



# FRISENETTE ApS



ADVANTEC®

## Laboratory Filtration Products

## Introduction

We are proud to present this second issue of a European catalogue of ADVANTEC® products manufactured by Toyo Roshi Kaisha, Ltd.

Toyo Roshi Kaisha, Ltd. is a well-reputed, leading manufacturer of filtration media and related scientific products, which was founded in 1917. To date, the company's main markets have been Japan, Asia and the United States. Since 2004 the range of laboratory filtration products and related equipment also has been available in Europe.

Our mission is to supply the pharmaceutical, public health, life science, chemical industry, food and beverage industry, environmental laboratories, and the electronics industry with high quality products in the field of separation science. The product range in this catalogue includes membrane filters, prefiltration media, glass fiber filters, qualitative and quantitative cellulose filters, capsule filters, test papers and an extensive range of filter holders in stainless steel, plastic and glass.

Customers have the right to expect the highest quality products. ADVANTEC® products are manufactured in accordance with strict quality standards and a quality control system to ensure they obtain products that offer consistent, uniform performance and superior integrity.

The quality management system at Toyo Roshi Kaisha, Ltd. is approved in pursuance of the *ISO 9001:2000* standard.

ADVANTEC® products are stocked in Denmark for fast and easy distribution in Europe and are available through a comprehensive network of selected distributors.

The catalogue contains the most central technical information. Should you have any questions, please do not hesitate to contact us or your local supplier of ADVANTEC® products.

**FRISENETTE ApS**

**ADVANTEC®**

# Table of Contents

Membrane Filters
Petri Dishes and Pads
Syringe Filters
Ultra Filtration Units
Glass- and Quartz Fiber Filters
Composite Filters
Filter Papers
Milk Sediment Discs
Paper Discs
PTFE Depth Filters
Extraction Thimbles
Blotting Membranes and -Papers
Vacuum Filter Holders
Filtration Manifolds
Pressure Filtration
Capsule Filters
Monitors
Test Papers
Chemical Compatability Guide
Index – A-Z
Index – Catalogue Nos.

# Membrane Filters

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 Ester 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 – PCTE membranes are track etched.



## Performance characteristics of Advantec membranes

- **Strong:**

Advantec membranes are monitored for both burst (longitudinal) and tensile (lateral) strength. Supported Acetate are the strongest reverse phase membranes available from Advantec.

- **Chemically and biologically clean:**

As a 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 100 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 extractable (0.1 weight %). All

Advantec membranes are Triton- and pyrogen-free (0,005 ng/cm<sup>2</sup> filter area)

- **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. Operation 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.

## 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	5.0	8.0	10	
Mixed Cellulose Ester (MCE)	General purpose Microbiology Particle analysis	Aqueous solutions	✓		■	■	■	■	■	■	■			
Cellulose Acetate	General filtration Cytology Binding studies	Aqueous solutions	✓			■	■	■	■	■				
Coated Cellulose Acetate	Clarify solutions Prefilter	Aqueous solutions	✓					■	■	■	■	■	■	■
Hydrophilic PTFE	HPLC solutions Clarify or sterilize aqueous/organic mixtures	Aqueous and organic solutions	✓		■	■	■	■	■					
Hydrophobic PTFE	Gas venting Clarify or sterilize strong acids or solvents	Non-aqueous solvents		✓	■	■	■	■	■	■				
Polycarbonate	Microscopy Beverage testing	Aqueous solutions	✓		■	■	■	■			■	■	■	

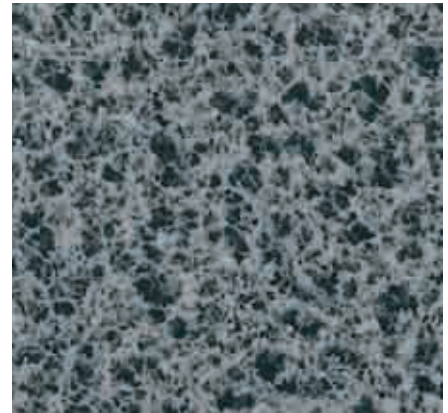
## Ordering Information: Membrane filter nomenclature

<b>A</b>	<b>020</b>	<b>A</b>	<b>293</b>	<b>C</b>
<b>Quantity per package</b>				
A = 100		D = 10		K = HE ind. pack WG, 100
B = 50		E = 5		R = 1 roll
C = 25		J = HE ind. pack WP, 100		W = 1000
<b>Diameter [mm]</b>				
13 = 013		47 = 047		90 = 090
20 = 020		50 = 050		100 = 100
25 = 025		82 = 082		102 = 102
37 = 037		85 = 085		137 = 137
<b>Sheets/rolls [cm]</b>				
20 x 20 = 204				
22 x 22 = 224				
30 x 30 = 304				
33 cm x 3 m = 330				
<b>Surface/Type</b>				
Non-sterile packages			Pre-sterile packages	
Packaging			Individually wrapped	
			Plain	Grid
Surface	Plain	Grid	No pad	No pad
White	A, X**	B	G	H
White HE*	J	K		
Black	N	P	Q	R
Green	U	V	W	W
*HE = Hydrophobic Edge				
**Opticlear MF				
<b>Membrane pore size [µm]</b>				
5.0 = 500		0.8 = 080		0.45 = 045
3.0 = 300		0.65 = 065		0.30 = 030
1.0 = 100		0.50 = 050		0.20 = 020
0.10 = 010				
CMF (nominal µm)				
10 = 100				
2 = 020				
0.8 = 008				
<b>Type of filter</b>				
A = Mixed Cellulose Ester		H = Hydrophilic PTFE		T = Hydrophobic PTFE, unsupported
B = Cellulose pads		J = Hydrophobic PTFE, polypropylene backing		Y = Coated Cellulose Acetate
C = Cellulose Acetate		K = Polycarbonate		

# Membrane Filters

## Mixed Cellulose Esters (MCE)

- **Composition:** Mixed cellulose esters includes cellulose nitrate, also known as nitrocellulose, and cellulose acetate
- **High porosity:** Provides superior flow rates
- **High protein binding:** Can be blocked by pretreatment or utilized in applications
- **High purity:** Triton-free and non reactive to pyrogens
- **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 Ester (MCE), Code A

Pore Size [µm]	Color	Surface	Bubble Point <sup>1</sup>		Flow Rate <sup>2</sup>		Porosity <sup>3</sup> [%]	Thickness [µm]
			[MPa]	[psi]	Water [ml/min/cm <sup>2</sup> ]	Air [L/min/cm <sup>2</sup> ]		
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	15.0	80	145
0.45	Green	Grid	≥0.22	≥32.7	50	5.0	78	135
0.80	Green	Grid	≥0.10	≥14.9	170	15.0	80	145

#### Definitions:

1. Bubble point is the minimum pressure required to force air through a membrane which has been prewet with water.st (0.1 µm membranes prewet with isopropanol)
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 prefiltered nitrogen at 10 psi.
3. Porosity refers to the percent open area.

- Refractive index 1.50
- Maximum operating temperature 130°C
- Ash content 2-5 µg/cm<sup>2</sup>

### Ash Content of White Plain MCE Membrane Filters (ppm):

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

## Mixed Cellulose Ester Membranes (MCE)

### Ordering Information

#### White – Non-sterile

Pore Size [µm]	Diameter [mm]	Surface	Packing	Cat. No.
<b>0.1</b>	13	Plain	100	A010A013A
	25	Plain	100	A010A025A
	47	Plain	100	A010A047A
	50	Plain	100	A010A050A
	90	Plain	25	A010A090C
	142	Plain	25	A010A142C
293	Plain	25	A010A293C	
<b>0.2</b>	13	Plain	100	A020A013A
	25	Plain	100	A020A025A
	25	Grid	100	A020B025A
	47	Plain	100	A020A047A
	47	Grid	100	A020B047A
	47	Plain*	100	A020J047A
	47	Grid*	100	A020K047A
	50	Plain	100	A020A050A
	90	Plain	25	A020A090C
	142	Plain	25	A020A142C
293	Plain	25	A020A293C	
<b>0.3</b>	13	Plain	100	A030A013A
	25	Plain	100	A030A025A
	47	Plain	100	A030A047A
	50	Plain	100	A030A050A
	90	Plain	25	A030A090C
	142	Plain	25	A030A142C
293	Plain	25	A030A293C	
<b>0.45</b>	13	Plain	100	A045A013A
	13	Grid	100	A045B013A
	25	Plain	100	A045A025A
	25	Grid	100	A045B025A
	37	Plain	100	A045A037A
	37	Grid	100	A045B037A
	47	Plain	100	A045A047A
	47	Grid	100	A045B047A
	47	Plain*	100	A045J047A
	47	Grid*	100	A045K047A
	50	Plain	100	A045A050A
	50	Grid	100	A045B050A
	90	Plain	25	A045A090C
	142	Plain	25	A045A142C
	293	Plain	25	A045A293C

\*with hydrophobic edge

#### White – Non-sterile (continued)

Pore Size [µm]	Diameter [mm]	Surface	Packing	Cat. No.
<b>0.65</b>	13	Plain	100	A065A013A
	13	Grid	100	A065B013A
	25	Plain	100	A065A025A
	25	Grid	100	A065B025A
	47	Plain	100	A065A047A
	47	Grid	100	A065B047A
	50	Plain	100	A065A050A
	50	Grid	100	A065B050A
90	Plain	25	A065A090C	
142	Plain	25	A065A142C	
293	Plain	25	A065A293C	
<b>0.8</b>	13	Plain	100	A080A013A
	13	Grid	100	A080B013A
	25	Plain	100	A080A025A
	25	Grid	100	A080B025A
	37	Plain	100	A080A037A
	37	Grid	100	A080B037A
	47	Plain	100	A080A047A
	47	Grid	100	A080B047A
	50	Plain	100	A080A050A
	50	Grid	100	A080B050A
90	Plain	25	A080A090C	
142	Plain	25	A080A142C	
293	Plain	25	A080A293C	
<b>1.0</b>	13	Plain	100	A100A013A
	25	Plain	100	A100A025A
	47	Plain	100	A100A047A
	50	Plain	100	A100A050A
	90	Plain	25	A100A090C
	142	Plain	25	A100A142C
293	Plain	25	A100A293C	
<b>3.0</b>	13	Plain	100	A300A013A
	25	Plain	100	A300A025A
	47	Plain	100	A300A047A
	50	Plain	100	A300A050A
	90	Plain	25	A300A090C
	142	Plain	25	A300A142C
	293	Plain	25	A300A293C
	<b>5.0</b>	13	Plain	100
25		Plain	100	A500A025A
47		Plain	100	A500A047A
50		Plain	100	A500A050A
90		Plain	25	A500A090C
142		Plain	25	A500A142C
293		Plain	25	A500A293C

## Mixed Cellulose Ester Membranes (MCE)

### Ordering Information

#### Black – Non-sterile

Pore Size [µm]	Diameter [mm]	Surface	Packing	Cat. No.
<b>0.45</b>	13	Plain	100	A045N013A
	13	Grid	100	A045P013A
	25	Plain	100	A045N025A
	25	Grid	100	A045P025A
	37	Plain	100	A045N037A
	37	Grid	100	A045P037A
<b>0.8</b>	47	Plain	100	A045N047A
	47	Grid	100	A045P047A
	13	Plain	100	A080N013A
	13	Grid	100	A080P013A
<b>0.8</b>	25	Plain	100	A080N025A
	25	Grid	100	A080P025A
	47	Plain	100	A080N047A
	47	Grid	100	A080P047A

#### Opticlear – Non-sterile (continued)

Pore Size [µm]	Diameter [mm]	Surface	Packing	Cat. No.
<b>0.8</b>	25	Plain	100	A080X025A
	25	Grid	100	A080X025B
	37	Plain	100	A080X037A
	37	Grid	100	A080X037B
	47	Plain	100	A080X047A
	47	Grid	100	A080X047B

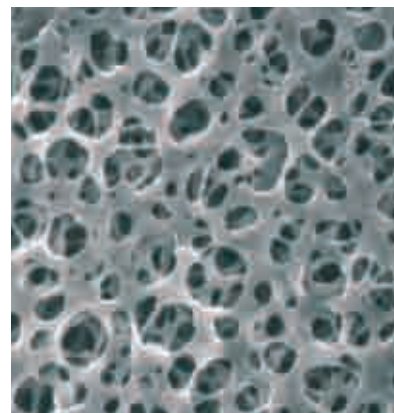
#### Green – Non-sterile

Pore Size [µm]	Diameter [mm]	Surface	Packing	Cat. No.
<b>0.45</b>	13	Plain	100	A045U013A
	13	Grid	100	A045V013A
	25	Plain	100	A045U025A
	25	Grid	100	A045V025A
	47	Plain	100	A045U047A
	47	Grid	100	A045V047A
<b>0.8</b>	47	Grid	100	A080V047A



## Cellulose Acetate (CA)

- **Composition:** Mixture of cellulose triacetate and diacetate
- **Characteristics:** Low static charge and high strength
- **Sterilizable:** May be repeatedly sterilized without loss of integrity or change in bubble point
- **Clean:** 0.1wt% aqueous extractables
- **Relative to MCE membranes:**
  - improved solvent resistance to low molecular weight alcohols
  - better heat resistance
  - lower protein binding



### Applications

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

### Specifications for Cellulose Acetate, Code C

Pore Size [μm]	Bubble Point <sup>1</sup>		Flow Rate <sup>2</sup>		Porosity <sup>3</sup> [%]	Thickness <sup>4</sup> [μm]
	[MPa]	[psi]	Water [ml/min/cm <sup>2</sup> ]	Air [L/min/cm <sup>2</sup> ]		
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

#### Definitions

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

### Ash Content of Cellulose Acetate

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

- 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

### Ordering Information

#### White – Non-sterile

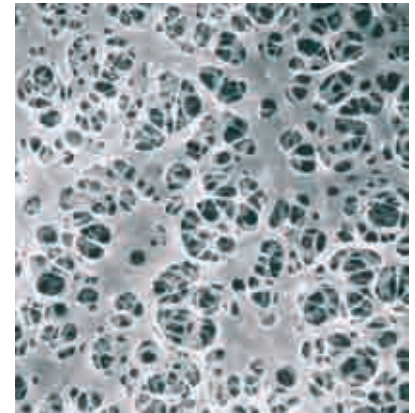
Pore Size [μm]	Diameter [mm]	Surface	Packing	Cat. No.
<b>0.2</b>	13	Plain	100	C020A013A
	25	Plain	100	C020A025A
	37	Plain	100	C020A037A
	47	Plain	100	C020A047A
	90	Plain	25	C020A090C
	142	Plain	25	C020A142C
293	Plain	25	C020A293C	
<b>0.45</b>	13	Plain	100	C045A013A
	25	Plain	100	C045A025A
	37	Plain	100	C045A037A
	47	Plain	100	C045A047A
	90	Plain	25	C045A090C
	142	Plain	25	C045A142C
293	Plain	25	C045A293C	

#### White – Non-sterile (continued)

Pore Size [μm]	Diameter [mm]	Surface	Packing	Cat. No.
<b>0.8</b>	13	Plain	100	C080A013A
	25	Plain	100	C080A025A
	37	Plain	100	C080A037A
	47	Plain	100	C080A047A
	90	Plain	25	C080A090C
	142	Plain	25	C080A142C
293	Plain	25	C080A293C	
<b>3.0</b>	13	Plain	100	C300A013A
	25	Plain	100	C300A025A
	37	Plain	100	C300A037A
	47	Plain	100	C300A047A
	90	Plain	25	C300A090C
	142	Plain	25	C300A142C
293	Plain	25	C300A293C	

## 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



### Applications

- Use as a clarifying filter or prefilter

### Specifications for Coated Cellulose Acetate, Code Y

Nominal Rating [µm]	Bubble Point <sup>1</sup>		Flow Rate <sup>2</sup>		% Latex Particle Retention [particle size in µm]							
	[MPa]	[psi]	Water [ml/min/cm <sup>2</sup> ]	Air [L/min/cm <sup>2</sup> ]	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 Rates 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 prefiltered nitrogen at 10 psi

### Ordering Information

#### White – Non-sterile

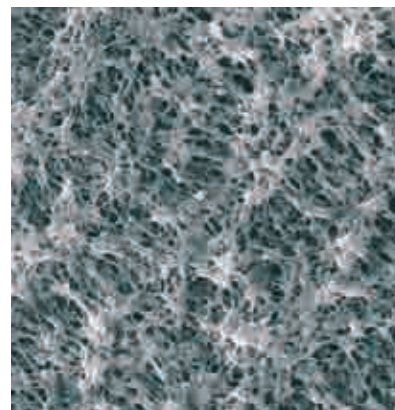
Pore Size [µm]	Diameter [mm]	Surface	Packing	Cat. No.
<b>0.8</b>	35	Plain	100	Y008A035A
	47	Plain	100	Y008A047A
	76	Plain	100	Y008A076A
	90	Plain	100	Y008A090A
	124	Plain	100	Y008A124A
	142	Plain	100	Y008A142A
	257	Plain	100	Y008A257A
	293	Plain	100	Y008A293A
<b>2.00</b>	35	Plain	100	Y020A035A
	47	Plain	100	Y020A047A
	76	Plain	100	Y020A076A
	90	Plain	100	Y020A090A
	124	Plain	100	Y020A124A
	142	Plain	100	Y020A142A
	257	Plain	100	Y020A257A
	293	Plain	100	Y020A293A

#### White – Non-sterile (continued)

Pore Size [µm]	Diameter [mm]	Surface	Packing	Cat. No.
<b>10.00</b>	35	Plain	100	Y100A035A
	47	Plain	100	Y100A047A
	76	Plain	100	Y100A076A
	90	Plain	100	Y100A090A
	124	Plain	100	Y100A124A
	142	Plain	100	Y100A142A
257	Plain	100	Y100A257A	
293	Plain	100	Y100A293A	

## 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**



### Applications

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

#### Note:

Autoclaving is not recommended since the membrane then will be hydrophobic.

### Specifications for hydrophilic PTFE, Code H

Pore Size [μm]	Bubble Point <sup>1</sup>		Flow Rates <sup>2</sup>		Porosity <sup>3</sup> [%]	Thickness [μm]	Max. Operating Temperature [°C]
	[MPa]	[psi]	Water [ml/min/cm <sup>2</sup> ]	Air [L/min/cm <sup>2</sup> ]			
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 poresize  
Air: Using prefiltered nitrogen at 10 psi.
3. Porosity refers to the percent open area.

### Trace 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

#### White – Non-sterile

Pore Size [μm]	Diameter [mm]	Surface	Packing	Cat. No.
<b>0.10</b>	13	Plain	100	H010A013A
	25	Plain	100	H010A025A
	47	Plain	100	H010A047A
	90	Plain	25	H010A090C
	142	Plain	25	H010A142C
	293	Plain	10	H010A293D
<b>0.20</b>	13	Plain	100	H020A013A
	25	Plain	100	H020A025A
	47	Plain	100	H020A047A
	90	Plain	25	H020A090C
	142	Plain	25	H020A142C
	293	Plain	10	H020A293D

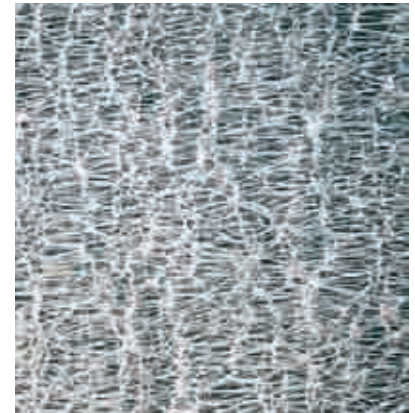
#### White – Non-sterile (continued)

Pore Size [μm]	Diameter [mm]	Surface	Packing	Cat. No.
<b>0.50</b>	13	Plain	100	H050A013A
	25	Plain	100	H050A025A
	47	Plain	100	H050A047A
	90	Plain	25	H050A090C
	142	Plain	25	H050A142C
	293	Plain	10	H050A293D
<b>1.00</b>	13	Plain	100	H100A013A
	25	Plain	100	H100A025A
	47	Plain	100	H100A047A
	90	Plain	25	H100A090C
	142	Plain	25	H100A142C
	293	Plain	10	H100A293D

# Membrane Filters

## Hydrophobic PTFE, supported

- **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 130°C



### 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 types

### Specifications for hydrophobic PTFE, Code J

Pore Size [μm]	Bubble Point <sup>1</sup>		Flow Rates <sup>2</sup>		Porosity <sup>3</sup> [%]	Maximum Operating Temperature [°C]	Water Break Through		Thickness [μm]
	[MPa]	[psi]	Acetone [ml/min/cm <sup>2</sup> ]	Air [L/min/cm <sup>2</sup> ]			[MPa]	[psi]	
0.10	≥0.140	≥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 methanol
2. Flow rates determined under constant vacuum 0.7 kg/cm<sup>2</sup> (10 psi)
3. Porosity refers to the percent open area

### Ordering Information

#### White – Non-sterile

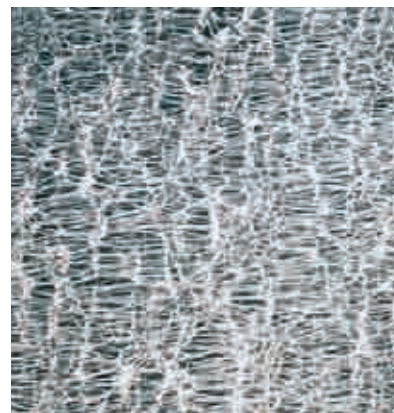
Pore Size [μm]	Diameter [mm]	Surface	Packing	Cat. No.
<b>0.10</b>	13	Plain	100	J010A013A
	25	Plain	100	J010A025A
	37	Plain	100	J010A037A
	47	Plain	100	J010A047A
	50	Plain	100	J010A050A
	90	Plain	25	J010A090C
	142	Plain	25	J010A142C
	293	Plain	10	J010A293D
<b>0.20</b>	13	Plain	100	J020A013A
	25	Plain	100	J020A025A
	37	Plain	100	J020A037A
	47	Plain	100	J020A047A
	50	Plain	100	J020A050A
	90	Plain	25	J020A090C
	142	Plain	25	J020A142C
	293	Plain	10	J020A293D

#### White – Non-sterile (continued)

Pore Size [μm]	Diameter [mm]	Surface	Packing	Cat. No.
<b>0.50</b>	13	Plain	100	J050A013A
	25	Plain	100	J050A025A
	37	Plain	100	J050A037A
	47	Plain	100	J050A047A
	50	Plain	100	J050A050A
	90	Plain	25	J050A090C
<b>1.00</b>	13	Plain	100	J100A013A
	25	Plain	100	J100A025A
	37	Plain	100	J100A037A
	47	Plain	100	J100A047A
	50	Plain	100	J100A050A
	90	Plain	25	J100A090C
	142	Plain	25	J100A142C
	293	Plain	10	J100A293D

## Hydrophobic PTFE, unsupported

- **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



### 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

### Specifications for hydrophobic PTFE, Code T

Pore Size [μm]	Bubble Point <sup>1</sup>		Flow Rates <sup>2</sup>		Porosity <sup>3</sup> [%]	Thickness [μm]	Max. Operating Temp. [°C]
	[MPa]	[psi]	Acetone [ml/min/cm <sup>2</sup> ]				
0.10	≥0.12	≥17.4	27	68	70	260	
0.20	≥0.091	≥13.2	55	74	80	260	
0.50	≥0.063	≥9.1	100	78	75	260	
0.80	≥0.039	≥5.7	200	76	75	260	
1.00	≥0.031	≥4.5	300	79	75	260	
3.00	≥0.013	≥1.9	750	83	75	260	

### Trace Metal Content [μg/g]

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

#### 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/cm<sup>2</sup> (10 psi)
3. Porosity refers to the percent open area

#### Note:

PTFE membrane filters tend to shrink as they are manufactured by stretching method. Do not remove the separating paper between membranes until shortly before placed in the filter holder. PTFE membranes tend to shrink when heated.

