*
Filtration size		12.5 cm ²

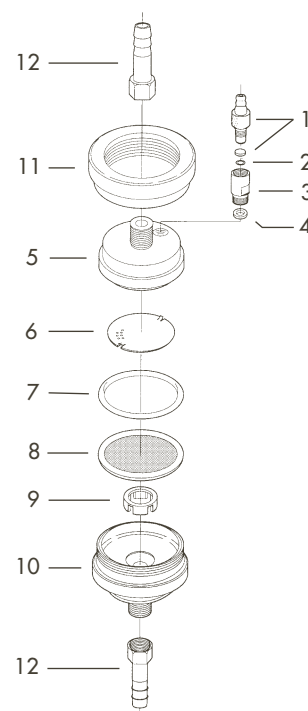
* If a membrane filter is used as a prefilter, use a 47 mm filter and place a polyester mesh separator between the 2 membranes (See page 14).

Replacement Parts

		KS-47
1	Vent valve set	19307220
2		
3		
4		
5	Inlet body	
6	Back pressure support	19307404
7	O-ring (silicone)	19304712
8	Support screen (SUS304)	19304715
9	Underdrain support	19307204
10	Outlet body	
11	Locking ring	
12	Inlet/outlet adapter	19301510
	Gasket for inlet/outlet adapter	19321014

ORDERING INFORMATION

Model	KS-47
Catalog No.	17307400



KS-47

Large Standard Stainless Steel Holders – 90, 142, 293mm

- **Seal membrane by hand tightening** locking wing nuts
- **Optimal holder design** minimizes resistance and maximizes flow rate
- **Each unit labeled** with identifying serial numbers on the outside of both the inlet and outlet plates

APPLICATIONS

- Use in-line for filtering gases or liquids
- Use with pressure vessel for batch type operations



KS-90

SPECIFICATIONS

	KS-90	KS-142	KS-293
Materials:			
Body	SUS304		
Support screen	PTFE coated photoetched stainless steel		
O-rings (standard)	Silicone		
Gasket	PTFE		
Connections:			
Inlet / Outlet	3/4" PS to 11 mm (3/8") hose barb	3/4" PS to 16 mm (5/8") hose barb	
Pressure:			
Inlet	0.68 MPa (99 psi)		
Differential	0.29 MPa (42 psi)		
Weight:	4 kg (8.8 lb)	6 kg (13 lb)	19 kg (42 lb)
Membrane Compatibility:			
Membrane filter size	90 mm	142 mm	293 mm
Prefilter size	76 mm	124 mm	257 mm
Filtration area	45.3 cm ²	113 cm ²	530 cm ²

Supplied with aluminum wrench (spanner) and 6 mm allen wrench (hex key).

ORDERING INFORMATION

Model	KS-90	KS-142	KS-293
Catalog No.	17301700	17301900	17302500



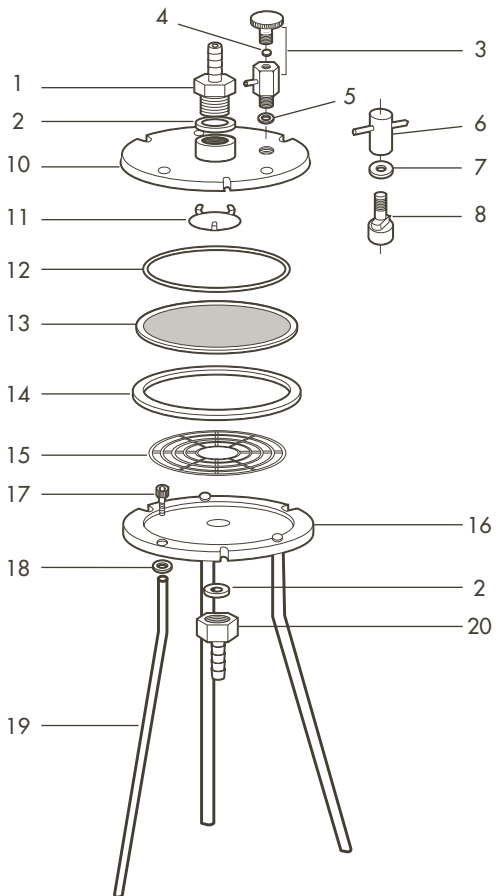
KS-142



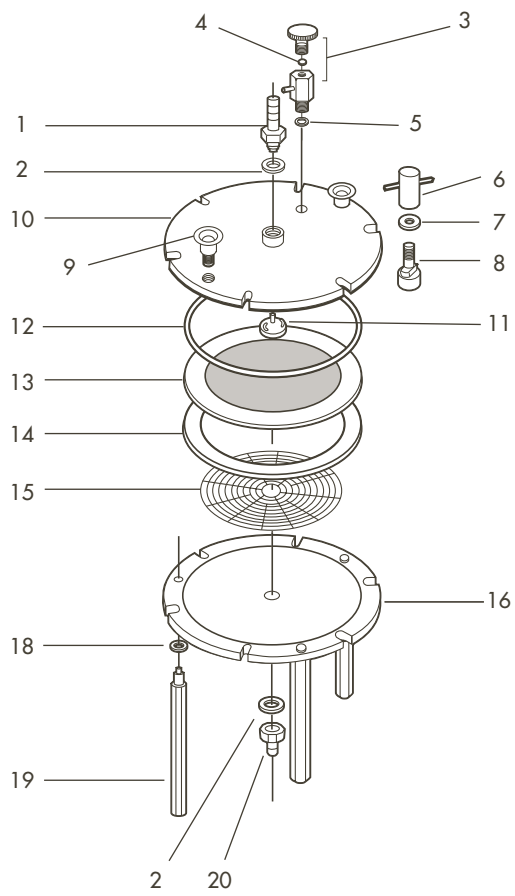
KS-293

Replacement Parts

		Material	KS-90	KS-142	KS-293
1	3/4" PSM Inlet adapter	SUS304	19301713		19302510
2	Gasket for Inlet adapter	PTFE	19301710		
3	Vent valve	SUS304	19301711	19301911	
4	Stopsheet for vent valve	PTFE			
5	Gasket for vent valve	PTFE	19301712	19301912	19302512
6	Sealing wing nut	SUS304	-	19301770	19301773
7	Sealing washer	SUS304			
8	Sealing bolt	SUS304			
9	Handle for Inlet plate	SUS304	-	-	
10	Inlet plate	SUS304			
11	Flow deflector	SUS304			
12	O-ring	Silicone	19301705	19301905	19302505
13	Support screen	PTFE coated SS	19301704	19301904	19302504
14	Gasket	PTFE	19301703	19301903	19302503
15	Underdrain support	SUS304	19301702	19301902	19302502
16	Outlet plate	SUS304			
17	Leg bolt	SUS304	19301760		-
18	Leg washer	SUS304			
19	Leg	SUS304			
20	3/4" PSF Outlet adapter	SUS304	19301717		19302511



KS-142



KS-293

Large Sanitary Stainless Steel Holders – 90, 142, 293 mm

- **Sanitary connections** are threadless and can be completely disassembled for thorough cleaning
- **Designed for minimal resistance and maximal flow**
- **Removable wing nuts** tighten easily by hand to seal membrane
- **Both inlet and outlet plates clearly marked** with identifying serial number