### Ordering Information

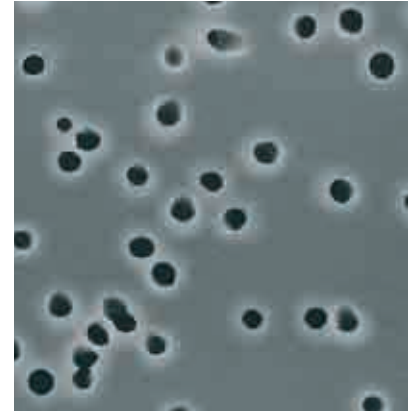
Pore Size [μm]	Diameter [mm]	Surface	Packing	Cat. No.
<b>0.10</b>	13	Plain	100	T010A013A
	25	Plain	100	T010A025A
	47	Plain	100	T010A047A
	90	Plain	25	T010A090C
	142	Plain	25	T010A142C
	293	Plain	10	T010A293D
<b>0.20</b>	13	Plain	100	T020A013A
	25	Plain	100	T020A025A
	47	Plain	100	T020A047A
	90	Plain	25	T020A090C
	142	Plain	25	T020A142C
	293	Plain	10	T020A293D
<b>0.50</b>	13	Plain	100	T050A013A
	25	Plain	100	T050A025A
	47	Plain	100	T050A047A
	90	Plain	25	T050A090C
	142	Plain	25	T050A142C
	293	Plain	10	T050A293D

Pore Size [μm]	Diameter [mm]	Surface	Packing	Cat. No.
<b>0.80</b>	13	Plain	100	T080A013A
	25	Plain	100	T080A025A
	47	Plain	100	T080A047A
	90	Plain	25	T080A090C
	142	Plain	25	T080A142C
	293	Plain	10	T080A293D
<b>1.00</b>	13	Plain	100	T100A013A
	25	Plain	100	T100A025A
	47	Plain	100	T100A047A
	90	Plain	25	T100A090C
	142	Plain	25	T100A142C
	293	Plain	10	T100A293D
<b>3.00</b>	13	Plain	100	T300A013A
	25	Plain	100	T300A025A
	47	Plain	100	T300A047A
	90	Plain	25	T300A090C
	142	Plain	25	T300A142C
	293	Plain	10	T300A293D

# Membrane Filters

## 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 extreme weight stable



### 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

### Specifications for Polycarbonate Membrane, Code K

Pore Size [µm]	Bubble Point <sup>1</sup>		Flow Rate <sup>2</sup>		Nominal Thickness [µm]
	[MPa]	[psi]	Water [ml/min/cm <sup>2</sup> ]	Air [L/min/cm <sup>2</sup> ]	
0.10	≥0.22	100	2	2	6
0.20	≥0.13	72	17	4	10
0.40	≥0.082	36	41	10	10
0.80	≥0.048	18	120	20	9
8.00	≥0.0048	2	1300	40	7

#### Definitions

1. Bubble point is the minimum pressure required to force air through a membrane which has been prewet with isopropanol.
2. Flow rate indicates initial flow at 10 psi using a KGS 47 filter holder.  
Water: Using water prefiltered to 0.1 µm pore size  
Air: Using prefiltered nitrogen at 10 psi

Maximum Operation Temperature: 140 °C

### Ordering Information

#### White – Non-sterile

Pore Size [µm]	Diameter [mm]	Surface	Packing	Cat. No.
<b>0.10</b>	13	Plain	100	K010A013A
	25	Plain	100	K010A025A
	47	Plain	100	K010A047A
<b>0.20</b>	13	Plain	100	K020A013A
	25	Plain	100	K020A025A
	47	Plain	100	K020A047A
<b>0.40</b>	13	Plain	100	K040A013A
	25	Plain	100	K040A025A
	47	Plain	100	K040A047A
<b>0.80</b>	13	Plain	100	K080A013A
	25	Plain	100	K080A025A
	47	Plain	100	K080A047A
<b>8.00</b>	13	Plain	100	K800A013A
	25	Plain	100	K800A025A
	47	Plain	100	K800A047A

#### Black – Non-sterile

Pore Size [µm]	Diameter [mm]	Surface	Packing	Cat. No.
<b>0.20</b>	25	Plain	100	K020N025A
	47	Plain	100	K020N047A
<b>0.40</b>	25	Plain	100	K040N025A
	47	Plain	100	K040N047A

## Sterile Membranes for Microbiology

- **Made from Mixed Esters of Cellulose (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 cm<sup>2</sup>)

- **Convenient packaging**

Membranes are available individually wrapped for optimum sterility.

- **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. Advantec membranes were developed and are manufactured to comply with the provisions of:

- ISO 7704:1985, Water Quality – Evaluation of membrane filters for microbiological analysis
- The National Interim Primary Drinking Water Regulations
- Guidelines for Establishing Test Procedures for the Analysis of Pollutants
- Standard Methods for the Examination of Water and Waste water
- ASTM

- **Applications**

Applications include microbiological analysis of water, wastewater, pharmaceuticals and beverages.

# Membrane Filters

## Sterile Membranes for Microbiology

Three colors are available:

- White plain and with grids
- Black plain and with grids
- Green with grids

Specifications for MCE membranes, please see page 6 and page 9 for CA membranes



### Ordering Information

#### MCE – White

Pore Size [µm]	Diameter [mm]	Surface	Packing	Cat. No.
<b>3.00</b>	47	Plain	100	A300G047A
	50	Plain	100	A300G050A
<b>1.00</b>	47	Plain	100	A100G047A
	47	Grid	100	A100H047A
	50	Grid	100	A100H050A
<b>0.80</b>	47	Plain	100	A080G047A
	47	Grid	100	A080H047A
	47	Grid	1000	A080H047W
	50	Plain	100	A080G050A
50	Grid	100	A080H050A	
	<b>0.65</b>	47	Plain	100
47		Grid	100	A065H047A
50		Grid	100	A065H050A
<b>0.45</b>	47	Plain	100	A045G047A
	47	Grid	100	A045H047A
	47	Grid	1000	A045H047W
	50	Plain	100	A045G050A
	50	Grid	100	A045H050A
	82	Grid	100	A045H082A
<b>0.20</b>	47	Plain	100	A020G047A
	47	Grid	100	A020H047A

#### CA – White

Pore Size [µm]	Diameter [mm]	Surface	Packing	Cat. No.
<b>0.45</b>	47	Plain	100	C045G047A
	85	Plain	100	C045G085A
<b>0.20</b>	47	Plain	100	C020G047A

#### MCE – Black

Pore Size [µm]	Diameter [mm]	Surface	Packing	Cat. No.
<b>0.80</b>	47	Grid	100	A080R047A
	47	Grid	1000	A080R047W
<b>0.45</b>	47	Grid	100	A045R047A
	47	Grid	1000	A045R047W
	50	Grid	100	A045R050A

#### MCE – Green

Pore Size [µm]	Diameter [mm]	Surface	Packing	Cat. No.
<b>0.45</b>	47	Grid	100	A045W047A
	50	Grid	100	A045W050A



## Petri Dishes

- **Polystyrene dishes** suitable for culturing micro-organisms 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 (8.85 ± 0.17 mm thick, absorbs 1.8 - 2.2 ml liquid)
- **Manufacturer's certification** of compliance available upon request



### Ordering Information

Model	Description	Size	Packing	Cat. No.
PD-47A	Sterile Petri Dishes	OD54 x 11 mm	100 (5 sleeves of 20)	42004010
PD-47B	Sterile Petri Dishes with Pads	OD54 x 11 mm	100 (5 sleeves of 20)	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



### Ordering Information

Cat. No.	Packing
B200G047A	100

## 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
- **Length:** 115 mm



### Ordering Information

Model	Material	Cat. No.
FS-1	SUS 304	17800000

## DISMIC Disposable Syringe Filter Units

## LABODISC Disposable In-Line/Syringe Filter Units



### Features

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

The Advantec range of DISMIC syringe filters is versatile in terms of volume to be filtered and which kind of liquids to be filtered.

- 3 mm filters for volumes <2 ml
- 13 mm filters for volumes <10 ml
- 25 mm filters for volumes <50 ml
- 50 mm filters for volumes <1 liter

Different membrane types and filter housings available for any kind of filtration. Some types available both non-sterile and sterile.

## Specifications:

		DISMIC 3	DISMIC 13	DISMIC 25		LABODISC
<b>Housing material</b>		PP	PP	PP	Acrylic	PP
<b>Housing diameter</b>	[mm]	3	13	25	25	50
<b>Filtration area</b>	[cm <sup>2</sup> ]	0.06	0.9	4.0	4.0	19.6
<b>Hold-up volume</b>	[ml]	<0.01	<0.03	<0.1	<0.1	<3.0
<b>Sample volume</b>	[ml]	<2 ml	<10 ml	<50 ml	<50 ml	<1 liter
<b>Pressure limit</b>	[psi]	74	74	74	74	49
<b>Max. operating temperature</b>	[°C]	60	60	60	45	60
<b>Connections</b>		Inlet: female luer-lock / Outlet: male luer slip				7-13.5 mm hose barb, female luer slip

Note: Pressure limits for DISMIC 13HP and DISMIC 25HP is 57 psi.

## DISMIC – Disposable Syringe Filter Units

### DISMIC 3

#### Membrane Types and Ordering Information

#### Membrane Types

	Characteristics
<b>Cellulose Acetate</b>	A commonly used hydrophilic membrane. Low protein binding, suitable for aqueous protein solutions. Suitable for most alcohols.
<b>PTFE, hydrophobic</b>	Ideal for filtration of solvents, acids and bases. Air venting.



#### Ordering Information

Diameter [mm]	Membrane material	Pore size (µm)	Housing material	Packing	Cat. No. Non-sterile	Cat. No. Sterile
3	Cellulose Acetate	0.20	Polypropylene	100	03CP020AN	03CP020AS
3	Cellulose Acetate	0.45	Polypropylene	100	03CP045AN	03CP045AS
3	PTFE, hydrophobic	0.50	Polypropylene	100	03JP050AN	-

## DISMIC – Disposable Syringe Filter Units

### DISMIC 13

#### Membrane Types and Ordering Information

#### Membrane Types

	Characteristics
<b>Cellulose Acetate</b>	A commonly used hydrophilic membrane. Low protein binding, suitable for aqueous protein solutions. Suitable for most alcohols.
<b>PTFE, hydrophobic</b>	Ideal for filtration of solvents, acids and bases. Air venting.
<b>PTFE, hydrophilic</b>	Versatile: Suitable for both solvents and aqueous solutions. Ideal for filtering HPLC samples. Studies has shown that hydrophilic PTFE has a low binding of Pesticides. The models in blister packs, Cat. Nos.13HP020CN and 13HP045CN, are specially manufactured for Ion Chromatography analysis.



13CP AN / AS



13JP



13HP



13HP in blister pack

#### Table of Negative Ion elution comparison

Item	F <sup>-</sup>	Cl <sup>-</sup>	No <sub>2</sub> <sup>-</sup>	Br <sup>-</sup>	No <sub>3</sub> <sup>-</sup>	PO <sub>4</sub> <sup>3-</sup>	SO <sub>4</sub> <sup>2-</sup>
13HP020CN	ND*	16.0	ND	ND	ND	ND	ND
13HP045CN	ND	10.2	ND	ND	ND	ND	ND
A company filter unit	ND	56.6	ND	ND	7.6	ND	35.6
B company filter unit	ND	22.6	ND	ND	ND	ND	ND
C company filter unit	ND	14.0	ND	ND	90.4	ND	88.6

\*) No Detection: less than detection limit

#### Ordering Information

Diameter [mm]	Membrane material	Pore size (µm)	Housing material	Packing	Cat. No. Non-sterile	Cat. No. Sterile
13	Cellulose Acetate	0.20	Polypropylene	100	13CP020AN	13CP020AS
13	Cellulose Acetate	0.45	Polypropylene	100	13CP045AN	13CP045AS
13	PTFE, hydrophobic	0.20	Polypropylene	100	13JP020AN	-
13	PTFE, hydrophobic	0.50	Polypropylene	100	13JP050AN	-
13	PTFE, hydrophilic	0.20	Polypropylene	100	13HP020AN	-
13	PTFE, hydrophilic	0.45	Polypropylene	100	13HP045AN	-
13	PTFE, hydrophilic	0.20	Polypropylene	50	13HP020CN	-
13	PTFE, hydrophilic	0.45	Polypropylene	50	13HP045CN	-

## DISMIC – Disposable Syringe Filter Units

### DISMIC 25

#### Membrane Types and Ordering Information

##### Membrane Types

	Characteristics
<b>Mixed Cellulose Ester</b>	A hydrophilic membrane with high porosity which provides a high flow rate. This type will bind proteins.
<b>Cellulose Acetate</b>	A commonly used hydrophilic membrane. Low protein binding, suitable for aqueous protein solutions. Suitable for most alcohols.
<b>PTFE, hydrophobic</b>	Ideal for filtration of solvents, acids and bases. Air venting.
<b>PTFE, hydrophilic</b>	Versatile: Suitable for both solvents and aqueous solutions. Ideal for filtering HPLC samples. Studies has shown that hydrophilic PTFE has a low binding of Pesticides.



25AS AN / AS



25CS AN / AS



25JP



25HP

##### Ordering Information

Diameter [mm]	Membrane material	Pore size (µm)	Housing material	Packing	Cat. No. Non-sterile	Cat. No. Sterile
25	Mixed Cellulose Ester	0.20	Acrylic	50	25AS020AN	25AS020AS
25	Mixed Cellulose Ester	0.45	Acrylic	50	25AS045AN	25AS045AS
25	Cellulose Acetate	0.20	Acrylic	50	25CS020AN	25CS020AS
25	Cellulose Acetate	0.45	Acrylic	50	25CS045AN	25CS045AS
25	Cellulose Acetate	0.80	Acrylic	50	25CS080AN	25CS080AS
25	PTFE, hydrophobic	0.20	Polypropylene	50	25JP020AN	25JP020AS
25	PTFE, hydrophobic	0.50	Polypropylene	50	25JP050AN	-
25	PTFE, hydrophilic	0.20	Polypropylene	100	25HP020AN	-
25	PTFE, hydrophilic	0.45	Polypropylene	100	25HP045AN	-

## LABODISC – Disposable In-Line/Syringe Filter Units

### LABODISC 50

#### Membrane Types and Ordering Information

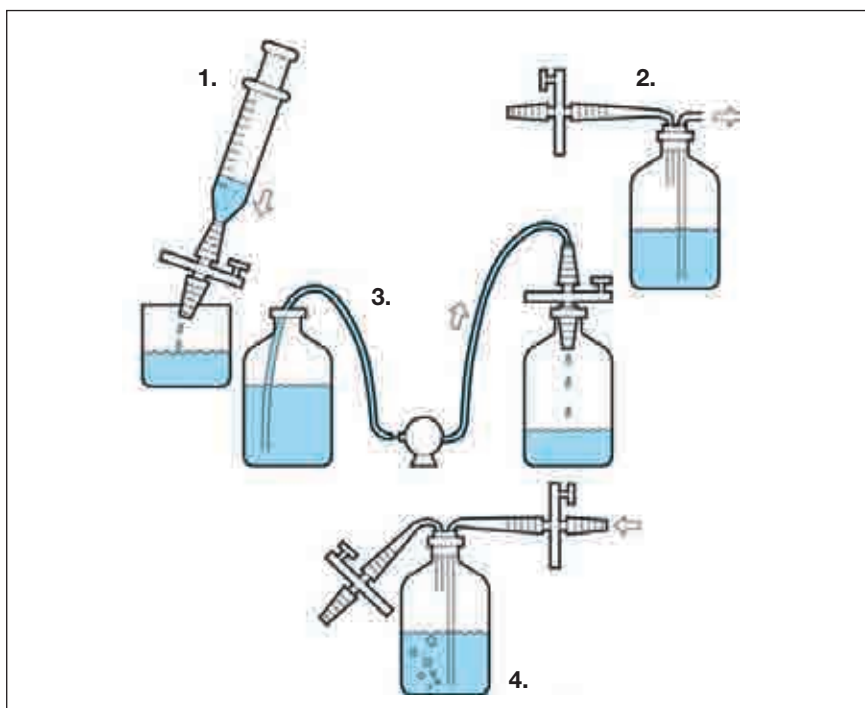
##### Membrane Types

	Characteristics
<b>Cellulose Acetate</b>	A commonly used hydrophilic membrane. Low protein binding, suitable for aqueous protein solutions. Suitable for most alcohols.
<b>PTFE, hydrophobic</b>	Ideal for filtration of solvents, acids and bases. Air venting.



##### Ordering Information

Diameter [mm]	Membrane material	Pore size (µm)	Housing material	Packing	Cat. No. Non-sterile	Cat. No. Sterile
50	Cellulose Acetate	0.20	Polypropylene	10	50CP020AN	50CP020AS
50	Cellulose Acetate	0.45	Polypropylene	10	50CP045AN	50CP045AS
50	PTFE, hydrophobic	0.20	Polypropylene	10	50JP020AN	50JP020AS
50	PTFE, hydrophobic	0.50	Polypropylene	10	50JP050AN	-



1. Filtration with a syringe
2. Venting when emptying a container
3. Filtration with a peristaltic pump
4. Venting when filling a container

## USY Disposable Ultrafiltration Units

- **Easy** small volume ultrafiltration
- **Collect** concentrated solution, filtrate or both
- **Syringe-driven** filtration, no equipment required
- **Ultrafilter membranes** integrated into the units
- **Choose from** 10, 50 and 200 kDa ultrafilter units
- **Simple** unit assembly and operation

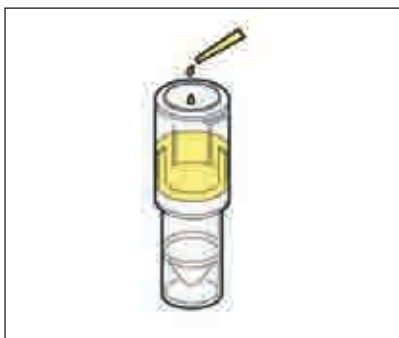
## Applications

These disposable ultrafiltration units are designed to easily concentrate, separate or otherwise purify small volumes (<2 ml) of liquids, on the basis of molecular weight cut off using positive pressure. Clear filtration chamber allows visual confirmation of filtration progress.



## Specifications:

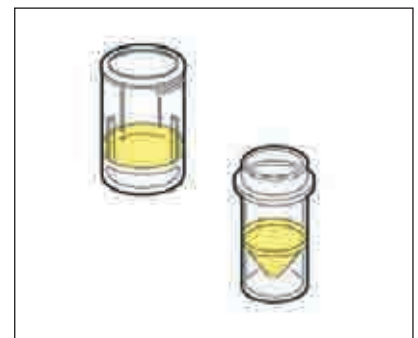
Materials	
Cell cap, Luer cap	Polypropylene
Check valve:	Silicone
Retentive cell:	Acrylic
Ultra filter:	Polysulfone
Filtrate cell:	Acrylic
<b>Effective filtration Area:</b>	2.0 cm <sup>2</sup>
<b>Maximum cell capacity:</b>	2.0 ml
<b>Minimum graduated volume:</b>	0.5 ml
<b>Minimum recovery volume:</b>	0.5 ml
<b>Maximum concentration:</b>	40 x
<b>Maximum temperature:</b>	50°C
<b>Sterilization:</b>	25% Ethanol, 5% Formalin
<b>Maximum pressure:</b>	0.29 MPa (42.6 psi)
<b>Filtrate cell capacity:</b>	2.5 ml



1  
Pipet sample (approximately 1-2 ml) into the retentate cell.



2  
Place the cell cap onto the retentate cell and gently screw into place. Pressurize the unit by injecting 10 ml of air with a syringe.



3  
The concentrated sample can be collected from the retentate cell while the filtrate can be collected from the filter cell.

## › Solute Rejection [%]

1 ml of sample filtered at 0.2 MPa

		USY-1	USY-5	USY-20
Molecular Weight Cut Off of Ultra Filter		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

1 box contains:

- 24 pcs. Retentate cells
- 24 pcs. Filtrate Cells
- 4 pcs. Luer Caps
- 4 pcs. Cell Caps
- 4 pcs. Check Valves

Type	Cut Off	Cat. No.
USY-1	10,000 MWCO	39651001
USY-5	50,000 MWCO	39651005
USY-20	200,000 MWCO	39651020



Glass Fiber and Quartz Fiber filters are perhaps the most highly engineered fibrous filtration media available for research and industrial applications.

Glass microfibers, the starting raw material, are entirely man-made. Since the ultimate retention characteristics of the filter paper are determined by the microfiber diameter, rigid manufacturing controls are imposed to produce consistent, controlled diameter fibers. Typical diameters range from 0.5 to 1.0  $\mu\text{m}$ .

Once compacted, these fibers form a dense, random fiber matrix. When used in aqueous filtration, high flow rates and high loading capacities are observed as particles are entrapped within the filter matrix.

Chemical resistance, pH resistance and biological inertness are maximized since the fibers are borosilicate glass. Thermal resistance can be increased from 500°C to 1000°C by reinforcing the fiber within alumina binder.

Glass fiber filters with binder are recommended for long duration filtrations under pressure.

Glass fiber filters without binder are recommended for analytical and gravimetric determinations.



*Glass Fiber Filters*



*Quartz Fiber Filters*

## Glass Fiber Filters

### Characteristics

- **Dense**
- **Highly resistant** to chemical attack, biologically inert
- **Easily sterilized:** Can be baked or autoclaved
- **Store indefinitely:** Unaffected by humidity

### Applications

- Use as a prefilter to extend membrane life
- Water and air pollution analysis
- Liquid clarification
- Cell harvesting



### Specifications

Type	Applications/ Characteristics	Weight [g/m <sup>2</sup> ]	Thick- ness [mm]	Nominal Rating [μm]	Water Flow Time <sup>1</sup> [sec.]	Gas Collection Efficiency [%; 0.3 μm DOP]	Pressure Drop at 5 cm/sec [kPa]	Binder	Max. Temp. [°C]
GA-55	General purpose paper Air pollution monitoring	55	0.21	0.6	23	99.9	0.33	None	500
GA-100	General purpose paper Filtration of precipitated proteins or cells Air pollution monitoring	110	0.44	1.0	11	96	0.20	None	500
GA-200	Thick filter recommended for filtering viscous fluids as liquid sugars and gels	175	0.74	0.8	15	99.9	0.35	None	500
GB-100R	High and low volume aerosols for airborne dust and metal contaminants Low trace metal content of As, Pb, and Cd DNA/RNA and protein precipitates	95	0.38	0.6	15	99.99	0.30	None	500
GB-140	Compared to GB-100R: Thicker, greater wet strength, slower filtration speed Industrial waste analysis Low absorption, limited wet strength and loading capacity	140	0.56	0.4	58	99.99	1.11	None	500
GC-50	Prefilter for membrane filters (0.45 μm or smaller) Scintillation counting Suspended solids analysis of industrial waters and wastewater	48	0.19	0.5	28	99.99	0.52	None	500
GC-90	High wet strength Clinical screening	100	0.30	0.5	20	99.99	0.42	Organic	120
GD-120	Prefilter for 0.45 μm – 1.2 μm membranes High wet strength, very high loading capacity	123	0.51	0.9	14	97	0.17	None	500
GF-75	Most retentive grade offered Collection of IgC or other very fine protein precipitates Clarifying chemically aggressive solutions TCLP (EPA method 1311) – use with KST 142	75	0.35	0.3	84	99.999	1.67	None	500
GS-25	Limited dirt holding capacity High wet strength Prefilter for 0.65 μm or smaller mem- branes	70	0.21	0.6	15	99.9	0.32	Organic	120
DP-70	High wet strength Very high loading capacity Dust measurement	170	0.52	0.6	20	-	0.52	Organic	120

1. Flow time is the time in seconds to filter 100 ml of distilled water at 20°C under pressure supplied by a 10 cm water column through a 10 cm<sup>2</sup> section of filter.

Comparison Table and Metal Content Table, see page 31

## Glass Fiber Filters

### Ordering Information

#### Grade GA-55

Diameter [mm]	Packing	Cat. No.
25	100	GA055.025
37	100	GA055.037
45	100	GA055.045
47	100	GA055.047
50	100	GA055.050
55	100	GA055.055
70	100	GA055.070
90	100	GA055.090
110	100	GA055.110
125	100	GA055.125
150	100	GA055.150
Sheets, size		
203 x 254	100	GA055.810

#### Grade GA-100

Diameter [mm]	Packing	Cat. No.
25	100	GA100.025
35	100	GA100.035
37	100	GA100.037
45	100	GA100.045
47	100	GA100.047
55	100	GA100.055
70	100	GA100.070
90	100	GA100.090
110	100	GA100.110
125	100	GA100.125
150	100	GA100.150
Sheets, size		
203 x 254	50	GA100.810

#### Grade GA-200

Diameter [mm]	Packing	Cat. No.
25	50	GA200.025
37	50	GA200.037
45	50	GA200.045
47	50	GA200.047
55	50	GA200.055
70	50	GA200.070
90	50	GA200.090
110	50	GA200.110
125	50	GA200.125
150	50	GA200.150
Sheets, size		
203 x 254	50	GA200.810

#### Grade GB-100R

Diameter [mm]	Packing	Cat. No.
25	100	GB100R.025
37	100	GB100R.037
45	100	GB100R.045
47	100	GB100R.047
55	100	GB100R.055
70	100	GB100R.070
90	100	GB100R.090
110	100	GB100R.110
125	100	GB100R.125
150	100	GB100R.150
Sheets, size		
203 x 254	50	GB100R.810

## Glass Fiber Filters

### Ordering Information

#### Grade GB-140

Diameter [mm]	Packing	Cat. No.
25	100	GB140.025
37	100	GB140.037
45	100	GB140.045
47	100	GB140.047
55	100	GB140.055
70	100	GB140.070
90	100	GB140.090
110	100	GB140.110
125	100	GB140.125
150	100	GB140.150
Sheets, size		
203 x 254	50	GB140.810

#### Grade GC-50

Diameter [mm]	Packing	Cat. No.
25	100	GC050.025
37	100	GC050.037
45	100	GC050.045
47	100	GC050.047
55	100	GC050.055
70	100	GC050.070
90	100	GC050.090
110	100	GC050.110
125	100	GC050.125
150	100	GC050.150
Sheets, size		
203 x 254	100	GC050.810

#### Grade GC-90

Diameter [mm]	Packing	Cat. No.
25	100	GC090.025
37	100	GC090.037
45	100	GC090.045
47	100	GC090.047
55	100	GC090.055
70	100	GC090.070
90	100	GC090.090
110	100	GC090.110
125	100	GC090.125
150	100	GC090.150
Sheets, size		
203 x 254	50	GC090.810

#### Grade GD-120

Diameter [mm]	Packing	Cat. No.
25	50	GD120.025
37	50	GD120.037
45	50	GD120.045
47	50	GD120.047
55	50	GD120.055
70	50	GD120.070
90	50	GD120.090
110	50	GD120.110
125	50	GD120.125
150	50	GD120.150
Sheets, size		
203 x 254	50	GD120.810

## Glass Fiber Filters

### Ordering Information

#### Grade GF-75

Diameter [mm]	Packing	Cat. No.
25	100	GF075.025
37	100	GF075.037
45	100	GF075.045
47	100	GF075.047
55	100	GF075.055
70	100	GF075.070
90	100	GF075.090
110	100	GF075.110
125	100	GF075.125
150	100	GF075.150
Sheets, size		
203 x 254	50	GF075.810

#### Grade GS-25

Diameter [mm]	Packing	Cat. No.
25	100	GS025.025
37	100	GS025.037
45	100	GS025.045
47	100	GS025.047
55	100	GS025.055
70	100	GS025.070
90	100	GS025.090
110	100	GS025.110
125	100	GS025.125
150	100	GS025.150
Sheets, size		
203 x 254	100	GS025.810

#### Grade DP-70

Diameter [mm]	Packing	Cat. No.
35	50	DP070.035
37	50	DP070.037
45	50	DP070.045
47	50	DP070.047
55	50	DP070.055
70	50	DP070.070
90	50	DP070.090
110	50	DP070.110
125	50	DP070.125
150	50	DP070.150
Sheets, size		
203 x 254	25	DP070.810

## Quartz Fiber Filters

### Characteristics

- **Highly resistant** to chemical attack, biologically inert
- **High purity:** Very low trace metal content, does not adsorb nitrous and sulfur dioxides; Grade QR-100 is pre-fired at 1000°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



### Specifications

Type	Applications/ Characteristics	Weight [g/m <sup>2</sup> ]	Thickness [mm]	Gas Collection Efficiency [%; 0.3 µm DOP]	Pressure Drop at 5 cm/sec. [kPa]	Binder	Max. Temp. [°C]
QR-100	Superior chemical resistance, does not absorb acid gases	85	0.38	99.9	0.45	None	1000
QR-200	Filtration at elevated temperatures Low adsorption Monitor airborne particulates	200	1.0	99.9	0.34	Inorganic	1000

Comparison Table and Metal Content Table, see page 31

### Grade QR-100

Diameter [mm]	Packing	Cat. No.
25	100	QR100.025
37	100	QR100.037
45	100	QR100.045
47	100	QR100.047
55	100	QR100.055
70	100	QR100.070
90	100	QR100.090
110	100	QR100.110
125	100	QR100.125
150	100	QR100.150
Sheets, size		
203 x 254	50	QR100.810

### Grade QR-200

Diameter [mm]	Packing	Cat. No.
25	50	QR200.025
37	50	QR200.037
45	50	QR200.045
47	50	QR200.047
55	50	QR200.055
70	50	QR200.070
90	50	QR200.090
110	50	QR200.110
125	50	QR200.125
150	50	QR200.150
Sheets, size		
203 x 254	50	QR200.810

## Glass Fiber & Quartz Fiber Filters

### Comparison Table

#### Binder Free Glass Fiber Filters

Advantec	Whatman	Millipore	Munktell	Macherey-Nagel	ALBET-Hahnemuehle
GA-55	GF/A	APFA	MGA	GF-1	FPGF 50
GB-140	GF/B	APFB	MGB	GF-2	FPGF 51
GC-50	GF/C	APFC	MGC	GF-3	FPGF 52
GD-120	GF/D	APFD	MGD	GF-4	FPGF 53
GF-75	GF/F	APFF	MGF	GF-5	FPGF 55

#### Quartz Fiber Filters

QR-100	QM-A	AQFA	MK 360	QF-10	FQT
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#### Note:

This table should be considered as alternatives rather than equivalents. When comparing depth filters like glass fiber filters it is impossible to obtain an exact equivalent. The comparison is based on filters made of the same type of raw material giving similar filtration properties. Filtration speed can differ between types with the same retention efficiency because of the thickness of the filter. Thin filters filter faster than thick filters.

### Metal Content Table

#### Glass Fiber Filters [µg/g]

Grade	Pb	Cd	Mn	Zn	Cu	Ni	Cr	Fe
GA-55	1	<0.5	3.8	14000	<1	<1	3	100
GA-100	<1	<0.5	<0.5	<1	<1	<1	<1	10
GA-200	<1	<0.5	<0.5	<1	<1	<1	<1	8
GB-100R	3	<0.5	<0.5	<1	<1	<1	<1	10
GB-140	<1	<0.5	1.6	8700	<1	<1	1	57
GC-50	<1	<0.5	2.6	7600	<1	<1	7	73
GC-90	<1	<0.5	<0.5	<1	<1	<1	<1	9
GD-120	<1	<0.5	<0.5	1200	<1	<1	<1	10
GF-75	2	<0.5	4	1800	<1	<1	6	180
GS-25	<1	<0.5	<0.5	<1	<1	<1	<1	11
DP-70	<1	<0.5	1.4	4200	<1	<1	2	37

Analysis Method: Flame atomic absorption spectrophotometry

- Pre-treatment:
1. Extracting by heated HCl-HNO<sub>3</sub> mixed acid
  2. Condensing the extracted solution
  3. Re-extracting by heated H-Cl-HNO<sub>3</sub> mixed acid
  4. Analyzing the re-extracted solution

#### Quartz Fiber Filters [µg/g]

Grade	Pb	Cd	Mn	Zn	Cu	Ni	Cr	Fe
QR-100	<1	<0.5	<0.5	<1	<1	<1	1	8
QR-200	<1	<0.5	<0.5	<1	<1	1	3	45

Analysis Method except for Zn: Electric heating atomic absorption spectrophotometry

Analysis Method for Zn: Flame atomic absorption spectrophotometry

- Pre-treatment:
1. Extracting to dryness
  2. Evaporating to dryness
  3. Dissolving by HNO<sub>3</sub>(conc.)
  4. Filtrating by Filter paper No. 5C
  5. Analyzing

# Composite Filters

## PG-60

- **Glass Fibers** covered with polytetrafluoroethylene (PTFE)
- **Hydrophobic**
- **Low absorption:** The moisture absorption is very low as the surface is coated with PTFE. Therefore the measurement of dust concentration is not affected by humidity of the air
- **The absorption of acid gases** such as SO<sub>x</sub> or NO<sub>x</sub> is very low since Fluoropolymer is used as binder

## Applications

- Measurement of dust concentration in air and exhaust gas



### Usage note

PG-60 is designed for air/gas filtration only, and any liquid should not be filtrated.

### Specifications

Grade	Weight [g/m <sup>2</sup> ]	Thickness [mm]	Pressure Drop [kPa] <sup>1</sup>	DOP retention [% , 0.3 μm] <sup>2</sup>	Water Break Through [kPa] <sup>3</sup>	Binder	Max. Operating Temp. [°C]
PG-60	60	0.15	0.30	99.9	>7.8	Fluoropolymer	260

1) Air velocity: 5 cm/sec.

2) Test conditions are subject to JIS Z 8901 (Air velocity: 5 cm/sec.)

3) Pressure of the water passing through the filter.

### Metal Content (μg/g)

Pb	Cd	Mn	Zn	Cu	Ni	Cr	Fe
<1.0	<0.1	<0.5	6.3	2.6	<0.5	<0.1	31

## Ordering Information

Diameter [mm]	Packing	Cat. No.
25	100	PG60.025
26	100	PG60.026
37	100	PG60.037
45	100	PG60.045
47	100	PG60.047
55	100	PG60.055
70	100	PG60.070
90	50	PG60.090
110	50	PG60.110
125	50	PG60.125
150	50	PG60.150
Sheets, size		
203 x 254	50	PG60.810





## Qualitative and Quantitative Filter Papers

- Qualitative Filter Papers are manufactured from 100% alpha cotton cellulose.
- Primarily used for clarifying and removing precipitates, these papers are ideal for filtrations that do not require low ash.
- Six types of qualitative papers are available. Choice of paper is usually based on the size of precipitates to be retained and the flow rate. Papers are available in both circles and sheets.
- Quantitative Filter Papers are made from the highest quality alpha cotton cellulose. One critical step in the manufacture of these filter papers is acid washing. Papers are double acid washed in hydrochloric then hydrofluoric acid to further reduce levels of  $\text{SiO}_2$ ,  $\text{CaO}$  and  $\text{Fe}^{2+}$ . Following the acid wash, all papers are rinsed with ultrapure water to neutralize them.

## Qualitative Filter Papers

### Characteristics

- 100% alpha cotton cellulose
- pH tolerant 0 to 12
- Temperature Maximum 120°C
- Wide selection – six types
- Higher ash than quantitative

### Applications

- Clarify and remove precipitates
- Preparation for qualitative analysis



### Descriptions

- No.1** Produced for general filtrations with a fast flow rate. This paper will retain coarse and gelatinous precipitates (>10 µm). Smooth paper of normal hardness.
- No.2** This paper is thicker than No. 1 paper and will retain medium sized precipitates (5-10 µm). Smooth paper of normal hardness.
- No. 131** This paper has highest retention efficiency of qualitative papers (<5 µm) and slower flow rates. This paper has a higher wet strength and will withstand suction.
- No. 231** This paper is thin and slightly more retentive (8 µm) than No. 1. General purpose.
- No. 232** This thin retentive paper (5 µm) has a slow initial flow rate.
- No. 235** A smooth, dense paper, the No. 235 will retain very fine crystalline precipitates. Smooth normal hardness.

### Specifications

Type	Applications/Characteristics	Weight [g/m <sup>2</sup> ]	Thickness [mm]	Flow Time <sup>1</sup> [sec]	Absorption-speed <sup>2</sup> [cm]	Retention Characteristics	Gas Collection Efficiency [%; 0.3 µm DOP]
No. 1	Retains large crystalline particles and gelatinous precipitates. Fast flow rate, smooth surface, normal hardness.	90	0.20	45	9.0	Coarse	65
No. 2	Retains medium crystalline precipitates, fast flow rate, smooth surface, normal hardness.	125	0.26	80	8.0	Medium	80
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	Medium-Fine	90
No. 231	Retains crystalline precipitates, moderate flow rate, smooth surface, normal hardness.	95	0.18	130	7.5	Medium	-
No. 232	Retains medium to medium-fine particulates, slow flow rate, smooth, normal hardness.	90	0.18	250	5.0	Medium-Medium-Fine	-
No. 235	Highest retention efficiency, retains very fine particulates, very slow flow rate, smooth.	95	0.17	1200	4.0	Very fine	-

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 cm<sup>2</sup> section of filter paper.

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

Comparison Table, see page 41

## Qualitative Filter Papers

### Ordering Information

#### Grade No. 1

Diameter [mm]	Packing	Cat. No.
55	100	1.055
70	100	1.070
90	100	1.090
110	100	1.110
125	100	1.125
150	100	1.150
185	100	1.185
240	100	1.240
285	100	1.285
300	100	1.300
330	100	1.330
360	100	1.360
400	100	1.400
500	100	1.500
600	100	1.600
Sheets, size		
485 x 560	100	1.485560
600 x 600	100	1.600600

#### Grade No. 2

Diameter [mm]	Packing	Cat. No.
55	100	2.055
70	100	2.070
90	100	2.090
110	100	2.110
125	100	2.125
150	100	2.150
185	100	2.185
240	100	2.240
285	100	2.285
300	100	2.300
330	100	2.330
360	100	2.360
400	100	2.400
500	100	2.500
600	100	2.600
Sheets, size		
485 x 560	100	2.485560
600 x 600	100	2.600600

#### Grade No. 131

Diameter [mm]	Packing	Cat. No.
55	100	131.055
70	100	131.070
90	100	131.090
110	100	131.110
125	100	131.125
150	100	131.150
185	100	131.185
240	100	131.240
285	100	131.285
300	100	131.300
330	100	131.330
360	100	131.360
400	100	131.400
500	100	131.500
600	100	131.600
Sheets, size		
485 x 560	100	131.485560
600 x 600	100	131.600600

#### Grade No. 231

Diameter [mm]	Packing	Cat. No.
55	100	231.055
70	100	231.070
90	100	231.090
110	100	231.110
125	100	231.125
150	100	231.150
185	100	231.185
Sheets, size		
485 x 560	100	231.485560

## Qualitative Filter Papers

### › Ordering Information

#### Grade No. 232

Diameter [mm]	Packing	Cat. No.
55	100	232.055
70	100	232.070
90	100	232.090
110	100	232.110
125	100	232.125
150	100	232.150
185	100	232.185
Sheets, size		
485 x 560	100	232.485560

#### Grade No. 235

Diameter [mm]	Packing	Cat. No.
55	100	235.055
70	100	235.070
90	100	235.090
110	100	235.110
125	100	235.125
150	100	235.150
185	100	235.185
Sheets, size		
485 x 560	100	235.485560

## Quantitative Filter Papers

### Characteristics

- **Highest quality** alpha cotton cellulose
- **Low ash** content
- **Acid washed:** Double acid washed in hydrochloric then hydrofluoric acid, then rinsed with ultrapure water to neutralize. No. 4A is further treated with nitric acid before washing

### Applications

- Gravimetric analysis
- Environmental monitoring

### Descriptions



- No. 4A** This acid washed paper is further treated with nitric acid to harden the paper for superior wet strength. No. 4A papers has a high retention efficiency for fine particulates <5 μm, excellent pH and chemical resistance.
- No. 5A** This is a double acid washed paper of low ash to retain coarse precipitates (>10 μm) with high flow rates. Recommended for filtering hydroxides, metallic aerosols and determining silica content in steel.
- No. 5B** This is a double acid washed paper for retaining medium size (5-10 μm) precipitates. General purpose paper.
- No. 5C** A double washed paper with slow flow rate and high retention efficiency. Recommended for collecting particles <5μm, gravimetric analysis and for collecting precipitates that tend toward colloidal dispersion.
- No. 6** High purity, low ash paper for retaining medium fine 2-10 μm particulates. Uses are primarily precision analyses of trace and precious metals, beverages, water etc.
- No. 7** This is the highest purity quantitative paper available with fast flow rate for retaining medium size particles (5-10 μm). Recommended for gravimetric analyses of minute trace and precious metals and for research labs where precision is a high priority.

### Specifications

Type	Applications/ Characteristics	Weight [g/m <sup>2</sup> ]	Thickness [mm]	Flow Time <sup>1</sup> [sec]	Absorption- speed <sup>2</sup> [cm]	Retention Characteristics	Gas Collection Efficiency [%; 0.3 μm DOP]
No. 4A	High retention efficiency, hardened ashless for retaining fine crystalline particulates (<5 μm). Slow flow rate. High chemical and pH resistance. High wet strength. This filter is suitable for use under pressure.	96	0.12	915	4.0	Very Fine	90
No. 5A	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	Coarse and gelatinous	75
No. 5B	Retains medium particles (5-10 μm) such as CaCO <sub>3</sub> , PbSO <sub>4</sub> , CaCO <sub>4</sub> , MnCO <sub>3</sub> , ZnCO <sub>3</sub> , ZnS, AgCl	108	0.21	195	7.0	Medium	90
No. 5C	Collect fine precipitates (<5 μ) such as SrSO <sub>4</sub> , BaSO <sub>4</sub> , HgCrO <sub>4</sub> and colloidal dispersions, gravimetric analysis	118	0.22	570	6.0	Fine	93
No. 6	Retains medium-fine particulates (2-10 μm), trace and precious metals	103	0.20	300	6.0	Medium-Fine	90
No. 7	Highest purity for retaining medium particles (5-10 μm), precise gravimetric analysis	87	0.18	200	7.0	Medium	85

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 cm<sup>2</sup> section of filter paper.