APPLICATIONS

- Ultraclean or sterilize gases or liquids
- Use with a pressure vessel for large volumes and batch type operations



KS-90-ST

SPECIFICATIONS

	KS-90-ST	KS-142-ST	KS-293-ST
Materials:			
Body	SUS304		
Support screen	PTFE coated photoetched stainless steel		
O-rings (standard)	Silicone		
Gasket	PTFE		
Connections:			
Inlet / Outlet	1" sanitary fitting to 16 mm (5/8") hose barb		1.5" sanitary fitting to 16 mm (5/8") hose barb
Pressure:			
Inlet	0.68 MPa (99 psi)		
Differential	0.29 MPa (42 psi)		
Weight:	4 kg (8.8 lb)	6 kg (13 lb)	19 kg (42 lb)
Membrane Compatibility:			
Membrane filter size	90 mm	142 mm	293 mm
Prefilter size	76 mm	124 mm	257 mm
Filtration area	45.3 cm ²	113 cm ²	530 cm ²

Supplied with aluminum wrench (spanner) and 6 mm allen wrench (hex key).



KS-142-ST



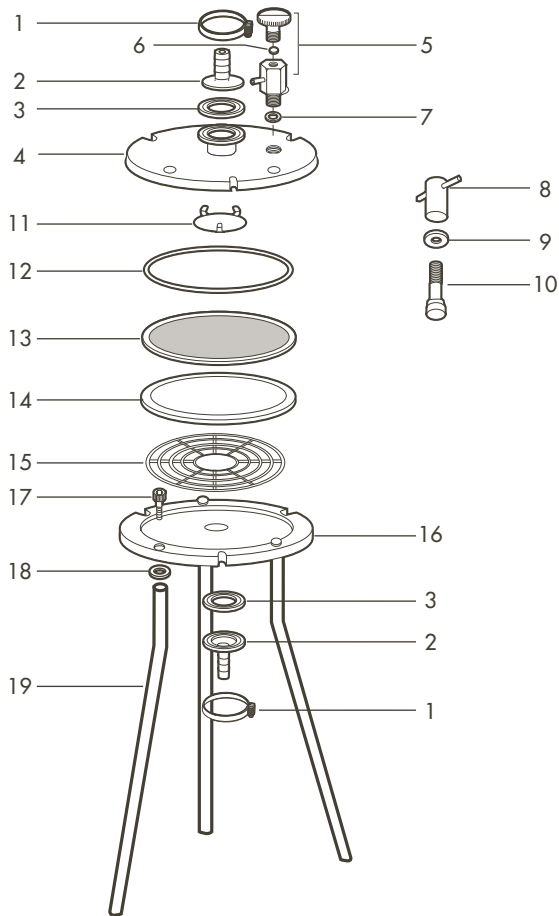
KS-293-ST

ORDERING INFORMATION

Model	KS-90-ST	KS-142-ST	KS-293-ST
Catalog No.	17301800	17302100	17302700

Replacement Parts

		Material	KS-90-ST	KS-142-ST	KS-293-ST
1	Clamp, 1.5S	SUS304	19306000		
2	Inlet/Outlet adapter	SUS304	19306200		
3	Inlet/Outlet Gasket	Silicone	19306100	19306108	
4	Inlet plate	SUS304			
5	Vent valve	SUS304	19301711	19301911	
6	Stopsheet for vent valve	PTFE			
7	Gasket for vent valve	PTFE	19301712	19301912	19302512
8	Sealing wing nut	SUS304	19301770		19301773
9	Sealing washer	SUS304			
10	Sealing bolt	SUS304			
11	Flow deflector	SUS304			
12	O-ring	Silicone	19301705	19301905	19302505
13	Support screen	PTFE coated SS	19301704	19301904	19302504
14	Gasket	PTFE	19301703	19301903	19302503
15	Underdrain support	SUS304	19301702	19301902	19302502
16	Outlet plate	SUS304			
17	Leg bolt	SUS304	19301760		-
18	Leg washer	SUS304			
19	Leg	SUS304			



KS-142-ST

Large Stainless Steel Holders with Reservoirs

- **Designed for filtering small batches** of liquid without having to use a separate pressure vessel
- **Separate ports** for pressurizing the reservoir and for adding additional sample
- **Membrane sealed internally** by hand-tightening locking wing nuts

APPLICATIONS

- Sterilizing, ultracleaning, and flow decay tests for pilot studies
- Suitable for hazardous toxicity testing and TCLP
- Optional back pressure screen recommended for intermittent fill operations



KST-47



KST-90



KST-142

SPECIFICATIONS

	KST-47	KST-90	KST-142
Materials:			
Body	SUS304		
Support screen	Photoetched SUS304	PTFE coated photoetched SUS304	
O-rings (standard)	Silicone		
Gasket (standard)	Silicone/PTFE	PTFE	
Connections:			
Inlet	1/4" PS	1/4" PT	
Inlet adapter	Stepped hose barb (7 mm, 10.5mm, 13mm)		Ball valve with stepped hose barb (7 mm, 10.5 mm, 13 mm)
Outlet	1/4" PS	3/4" PS	
Outlet adapter	9.5 mm hose barb	11 mm hose barb	
Pressure:			
Inlet	0.49 MPa (71 psi)		
Differential	0.29 MPa (42 psi)		
Vent relief valve	0.44 ± 0.04 MPa (64 ± 6 psi)		
Weight:	1 kg (2.2 lb)	5 kg (11 lb)	6 kg (13 lb)
Capacity:	200 mL	750 mL	1,500mL
Membrane Compatibility:			
Membrane filter size	47 mm	90 mm	142 mm
Prefilter size	35 mm	76 mm	124 mm
Filtration area	12.5 cm ²	45.3 cm ²	113 cm ²

Supplied with aluminum wrench (spanner) and 6 mm allen wrench (hex key) except KST-47.

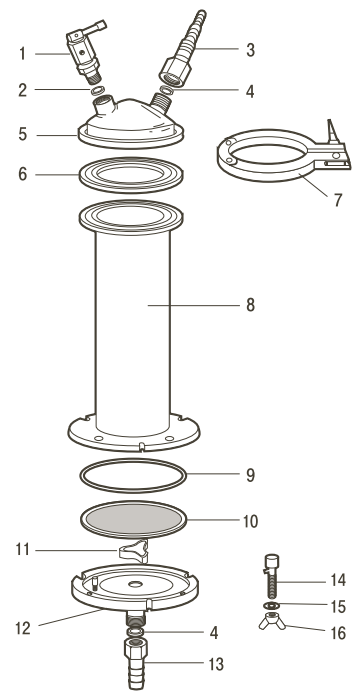
ORDERING INFORMATION

	KST-47	KST-90	KST-142
Catalog No.	17301500	17301600	17302300

Assemblies are available with PTFE coating by special order.

Replacement Parts

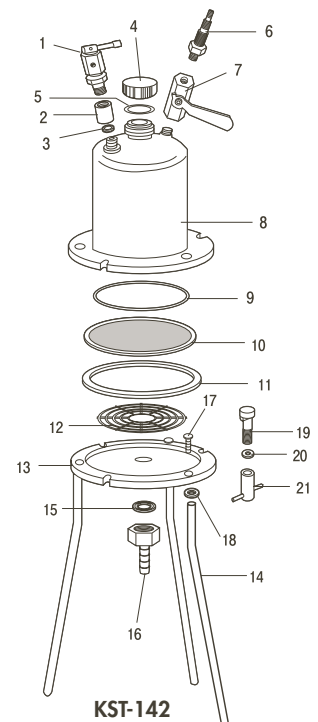
		Material	KST-47
1	Vent relief valve	SUS304/FPM	19301525
2	Gasket for vent relief valve	PTFE	19301509
3	Inlet adapter (1/4" PSF hose barb)	SUS304	19321011
4	Gasket for Inlet adapter	PTFE	19321014
5	Inlet Cap	SUS304	
6	Inlet Cap Gasket	Silicone	19306108
7	Clamp, 1.5S	SUS304	19306000
8	Reservoir	SUS304	
9	O-ring	Silicone	19304712
10	Support screen	SUS304	19304703
11	Underdrain support	SUS304	19301515
12	Outlet plate	SUS304	
13	Outlet adapter (1/4" PSF hose barb)	SUS304	19301510
14	Wing-type bolt	SUS304	19301178
15	Sealing washer	SUS304	
16	Wing-type nut	SUS304	



KST-47

Replacement Parts

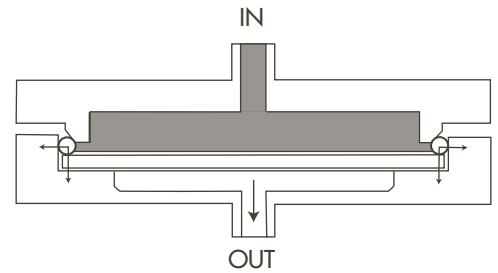
		Material	KST-90	KST-142
1	Vent relief valve	SUS304/FPM		19321025
2	Vent Socket	SUS304		19302314
3	Gasket for vent relief valve	PTFE		19321014
4	Inlet Cap	SUS304	19301610	19302310
5	Inlet Cap O-ring	Silicone	19301609	19302309
6	Inlet adapter (1/4" PTM hose barb)	SUS304	19321611	
7	Valve	SUS304	19302320	
8	Reservoir	SUS304		
9	O-ring	Silicone	19301705	19301905
10	Support screen	PTFE coated SS	19301704	19301904
11	Gasket	PTFE	19301703	19301903
12	Underdrain support	SUS304	19301702	19301902
13	Outlet plate	SUS304		
14	Leg	SUS304		
15	Gasket for Outlet adapter	PTFE	19301710	
16	Outlet adapter (3/4" PSF hose barb)	SUS304	19301717	
17	Sealing Bolt	SUS304	19301760	
18	Locking Washer	SUS304		
19	Wing-type bolt	SUS304	19301770	
20	Sealing washer	SUS304		
21	Wing-type nut	SUS304		



KST-142

Multi-Media Pressure Sealing Holders

- **Dual sealing mechanism** compresses the filter between the inside wall of the outlet plate and the O-ring on the outer edge
- **Broad range of media thickness**, including filter pads, can be used



Dual sealing mechanism



KS-90-UH



KS-142-UH



KS-293-UH

SPECIFICATIONS

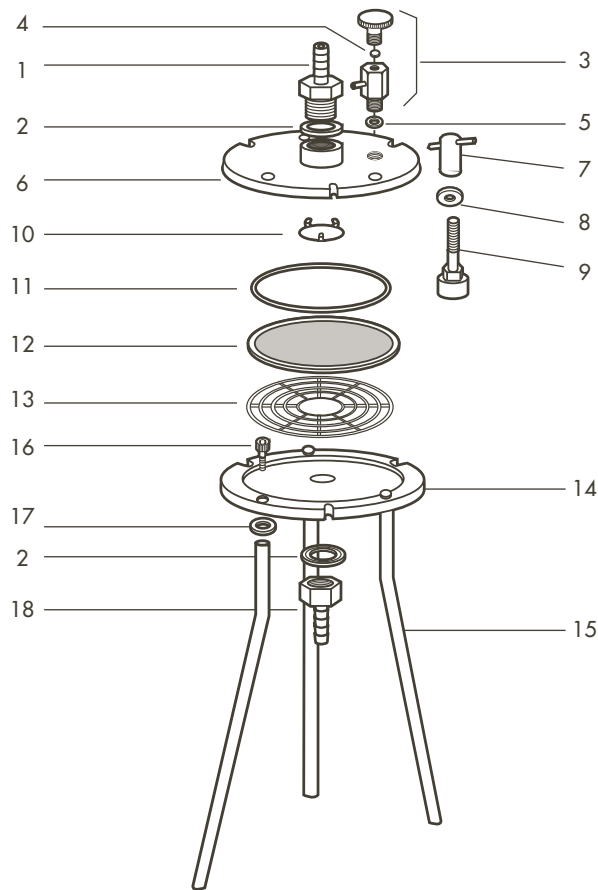
	KS-90-UH	KS-142-UH	KS-293-UH
Materials:			
Body	SUS304		
Support screen	PTFE coated photoetched stainless steel		
O-ring	Silicone		
Connections:			
Inlet/Outlet	3/4" PS		
Adapter	11 mm hose barb	16 mm hose barb	
Pressure:			
Inlet	0.68 MPa (99 psi)		
Differential	0.29 MPa (42 psi)		
Weight:	4.5 kg (9.9 lb)	7 kg (15.4 lb)	21 kg (46 lb)
Membrane Compatibility:			
Membrane filter size	90 mm	142 mm	293 mm
Prefilter size	76 mm	124 mm	257 mm
Filtration area	45.3 cm ²	113 cm ²	530 cm ²

ORDERING INFORMATION

Model	KS-90-UH	KS-142-UH	KS-293-UH
Catalog No.	17301790	17301990	17302590

Replacement Parts

		Material	KS-90-UH	KS-142-UH	KS-293-UH
1	3/4" PSM Inlet adapter	SUS304	19301713		19302510
2	Gasket for Inlet adapter	PTFE	19301710		
3	Vent valve	SUS304	19301711	19301911	
4	Stopsheet for vent valve	PTFE			
5	Gasket for vent valve	PTFE	19301712	19301912	19302512
6	Inlet plate	SUS304			
7	Sealing wing nut	SUS304	-	19301771	19301774
8	Sealing washer	SUS304			
9	Sealing bolt	SUS304			
10	Flow deflector	SUS304			
11	O-ring	Silicone	19301795	19301995	19303704
12	Support screen	PTFE coated SS	19301794	19301994	19302594
13	Underdrain support	SUS304	19301702	19301902	19302502
14	Outlet plate	SUS304			
15	Leg	SUS304			
16	Leg bolt	SUS304	19301761		-
17	Leg washer	SUS304			
18	3/4" PSF Outlet adapter	SUS304	19301717	19302511	



KS-142-UH

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Selecting and Designing a Filtration System

In designing or selecting a system for microporous filtration, it is worthwhile to spend some time defining a few specific parameters of the filtration problem:

- **What is to be filtered, liquid or gas?** For filtering of gases or sterile venting of vessels or gas lines, use a hydrophobic membrane such as PTFE. Chemical resistance tables can be used to help select a membrane material suitable to the liquid being filtered. Also check the compatibility of the filter holder and any O-rings with the filtrate.
- **What size are the smallest particles to be removed?** In general, a pore size just smaller than the smallest size particle to be removed is chosen. For example, 0.20 μm pore size membrane is generally used for sterilizing culture medium, but a 0.10 μm membrane is needed to ensure Mycoplasma removal.
- **At what pressures will the system be operated?** Check the specifications or assume a differential pressure of 2-5 psi ($\sim 0.3 \text{ kg/cm}^2$) for a single holder. Be sure to account for the effects of pressure drop in a multi-holder system.
- **How will the filter holder be connected to the system?** Standard Luer, threaded, sanitary, and hose connectors are available depending on the model. Check the specifications for the product you choose.
- **What is the operating temperature?** Check the specifications for your filtration medium (membrane or other filter) and holder.
- **What size filter and holder do I need?** Estimate what volume you will be filtering and the amount of time you plan to allow for the filtration. By dividing the volume by the time in which you expect to complete this filtration you will get a desired minimum flow rate. Use the graphs at right to determine the flow rate per unit area for the differential pressure and membrane in your system (assume a pressure differential of 5 psi ($\sim 0.3 \text{ kg/cm}^2$) if it is not known). Divide the desired flow rate by the flow rate per unit area to get a minimum filtration area in cm^2 . Multiply this area by a factor of ~ 5 to allow for clogging.

ADJUSTMENTS

For gaseous filtrations that take place outside of standard temperature and pressure (20°C , one atmosphere), correct flow rates using the following formula:

$$F = F_o \frac{293}{273+T} \frac{P + \Delta P/2}{1.03 + \Delta P/2}$$

F = Corrected flow rate
 F_o = Flow rate from chart
 T = Temperature in $^\circ\text{C}$
 P = Exit pressure in kg/cm^2
 ΔP = Pressure drop through the system in kg/cm^2

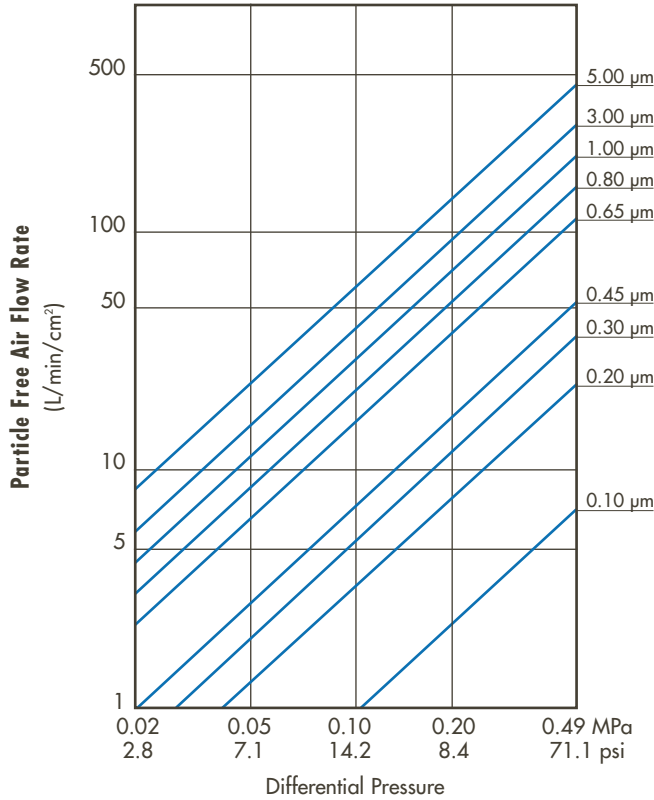
Liquid viscosity can have a significant effect on flow rate. Use this formula to correct for this effect:

$$\text{Flow rate} = \frac{A \cdot P}{V}$$

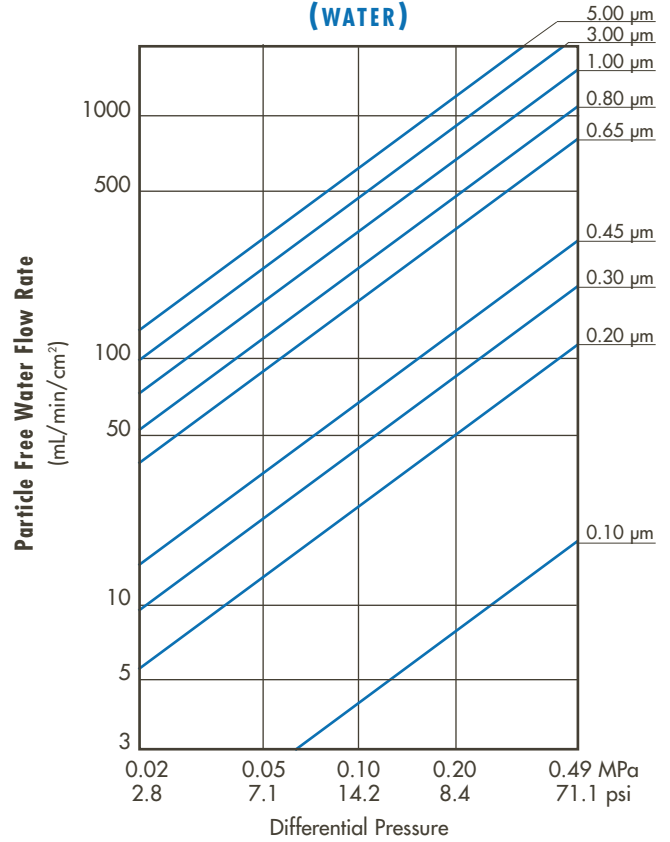
A = Effective filtration area
 P = Differential pressure
 V = Viscosity

GRAPHS – FLOW RATE VS. DIFFERENTIAL PRESSURE

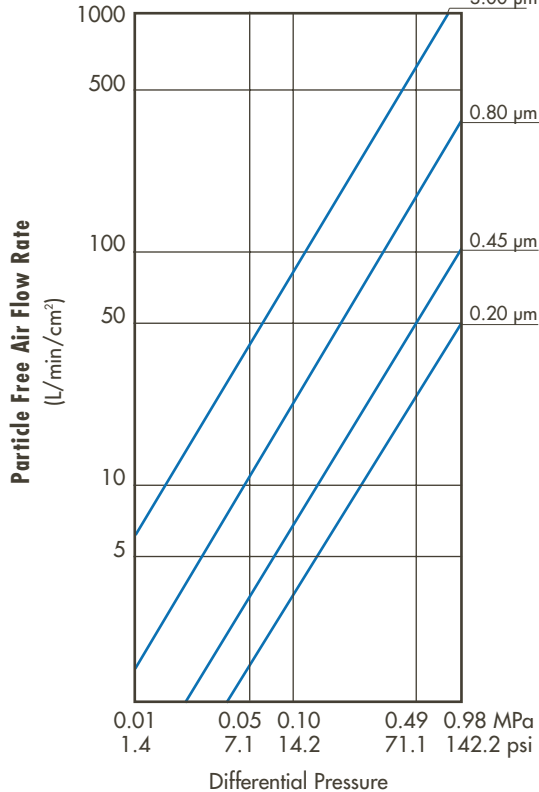
MIXED ESTER OF CELLULOSE (AIR)