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

Comparison Table and Ash Content table, see page 41

## Quantitative Filter Papers

### Ordering Information

#### Grade No. 4A

Diameter [mm]	Packing	Cat. No.
55	100	4A.055
70	100	4A.070
90	100	4A.090
110	100	4A.110
125	100	4A.125
150	100	4A.150
185	100	4A.185
240	100	4A.240
285	100	4A.285
300	100	4A.300
330	100	4A.330
360	100	4A.360
400	100	4A.400
500	100	4A.500
Sheets, size		
485 x 560	100	4A.485560

#### Grade No. 5A

Diameter [mm]	Packing	Cat. No.
55	100	5A.055
70	100	5A.070
90	100	5A.090
110	100	5A.110
125	100	5A.125
150	100	5A.150
185	100	5A.185
240	100	5A.240
285	100	5A.285
300	100	5A.300
330	100	5A.330
360	100	5A.360
400	100	5A.400
500	100	5A.500
Sheets, size		
485 x 560	100	5A.485560

#### Grade No. 5B

Diameter [mm]	Packing	Cat. No.
55	100	5B.055
70	100	5B.070
90	100	5B.090
110	100	5B.110
125	100	5B.125
150	100	5B.150
185	100	5B.185
240	100	5B.240
285	100	5B.285
300	100	5B.300
330	100	5B.330
360	100	5B.360
400	100	5B.400
500	100	5B.500
Sheets, size		
485 x 560	100	5B.485560

#### Grade No. 5C

Diameter [mm]	Packing	Cat. No.
55	100	5C.055
70	100	5C.070
90	100	5C.090
110	100	5C.110
125	100	5C.125
150	100	5C.150
185	100	5C.185
240	100	5C.240
285	100	5C.285
300	100	5C.300
330	100	5C.330
360	100	5C.360
400	100	5C.400
500	100	5C.500
Sheets, size		
485 x 560	100	5C.485560

## Quantitative Filter Papers

### Ordering Information

#### Grade No. 6

Diameter [mm]	Packing	Cat. No.
55	100	6.055
70	100	6.070
90	100	6.090
110	100	6.110
125	100	6.125
150	100	6.150
185	100	6.185
240	100	6.240
285	100	6.285
300	100	6.300
330	100	6.330
360	100	6.360
400	100	6.400
500	100	6.500
Sheets, size		
485 x 560	100	6.485560

#### Grade No. 7

Diameter [mm]	Packing	Cat. No.
55	100	7.055
70	100	7.070
90	100	7.090
110	100	7.110
125	100	7.125
150	100	7.150
185	100	7.185
240	100	7.240
285	100	7.285
300	100	7.300
330	100	7.330
360	100	7.360
400	100	7.400
500	100	7.500
Sheets, size		
485 x 560	100	7.485560

## Phase Separating Filters

### Characteristics

- **Silicone treated** cellulose paper
- **Separate** aqueous and non-aqueous phases of mixtures
- **Hydrophobic filters** retain aqueous phase while non-aqueous phase passes through



### Specifications

Grade Code	Material	Weight [g/m <sup>2</sup> ]	Thickness [mm]	Particle Retention [μm]
2S	Silicone treated cellulose	120	0.26	5

### Ordering Information

Diameter [mm]	Packing	Cat. No.
55	100	2S.055
70	100	2S.070
90	100	2S.090
110	100	2S.110
125	100	2S.125
150	100	2S.150
185	100	2S.185

Comparison Table, see page 41





## Qualitative & Quantitative Filter Papers

### Comparison Table

Advantec	Whatman	Former S&S	Munktell	Macherey-Nagel	Filtrak	ALBET-Hahnemuehle
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#### Qualitative Filter Papers

1	4	-	3	617	288	FP604
2	1	595	1F	615	289	FP597
131	3 or 6	598	106	618	290	FP602H
231	1	595	1F	615	289	FP595
232	2	-	150	616md	292	FP593
235	5	602h	120H	619de	291	FP602eh

#### Quantitative Filter Papers

4A	50	1575	4/N	1674	1291	-
5A	41	589 <sup>1</sup>	OOR	640w	388	FP589/1
5B	40	589 <sup>2</sup>	OOA or OOK <sup>1)</sup>	640m	392	FP589/2
5C	42	-	OOH	640d	391	FP589/5
6	44	589 <sup>3</sup>	OOA or OOK <sup>1)</sup>	640dd	390	FP589/3
7	43	-	OOM	640m	389	FP589/6

#### Phase Separating Filters

2S	1PS	-	124	616WA	480
----	-----	---	-----	-------	-----

1) Munktell OOA and OOK are very similar

#### Note:

This table should be considered as alternatives rather than equivalents.

When comparing depth filters like filter papers it is impossible to obtain an exact equivalent.

The comparison is based on papers made of the same type of raw material giving similar filtration properties. Filtration speed can differ between types with the same retention efficiency because of the thickness of the filter. Thin filters filter faster than thick filters.

### Ash Content of Quantitative Filter Papers

[mg per circle (up to diameter 185 mm)]

Circle diameter	No. 5A	No. 5B	No. 5C	No. 6	No. 7
55	0.02	0.02	0.02	0.02	0.02
70	0.03	0.04	0.04	0.03	0.03
90	0.06	0.06	0.06	0.05	0.04
11	0.09	0.10	0.10	0.08	0.07
125	0.11	0.12	0.12	0.10	0.09
150	0.16	0.18	0.18	0.15	0.12
185	0.24	0.27	0.27	0.23	0.19

# Milk Sediment Discs

## › Milk Sediment Discs

- **Use to check** for contamination in dairy products
- **Discs made of high purity** cellulose fibers
- **Choose from** black or white discs



## › Ordering Information

	Color	Packing	Cat. No.
Milk Sediment Disc	White	50	1026.033
Milk Sediment Disc	Black	50	1026B.033

## Antibiotic Assay Discs

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



## Ordering Information

	Thickness [mm]	Diameter [mm]	Packing	Cat. No.
for Antibiotic Assay	1.5	8	1000	49005010
for Antibiotic Assay	0.7	8	1000	49005020
for Antibiotic Assay	0.7	6	1000	49005040

	Thickness [mm]	Diameter [mm]	Absorbing Capacity [ml/disc]	Packing	Cat. No.
for Antimicrobial Substances	1.1	10	0.07-0.08	1000	49006010
for Benzylpenicillin	1.5	10	0.2	100	49007010

## Blaine Test Paper

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

	Packing	Cat. No.
Blaine Test Paper	250	01511012



## ► Polyflon – PTFE Fiber 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
- **Thermostable:** Maximum operating temperature 260°C

## ► Applications

- Separation of aqueous and non-aqueous phases
- Filtration of hot acids and strong solvents
- Venting air and gases



## Specifications

Grade	Weight [g/m <sup>2</sup> ]	Thickness [mm]	Porosity [%]	Pressure drop at 5 cm/sec. [kPa]	Pressure drop [psi]	DOP retention [%, 0.3 μm]	Particle retention [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

## Polyflon – PTFE Fiber Filters

### Ordering Information

#### Grade PF100

Diameter [mm]	Packing	Cat. No.
47	20	PF100.047
55	20	PF100.055
70	20	PF100.070
90	20	PF100.090
110	10	PF100.110
125	10	PF100.125
150	10	PF100.150
Sheets, size		
300 x 300	5	PF100.300300

#### Grade PF040

Diameter [mm]	Packing	Cat. No.
47	10	PF040.047
50	10	PF040.050
55	10	PF040.055
70	10	PF040.070
90	10	PF040.090
110	5	PF040.110
125	5	PF040.125
150	5	PF040.150
Sheets, size		
300 x 300	5	PF040.300300

#### Grade PF060

Diameter [mm]	Packing	Cat. No.
47	20	PF060.047
55	20	PF060.055
70	20	PF060.070
90	20	PF060.090
110	10	PF060.110
125	10	PF060.125
150	10	PF060.150
Sheets, size		
300 x 300	5	PF060.300300

#### Grade PF020

Diameter [mm]	Packing	Cat. No.
47	10	PF020.047
50	10	PF020.050
55	10	PF020.055
70	10	PF020.070
90	10	PF020.090
110	5	PF020.110
125	5	PF020.125
150	5	PF020.150
Sheets, size		
300 x 300	5	PF020.300300

#### Grade PF050

Diameter [mm]	Packing	Cat. No.
47	20	PF050.047
55	20	PF050.055
70	20	PF050.070
90	20	PF050.090
110	10	PF050.110
125	10	PF050.125
150	10	PF050.150
Sheets, size		
300 x 300	5	PF050.300300

# Extraction Thimbles

Extraction Thimbles are seamless, high purity filters with a distinctive thimble shape. Thimbles are available in four different materials of construction in many sizes. Typical applications include analysis of fats, oils, grease, organics, pesticides and pollutants, additives in plastic 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 ( $\leq 500$  °C)
- Acid resistant (except hydrofluoric)
- Acid washed for minimum trace metal content

## › Quartz Fiber Thimbles – Nos. 88R and 88RH

- Use up to 1000°C
- No. 88RH is treated at 900°C for 4 hours to stabilize the weight prior to use
- Both 88R and 88RH are tapered for ease in loading into stack samplers

## › PTFE Fiber and PTFE/Quartz Fiber Thimbles – Nos. 89 and 89S

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

### Specifications

Type	Material	Nominal Rating [ $\mu\text{m}$ ]	Wall Thickness [mm]	Weight [g per 25x90 mm Thimble]	Pressure drop at 5 l/min. [kPa]	Collection Efficiency [%; 0.3 $\mu\text{m}$ DOP]	Max. Operating Temperature [°C]	Heating loss rate [%]
84	Cellulose	8	1.5	3.6	0.25	89	120	-
86R	Glass Fiber	1	1.6	1.8	0.30	>99.9	500	0.2
88R	Quartz Fiber	-	2.2	1.6	0.44	>99.9	1000	-
88RH	Quartz Fiber	-	2.2	1.6	0.44	>99.9	1000	0.1
89	PTFE Fiber	-	1.8	11.0	4.5	>99.9	260	-
89S	PTFE/Quartz Fiber	-	1.6	6	0.54	>99.9	400	0.07

## Ordering Information

### Note

Please note that there are two versions of sizes available; either expressed as Internal diameter x height or External diameter x height.

Cat. Nos. with "X" as the last digit means External diameter and Cat. Nos. without the "X" mentioned, is the Internal diameter of the thimbles.

### Tolerances:

Diameter +/- 3%

Height +/- 1.5%

### Cellulose Thimbles – No. 84

#### External diameter

Size [mm] diameter x height	Packing	Cat. No.
20 x 90	25	84.209X
22 x 90	25	84.229X
25 x 90	25	84.259X
28 x 100	25	84.280X
30 x 100	25	84.300X
33 x 120	25	84.332X
35 x 120	25	84.352X
40 x 150	25	84.405X
45 x 150	25	84.455X
53 x 150	25	84.535X
60 x 200	25	84.600X
75 x 210	25	84.751X

### Glass Fiber Thimbles – No. 86R

#### External diameter

Size [mm] diameter x height	Packing	Cat. No.
20 x 90	25	86R.209X
22 x 90	25	86R.229X
25 x 90	25	86R.259X
28 x 100	25	86R.280X
30 x 100	25	86R.300X
33 x 120	25	86R.332X
35 x 120	25	86R.352X
40 x 150	25	86R.405X
45 x 150	25	86R.455X
53 x 150	25	86R.535X
60 x 200	25	86R.600X
75 x 210	25	86R.751X

### Cellulose Thimbles – No. 84

#### Internal diameter

Size [mm] diameter x height	Packing	Cat. No.
19 x 90	25	84.199
22 x 65	25	84.226
22 x 80	25	84.228
25 x 60	25	84.256
25 x 80	25	84.258
25 x 90	25	84.259
25 x 100	25	84.250
28 x 100	25	84.280
30 x 80	25	84.308
30 x 100	25	84.300
33 x 80	25	84.338
33 x 94	25	84.339
33 x 100	25	84.330
43 x 123	25	84.432

### Glass Fiber Thimbles – No. 86R

#### Internal diameter

Size [mm] diameter x height	Packing	Cat. No.
19 x 90	25	86R.199
25 x 90	25	86R.259
25 x 100	25	86R.250
30 x 80	25	86R.308
30 x 100	25	86R.300
43 x 123	25	86R.432

## Ordering Information

### Quartz Fiber Thimbles – No. 88R

#### External diameter

Size [mm] diameter x height	Packing	Cat. No.
20 x 90	25	88R.209X
22 x 90	25	88R.229X
25 x 90	10	88R.259X
28 x 100	25	88R.280X
30 x 100	25	88R.300X
33 x 120	25	88R.332X
35 x 120	25	88R.352X
40 x 150	25	88R.405X
45 x 150	25	88R.455X
53 x 150	25	88R.535X
60 x 200	25	88R.600X
75 x 210	25	88R.751X

### Quartz Fiber Thimbles – No. 88R

#### Internal diameter

Size [mm] diameter x height	Packing	Cat. No.
19 x 90	25	88R.199
25 x 100	25	88R.250
30 x 80	25	88R.308
30 x 100	25	88R.300
33 x 80	25	88R.338
43 x 123	25	88R.432

### Quartz Fiber Thimbles – No. 88RH

#### External diameter

Size [mm] diameter x height	Packing	Cat. No.
25 x 90	10	88RH.259X

### PTFE Fiber Thimbles – No. 89

#### External diameter

Size [mm] diameter x height	Packing	Cat. No.
25 x 90	10	89.259X

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

#### External diameter

Size [mm] diameter x height	Packing	Cat. No.
25 x 90	10	89S.259X



## ▶ Nitrocellulose Blotting Membranes

- **Pure esters of nitrocellulose**, free of acetate and other esters
- **Maximal protein/nucleic acid binding**, up to 80-100 µg/cm<sup>2</sup>
- **Low background**
- **Two pore sizes available:** 0.45 µm is suitable for most blotting applications, 0.2 µm sizes for lower molecular weights
- **Complete range available:** Circles, sheets and rolls



## ▶ Ordering Information

### Pore size 0.2 µm

Circles, size	Packing	Cat. No.
82 mm	25	S020A082C
85 mm	25	S020A085C
Sheets, size		
22 x 22 cm	10	S020A224D
30 x 30 cm	10	S020A304D
Rolls, size		
33 cm x 3 m	1	S020A330R

### Pore size 0.45 µm

Circles, size	Packing	Cat. No.
82 mm	25	S045A082C
85 mm	25	S045A085C
Sheets, size		
22 x 22 cm	10	S045A224D
30 x 30 cm	10	S045A304D
Rolls, size		
33 cm x 3 m	1	S045A330R

## Blotting/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
- **Smooth surface** for optimal contact with membrane
- **Five grades** available of different thickness
- **Available in** cuts on request



## Specifications

Grade	Weight [g/m <sup>2</sup> ]	Thickness [mm]	Absorption Speed <sup>1</sup> [cm]
51B	87	0.17	7.0
514A	185	0.32	7.5
50	140	0.25	6.0
526	325	0.70	11.0
590	285	0.93	18.0

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

## Ordering Information

### Grade 50

Size [cm]	Packing	Cat. No.
60 x 60	50	50.600600

### Grade 51B

Size [cm]	Packing	Cat. No.
45 x 57	100	51B.460570

### Grade 526

Size [cm]	Packing	Cat. No.
60 x 60	50	526.600600

### Grade 514A

Size [cm]	Packing	Cat. No.
45 x 57	100	514A.460570

### Grade 590

Size [cm]	Packing	Cat. No.
60 x 60	50	590.600600

Vacuum filtration is used primarily in micro-biological 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 and stainless steel assemblies with funnels holding from 22 ml to 1,100 ml.



KG-25



KGS-25



KG-47



KGS-47



KGS-47-TF



KG-90



KGS-90

## Glass Microfiltration: Support Systems

### ▶ Sintered Glass Support (Glass Frit)

- Glass frit (nominal retention 30-50  $\mu\text{m}$ )
- Recommended when filtering highly acidic (low pH) solutions or when slower flow rates are preferred to maximize contact with the filter or reagent
- Ground glass seal



Sintered base

### ▶ Stainless Steel Support

- Stainless steel screen (Type 316, 100 mesh)
- PTFE gasket
- Maximize flow rate with proteinaceous or viscous solutions
- Will not shed particles into the filtrate
- Ground glass seal



SS support base

### Filter Specifications

Model	KG-25 KGS-25	KG-47 KGS-47 KGS-47-TF	KG-90 KGS-90
Filter dia. [mm]	25	47	90
Effective filtration area [cm <sup>2</sup> ]	2.1	9.6	43.0

# Vacuum Filter Holders

## 25 mm Glass Microanalysis Holders

- **Use for filtering small volumes** for biological or particulate contamination
- Available with either sintered glass base or with stainless steel screen support
- **Use stainless steel screen** when producing ultraclean filtrate or when filtering proteinaceous solutions



KG-25

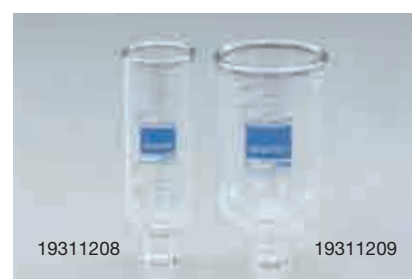
KGS-25

## Specifications

	KG-25	KGS-25
<b>Funnel capacity:</b>	Maximum volume 22 ml, graduated to 15 ml	
<b>Materials:</b>		
Support	Sintered glass	Stainless steel screen
Funnel and base	Borosilicate glass	Borosilicate glass
Stopper	Silicone rubber	Silicone rubber
Clamp	Anodized aluminium	Anodized aluminium
<b>Connection:</b>		
Included	No. 4 stopper adapts to standard 125 ml vacuum filter flask	
<b>Membrane Filter Compatibility:</b>		
Filter size	25 mm	25 mm
Prefilter size	16 mm	16 mm
Filtration area	2.1 cm <sup>2</sup>	2.1 cm <sup>2</sup>

## Ordering Information

Model	KG-25	KGS-25
Cat. No.	17311200	17311300

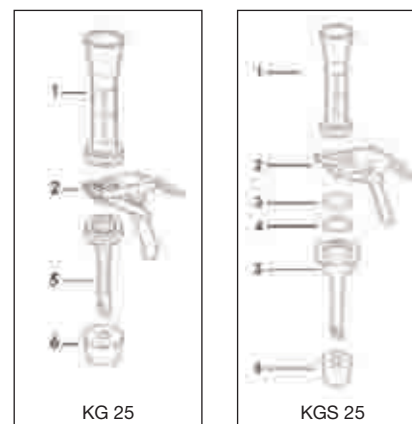


19311208

19311209

## Replacement parts and optional funnels

		KG-25	KGS-25
1	Funnel, 15 ml (22 ml)	19311201	19311201
1	Funnel, 150 ml (160 ml)	19311208	19311208
1	Funnel, 300 ml (320 ml)	19311209	19311209
2	Clamp	19311003	19311003
3	Screen (stainless steel)	-	19311304
4	Gasket (PTFE)	-	19311305
5	Base	19311202	19311302
6	Stopper No. 4	19311004	19311004



KG 25

KGS 25

## 47 mm Glass Microanalysis Holders

- **Standard size** for microbiology and particulate analysis
- **Filter up to 500 ml**
- **Available with sintered glass support and stainless steel support.** Last-mentioned also with PTFE flange to prevent membrane sticking to glass when autoclaving with filter in place



KG-47

KGS-47

KGS-47-TF

## Specifications

	KG-47	KGS-47	KGS-47-TF
<b>Funnel capacity:</b>	Maximum volume 320 mm (graduated to 300 ml)		
<b>Materials:</b>			
Support	Sintered glass	Stainless steel screen	Stainless steel and PTFE
Funnel and base	Borosilicate glass	Borosilicate glass	Borosilicate glass
Stopper	Silicone rubber	Silicone rubber	Silicone rubber
Clamp	Anodized aluminium	Anodized aluminium	Anodized aluminium
<b>Connection:</b>			
Included	No. 8A stopper adapts to standard 1 L vacuum filter flask or vacuum manifold		
<b>Membrane Filter Compatibility:</b>			
Filter size	47 mm	47 mm	47 mm
Prefilter size	35 mm	35 mm	35 mm
Filtration area	9.6 cm <sup>2</sup>	9.6 cm <sup>2</sup>	9.6 cm <sup>2</sup>

## Ordering Information

Model	KG-47	KGS-47	KGS-47-TF
Cat. No.	17311400	17311500	17311600

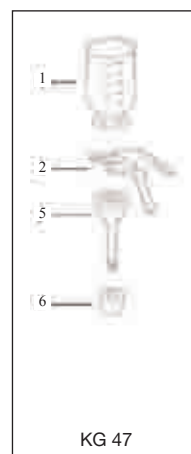


19311408

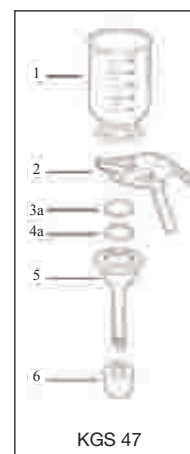
19311409

## Replacement parts and optional funnels

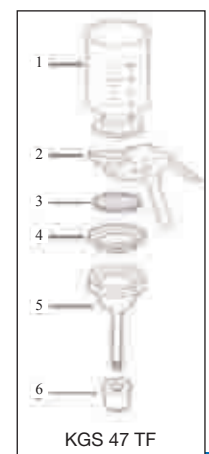
	KG-47	KGS-47	KGS-47-TF
1 Funnel, 100 ml	19311408	19311408	19311408
1 Funnel, 300 ml	19311401	19311401	19311401
1 Funnel, 500 ml	19311409	19311409	19311409
2 Clamp	19311403	19311403	19311403
3a/3 Screen (stainless steel)	-	19311504	19311504
4a Gasket (PTFE)	-	19311505	-
4 Flange (PTFE)	-	-	19311605
5 Base	19311402	19311502	19311602
6 Stopper No. 8A	19311404	19311404	19311404



KG 47



KGS 47



KGS 47 TF

# Vacuum Filter Holders

## 90 mm Glass Microanalysis Holders

- **Larger filtration** area for filtering larger volumes (>500 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



KG-90

KGS-90

## Specifications

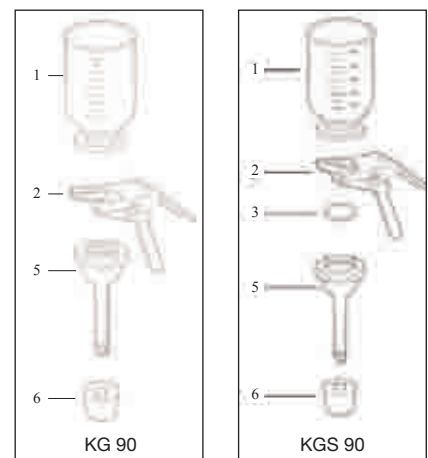
	KG-90	KGS-90
<b>Funnel capacity:</b>	Maximum volume 1100 ml, graduated to 1000 ml	
<b>Materials:</b>		
Support	Sintered glass	Stainless steel screen
Funnel and base	Borosilicate glass	Borosilicate glass
Stopper	Silicone rubber	Silicone rubber
Clamp	Anodized aluminium	Anodized aluminium
<b>Connection:</b>		
Included	No. 8A stopper adapts to standard 1 L vacuum filter flask or vacuum manifold	
<b>Membrane Filter Compatibility:</b>		
Filter size	90 mm	90 mm
Prefilter size	70 mm	70 mm
Filtration area	43 cm <sup>2</sup>	43 cm <sup>2</sup>

## Ordering Information

Model	KG-90	KGS-90
Cat. No.	17312100	17312200

## Replacement parts

		KG-90	KGS-90
1	Funnel, 1000 ml (1100 ml)	19312101	19312101
2	Clamp	19312102	19312102
3	Screen (stainless steel)	-	19312204
5	Base	19312103	19312203
6	Stopper No. 8A	19311404	19311404



## 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 20)
- **Autoclavable** at 120°C for 20 min.



KP-47H



KP-47U



KP-47W



KP-47S

## Specifications

	KP-47H	KP-47U	KP-47W	KP-47S
<b>Materials:</b>				
Support	Polypropylene	Polypropylene	Polypropylene	Polypropylene
Funnel and base	Polysulfone	Polysulfone	Polysulfone	Polysulfone
Receiver flask	-	-	-	Polysulfone
Stopper, O-rings	Silicone Rubber	Silicone Rubber	Silicone Rubber	Silicone Rubber
Caps	-	Silicone Rubber	-	Silicone Rubber
Vacuum adapter	-	-	-	Polypropylene
<b>Connection:</b>				
Outlet	No. 8B stopper adapts to standard 1 L vacuum filter flask, vacuum manifold. KP-47S screws onto receiver flask.			
Receiving flask port	-	-	-	Luer slip
Funnel cover port	-	Luer slip	-	Luer slip
<b>Capacity:</b>				
Funnel	300 ml	300 ml	500 ml	300 ml
Receiver	-	-	-	300 ml
<b>Pressure:</b> Vacuum (25 in Hg maximum)				
<b>Membrane Filter Compatibility:</b>				
Filter size	47 mm	47 mm	47 mm	47 mm
Prefilter size	41 mm	41 mm	41 mm	41 mm
Filtration area	13.5 cm <sup>2</sup>	13.5 cm <sup>2</sup>	13.5 cm <sup>2</sup>	13.5 cm <sup>2</sup>

## Ordering Information

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

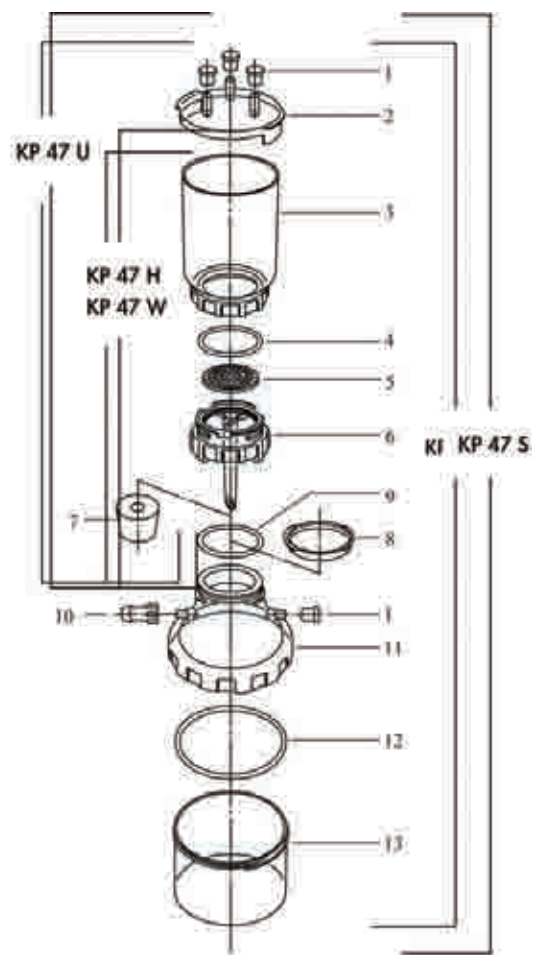
## Replacement parts

### Replacement Parts – Funnel assembly

	Model	KP-47H	KP-47U	KP-47W	KP-47S
	<b>Cat. No.</b>	43301030	43301020	43301050	43301010
1	Gum rubber cap	-	44501010	-	44501010
2	Funnel cover	-	44501001	-	44501001
3	Funnel	44501002	44501002	44501102	44501002
4	Funnel O-ring	44501008	44501008	44501008	44501008
5	Filter support	44501004	44501004	44501004	44501004
6	Base	44501003	44501003	44501003	44501003
7	Stopper No. 8B	19311008	19311008	19311008	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





## Stainless Steel Filter Holders – KSF-47

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



## Specifications

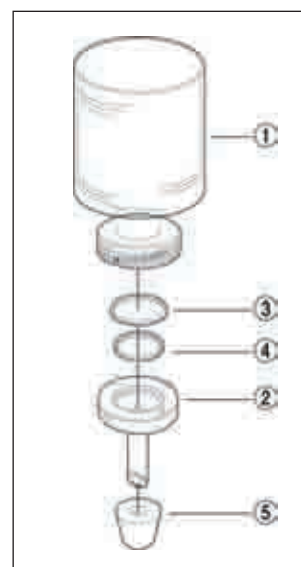
KSF-47	
<b>Materials:</b>	
Support	Type 316 stainless steel
Funnel, base	Type 304 stainless steel
Stopper	Silicone rubber
Gasket	PTFE
<b>Connection:</b>	
Included	No. 8A stopper adapts to standard 1 L vacuum filter flask or vacuum manifold
<b>Capacity:</b>	
Funnel	500 ml
<b>Pressure:</b>	
	Vacuum (21 in Hg recommended)
<b>Membrane Filter Compatibility:</b>	
Filter size	47 mm
Prefilter size	35 mm
Filtration area	9.3 cm <sup>2</sup>

## Ordering Information

Model	KSF-47
Cat. No.	17312600

## Replacement parts

KSF-47		
1	Funnel	-
2	Base	-
3	SS support screen	19311504
4	PTFE gasket	19311505
5	Stopper No. 8A	19311404



## Vacuum Filtration

### ▶ Disposable Vacuum Filtration Unit

- **Disposable**; no cleaning saves labor time
- **Hydrophilic PTFE membrane**, suitable for filtration of both aqueous liquids and solvents
- **Fits receiver flasks** with neck diameter from 24 mm to 50 mm and minimum height of 30 mm
- **Two pore sizes available**, 0.2  $\mu\text{m}$  and 0.5  $\mu\text{m}$

### Applications

Ideal for filtering and degassing HPLC mobile phases.



### ▶ Specifications

Model	VH020P	VH050P
<b>Materials:</b>	Hydrophilic PTFE membrane filter in polyethylene housing	
Pore size, $\mu\text{m}$	0.20	0.50
Effective Filtration area [ $\text{cm}^2$ ]	22.1	22.1
Funnel capacity, ml	350	350

### ▶ Ordering Information

Model	VH020P	VH050P
Cat. No.	8100020	8100050

## ▶ PVC Manifolds

- **Lightweight**
- **Resistant to acids**
- **Standard cup** accepts stoppers Nos. 8A and 8B to adapt microanalysis units and other devices
- **2-way** valve with Teflon (PTFE) stopcock in PVC body
- Not autoclavable



## ▶ Specifications

### Materials:

Body and branches	Polyvinylchloride (PVC)
Valves	PTFE stopcock, PVC body

### Connection:

Outlet	1/4 " male PT to hose barb fitting connects main manifold to 11 mm i.d. vacuum tubing
Standard cup	Accepts stoppers Nos. 8A and 8B

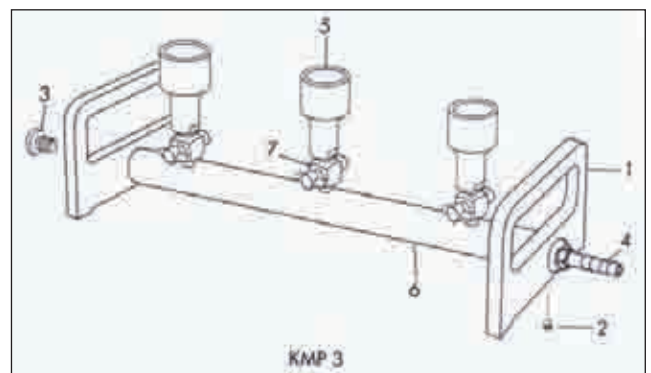
### Temperature:

Maximum	60°C
---------	------

Dimensions	L x W x H [cm]	Distance between stations (center to center) [cm]	Weight [kg]
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		Cat. No.
3 station	KMP 3	17313400
6 station	KMP 6	17313600



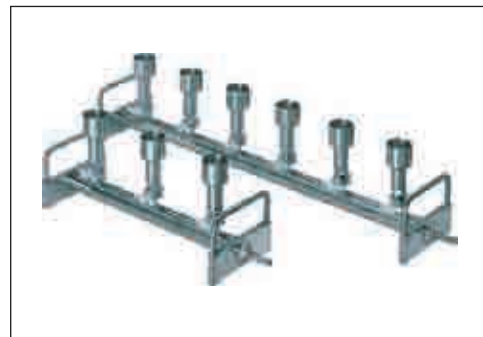
## ▶ Replacement parts

		Cat. No.
1	Handle	-
2	Handle set screw	-
3	Pipe plug	-
4	Hose barb	19313411
5	Branch (standard cup)	-
6	Main manifold	
	3 station	-
	6 station	-
7	Stopcock assembly, 2-way	19313405

# Filtration Manifolds

## Stainless Steel Manifolds

- **Durable**, made of type 304 stainless steel
- **Autoclavable**
- **2-way valves**, individual or multiple (up to 6) filtrations possible
- **Standard cup** accepts stoppers Nos. 8A and 8B to adapt microanalysis units and other devices



## Specifications

### Materials:

Body and branches	Type 304 stainless steel
Valves	PTFE stopcock, chrome plated brass body

### Connection:

Outlet	1/4 " male NPT to hose barb fitting connects main manifold to 11 mm i.d. vacuum tubing
Standard cup	Accepts stoppers Nos. 8A and 8B

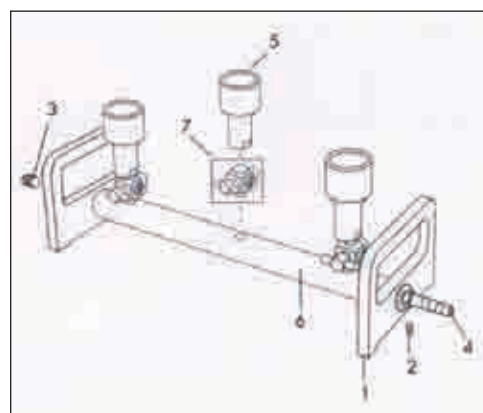
Dimensions	L x W x H [cm]	Distance between stations [cm]	Weight [kg]
3 station	45.7 x 12 x 20.3	14	5.0
6 station	72.4 x 12 x 20.3	14	8.0

## Ordering Information

Model		Cat. No.
3 station	KM3N	17313100
6 station	KM6N	17313300

## Replacement parts

		Cat. No.
1	Handle	-
2	Handle set screw	-
3	Pipe plug	-
4	Hose barb	19313011
5	Branch (standard cup)	-
6	Main manifold	
	3 station	-
	6 station	-
7	Stopcock assembly, 2-way	19313005



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 ( $\leq 14.7$  psi)
- Denaturation of proteins and other biological polymers due to foaming downstream of the membrane is avoided
- Unintentional contamination downstream of the membrane is minimized
- 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, radiolabelled samples	Proteins, enzymes, radiolabelled samples, gases	Biological media, electrolyte solutions for counters, gases	Biological media, ultrapure water, serum, gases	Biological media, ultrapure water, serum, gases	Pharmaceuticals, cosmetics, large scale biologicals
<b>Recommended Models</b>						
Luer Connection	KS 13	KS 25	-	-	-	
Threaded Connection	-	LS 25 PP 25 PFA 25	KS 47 LS 47 PP 47 PFA 47	KS 90	KS 142	KS 293
Sanitary Connection	-	KS 25 F	KS 47 F	KS 90 ST	KS 142 ST	KS 293 ST
<b>Filter Specifications</b>						
Membrane Diameter [mm]	13	25	35, 38, 42, or 47	90	142	293
Prefilter Diameter <sup>1</sup> [mm]	8	21 or 25	37	76	124	257
Filtration Area [cm <sup>2</sup> ]	0.9	3.5 or 3.8	12.5	45.3	113	530
<b>Liquid Flow Rate<sup>2</sup> [l/min]</b>						
0.20 $\mu$ m	0.005	0.03	0.15	0.8	1.7	7.1
0.45 $\mu$ m	0.02	0.08	0.4	1.64	4.9	18.8
1.00 $\mu$ m	0.12	0.35	1.3	7.0	11.0	32.0
5.00 $\mu$ m	0.3	1.1	2.1	9.5	14.0	35.5

1) Prefilter size varies with model. Refer to individual model specifications before choosing a prefilter.  
 2) Liquid flow rates represent typical initial water flow rates at 0.7 kg/cm<sup>2</sup> differential pressure at 20°C using clean water filtered to 0.1  $\mu$ m using MCE membrane.

## ▶ Polypropylene In-Line 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
- **Two sizes available**, 25 mm for volumes (liquids) <50 ml and 47 mm for up to 1 liter
- **Autoclavable**, at 121°C for 20 minutes



PP 25



PP 47

## ▶ Specifications

	PP 25	PP 47
<b>Materials:</b>		
Body and support screens	Polypropylene	Polypropylene
O-ring (standard)	Silicone	Silicone
<b>Connection:</b>		
Inlet	Female Luer-lock	Combination 1/4" NPTM and female Luer slip
Outlet	Male Luer slip	Combination 1/4" NPTM and female Luer slip
<b>Pressure:</b>		
Inlet	5 kg/cm <sup>2</sup>	5 kg/cm <sup>2</sup>
Differential	3 kg/cm <sup>2</sup>	5 kg/cm <sup>2</sup>
<b>Temperature:</b>		
Maximum (autoclave) 1 bar, 20 min.	121°C	121°C
Maximum operating (liquids)	80°C	80°C
<b>Filter Specifications:</b>		
Filter size	25 mm	47 mm
Prefilter size	21 mm	42 mm
Filtration area	3.5 cm <sup>2</sup>	13.5 cm <sup>2</sup>
Recommended volume	<50 ml	Up to 1 liter
<b>Dimensions:</b>		
Diameter	30 mm	65 mm
Height	30 mm	50 mm

## ▶ Ordering Information

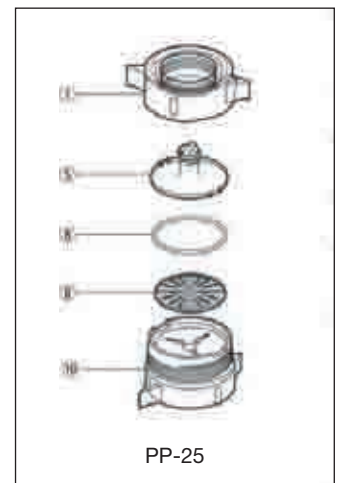
Model	PP 25	PP 47
Cat. No.	43303010	43303020
Packing	6	1

## Polypropylene In-Line Holders

### Typical initial liquid flow rates [ml/min]

Membrane Pore size [µm]	PP 25	PP 47
0.20	35	250
0.45	80	600
1.00	320	1700
3.00	740	2800

Conditions: Water, 20°C, filtered through MCE membranes at 1 kg/cm<sup>2</sup> differential pressure.



### Replacement Parts

		PP 25
1	Locking ring, outer	44540101
5	Inlet cap	44540102
6	Support screen	44540104
8	Inlet cap O-ring (standard)	44540106
10	Outlet base	44540103

		PP 47
1	Locking ring, outer	44501201
5	Inlet cap	44501202
6	Support screen	44501004
7	Locking O-ring	44501204
8	Inlet cap O-ring (standard)	44501204
9	Outlet base O-ring (standard)	44501208
10	Outlet base	44501203
11	Outlet adapter (male luer slip to hose barb)	44501013



## ▶ PFA In-Line Filter Holders

- **Superior chemical compatibility**, can be used with chemically aggressive liquids
- **Dual support screens** allow 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 has an air/bleed vent.



PFA 25



PFA 47

## ▶ Specifications

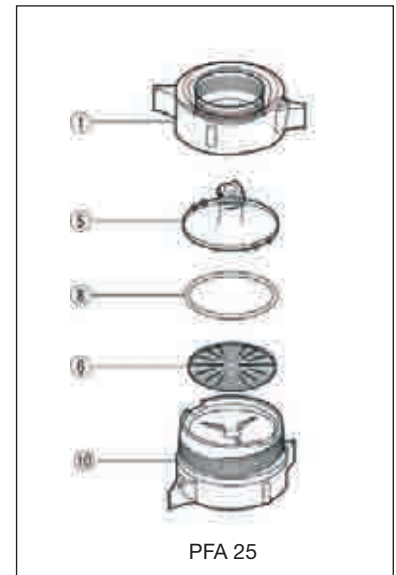
	PFA 25	PFA 47
<b>Materials:</b>		
Body and support screens	Teflon PFA (except for locking ring on PFA 47: glass filled ETFE)	
O-ring (standard)	Perfluoroelastomer	Perfluoroelastomer
<b>Connection:</b>		
Inlet	Female Luer-lock	Combination 1/4" NPTM, 1/4" tubing adapter
Outlet	Male Luer slip	Combination 1/4" NPTM, 1/4" tubing adapter
<b>Pressure:</b>		
Inlet	3 kg/cm <sup>2</sup>	3 kg/cm <sup>2</sup>
Differential, positive or negative, at 25°C	3 kg/cm <sup>2</sup>	3 kg/cm <sup>2</sup>
<b>Temperature:</b>		
Maximum operating	100°C	100°C
Autoclave	121°C, 15 min	121°C, 15 min
<b>Dimensions:</b>		
Diameter	32 mm	65 mm
Height	32 mm	70 mm
<b>Membrane Compatibility:</b>		
Filter size	25 mm	47 mm
Prefilter size	21 mm	42 mm
Filtration area	3.5 cm <sup>2</sup>	13.5 cm <sup>2</sup>
<b>Flow Rate:</b>		
Pore size (PTFE membrane)	Typical methanol flow rate at 1 kg/cm <sup>2</sup> , 20°C [ml/min]	
0.2 µm (J020)	60	400
0.5 µm (J050)	150	700
1.0 µm (J100)	350	1200



## PFA In-Line Filter Holders

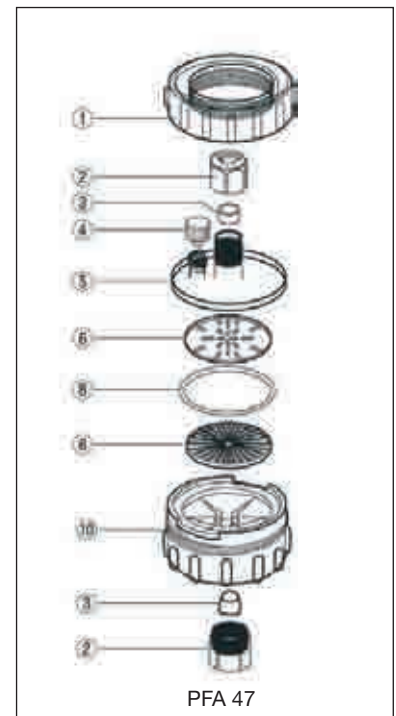
### Ordering Information

Model	PFA 25	PFA 47
Cat. 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
8	Inlet O-ring (standard)	44530206	44530106
10	Body	44530203	44530103



# Pressure Filtration

## Stainless Steel Syringe Holders

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

## Applications

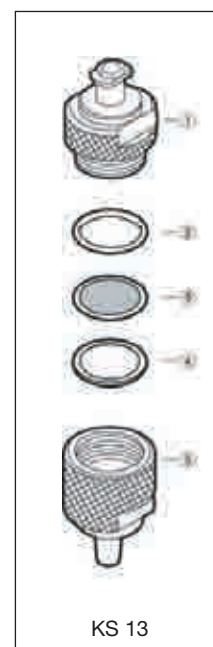
- Filter or clean small volumes of liquid such as eyewash or photoresists
- Clear turbid solutions such as serum
- Purify virus solutions

## Specifications

	KS 13	KS 25
<b>Materials:</b>		
Body, support screens	Type 304 Stainless Steel	Type 304 Stainless Steel
Gasket	PTFE (teflon)	PTFE (teflon)
O-ring	PTFE (teflon)	PTFE (teflon)
<b>Connection:</b>		
Inlet	Female Luer-lock	Female Luer-lock
Outlet	Male Luer slip	Male Luer slip
<b>Pressure:</b>		
Inlet	7 kg/cm <sup>2</sup>	7 kg/cm <sup>2</sup>
Differential	3 kg/cm <sup>2</sup>	3 kg/cm <sup>2</sup>
<b>Membrane Compatability:</b>		
Filter size	13 mm	25 mm
Pre-filter size	8 mm	21 mm
Filtration area	0.9 cm <sup>2</sup>	3.8 cm <sup>2</sup>
Dead volume	0.2 ml	0.4 ml
<b>Dimensions:</b>		
Diameter	16 mm	32 mm
Height	39 mm	36 mm



KS 13 / KS 25



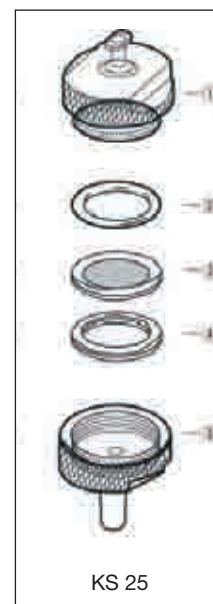
KS 13

## Ordering Information

Model	KS 13	KS 25
Cat. No.	17301000	17301200

## Replacement Parts

		KS 13	KS 25
1	Inlet, female Luer-lock	-	-
2	O-ring (PTFE)	19301004	19301204
3	Screen	19301003	19301203
4	Gasket (PTFE)	19301002	19301202
5	Outlet, male Luer slip	-	-



KS 25

## 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

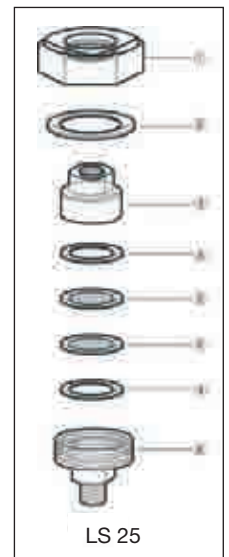
- Ultraclean and sterilize air and other gases including compressed gases
- In-line between pressurizing source (pump or gas cylinder) and dispensing vessel

## Specifications

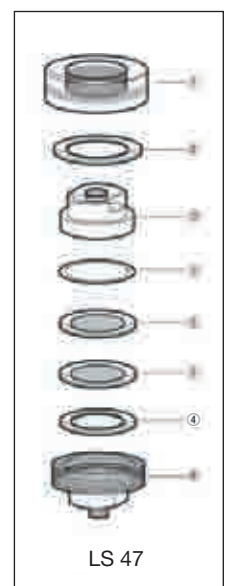
	LS 25	LS 47
<b>Materials:</b>		
Body, support screens	Type 304 Stainless Steel	Type 304 Stainless Steel
Locking ring	Chrome-plated brass	Chrome-plated brass
Gasket	PTFE (teflon)	PTFE (teflon)
O-ring	PTFE (teflon)	Silicone
<b>Connection:</b>		
Inlet	1/4" NPTF	1/4" NPTF
Outlet	1/4" NPTM	1/4" NPTM
<b>Pressure:</b>		
Inlet	5 kg/cm <sup>2</sup>	5 kg/cm <sup>2</sup>
Differential	2 kg/cm <sup>2</sup>	2 kg/cm <sup>2</sup>
<b>Membrane Compatibility:</b>		
Filter size	25 mm	47 mm
Prefilter size	25 mm	47 mm
Filtration area	3.8 cm <sup>2</sup>	12.5 cm <sup>2</sup>
<b>Dimensions:</b>		
Diameter	38 mm	69 mm
Height	50 mm	57 mm