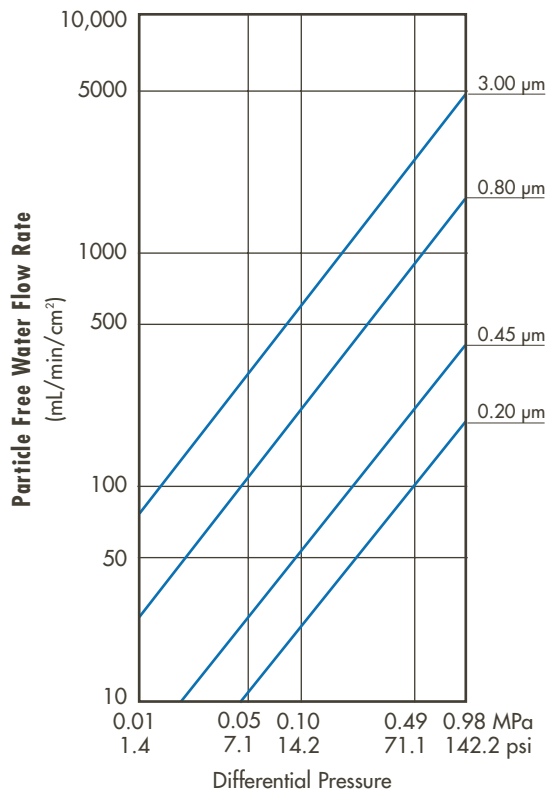
MIXED ESTER OF CELLULOSE (WATER)



CELLULOSE ACETATE (AIR)



CELLULOSE ACETATE (WATER)



Chemical Compatibility

This guide should be used as a reference to select the proper membrane, O-ring and filter holder with regard to chemical compatibility.

Recommendations are based on a 24-hour static exposure to the test fluid at room temperature.

- O – Recommended.** No change in either water flow rate or bubble point will be observed.
- * – Limited resistance.** Additional in-house testing is advised as swelling, discoloration or other minor changes may occur.
- x – Not recommended.** Significant changes in water flow rate and/or bubble point can be expected.
- – Data not available.**

CHEMICAL COMPATIBILITY – MEMBRANE FILTERS

Chemicals		Polymer/Product										
		MCE		CA	PCTE		PTFE	Supported PTFE	Hydrophilic PTFE	CMF Coated Cellulose acetate	37 mm monitor	37 mm monitor set
		White	Black		White	Black						
ACIDS	Glacial Acetic acid	x	x	x	o	x	o	o	o	x	x	x
	10% Acetic acid	o	o	o	o	o	o	o	o	o	*	*
	12 kmol/m ³ Hydrochloric acid (37%)	x	x	x	o	x	o	o	o	x	x	x
	6 kmol/m ³ Hydrochloric acid (19%)	o	x	x	o	o	o	o	o	x	*	*
	12 kmol/m ³ Nitric acid (53%)	x	x	x	o	x	o	o	o	x	x	x
	6 kmol/m ³ Nitric acid (26%)	o	x	x	o	x	o	o	o	x	x	x
	18 kmol/m ³ Sulfuric acid (96%)	x	x	x	x	x	o	o	x	x	x	x
	3 kmol/m ³ Sulfuric acid (16%)	o	o	x	o	o	o	o	o	x	*	*
	85% Phosphoric acid	o	o	x	o	x	o	o	o	x	*	*
	5% Boric acid	o	o	o	o	o	o	o	o	o	o	o
	50% Formic acid	*	x	x	o	x	o	o	o	x	x	x
	35% Hydrofluoric acid	o	x	x	o	x	o	o	o	x	x	x
60% Perchloric acid	x	x	x	o	x	o	o	o	x	x	x	
ALKALIS	6 kmol/m ³ Sodium hydroxide (26%)	x	x	x	x	x	o	o	o	x	x	x
	6 kmol/m ³ Potassium hydroxide (20%)	x	x	x	x	x	o	o	o	x	x	x
	6 kmol/m ³ Aqueous ammonia (11%)	x	x	x	x	x	o	o	o	x	x	x
ALCOHOLS	Methyl alcohol	x	x	*	o	x	o	o	o	o	x	x
	Ethyl alcohol	x	x	*	o	x	o	o	o	o	x	x
	Isopropyl alcohol	*	x	*	o	x	o	o	o	o	x	x
	Isobutyl alcohol	o	x	o	o	x	o	o	o	x	x	x
	n-Butyl alcohol	*	x	o	o	x	o	o	o	o	x	x
	Glycerin	o	o	o	o	o	o	o	o	o	o	o
	Amyl alcohol	*	x	o	o	x	o	o	o	o	*	*
	Benzyl alcohol	x	x	x	o	x	o	o	o	x	*	*
Ethylene glycol	*	x	o	o	o	o	o	o	x	*	x	

Continued on next page

CHEMICAL COMPATIBILITY – MEMBRANE FILTERS (CONTINUED)

Chemicals		Polymer/Product										
		MCE		CA	PCTE		PTFE	Supported PTFE	Hydrophilic PTFE	CMF Coated Cellulose acetate	37 mm monitor	37 mm monitor set
		White	Black		White	Black						
ETHERS	Ethyl ether	○	○	○	*	×	○	○	○	○	*	×
	Isopropyl ether	○	○	○	○	×	○	*	○	○	×	×
	Tetrahydrofuran (THF)	×	×	×	×	×	○	*	○	×	×	×
	Dioxane	×	×	×	×	×	○	*	○	×	×	×
	Petroleum ether	○	○	○	○	○	○	○	○	○	○	×
ESTERS	Methyl acetate	×	×	×	×	×	○	*	○	×	×	×
	Butyl acetate	×	×	*	*	×	○	*	○	○	×	×
	Amyl acetate	×	×	*	○	*	○	*	○	○	×	×
KETONES	Acetone	×	×	×	×	×	○	○	○	×	×	×
	Methyl ethyl ketone (MEK)	×	×	×	×	×	○	*	○	×	×	×
	Methyl isobutyl ketone (MIBK)	×	×	×	×	×	○	*	○	×	×	×
	Cyclohexanone	×	×	×	×	×	○	○	○	×	×	×
HYDROCARBONS	Benzene	○	×	○	×	×	○	○	○	○	×	×
	Toluene	○	○	○	×	*	○	*	○	○	×	×
	Xylene	○	×	○	○	×	○	*	○	×	×	×
	n-Hexane	○	○	○	○	○	○	○	○	○	×	×
	Gasoline	○	○	○	○	○	○	*	○	○	*	×
	Kerosene	○	○	○	○	○	○	*	○	×	○	*
HALOGENATED HYDROCARBONS	Chloroform	○	○	×	×	×	○	*	○	×	×	×
	Methylene chloride	*	×	×	×	×	○	*	○	×	×	×
	Trichloroethylene	○	○	○	×	×	○	*	○	○	×	×
	Tetrachloroethylene	○	×	○	×	×	○	*	○	○	×	×
	Carbon tetrachloride	○	○	○	○	○	○	○	○	○	×	×
AMINES	Aniline	×	×	×	×	×	○	○	○	×	×	×
	Dimethyl formamide	×	×	×	×	×	○	○	○	×	×	×
	Diethyl acetamide	×	×	×	×	×	○	○	○	×	×	×
	Triethanolamine	×	×	○	○	×	○	○	○	×	×	×
CELLOSOLVES	Methyl cellosolve	×	×	×	○	×	○	○	○	×	×	×
	Butyl cellosolve	×	×	○	○	×	○	○	○	○	×	×
MISCELLANEOUS	Nitrogen	○	○	○	○	○	○	○	○	○	○	○
	Hydrogen	○	○	○	○	○	○	○	○	○	○	○
	30% Hydrogen peroxide	○	○	○	○	○	○	○	○	○	×	×
	Saline solution	○	○	○	○	○	○	○	○	○	○	○
	Dimethyl sulfate	×	×	*	×	×	○	○	○	×	×	×
	Nitrobenzene	×	×	×	×	×	○	○	○	×	×	×
	Methanol (1): Chloroform (1)	×	×	×	×	×	○	*	○	×	×	×
	Pyridine	×	×	×	×	×	○	*	○	×	×	×
	Acetonitrile	×	×	×	×	×	○	○	○	×	×	×
	Phenol	×	×	×	×	×	○	○	○	×	×	×
	Freon	○	○	○	○	○	○	*	○	○	○	○
	37% Formaldehyde	○	×	*	○	×	○	○	○	○	×	×
	Silicone oil	○	○	○	○	×	○	*	○	×	○	○
	n-Hexane (95): Ethyl acetate (5)	*	○	×	○	○	○	*	○	○	×	×
	Acetonitrile (70):Distilled water (30)	×	×	×	×	×	○	○	○	×	×	×
Petroleum oil	○	○	○	○	×	○	○	○	○	*	×	