LS 25 / LS 47



LS 25



LS 47

## Ordering Information

Model	LS 25	LS 47
Cat. No.	17304500	17304700

## Replacement Parts and and Optional O-rings

		LS 25	LS 47
1	Locking ring	-	-
2	Locking ring gasket	19304504	19304704
3	Inlet body (1/4" NPTF)	-	-
4	Gasket PTFE	19301202	19304702
5	Stainless steel screen (304SS)	19301203	19304703
6	Outlet body (1/4" NPTM)	-	-
7	Silicone O-ring	-	19304703

# Pressure Filtration

## High Pressure Stainless Steel Holders

- Operate at high pressure, up to 100 kg/cm<sup>2</sup>
- 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	
<b>Materials:</b>	
Body, support screens	Type 304 Stainless Steel
O-ring	FPM
<b>Connection:</b>	
Inlet and Outlet	1/4" NPTF
<b>Pressure:</b>	
Inlet	100 kg/cm <sup>2</sup>
Differential	20 kg/cm <sup>2</sup>
<b>Dead volume:</b>	
Upstream	3 ml
Downstream	6.5 ml
<b>Membrane Compatibility:</b>	
Filter size	47 mm
Prefilter size	38 mm
Filtration area	12.5 cm <sup>2</sup>
<b>Dimensions:</b>	
Diameter	88 mm
Height (incl. adapters)	94 mm

## Ordering Information

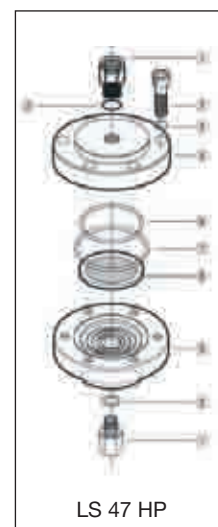
Model	LS 47 HP
Cat. No.	17304900

## 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	Sintered steel support	19304903
9	Outlet plate	-



LS 47 HP



LS 47 HP

## 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 25 F	KS 47 F
<b>Materials:</b>		
Body, support screens	Type 304 Stainless Steel	Type 304 Stainless Steel
O-ring	FPM and Silicone	FPM and Silicone
Gasket	PTFE	PTFE
<b>Connection:</b>		
Inlet/outlet	6 mm OD barb/4 mm ID	8 mm OD barb/6 mm ID
<b>Pressure:</b>		
Inlet	5 kg/cm <sup>2</sup>	5 kg/cm <sup>2</sup>
Differential	3 kg/cm <sup>2</sup>	3 kg/cm <sup>2</sup>
<b>Dimensions:</b>		
Diameter (without clamp)	50 mm	64 mm
Length (with vent valve)	72 mm	78 mm

## Ordering Information

Model	KS 25 F	KS 47 F
Cat. No.	17307000	17307200

## Replacement Parts

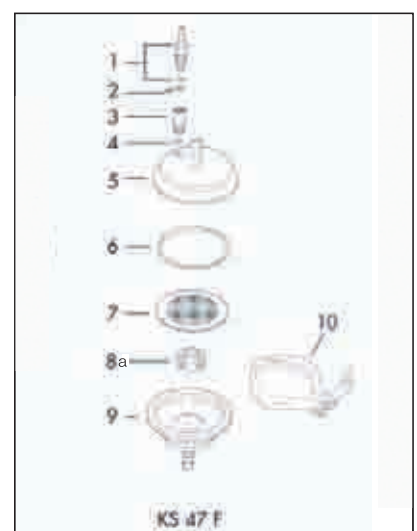
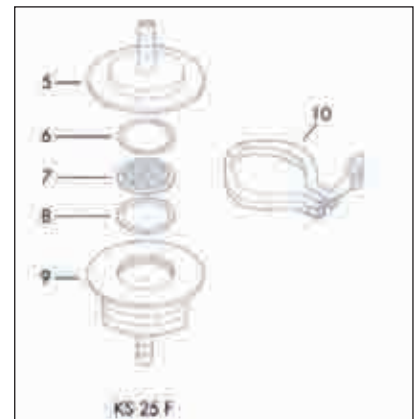
	KS 25 F	KS 47 F	
1-3	Vent valve set	-	19307220
4	Gasket (PTFE)	-	19307208
5	Inlet body	-	-
6	O-ring	19307003	19304712
7	Support screen	19301203	19304703
8a	Underdrain support	-	19307204
8	Gasket PTFE	19307004	-
9	Outlet body	-	-
10	Clamp	19306000	19306300



KS 25 F



KS 47 F



# Pressure Filtration

## ▶ Vented In-Line Stainless Steel Holder

- **Support screens are Teflon 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 and gases under positive pressure
- Sterilize with membrane in place for microbiological studies
- Install for point of use filtration on filling machines

Note: When using KS 47 to filter gases, a second support screen should be used upstream the membrane (Replacement Parts, No. 8)



KS 47

## ▶ Specifications

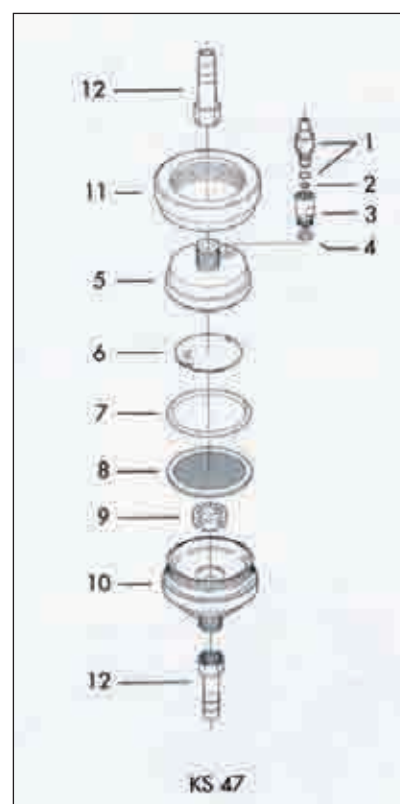
KS 47	
<b>Materials:</b>	
Body and support screens	Type 304 Stainless Steel
O-ring	FPM and silicone
Support screens	PTFE coated stainless steel
Gasket	PTFE
<b>Connections:</b>	
	1/4" PS to hose barb (9.5 mm)
<b>Pressure:</b>	
Inlet	7 kg/cm <sup>2</sup>
Differential	3 kg/cm <sup>2</sup>
<b>Dead volume:</b>	
Upstream	5 ml
Downstream	2 ml

## ▶ Ordering Information

Type Stainless Steel	KS 47
304 SS	17307400

## ▶ Replacement Parts

KS 47		
Type 304 SS		
1-4	Vent valve set	19307220
5	Inlet body	-
6	Back pressure support	19307404
7	O-ring (silicone)	19304712
8	Support screen	19304715
9	Underdrain support	19307204
10	Outlet body	-
11	Locking ring	-
12	Inlet/outlet adapter	19301510
	Gasket for inlet/outlet adapter	19321014



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

- **Seal membrane by hand tightening** locking wing nuts
- **Optimal holder design** minimizes resistance and maximizes flow rate
- **Each unit labelled** 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 vessels for batch type operations



KS 90

## Specifications

	KS 90	KS 142	KS 293
<b>Materials:</b>			
Body	Type 304 stainless steel		
Support screen	PTFE (Teflon) coated photoetched stainless steel		
O-rings	Silicone		
Gaskets	PTFE		
<b>Connection:</b>			
Inlet and outlet, 3/4" PS to:	11 mm hose barb	11 mm hose barb	16 mm hose barb
<b>Pressure:</b>			
Inlet	7 kg/cm <sup>2</sup>	7 kg/cm <sup>2</sup>	7 kg/cm <sup>2</sup>
Differential	3 kg/cm <sup>2</sup>	3 kg/cm <sup>2</sup>	3 kg/cm <sup>2</sup>
<b>Membrane Compatability:</b>			
Filter size	90 mm	142 mm	293 mm
Prefilter size	76 mm	124 mm	257 mm
Filtration area	45 cm <sup>2</sup>	113 cm <sup>2</sup>	530 cm <sup>2</sup>

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



KS 142



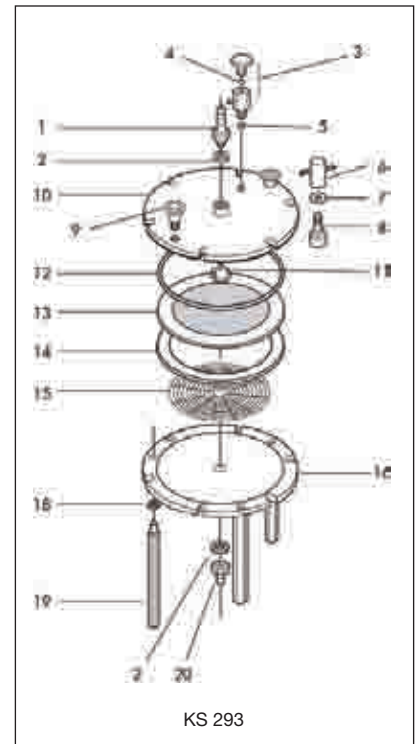
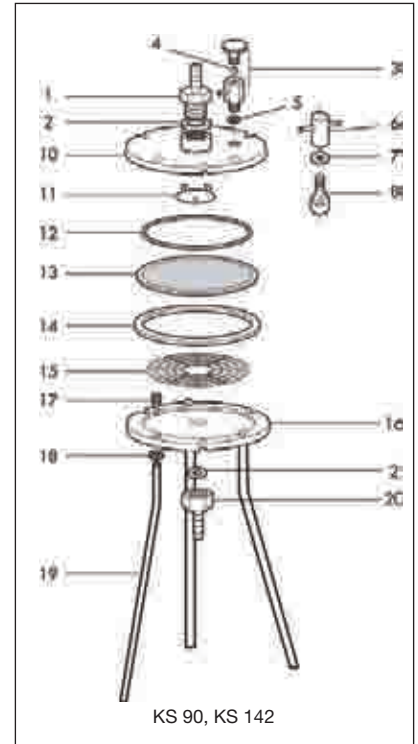
KS 293

## Ordering Information

Type Stainless Steel	KS 90	KS 142	KS 293
304 SS	17301700	17301900	17302500

## Replacement Parts

		Material	KS 90	KS 142	KS 293
1	3/4" PSM Inlet adapter	SUS304	19301713	19301713	19302510
2	Gasket for Inlet adapter	PTFE	19301710	19301710	19301710
3	Vent valve	SUS304	19301711	19301911	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				
8	Sealing bolt				
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 coatet 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	19301760	-
18	Leg washer				
19	Leg	SUS304	-	-	-
20	3/4" PSF Outlet adapter	SUS304	19301717	19301717	19302511





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

- **Sanitary connections** are non-threaded 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 numbers

## Applications

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



KS 90 ST



KS 142 ST



KS 293 ST

## Specifications

	KS 90 ST	KS 142 ST	KS 293 ST
<b>Materials:</b>			
Body	Type 304 stainless steel		
Support screen	PTFE (Teflon) coated photoetched stainless steel		
O-rings, gaskets	PTFE (Teflon), silicone rubber		
<b>Connection:</b>			
Inlet / outlet:	1.0"	1.0"	1.5"
	sanitary fitting to 16 mm hose barb	sanitary fitting to 16 mm hose barb	sanitary fitting to 16 mm hose barb
<b>Pressure:</b>			
Inlet	7 kg/cm <sup>2</sup>	7 kg/cm <sup>2</sup>	7 kg/cm <sup>2</sup>
Differential	3 kg/cm <sup>2</sup>	3 kg/cm <sup>2</sup>	3 kg/cm <sup>2</sup>
<b>Membrane Compatibility</b>			
Membrane filter size	90 mm	142 mm	293 mm
Prefilter size	76 mm	124 mm	257 mm
Filtration area	45.3 cm <sup>2</sup>	113 cm <sup>2</sup>	530 cm <sup>2</sup>

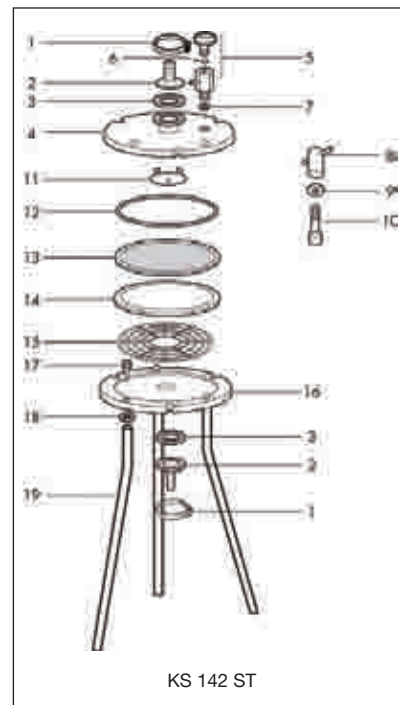
Supplied with aluminium wrench (spanner) and 6 mm allen wrench (hex key).

## Ordering Information

Type Stainless Steel	KS 90 ST	KS 142 ST	KS 293 ST
304 SS	17301800	17302100	17302700

## Replacement Parts

		Material	KS 90 ST	KS 142 ST	KS 293 ST
1	Clamp, 1.5S	SUS304	19306000	19306000	19306000
2	Inlet/Outlet adapter	SUS304	19306200	19306200	19306200
3	Inlet/Outlet gasket	Silicone	19306100	19306100	19306108
4	Inlet plate	SUS304	-	-	-
5	Vent valve	SUS304	19301711	19301911	19301911
6	Stopsheet for vent valve	PTFE	-	-	-
7	Gasket for vent valve	PTFE	19301712	19301912	19302512
8	Sealing wing nut	SUS304	19301770	19301770	19301773
9	Sealing washer				
10	Sealing bolt				
11	Flow deflector	SUS304	-	-	-
12	O-ring	Silicone	19301705	19301905	19302505
13	Support screen	PTFE coatet 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	19301760	-
18	Leg washer				
19	Leg	-	-	-	



## Introduction

- All polypropylene housings are 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 standard 78 mm
- Selected media available presterilized

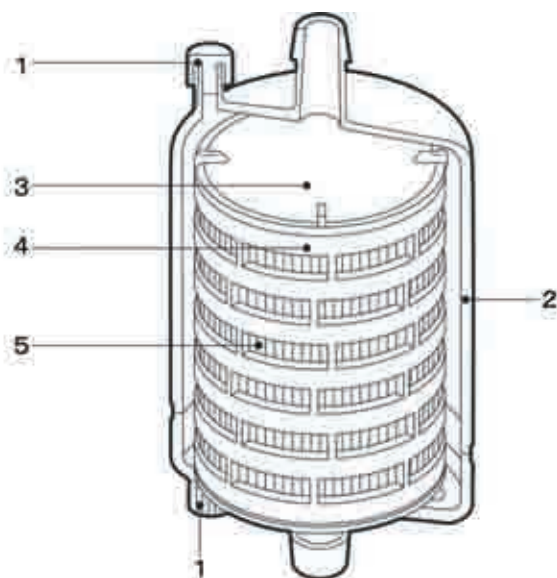
## Applications

- Filter tissue culture media, fermentation broths, 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 cartridge format
- Cannot be used for gas filtration



## Product Overview

Media	Code	Characteristics	Media type	Pore size or Nominal Rating [μm]	Membrane layers	Filtration area per capsule [cm <sup>2</sup> ]
PES	CCS	Hydrophilic	Membrane	0.20 - 0.45	Double	Up to 1800
PTFE	CCF	Hydrophobic	Membrane	0.05 - 1.0	Single/double	Up to 3600
PTFE	CCFH	Hydrophilic	Membrane	0.20	Single	Up to 3600
Polypropylene	CCP	Hydrophobic	Depth-type	0.8 - 30	-	Up to 2600
Glass	CCG	-	Depth-type	0.45 - 1.0	-	Up to 1200



- 1: Vent/drain  
 2: Housing  
 3: End cap  
 4: Outer sleeve  
 5: Pleated filter media



End Fixture B  
1/4" NPTM



End Fixture D  
1/2" NPTM



End Fixture H  
3/8" hose barb



End Fixture N  
1 1/2" sanitary fitting

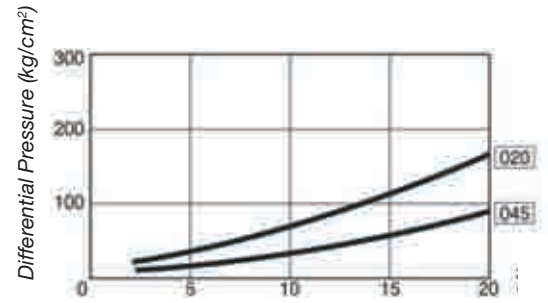
# Capsule Filters

## ▶ PES Capsule Filters – Code CCS

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

## ▶ Applications

- Filter pure water, high purity chemicals, pharmaceuticals, tissue culture media
- Remove bacteria or sub-micron particulates



Flow Rate (L/min)  
Typical water flow rate  
for CCS-\_\_\_-D1B at 25°C

## ▶ Specifications

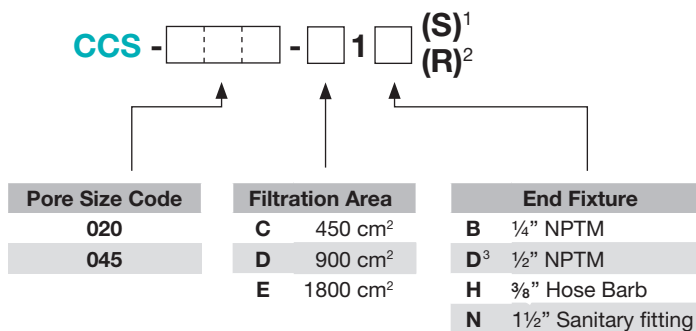
	CCS-020	CCS-045
Membrane layers	Double	Double
Pore Size [µm]	0.20	0.45
Max. inlet pressure	4 kg/cm <sup>2</sup>	4 kg/cm <sup>2</sup>
Max. Operating Temperature	60°C	60°C
Bubble point [water]	≥4 kg/cm <sup>2</sup>	≥3 kg/cm <sup>2</sup>
LRV / Organism	≥7 / B. diminuta	≥7 / S. marcescens

Length Code	Length [mm]*	Filtration Area [cm <sup>2</sup> ]
C	102	450
D	129	900
E	201	1800

\*Length given is for capsules with end fixture H.

## ▶ Ordering Information



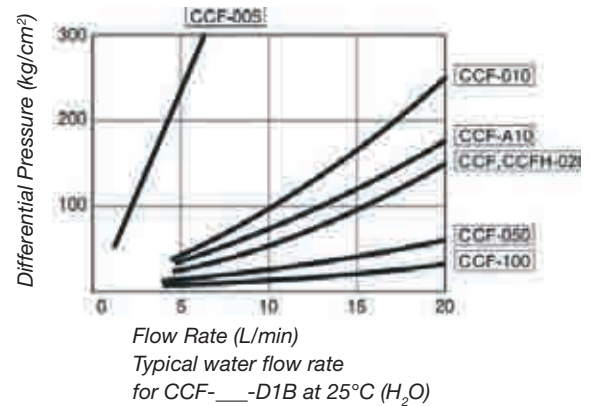
- 1) When ordering sterile units, specify "S" in the last position of the Cat. No.
- 2) When ordering pre-rinsed units, specify "R" in the last position of the Cat. No.
- 3) When ordering length code "C" (filtration area), end fixture code "D" is not available.

## PTFE Capsule Filters

### – Code CCF (Hydrophobic) and Code CCFH (Hydrophilic)

- **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
  - 0.20 µm pore size

Note: Autoclaving or allowing membrane to dry will make it hydrophobic



## Applications

- Use serially as prefilter and final filter
- Corrosive fluids and gases, photoresists, and both alkalis and acids
- Hydrophobic:
  - Solvent filtration
  - Air venting
- Hydrophilic:
  - Solvents with higher surface tension
  - Heterogeneous fluid mixtures

## Specifications

Type Code	CCF-005	CCF-A10	CCF-010	CCF-020	CCF-050	CCF-100	CCFH-020	
	Hydrophobic	Hydrophobic	Hydrophobic	Hydrophobic	Hydrophobic	Hydrophobic	Hydrophilic	
<b>Membrane layers</b>	Double	Double	Single	Single	Single	Single	Single	
<b>Pore size [µm]</b>	0.05	0.10	0.10	0.20	0.50	1.0	0.20	
<b>Bubble point (IPA) [kg/cm<sup>2</sup>]</b>	≥1.65	≥1.6	≥1.4	≥0.9	≥0.5	≥0.3	-	
<b>Max. Inlet Pressure</b>	4 kg/cm <sup>2</sup>	4 kg/cm <sup>2</sup>	4 kg/cm <sup>2</sup>	4 kg/cm <sup>2</sup>	4 kg/cm <sup>2</sup>	4 kg/cm <sup>2</sup>	4 kg/cm <sup>2</sup>	
<b>Max. Operating Temperature</b>	60°C	60°C	60°C	60°C	60°C	60°C	60°C	
<b>Length Code</b>	<b>Length [mm]*</b>		<b>Filtration Area [cm<sup>2</sup>]</b>					
<b>C</b>	102	900	900	570	570	570	570	900
<b>D</b>	129	1800	1800	1150	1150	1150	1150	1800
<b>E</b>	201	3600	3600	2300	2300	2300	2300	3600

\*Length given is for capsules with end fixture H.

## Ordering Information

CCF - [ ] - [ ] 1 [ ] (S) <sup>1</sup>			CCFH - [ ] - [ ] 1 [ ] (S) <sup>1</sup>		
Pore Size Code	Filtration Area	End Fixture	Pore Size Code	Filtration Area	End Fixture
005	C 570 cm <sup>2</sup>	B ¼" NPTM	020	C 900 cm <sup>2</sup>	B ¼" NPTM
010	D 1150 cm <sup>2</sup>	D <sup>2</sup> ½" NPTM		D 1800 cm <sup>2</sup>	D <sup>2</sup> ½" NPTM
020	E 2300 cm <sup>2</sup>	H ⅜" Hose Barb		E 3600 cm <sup>2</sup>	H ⅜" Hose Barb
050		N 1½" Sanitary fitting			N 1½" Sanitary fitting
100					

1) When ordering sterile units, specify "S" in the last position of the Cat. No.