○ - Recommended

* - Limited resistance

× - Not recommended

- - Data not available

CHEMICAL COMPATIBILITY: DISPOSABLE SYRINGE FILTER UNITS

Chemicals		AS Mixed cellulose esters with acrylic housing	CS Cellulose acetate with acrylic housing	CP Cellulose acetate with PP housing	HP Hydrophilic PTFE with PP housing	JP Hydrophobic PTFE with PP housing
ACIDS	3 kmol/m ³ Hydrochloric acid (10%)	○	*	*	○	○
	9 kmol/m ³ Hydrochloric acid (30%)	✗	✗	✗	○	○
	1 kmol/m ³ Sulfuric acid (5%)	○	○	○	○	○
	4 kmol/m ³ Sulfuric acid (20%)	✗	✗	✗	○	○
	1 kmol/m ³ Nitric acid (5%)	○	○	*	○	○
	4 kmol/m ³ Nitric acid (20%)	✗	✗	✗	*	*
	3.5 kmol/m ³ Acetic acid (20%)	○	○	○	○	○
	Glacial acetic acid	✗	✗	✗	○	○
	5 kmol/m ³ Hydrofluoric acid (10%)	✗	✗	✗	○	○
	19 kmol/m ³ Hydrofluoric acid (35%)	✗	✗	✗	○	○
	1 kmol/m ³ Chromic acid (10%)	*	*	*	*	*
1 kmol/m ³ Phosphoric acid (10%)	○	○	○	○	○	
ALKALIS	2.5 kmol/m ³ Sodium hydroxide (10%)	✗	✗	✗	○	○
	2 kmol/m ³ Potassium hydroxide (10%)	✗	✗	✗	○	○
	8 kmol/m ³ Aqueous ammonia (28%)	✗	○	*	○	○
ALCOHOLS	Methyl alcohol	✗	✗	○	○	○
	Ethyl alcohol	✗	*	○	○	○
	n-Propyl alcohol	*	○	○	○	○
	Isopropyl alcohol	*	○	○	○	○
	n-Butyl alcohol	*	○	○	○	○
	Amyl alcohol	*	○	○	○	○
	Benzyl alcohol	*	✗	✗	○	○
	Ethylene glycol	✗	✗	○	○	○
Glycerin	○	○	○	○	○	
ETHERS	Ethyl ether	✗	✗	*	*	*
	Isopropyl ether	✗	✗	○	○	○
	Tetrahydrofuran (THF)	✗	✗	✗	*	*
	Dioxane	✗	✗	✗	*	*
ESTERS	Methyl acetate	✗	✗	✗	*	*
	Ethyl acetate	✗	✗	✗	*	*
	Butyl acetate	✗	✗	✗	*	*
	Amyl acetate	✗	✗	*	*	*
KETONES	Acetone	✗	✗	✗	○	○
	Methyl ethyl ketone (MEK)	✗	✗	✗	*	*
	Methyl isobutyl ketone (MIBK)	✗	✗	✗	*	*
	Cyclohexanone	✗	✗	✗	*	*
HYDROCARBONS	Benzene	✗	✗	*	*	*
	Toluene	✗	✗	*	*	*
	Xylene	✗	✗	*	*	*
	n-Hexane	✗	✗	*	*	*
	Gasoline	*	*	○	○	○
	Kerosene	○	○	*	*	*

Continued on next page

CHEMICAL COMPATIBILITY: DISPOSABLE SYRINGE FILTER UNITS (CONTINUED)

Chemicals		AS Mixed cellulose esters with acrylic housing	CS Cellulose acetate with acrylic housing	CP Cellulose acetate with PP housing	HP Hydrophilic PTFE with PP housing	JP Hydrophobic PTFE with PP housing
HALOGENATED HYDROCARBONS	Chloroform	X	X	X	*	*
	Methylene chloride	X	X	X	*	*
	Trichloroethylene	X	X	*	*	*
	Carbon tetrachloride	X	X	*	O	O
	Trichloroethane	X	X	X	*	*
	Perchloroethylene	X	X	X	*	*
	Freon (TMC)	X	X	*	*	*
AMINES	Aniline	X	X	X	*	*
	Dimethyl formamide	X	X	X	*	*
	Diethyl acetamide	X	X	X	*	*
	Triethanolamine	X	O	O	O	O
CELLOSOLVES	Ethyl acetate cellosolve	X	X	X	*	*
MISCELLANEOUS	Acetonitrile	X	X	X	*	*
	Pyridine	X	X	X	*	*
	1 kmol/m ³ Sodium Hypochloride (6%)	X	X	X	O	O
	13 kmol/m ³ Formaldehyde (35%)	X	*	*	O	O
	Ferric chloride	O	O	O	O	O
	Copper sulfate	O	O	O	O	O
	Mineral oil	*	O	*	*	*
	Salt water	O	O	O	O	O
	3 kmol/m ³ Hydrogen peroxide (10%)	X	*	O	O	O
	Nitrobenzene	X	X	X	*	*
	Phenol	X	X	X	O	O
	Silicone oil	X	X	X	O	O
	Petroleum oil	*	*	O	O	O
	Acetonitrile (70): water (30)	X	X	X	O	O