2) When ordering length code "C" (filtration area), end fixture code "D" is not available.

# Capsule Filters

## ▶ Polypropylene Capsule Filters – Code 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

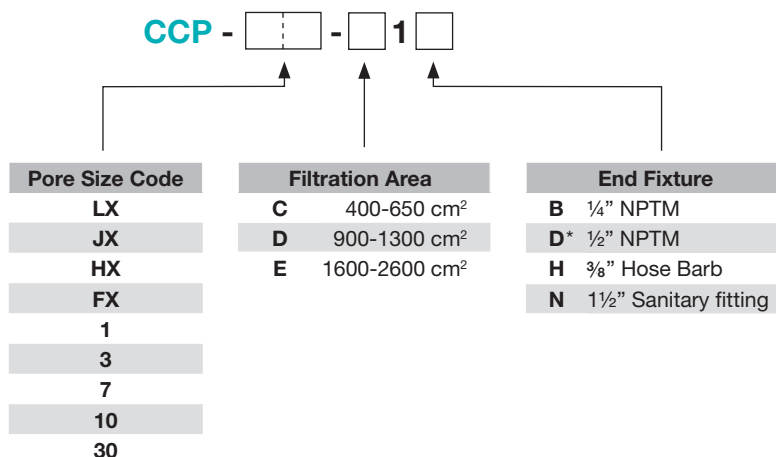
- High purity water filtration
- Prefiltration to a final membrane filter such as PES or PTFE (CCS, CCF or CCFH)
- Ultracleaning
- Filtration of process chemicals

## ▶ Specifications

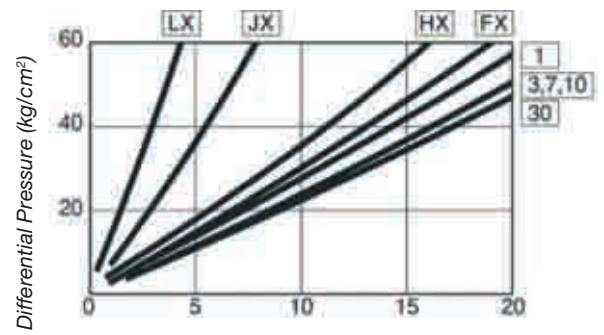
Type Code	CCP-LX	CCP-JX	CCP-HX	CCP-FX	CCP-1	CCP-3	CCP-7	CCP-10	CCP-30	
<b>Nominal rating [µm]</b>	0.8	1.0	2.0	3.0	2-5	5-10	10-20	10-20	20-30	
<b>% Particle retention</b>	>99	>99	>99	>99	94	98	98	92	97	
<b>Max. Inlet Pressure</b>	4 kg/cm <sup>2</sup>	4 kg/cm <sup>2</sup>	4 kg/cm <sup>2</sup>	4 kg/cm <sup>2</sup>	4 kg/cm <sup>2</sup>	4 kg/cm <sup>2</sup>	4 kg/cm <sup>2</sup>	4 kg/cm <sup>2</sup>	4 kg/cm <sup>2</sup>	
<b>Max. Operating Temp.</b>	60°C	60°C	60°C	60°C	60°C	60°C	60°C	60°C	60°C	
<b>Length Code</b>	<b>Length [mm]*</b>		<b>Filtration Area [cm<sup>2</sup>]</b>							
<b>C</b>	102	400	500	500	550	500	600	500	550	650
<b>D</b>	129	800	1000	1000	1100	1000	1200	1000	1100	1300
<b>E</b>	201	1600	2000	2000	2200	2000	2400	2000	2200	2600

\*Length given is for capsules with end fixture H.

## ▶ Ordering Information



\*) When ordering length code "C" (filtration area), end fixture code "D" is not available.



Flow Rate (L/min)  
Typical water flow rate for  
CCP-\_\_\_-D1B at 25°C

## › Glass Microfiber Capsule Filters – Code CCG

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

## › Applications

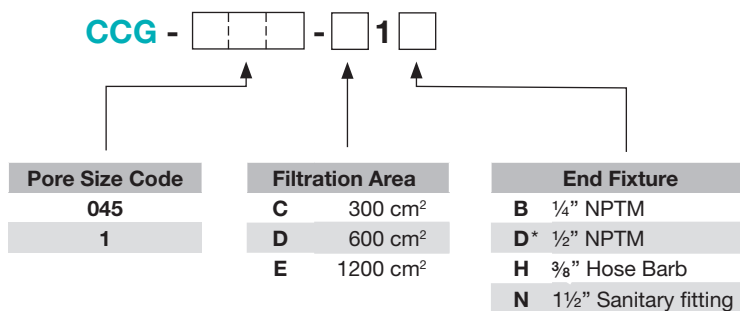
- Sea water filtration
- Aquaculture
- Prefiltration to a final membrane filter such as PES or PTFE (CCS, CCF or CCFH)

## › Specifications

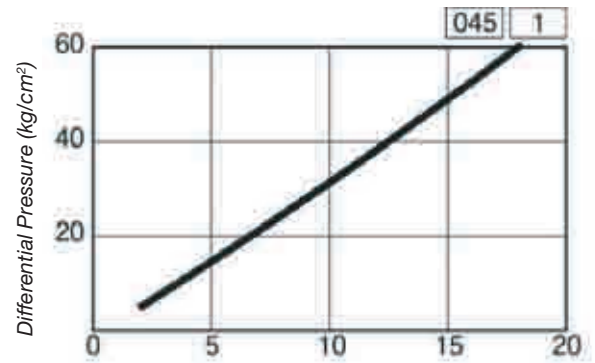
Type Code	045	1
<b>Nominal rating [µm]</b>	1-1.5	1.5-2
<b>Particle retention</b>	99,9%	99,9%
<b>Max. Inlet Pressure</b>	3 kg/cm <sup>2</sup>	3 kg/cm <sup>2</sup>
<b>Max. Operating Temperature</b>	60°C	60°C
<b>Length Code</b>	<b>Length [mm]*</b>	<b>Filtration Area (cm<sup>2</sup>)</b>
<b>C</b>	102	300
<b>D</b>	129	600
<b>E</b>	201	1200

\*Length given is for capsules with end fixture H.

## › Ordering Information



\*) When ordering length code "C" (filtration area), end fixture code "D" is not available.



Flow Rate (L/min)  
Typical water flow rate for  
CCG-\_\_\_-D1B at 25°C

## 37 mm Monitors for Microbial and Contamination Analysis

These 37 mm monitor units are disposable filter units which consists of a transparent plastic container in which a Mixed Cellulose Ester membrane and an absorption pad/support disc are assembled together.

Monitors are mainly used for microbiological inspection of gases and liquids. There are two types available, 2-piece and 3-piece units in which 0.45 µm or 0.80 µm membranes are placed together with a pad. 2-piece units are available with membranes with a hydrophobic edge to prevent air locks.

Collected samples can be cultured in place or be removed for further analysis or study.



### Applications – Recommended product

Application	Unit	Membrane
Microbiology – bacterial	2- or 3-piece	0.45 µm, white grid or black grid
Microbiology – yeast and mold	3-piece	0.80 µm, white grid or black grid
Aerosol analysis	3-piece	0.80 µm, white plain
Contamination analysis	2- or 3-piece	0.45 µm or 0.80 µm, white plain or grid

### Specifications

Monitor Type	2-piece	3-piece
Housing	Styrene acrylonitrile	
Membrane	Mixed cellulose ester	
Support Pad	Pure cotton cellulose	
Internal dimensions	Ø 34 x 9 mm	Ø 34 x 18 mm
External dimensions	Ø 42 x 29 mm	Ø 42 x 39 mm
Filtration area	9.0 cm <sup>2</sup> (6.7 cm <sup>2</sup> for HE* types)	
Internal volume	8 ml	16 ml
Max. operating temperature	45°C	

\* HE = Hydrophobic Edge



## Ordering Information

### 2-piece Monitors

Pore size [µm]	Membrane Color	Surface	Packing	Sterile	Sterile-HE
0.45	White	Grid	50	37AS245BS	37AS245BS-HE
0.45	Black	Grid	50	-	37AS245PS-HE

### 3-piece Monitors

Pore size [µm]	Membrane Color	Surface	Packing	Sterile	Non sterile
0.45	White	Grid	50	37AS345BS	-
0.45	Black	Grid	50	37AS345PS	-
0.80	White	Grid	50	37AS380BS	-
0.80	White	Plain	50	-	37AS380AN

### Optional and Replacement Parts

Type description	Packing	Cat. No.
Unassembled 2-piece with plugs	50	37OS200ON
Unassembled 3-piece with plugs	50	37OS300ON
Middle ring for 3-piece	50	37OS300MR
Absorbent pads/Support disc	100	M-085

## pH Indicator Test Papers

### Advantages of Test Papers

- Determination of pH value easily and inexpensively, without instrumentation
- Color changes instantaneously, compare to chart for determination
- Two convenient formats:
  - Roll, 9 mm wide, in dispenser, 5.5 m or 6 m length
  - Booklet of 20 strips, 7 x 70 mm, 10 booklets per pack



Test Papers – Roll type



Test Papers – Booklet

### Ordering Information – Roll Types

Note: Type WR is 5.5 m length, others are 6 m.

Type description	Measuring pH range											Cat. No.
UNIV	1	2	3	4	5	6	7	8	9	10	11	07011030
UNIV Refill	1	2	3	4	5	6	7	8	9	10	11	07011050
WR	0	2	4	5	6	7	8	9	10	12	14	07011040
BCG	4.0	4.2	4.4	4.6	4.8	5.0	5.2	5.4	5.6			07011010
BTB	6.2	6.4	6.6	6.8	7.0	7.2	7.4	7.6	7.8			07011020

### Ordering Information – Booklet Types

Note: Each box contains 10 booklets of 20 strips.

Type description	Measuring pH range											Cat. No.
CR	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.8	2.0			07010010
	7.2	7.4	7.6	7.8	8.0	8.2	8.4	8.6	8.8			
TB	1.4	1.6	1.8	2.0	2.2	2.4	2.6	2.8	3.0			07010020
	8.0	8.2	8.4	8.6	8.8	9.0	9.2	9.4	9.6			
BPB	2.8	3.0	3.2	3.4	3.6	3.8	4.0	4.2	4.4			07010030
PB	3.2	3.6	4.0	4.2	4.4	4.6	4.8	5.2	5.6			07010090
PP	3.4	3.8	4.2	4.6	5.0	5.2	5.6	6.0	6.4			07010130
BCG	4.0	4.2	4.4	4.6	4.8	5.0	5.2	5.4	5.6			07010040
CPR	5.0	5.2	5.4	5.6	5.8	6.0	6.2	6.4	6.6			07010100
MR	5.4	5.6	5.8	6.0	6.2	6.4	6.6	6.8	7.0			07010050
BCP	5.6	5.8	6.0	6.2	6.4	6.6	6.8	7.0	7.2			07010140
BTB	6.2	6.4	6.6	6.8	7.0	7.2	7.4	7.6	7.8			07010060
PR	0.0	0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.6			07010150
	6.6	6.8	7.0	7.2	7.4	7.6	7.8	8.0	8.2			
AZY	10.0	10.4	10.8	11.0	11.2	11.4	11.6	11.8	12.0			07010070
ALB	11.0	11.4	11.8	12.2	12.6	12.8	13.0	13.2	13.6			07010080
UNIV	1	2	3	4	5	6	7	8	9	10	11	07010120

## › Litmus Paper

- **Litmus Papers** made from high purity litmus to secure high sensitivity and clear color change
- **Blue Litmus Paper** change color to red when the liquid is acidic
- **Red Litmus Paper** change color to blue when the liquid is alkalic
- **Available in two sizes and packing;** booklets and loose strips



## › Ordering Information

### Red Litmus

Size [mm]	Packing	Cat. No.
7 x 70	10 booklets each of 20 strips	07020020
9 x 85	10 boxes each of 100 strips	07020040

### Blue Litmus

Size [mm]	Packing	Cat. No.
7 x 70	10 booklets each of 20 strips	07020010
9 x 85	10 boxes each of 100 strips	07020030

## Key to the Symbols:

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

- **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.
- ✘ **Not recommended:**  
Significant changes in water flow rate and/or bubble point can be expected.
- ✦ **Data not available.**

## Membrane Filters

CHEMICAL	Polymer / Product							
	MCE	CA	PCTE	PTFE	Supported PTFE	Hydrophilic PTFE	Coated CA	
<b>Acid</b>	Glacial Acetic acid	✘	✘	✘	●	●	●	✘
	10% Acetic acid	●	●	●	●	●	●	●
	12 kmol/m <sup>3</sup> Hydrochloric acid (37%, 12N)	✘	✘	●	●	●	●	✘
	6 kmol/m <sup>3</sup> Hydrochloric acid (19%, 6N)	▼	✘	●	●	●	●	✘
	12 kmol/m <sup>3</sup> Nitric acid (53%, 12N)	✘	✘	●	●	●	▼	✘
	6 kmol/m <sup>3</sup> Nitric acid (26%, 6N)	▼	✘	●	●	●	●	✘
	18 kmol/m <sup>3</sup> Sulfuric acid (96%, 36N)	✘	✘	✘	●	●	✘	✘
	3 kmol/m <sup>3</sup> Sulfuric acid (16%, 6N)	▼	✘	●	●	●	●	✘
	85% Phosphoric acid	●	✘	✘	●	●	●	✘
	5% Boric acid	●	●	●	●	●	●	●
	50% Formic acid	▼	▼	●	●	●	●	▼
	35% Hydrofluoric acid	✘	✘	●	●	●	●	✘
	60% Perchloric acid	●	✘	✘	●	●	●	✘
	<b>Alkalis</b>	6 kmol/m <sup>3</sup> Sodium hydroxide (26%, 6N)	✘	✘	✘	●	●	●
6 kmol/m <sup>3</sup> Potassium hydroxide (20%, 6N)		✘	✘	✘	●	●	●	✘
6 kmol/m <sup>3</sup> Aqueous ammonia (11%, 6N)		✘	✘	✘	●	●	●	✘
<b>Alcohol</b>	Methyl alcohol	✘	●	●	●	●	●	●
	Ethyl alcohol	✘	●	●	●	●	●	●
	Isopropyl alcohol	▼	●	●	●	●	●	●
	Isobutyl alcohol	▼	●	●	●	●	●	●
	Butyl alcohol	●	●	●	●	●	●	●
	Glycerol	●	●	●	●	●	●	●
	Amyl alcohol	▼	●	●	●	●	●	●
	Benzyl alcohol	▼	✘	✘	●	●	●	✘
Ethylene glycol	✘	●	●	●	●	●	●	

To be continued next page

## Membrane Filters (Continued)

CHEMICAL	Polymer / Product						
	MCE	CA	PCTE	PTFE	Sup-ported PTFE	Hydro-philic PTFE	Coated CA
<b>Ethers</b>	Ethyl ether	▼	●	●	●	▼	●
	Isopropyl ether	●	●	●	●	●	●
	Tetrahydrofuran	✗	✗	✗	●	✗	●
	Dioxane	✗	✗	✗	●	●	●
	Petroleum ether	●	●	●	●	●	●
<b>Esters</b>	Methyl acetate	✗	✗	✗	●	●	✗
	Butyl acetate	✗	✗	●	●	●	✗
	Amyl acetate	✗	▼	●	●	●	▼
<b>Ketones</b>	Acetone	✗	✗	✗	●	●	✗
	Methylethyl ketone	✗	✗	✗	●	●	✗
	Methyl isobutyl ketone	✗	✗	✗	●	●	✗
	Cyclohexanone	✗	✗	✗	●	●	✗
<b>Hydrocarbons</b>	Benzene	●	●	✗	●	●	●
	Toluene	●	●	✗	●	●	●
	Xylene	●	●	●	●	●	●
	Hexane	●	●	●	●	●	●
	Gasoline	●	●	●	●	▼	●
	Kerosene	●	●	●	●	●	●
<b>Halogenated hydrocarbons</b>	Chloroform	●	✗	✗	●	▼	✗
	Methylene chloride	✗	✗	✗	●	▼	✗
	Trichloroethylene	●	●	✗	●	●	●
	Tetrachloroethylene	●	●	●	●	●	●
	Carbon tetrachloride	●	●	✗	●	▼	●
<b>Amines</b>	Aniline	✗	✗	✗	●	●	✗
	Dimethyl formamide	✗	✗	✗	●	▼	✗
	Diethyl acetamide	✗	✗	✗	●	●	✗
	Triethanolamine	✗	●	✗	●	●	●
<b>Miscellaneous</b>	Methyl cellosolve	✗	✗	✗	●	●	✗
	Butyl cellosolve	✗	●	✗	●	●	●
	Nitrogen	●	●	●	●	●	●
	Hydrogen	●	●	●	●	●	●
	Oxygen	●	●	●	●	●	●
	30% Hydrogen peroxide	✗	●	●	●	●	●
	Saline solution	●	●	●	●	●	●
	Dimethylsulfoxide	✗	✗	✗	●	●	✗
	Nitrobenzene	✗	✗	✗	●	●	✗
	Methanol (1): Chloroform (1)	▼	✗	✗	●	●	✗
	Pyridine	✗	✗	✗	●	●	✗
	Acetonitrile	✗	✗	✗	●	●	✗
	Phenol	●	✗	✗	●	●	✗
	Freon	●	●	●	●	●	●
	37% Formaldehyde	▼	▼	●	●	●	▼
	Silicone oil	●	✗	●	●	●	✗
	n-Hexane (95): Ethyl acetate (5)	✗	●	●	●	●	●
Nitric acid (70): Distilled water (30)	✗	✗	✗	●	●	✗	
Petroleum oil	●	●	●	●	●	●	

## Disposable Syringe Filter Units

CHEMICAL		AS	CS	CP	HP	JP	
		Mixed Cellulose Esters with acrylic housing	Cellulose Acetate with acrylic housing	Cellulose Acetate with PP housing	Hydrophilic PTFE with PP housing	Hydrophobic PTFE with PP housing	
<b>Acids</b>	3 kmol/m <sup>3</sup> Hydrochloric acid (10%, 3N)	●	▼	▼	●	●	
	9 kmol/m <sup>3</sup> Hydrochloric acid (30%, 9N)	✗	✗	✗	●	●	
	1 kmol/m <sup>3</sup> Sulfuric acid (5%, 2N)	●	●	●	●	●	
	4 kmol/m <sup>3</sup> Sulfuric acid (20%, 8N)	✗	✗	✗	●	●	
	1 kmol/m <sup>3</sup> Nitric acid (5%, 1N)	●	●	▼	●	●	
	5 kmol/m <sup>3</sup> Nitric acid (20%, 5N)	✗	✗	✗	▼	▼	
	20% Acetic acid	●	●	●	●	●	
	Glacial acetic acid	✗	✗	✗	●	●	
	10% Hydrofluoric acid	✗	✗	✗	●	●	
	35% Hydrofluoric acid	✗	✗	✗	●	●	
	10% Chromic acid	▼	▼	▼	▼	▼	
	10% Phosphoric acid	●	●	●	●	●	
	<b>Alkalis</b>	2.5 kmol/m <sup>3</sup> Sodium hydroxide (10%, 2.5N)	✗	✗	✗	●	●
		2 kmol/m <sup>3</sup> Potassium hydroxide (10%, 2N)	✗	✗	✗	●	●
8 kmol/m <sup>3</sup> Aqueous ammonia (28%, 8N)		✗	●	▼	●	●	
<b>Alcohols</b>	Methyl alcohol	✗	✗	●	●	●	
	Ethyl alcohol	✗	▼	●	●	●	
	n-Propyl alcohol	▼	●	●	●	●	
	Isopropyl alcohol	▼	●	●	●	●	
	n-Butyl alcohol	▼	●	●	●	●	
	Amyl alcohol	▼	●	●	●	●	
	Benzyl alcohol	▼	✗	✗	●	●	
	Ethylene glycol	✗	✗	●	●	●	
	Glycerol	●	●	●	●	●	
	<b>Ethers</b>	Ethyl ether	✗	✗	▼	▼	▼
Isopropyl ether		✗	✗	●	●	●	
Tetrahydrofuran (THF)		✗	✗	✗	▼	▼	
Dioxane		✗	✗	✗	▼	▼	
<b>Esters</b>	Methyl acetate	✗	✗	✗	▼	▼	
	Ethyl acetate	✗	✗	✗	▼	▼	
	Butyl acetate	✗	✗	✗	▼	▼	
	Amyl acetate	✗	✗	▼	▼	▼	
<b>Ketones</b>	Acetone	✗	✗	✗	●	●	
	Methyl ethyl ketone (MEK)	✗	✗	✗	▼	▼	
	Methyl isobutyl ketone (MIBK)	✗	✗	✗	▼	▼	
	Cyclohexanone	✗	✗	✗	▼	▼	
<b>Hydro-carbons</b>	Benzene	✗	✗	▼	▼	▼	
	Toluene	✗	✗	▼	▼	▼	
	Xylene	✗	✗	▼	▼	▼	
	n-Hexane	✗	✗	▼	▼	▼	
	Gasoline	▼	▼	●	●	●	
Kerosene	●	●	▼	▼	▼		

To be continued next page

## Disposable Syringe Filter Units (Continued)

CHEMICAL		AS	CS	CP	HP	JP
		Mixed Cellulose Esters with acrylic housing	Cellulose Acetate with acrylic housing	Cellulose Acetate with PP housing	Hydrophilic PTFE with PP housing	Hydrophobic PTFE with PP housing
<b>Halogenated hydrocarbons</b>	Chloroform	×	×	×	▼	▼
	Methylene chloride	×	×	×	▼	▼
	Trichloroethylene	×	×	▼	▼	▼
	Carbon tetrachloride	×	×	▼	●	●
	Trichloroethane	×	×	×	▼	▼
	Perchloroethylene	×	×	×	▼	▼
<b>Amines</b>	Freon (TMC)	×	×	▼	▼	▼
	Aniline	×	×	×	▼	▼
	Dimethyl formamide	×	×	×	▼	▼
	Diethylacetamide	×	×	×	▼	▼
	Triethanolamine	×	●	●	●	●
<b>Misc.</b>	Ethyl acetate cellosolve	×	×	×	▼	▼
	Acetonitrile	×	×	×	▼	▼
	Pyridine	×	×	×	▼	▼
	Sodium Hypochloride	×	×	×	●	●
	35% Formaldehyde	×	▼	▼	●	●
	Iron (II) chloride	●	●	●	●	●
	Copper sulfate	●	●	●	●	●
	Mineral oil	▼	●	▼	▼	▼
	Salt water	●	●	●	●	●
	10% Hydrogen peroxide	×	▼	●	●	●
	Nitrobenzene	×	×	×	▼	▼
	Phenol	×	×	×	●	●
	Silicone oil	×	×	×	●	●
	Petroleum oil	▼	▼	●	●	●
	Acetonitrile (70): water (30)	×	×	×	●	●