O – Recommended

* – Limited resistance

X – Not recommended

– – Data not available

CHEMICAL COMPATIBILITY – CAPSULES

Chemicals	CCS	CCF	CCFH	CCP	CCG	
ACIDS	1 kmol/m ³ Acetic acid (5%)	○	○	○	○	○
	3.5 kmol/m ³ Acetic acid (20%)	○	○	*	○	○
	1 kmol/m ³ Chromic acid (10%)	✗	○	○	○	✗
	3 kmol/m ³ Hydrochloric acid (10%)	○	○	○	○	○
	11 kmol/m ³ Hydrochloric acid (35%)	○	○	✗	○	*
	5 kmol/m ³ Hydrofluoric acid (10%)	○	○	○	○	✗
	1 kmol/m ³ Nitric acid (5%)	○	○	○	○	○
	4 kmol/m ³ Nitric acid (20%)	○	○	○	○	○
	1 kmol/m ³ Phosphoric acid (10%)	○	○	○	○	○
	1 kmol/m ³ Sulfuric acid (5%)	○	○	○	○	○
4 kmol/m ³ Sulfuric acid (20%)	○	○	○	○	○	
ALKALIS	2.5 kmol/m ³ Sodium hydroxide (10%)	○	○	✗	○	○
	2 kmol/m ³ Potassium hydroxide (10%)	○	○	✗	○	○
	5 kmol/m ³ Aqueous ammonia (10%)	○	○	✗	○	*
	15 kmol/m ³ Aqueous ammonia (28%)	○	○	✗	○	○
ALCOHOLS	Methyl alcohol	○	○	○	○	○
	Ethyl alcohol	○	○	○	○	○
	n-propyl alcohol	○	○	○	○	○
	n-butyl alcohol	○	○	*	○	○
	Ethylene glycol	○	○	○	○	○
ETHERS	Ethyl ether	*	*	*	*	✗
	Dioxane	*	○	○	○	✗
	Tetrahydrofuran (THF)	✗	✗	✗	✗	✗
ESTERS	Amyl acetate	✗	*	*	*	✗
	Methyl acetate	✗	○	○	○	○
	Ethyl acetate	✗	○	○	○	○
	Butyl acetate	✗	○	○	○	○
KETONES	Acetone	✗	○	○	○	✗
	Methyl ethyl ketone (MEK)	✗	○	○	○	✗
	Methyl isobutyl ketone (MIBK)	✗	○	○	○	✗
HYDROCARBONS	n-Hexane	*	*	-	*	*
	Cyclohexane	*	*	*	*	*
	Benzene	*	✗	✗	✗	✗
	Toluene	✗	*	*	*	✗
	Xylene	✗	*	*	*	*
HALOGENATED HYDROCARBONS	Chloroform	✗	*	✗	*	✗
	Carbon tetrachloride	-	*	*	*	*
	Freon (TMC)	✗	*	-	*	✗
	Methylene chloride	✗	*	✗	*	✗
	Trichloroethylene	✗	*	*	*	✗
	Trichloroethane	✗	○	○	○	○
AMINES	Dimethyl formamide	✗	○	○	○	○
ALDEHYDES	Acetaldehyde	-	-	-	-	-
	13 kmol/m ³ Formaldehyde (35%)	○	○	*	○	○

Continued on next page

CHEMICAL COMPATIBILITY – CAPSULES (CONTINUED)

Chemicals		CCS	CCF	CCFH	CCP	CCG
CELLOSOLVES	Acetic cellosolve	X	O	O	O	O
MISCELLANEOUS	Acetonitrile	X	O	O	O	X
	Pyridine	X	O	O	O	O
	Nitrobenzene	-	-	X	-	-
	1 kmol/m ³ Sodium hypochlorite (6%)	X	O	O	O	O
	Ferric chloride	O	O	O	O	O
	Copper sulfate	O	O	O	O	O
	Mineral oil	O	O	O	*	O
	Salt water	O	O	O	O	O
	3 kmol/m ³ Hydrogen peroxide (10%)	O	O	O	O	O

O – Recommended * – Limited resistance X – Not recommended - – Data not available

CHEMICAL COMPATIBILITY – CARTRIDGES

Chemicals		TCR	TCS TCS-G TCS-E	TCF TCFH	TCY TCYE	TCP TCPE TCPD	TC	TC (SUS type with NBR Gasket)	TCG	TCG-R (NBR Gasket)
ACIDS	20% Acetic acid	O	O	O	O	O	X	X	O	O
	10% Chromic acid	X	X	O	X	O	X	X	X	X
	3 kmol/m ³ Hydrochloric acid (10%)	X	O	O	X	O	X	X	O	X
	9 kmol/m ³ Hydrochloric acid (30%)	X	O	O	X	O	X	X	O	X
	10% Hydrofluoric acid	O	O	O	X	O	O	X	X	X
	1 kmol/m ³ Nitric acid (5%)	X	O	O	O	O	O	X	O	O
	4 kmol/m ³ Nitric acid (20%)	X	O	O	X	O	X	X	O	O
	10% Phosphoric acid	O	O	O	O	O	*	X	O	O
	1 kmol/m ³ Sulfuric acid (5%)	X	O	O	O	O	O	O	O	O
4 kmol/m ³ Sulfuric acid (20%)	X	O	O	X	O	X	X	O	X	
ALKALIS	2.5 kmol/m ³ Sodium hydroxide (10%)	X	O	O	X	O	X	X	O	X
	2 kmol/m ³ Potassium hydroxide (10%)	X	O	O	X	O	X	X	O	X
	15 kmol/m ³ Aqueous ammonia (28%)	O	O	O	X	O	X	X	O	O
ALCOHOLS	Methyl alcohol	O	O	O	O	O	*	*	O	O
	Ethyl alcohol	O	O	O	O	O	O	O	O	O
	n-Propyl alcohol	O	O	O	O	O	O	O	O	O
	n-Butyl alcohol	O	O	O	O	O	O	O	O	O
ETHERS	Dioxane	X	X	O	X	O	X	X	X	X
	Tetrahydrofuran (THF)	X	X	X	X	X	X	X	X	X
	Ethyl ether	X	X	X	X	X	X	X	X	X
ESTERS	Amyl acetate	X	X	X	X	X	X	X	X	X
	Methyl acetate	X	X	O	X	O	O	O	O	X
	Ethyl acetate	X	X	O	X	O	*	X	O	X
	Butyl acetate	X	X	O	X	O	O	X	O	X
KETONES	Acetone	X	X	O	X	O	X	X	X	X
	Methyl ethyl ketone (MEK)	X	X	O	X	O	X	X	X	X
	Methyl isobutyl ketone (MIBK)	O	X	O	O	O	X	X	X	X
HYDROCARBONS	n-Hexane	X	X	X	X	X	X	X	X	X
	Benzene	X	X	X	X	X	X	X	X	X
	Toluene	X	X	*	*	*	*	X	X	X
	Xylene	X	X	*	*	*	O	X	*	X
HALOGENATED HYDROCARBONS	Chloroform	X	X	X	X	X	X	X	X	X
	Carbon tetrachloride	*	-	*	*	*	*	X	*	X
	Freon (TMC)	X	X	*	X	*	-	-	X	X
	Methylene chloride	X	X	X	X	X	X	X	X	X
	Trichloroethylene	X	X	X	X	X	X	X	X	X
	Trichloroethane	X	X	O	O	O	*	X	O	X
AMINES	Dimethyl formamide	X	X	O	X	O	X	X	O	X

Continued on next page

CHEMICAL COMPATIBILITY – CARTRIDGES (CONTINUED)

Chemicals		TCR	TCS TCS-G TCS-E	TCF TCFH	TCY TCYE	TCP TCPE TCPD	TC	TC (SUS type with NBR Gasket)	TCG	TCG-R (NBR Gasket)
ALDEHYDES	35% Formaldehyde	○	○	○	○	○	○	○	○	○
CELLOSOLVES	Acetic cellosolve	✕	✕	○	✕	○	*	*	○	✕
MISCELLANEOUS	Acetonitrile	✕	✕	○	✕	○	✕	✕	✕	✕
	Pyridine	✕	✕	○	✕	○	✕	✕	○	✕
	6% Sodium hypochlorite	✕	✕	○	✕	○	✕	✕	○	○
	Ferric chloride	○	○	○	○	○	✕	✕	○	✕
	Copper sulfate	○	○	○	○	○	*	✕	○	○
	Mineral oil	○	○	○	○	✕	✕	✕	○	○
	Salt water	○	○	○	○	○	○	✕	○	○
	10% Hydrogen peroxide	○	○	○	*	○	○	○	○	○

○ – Recommended * – Limited resistance ✕ – Not recommended – – Data not available

CHEMICAL COMPATIBILITY – GASKETS / O-RINGS

Chemicals		EPR EPDM	SILICONE	NBR	CHLOROPRENE	FPM	PTFE	FEP Encap- sulated
ACIDS	20% Acetic acid	O	O	*	*	O	O	O
	10% Chromic acid	*	*	X	X	*	O	O
	3 kmol/m ³ Hydrochloric acid (10%)	O	O	O	O	O	O	O
	9 kmol/m ³ Hydrochloric acid (30%)	O	X	*	*	O	O	O
	10% Hydrofluoric acid	*	X	X	O	*	O	O
	1 kmol/m ³ Nitric acid (5%)	O	O	X	*	O	O	O
	4 kmol/m ³ Nitric acid (20%)	X	X	X	X	O	O	O
	10% Phosphoric acid	O	O	O	O	O	O	O
	1 kmol/m ³ Sulfuric acid (5%)	O	O	O	O	O	O	O
4 kmol/m ³ Sulfuric acid (20%)	O	O	O	O	O	O	O	
ALKALIS	2.5 kmol/m ³ Sodium hydroxide (10%)	O	X	O	O	O	O	O
	2 kmol/m ³ Potassium hydroxide (20%)	O	*	O	O	O	O	O
	15 kmol/m ³ Aqueous ammonia (28%)	O	O	X	O	O	O	O
ALCOHOLS	Methyl alcohol	O	O	X	O	*	O	O
	Ethyl alcohol	O	O	*	O	O	O	O
	n-Propyl alcohol	O	O	*	O	O	O	O
	n-Butyl alcohol	O	O	X	*	O	O	O
ETHERS	Dioxane	*	*	X	X	X	O	O
	Tetrahydrofuran (THF)	X	X	X	X	X	O	O
	Ethyl ether	X	X	X	X	X	O	O
ESTERS	Amyl acetate	*	X	X	X	X	O	O
	Methyl acetate	O	*	X	X	X	O	O
	Ethyl acetate	*	*	X	X	X	O	O
	Butyl acetate	*	X	X	X	X	O	O
KETONES	Acetone	O	*	X	X	X	O	O
	Methyl ethyl ketone (MEK)	*	*	X	X	X	O	O
	Methyl isobutyl ketone (MIBK)	X	O	X	X	X	O	O
HYDROCARBONS	n-Hexane	X	X	O	*	O	O	O
	Benzene	X	*	X	X	O	O	O
	Toluene	X	X	X	X	O	*	*
	Xylene	X	X	X	X	O	O	O
HALOGENATED HYDROCARBONS	Chloroform	X	X	X	X	O	*	*
	Carbon tetrachloride	X	X	X	X	O	O	O
	Freon (TMC)	-	-	X	-	-	O	O
	Methylene chloride	X	X	X	X	O	O	O
	Trichloroethylene	X	X	X	X	O	O	O
	Trichloroethane	X	X	X	X	O	O	O
AMINES	Dimethyl formamide	O	O	X	X	X	O	O
ALDEHYDES	35% Formaldehyde	O	O	O	O	O	O	O
CELLOSOLVES	Acetic cellosolve	*	O	X	X	X	O	O
MISCELLANEOUS	Acetonitrile	O	X	X	O	X	O	O
	Pyridine	X	X	X	X	X	O	O
	6% Sodium hypochlorite	O	X	*	O	O	O	O
	Ferric chloride	O	O	O	O	*	O	O
	Copper sulfate	O	O	O	O	O	O	O
	Mineral oil	X	*	O	O	O	O	O
	Salt water	O	O	O	O	O	O	O
	10% Hydrogen peroxide	*	O	X	*	O	O	O

O – Recommended

* – Limited resistance

X – Not recommended

- – Data not available

Sterile Membrane Cross Reference Conversion Guide

Advantec	Description	Millipore	Whatman	Pall	Catalog Page
A020H047A	White grid	GSWG 047 S1	7187 114	-	19
A045D047A	White grid	HAWG 047 S0	-	63077	19
A045F047A	White grid	HAWG 047 S2	7141 104	-	19
A045H047A	White grid	HAWG 047 S1	7141 114	66068, 66278	19
A045H047W	White grid	HAWG 047 S1	7141 114	66068, 66278	19
A065F047A	White grid	HCWG 047 S4	-	-	19
A065H047A	White grid	HCWG 047 S1	-	66426	19
A045R047A	Black grid	HABG 047 S1	7153 104	66378	20
A080R047A	Black grid	AABG 047 S1	-	-	20
A045W047A	Green grid	-	7155 104	66379	20

See individual listings for packaging configurations.

Glass, Quartz, and Paper Cross Reference Conversion Guide

Advantec	Millipore	Whatman	ex-Schleicher & Schuell	Pall	Fisher	Ahlstrom	Catalog page
GA-55	APFA	GF/A	31	-	09-804-55A	111	30
GF-75	GFCP	GF/F	20	-	-	151	30
GB-100R	AP40	EPM 2000	1HV	A/E (Air)	-	-	30
GB-140	APFB	GF/B	32	-	09-804-55B	121	30
GC-50	AP40/APFC	GF/C	30/25	A/E (Water)	09-804-55C	131	30
GC-90	AP15	-	-	-	-	-	30
GD-120	APFD	GF/D	40	-	09-804-55D	141	30
GS-25	AP20	-	-	-	-	164	30
QR-100	-	QM-A	-	Micro Quartz	-	-	30
No. 1	FP105	4	410 or 1450cv	-	09-795F	631	24
No. 101	FP115	91	-	-	09-790-12F	-	24
No. 131	FP102	3	597	-	09-803-6G	238	24
No. 2	-	-	604	-	09-801-E	601	24
No. 231	FP104	2	-	-	-	-	24
No. 232	FP102	6	-	-	-	642	24
No. 235	-	5	-	-	09-803-5F	610	24

Comparisons of glass fiber filters are for those with closest similarity. Exact counterparts do not exist due to the nature of the depth type filter matrix.

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