## Capsule Filters

CHEMICAL	CCS	CCF/CCFH	CCP	CCG		
<b>Acids</b>	5% Acetic acid	●	●	●	●	
	20% Acedic acid	●	●	●	▼	
	10% Chromic acid	✦	▼	▼	✖	
	3 kmol/m <sup>3</sup> Hydrochloric acid (10%, 3N)	●	●	●	●	
	11 kmol/m <sup>3</sup> Hydrochloric acid (35%, 11N)	●	●	●	▼	
	10% Hydrofluoric acid	✦	●	●	✖	
	1 kmol/m <sup>3</sup> Nitric acid (5%, 1N)	✦	●	●	▼	
	4 kmol/m <sup>3</sup> Nitric acid (20%, 4N)	✦	▼	▼	✖	
	10% Phosphoric acid	✦	●	●	●	
	1 kmol/m <sup>3</sup> Sulfuric acid (5%, 2N)	●	●	●	●	
	4 kmol/m <sup>3</sup> Sulfuric acid (20%, 8N)	●	●	●	▼	
	<b>Alkalis</b>	2.5 kmol/m <sup>3</sup> Sodium hydroxide (10%, 3N)	●	●	●	▼
		2 kmol/m <sup>3</sup> Potassium hydroxide (10%, 2N)	●	●	●	▼
5 kmol/m <sup>3</sup> Aqueous ammonia (10%. 5N)		●	●	●	▼	
15 kmol/m <sup>3</sup> Aqueous ammonia (28%. 15N)		●	●	●	▼	
<b>Alcohols</b>	Methyl alcohol	●	●	●	▼	
	Ethyl alcohol	●	●	●	▼	
	n-Propyl alcohol	●	●	●	▼	
	n-Butyl alcohol	●	●	●	▼	
	Ethylene glycol	●	●	●	●	
<b>Ethers</b>	Ethyl ether	▼	▼	▼	✖	
	Dioxane	▼	▼	▼	✖	
	Tetrahydrofuran (THF)	✖	▼	▼	✖	
<b>Esters</b>	Amyl acetate	✦	▼	▼	✦	
	Methyl acetate	✦	▼	▼	▼	
	Ethyl acetate	✖	▼	▼	▼	
	Butyl acetate	✦	▼	▼	▼	
<b>Ketones</b>	Acetone	✖	▼	▼	✖	
	Methyl ethyl ketone (MEK)	✖	▼	▼	✖	
	Methyl isobutyl ketone (MIBK)	✖	▼	▼	✖	
<b>Hydro-carbons</b>	n-Hexane	▼	▼	▼	▼	
	Cyclohexane	▼	▼	▼	▼	
	Benzene	▼	▼	▼	▼	
	Toluene	✖	▼	▼	✖	
	Xylene	✦	▼	▼	▼	
<b>Halogenated hydrocarbons</b>	Chloroform	✖	▼	▼	✖	
	Carbon tetrachloride	✦	▼	▼	▼	
	Freon (TMC)	✖	▼	▼	✖	
	Methylene chloride	✖	▼	▼	✖	
	Trichloroethylene	✦	▼	▼	✖	
<b>Amines</b>	Trichloroethane	✦	▼	▼	▼	
	Dimethyl formamide	✖	▼	▼	✖	
<b>Aldehydes</b>	Acetaldehyde	✦	✦	✦	✦	
	35% Formaldehyde	●	●	●	●	
<b>Misc.</b>	Acetic cellosolve	✦	▼	▼	▼	
	Acetonitrile	✦	▼	▼	✦	
	Pyridine	✦	▼	▼	✖	
	Nitrobenzene	✦	✦	✦	✦	
	6% Sodium hypochlorite	✦	●	●	●	
	Ferrous chloride	●	●	●	●	
	Copper Sulfate	●	●	●	●	
	Mineral oil	▼	▼	▼	▼	
	Salt water	●	●	●	●	
	10% Hydrogen peroxide	●	●	●	▼	



- A**  
Absorbent Pads..... 17  
Antibiotic Assay Discs..... 43  
Ashless Filter Papers.....33, 37-39
- B**  
Blaine Test Paper..... 43  
Blotting Membranes..... 49  
Blotting Papers..... 50
- C**  
Capsule Filters.....75-79  
    Glass fiber..... 79  
    Polyethersulfone membranes..... 76  
    Polypropylene depth media..... 78  
    PTFE membranes, hydrophilic..... 77  
    PTFE membranes, hydrophobic..... 77  
Cellulose Acetate membranes.....4-5, 9  
Cellulose Acetate membranes, sterile..... 4-5, 15-16  
Chemical Compatibility Guides.....84-88  
Chromatography Papers..... 50  
Coated Cellulose Acetate membranes..... 10  
Comparison Table  
    Filter Papers..... 41  
    Glass & Quartz Fiber Filters..... 31  
Composite Filters..... 32
- D**  
Depth Filters.....25-45  
    Glass fibers.....25-29, 31  
    Coated glass fibers..... 32  
    Cellulose fibers.....33-43  
    PTFE fibers.....44-45  
    Quartz fibers.....30-31  
DISMIC syringe filters..... 18-21  
Disposable Vacuum Filter Funnel..... 58
- E**  
Extraction Thimbles.....46-48  
    Cellulose.....46-47  
    Glass fiber.....46-47  
    PTFE fiber.....46, 48  
    PTFE/Silica fiber.....46, 48  
    Silica fiber.....46, 48
- F**  
Filter Holders.....51-74  
    Glass.....51-54  
    PFA.....61, 64  
    Polysulfone.....55-56  
    Polypropylene.....61-63  
    Pressure filtration.....61-74  
    Stainless steel, vacuum.....57  
    Stainless steel, pressure.....61, 66-74  
    Vacuum filtration.....51-58  
Filter Papers.....33-42  
    Qualitative.....33-36  
    Quantitative, ashless.....33, 37-39  
    Silicone treated.....40  
Filtration Manifolds.....59-60  
    PVC.....59  
    Stainless steel.....60  
Forcep.....17
- G**  
Glass Fiber Filters.....25-29, 31  
    PTFE coated.....32
- H**  
Hybridization membranes.....49
- I**  
Indicator Papers.....82-83  
In-line Filters.....18-19, 22  
Ion-chromatography, Syringe Filters for.....20
- L**  
LABODISC in-line/syringe filters.....18-19, 22  
Litmus Paper.....83
- M**  
Manifolds.....59-60  
    PVC.....59  
    Stainless steel.....60  
Membrane Filters.....4-16  
    Cellulose Acetate.....9, 16  
    Coated Cellulose Acetate.....10  
    Mixed Cellulose Ester.....6-8, 16  
    Polycarbonate.....14  
    PTFE, hydrophilic.....11  
    PTFE, hydrophobic, supported.....12  
    PTFE, hydrophobic, unsupported.....13  
Milk Sediment Discs.....42  
Mixed Cellulose Ester membranes.....6-8, 16  
Monitors.....80-81
- N**  
Nitrocellulose Blotting Membranes.....49
- P**  
Paper discs for Antibiotic Assay.....43  
Petri Dishes.....17  
pH Indicator Paper.....82  
Phase Separating Filters.....40  
Polycarbonate membranes.....14  
Polyflon Filters.....44-45  
Pressure Filter Holders.....61-74  
    PFA.....61, 64  
    PP.....61-63  
    Stainless steel.....61, 66-74  
PTFE coated glass fiber filters.....32  
PTFE depth Filters.....44-45  
PTFE fiber filters.....44-45  
PTFE membrane filters.....11-13
- Q**  
Qualitative Filter Papers.....33-36  
Quantitative Filter Papers.....33, 37-39  
Quartz Fiber Filters.....30-31
- S**  
Silicone treated Filter Papers.....40  
Sterile membranes, Cellulose Acetate.....16  
Sterile membranes, Mixed Cellulose Ester.....16  
Syringe Filters.....18-22  
    3 mm.....18-19  
    13 mm.....18-20  
    25 mm.....18, 21  
    50 mm.....18, 22  
Syringe Filters for ion-chromatography.....20
- T**  
Test Papers.....82-83  
    Litmus Paper.....83  
    pH Test Paper.....82
- U**  
Ultra Filtration Units.....23-24
- V**  
Vacuum filter Holders.....51-58  
    Glass.....51-54  
    Polysulfone.....55-56  
    Stainless steel.....57  
Vacuum Filtration Funnel, disposable.....58

# Index – Catalogue Nos.

Cat. No.	Page	Cat. No.	Page	Cat. No.	Page
01511012.....	43	13CP045AN.....	20	19304504.....	67
03CP020AN.....	19	13CP045AS.....	20	19304702.....	67
03CP020AS.....	19	13HP020AN.....	20	19304703.....	67, 69
03CP045AN.....	19	13HP020CN.....	20	19304704.....	67
03CP045AS.....	19	13HP045AN.....	20	19304712.....	69, 70
03JP050AN.....	19	13HP045CN.....	20	19304715.....	70
07010010.....	82	13JP020AN.....	20	19304903.....	68
07010020.....	82	13JP050AN.....	20	19304905.....	68
07010030.....	82	17301000.....	66	19304906.....	68
07010040.....	82	17301200.....	66	19304910.....	68
07010050.....	82	17301700.....	71	19306000.....	69, 74
07010060.....	82	17301800.....	73	19306108.....	74
07010070.....	82	17301900.....	71	19306200.....	74
07010080.....	82	17302100.....	73	19306300.....	69
07010090.....	82	17302500.....	71	19307003.....	69
07010100.....	82	17302700.....	73	19307004.....	69
07010120.....	82	17304500.....	67	19307204.....	69, 70
07010130.....	82	17304700.....	67	19307208.....	69
07010140.....	82	17304900.....	68	19307220.....	69, 70
07010150.....	82	17307000.....	69	19307404.....	70
07011010.....	82	17307200.....	69	19311003.....	52
07011020.....	82	17307400.....	70	19311004.....	52
07011030.....	82	17311200.....	52	19311008.....	56
07011040.....	82	17311300.....	52	19311201.....	52
07011050.....	82	17311400.....	53	19311202.....	52
07020010.....	83	17311500.....	53	19311208.....	52
07020020.....	83	17311600.....	53	19311209.....	52
07020030.....	83	17312100.....	54	19311302.....	52
07020040.....	83	17312200.....	54	19311304.....	52
1.055.....	35	17312600.....	57	19311305.....	52
1.070.....	35	17313100.....	60	19311401.....	53
1.090.....	35	17313300.....	60	19311402.....	53
1.110.....	35	17313400.....	59	19311403.....	53
1.125.....	35	17313600.....	59	19311404.....	53, 54, 57
1.150.....	35	17800000.....	17	19311408.....	53
1.185.....	35	19301002.....	66	19311409.....	53
1.240.....	35	19301003.....	66	19311502.....	53
1.285.....	35	19301004.....	66	19311504.....	53, 57
1.300.....	35	19301202.....	66-67	19311505.....	53, 57
1.330.....	35	19301203.....	66-67, 69	19311602.....	53
1.360.....	35	19301204.....	66	19311605.....	53
1.400.....	35	19301510.....	70	19312101.....	54
1.485560.....	35	19301702.....	72, 74	19312102.....	54
1.500.....	35	19301703.....	72, 74	19312103.....	54
1.600.....	35	19301704.....	72, 74	19312203.....	54
1.600600.....	35	19301705.....	72, 74	19312204.....	54
1026.033.....	42	19301710.....	72	19313005.....	60
1026B.033.....	42	19301711.....	72, 74	19313011.....	60
131.055.....	35	19301712.....	72, 74	19313405.....	59
131.070.....	35	19301713.....	72	19313411.....	59
131.090.....	35	19301717.....	72	19321014.....	70
131.110.....	35	19301760.....	72, 74	2.055.....	35
131.125.....	35	19301770.....	72, 74	2.070.....	35
131.150.....	35	19301773.....	72, 74	2.090.....	35
131.185.....	35	19301902.....	72, 74	2.110.....	35
131.240.....	35	19301903.....	72, 74	2.125.....	35
131.285.....	35	19301904.....	72, 74	2.150.....	35
131.300.....	35	19301905.....	72, 74	2.185.....	35
131.330.....	35	19301911.....	72, 74	2.240.....	35
131.360.....	35	19301912.....	72, 74	2.285.....	35
131.400.....	35	19302502.....	72, 74	2.300.....	35
131.485560.....	35	19302503.....	72, 74	2.330.....	35
131.500.....	35	19302504.....	72, 74	2.360.....	35
131.600.....	35	19302505.....	72, 74	2.400.....	35
131.600600.....	35	19302510.....	72	2.485560.....	35
13CP020AN.....	20	19302511.....	72	2.500.....	35
13CP020AS.....	20	19302512.....	72, 74	2.600.....	35

Cat. No.	Page	Cat. No.	Page	Cat. No.	Page
2.600600.....	35	43303010.....	62	50JP050AN.....	22
231.055.....	35	43303020.....	62	51A.460570.....	50
231.070.....	35	43307010.....	65	51B.460570.....	50
231.090.....	35	43307020.....	65	526.600600.....	50
231.110.....	35	44501001.....	56	590.600600.....	50
231.125.....	35	44501002.....	56	5A.055.....	38
231.150.....	35	44501003.....	56	5A.070.....	38
231.185.....	35	44501004.....	56, 63	5A.090.....	38
231.485560.....	35	44501005.....	56	5A.110.....	38
232.055.....	36	44501006.....	56	5A.125.....	38
232.070.....	36	44501007.....	56	5A.150.....	38
232.090.....	36	44501008.....	56	5A.185.....	38
232.110.....	36	44501009.....	56	5A.240.....	38
232.125.....	36	44501010.....	56	5A.285.....	38
232.150.....	36	44501013.....	56, 63	5A.300.....	38
232.185.....	36	44501015.....	56	5A.330.....	38
232.485560.....	36	44501102.....	56	5A.360.....	38
235.055.....	36	44501201.....	63	5A.400.....	38
235.070.....	36	44501202.....	63	5A.485560.....	38
235.090.....	36	44501203.....	63	5A.500.....	38
235.110.....	36	44501204.....	63	5B.055.....	38
235.125.....	36	44501208.....	63	5B.070.....	38
235.150.....	36	44530101.....	65	5B.090.....	38
235.185.....	36	44530102.....	gl65	5B.110.....	38
235.485560.....	36	44530103.....	65	5B.125.....	38
25AS020AN.....	21	44530104.....	65	5B.150.....	38
25AS020AS.....	21	44530105.....	65	5B.185.....	38
25AS045AN.....	21	44530106.....	65	5B.240.....	38
25AS045AS.....	21	44530110.....	65	5B.285.....	38
25CS020AN.....	21	44530111.....	65	5B.300.....	38
25CS020AS.....	21	44530201.....	65	5B.330.....	38
25CS045AN.....	21	44530202.....	65	5B.360.....	38
25CS045AS.....	21	44530203.....	65	5B.400.....	38
25CS080AN.....	21	44530204.....	65	5B.485560.....	38
25CS080AS.....	21	44530206.....	65	5B.500.....	38
25HP020AN.....	21	44540101.....	63	5C.055.....	38
25HP045AN.....	21	44540102.....	63	5C.070.....	38
25JP020AN.....	21	44540103.....	63	5C.090.....	38
25JP020AS.....	21	44540104.....	63	5C.110.....	38
25JP050AN.....	21	44540106.....	63	5C.125.....	38
2S.055.....	40	49005010.....	43	5C.150.....	38
2S.070.....	40	49005020.....	43	5C.185.....	38
2S.090.....	40	49005040.....	43	5C.240.....	38
2S.110.....	40	49006010.....	43	5C.285.....	38
2S.125.....	40	49007010.....	43	5C.300.....	38
2S.150.....	40	4A.055.....	38	5C.330.....	38
2S.185.....	40	4A.070.....	38	5C.360.....	38
37AS245BS.....	81	4A.090.....	38	5C.400.....	38
37AS245BS-HE.....	81	4A.110.....	38	5C.485560.....	38
37AS245PS-HE.....	81	4A.125.....	38	5C.500.....	38
37AS345BS.....	81	4A.150.....	38	6.055.....	39
37AS345PS.....	81	4A.185.....	38	6.070.....	39
37AS380AN.....	81	4A.240.....	38	6.090.....	39
37AS380BS.....	81	4A.285.....	38	6.110.....	39
37OS200ON.....	81	4A.300.....	38	6.125.....	39
37OS300MR.....	81	4A.330.....	38	6.150.....	39
37OS300ON.....	81	4A.360.....	38	6.185.....	39
39651001.....	24	4A.400.....	38	6.240.....	39
39651005.....	24	4A.485560.....	38	6.285.....	39
39651020.....	24	4A.500.....	38	6.300.....	39
42004010.....	17	50.600600.....	50	6.330.....	39
42004020.....	17	50CP020AN.....	22	6.360.....	39
43301010.....	55, 56	50CP020AS.....	22	6.400.....	39
43301020.....	55, 56	50CP045AN.....	22	6.485560.....	39
43301030.....	55, 56	50CP045AS.....	22	6.500.....	39
43301050.....	55, 56	50JP020AN.....	22	7.055.....	39
43301050.....	56	50JP020AS.....	22	7.070.....	39

# Index – Catalogue Nos.

Cat. No.	Page	Cat. No.	Page	Cat. No.	Page
7.090.....	39	88R.308.....	48	A045P025A.....	8
7.110.....	39	88R.332X.....	48	A045P037A.....	8
7.125.....	39	88R.338.....	48	A045P047A.....	8
7.150.....	39	88R.352X.....	48	A045R047A.....	16
7.185.....	39	88R.405X.....	48	A045R047W.....	16
7.240.....	39	88R.432.....	48	A045R050A.....	16
7.285.....	39	88R.455X.....	48	A045U013A.....	8
7.300.....	39	88R.535X.....	48	A045U025A.....	8
7.330.....	39	88R.600X.....	48	A045U047A.....	8
7.360.....	39	88R.751X.....	48	A045V013A.....	8
7.400.....	39	88RH.259X.....	48	A045V025A.....	8
7.485560.....	39	89.259X.....	48	A045V047A.....	8
7.500.....	39	89S.259X.....	48	A045W047A.....	16
8100020.....	58	A010A013A.....	7	A045W050A.....	16
8100050.....	58	A010A025A.....	7	A065A013A.....	7
84.199.....	47	A010A047A.....	7	A065A025A.....	7
84.209X.....	47	A010A050A.....	7	A065A047A.....	7
84.226.....	47	A010A090C.....	7	A065A050A.....	7
84.228.....	47	A010A142C.....	7	A065A090C.....	7
84.229X.....	47	A010A293C.....	7	A065A142C.....	7
84.250.....	47	A020A013A.....	7	A065A293C.....	7
84.256.....	47	A020A025A.....	7	A065B013A.....	7
84.258.....	47	A020A047A.....	7	A065B025A.....	7
84.259.....	47	A020A050A.....	7	A065B047A.....	7
84.259X.....	47	A020A090C.....	7	A065B050A.....	7
84.280.....	47	A020A142C.....	7	A065G047A.....	16
84.280X.....	47	A020A293C.....	7	A065H047A.....	16
84.300.....	47	A020B025A.....	7	A065H050A.....	16
84.300X.....	47	A020B047A.....	7	A080A013A.....	7
84.308.....	47	A020G047A.....	16	A080A025A.....	7
84.330.....	47	A020H047A.....	16	A080A037A.....	7
84.332X.....	47	A020J047A.....	7	A080A047A.....	7
84.338.....	47	A020K047A.....	7	A080A050A.....	7
84.339.....	47	A030A013A.....	7	A080A090C.....	7
84.352X.....	47	A030A025A.....	7	A080A142C.....	7
84.405X.....	47	A030A047A.....	7	A080A293C.....	7
84.432.....	47	A030A050A.....	7	A080B013A.....	7
84.455X.....	47	A030A090C.....	7	A080B025A.....	7
84.535X.....	47	A030A142C.....	7	A080B037A.....	7
84.600X.....	47	A030A293C.....	7	A080B047A.....	7
84.751X.....	47	A045A013A.....	7	A080B050A.....	7
86R.199.....	47	A045A025A.....	7	A080G047A.....	16
86R.209X.....	47	A045A037A.....	7	A080G050A.....	16
86R.229X.....	47	A045A047A.....	7	A080H047A.....	16
86R.250.....	47	A045A050A.....	7	A080H047W.....	16
86R.259.....	47	A045A090C.....	7	A080H050A.....	16
86R.259X.....	47	A045A142C.....	7	A080N013A.....	8
86R.280X.....	47	A045A293C.....	7	A080N025A.....	8
86R.300.....	47	A045B013A.....	7	A080N047A.....	8
86R.300X.....	47	A045B025A.....	7	A080P013A.....	8
86R.308.....	47	A045B037A.....	7	A080P025A.....	8
86R.332X.....	47	A045B047A.....	7	A080P047A.....	8
86R.352X.....	47	A045B050A.....	7	A080R047A.....	16
86R.405X.....	47	A045G047A.....	16	A080R047W.....	16
86R.432.....	47	A045G050A.....	16	A080V047A.....	8
86R.455X.....	47	A045H047A.....	16	A080X025A.....	8
86R.535X.....	47	A045H047W.....	16	A080X025B.....	8
86R.600X.....	47	A045H050A.....	16	A080X037A.....	8
86R.751X.....	47	A045H082A.....	16	A080X037B.....	8
88R.199.....	48	A045H085A.....	16	A080X047A.....	8
88R.209X.....	48	A045J047A.....	7	A080X047B.....	8
88R.229X.....	48	A045K047A.....	7	A100A013A.....	7
88R.250.....	48	A045N013A.....	8	A100A025A.....	7
88R.259X.....	48	A045N025A.....	8	A100A047A.....	7
88R.280X.....	48	A045N037A.....	8	A100A050A.....	7
88R.300.....	48	A045N047A.....	8	A100A090C.....	7
88R.300X.....	48	A045P013A.....	8	A100A142C.....	7

Cat. No.	Page	Cat. No.	Page	Cat. No.	Page
A100A293C	7	GA055.050	27	GC090.047	28
A100G047A	16	GA055.055	27	GC090.055	28
A100H047A	16	GA055.070	27	GC090.070	28
A100H050A	16	GA055.090	27	GC090.090	28
A300A013A	7	GA055.110	27	GC090.110	28
A300A025A	7	GA055.125	27	GC090.125	28
A300A047A	7	GA055.150	27	GC090.150	28
A300A050A	7	GA055.810	27	GC090.810	28
A300A090C	7	GA100.025	27	GD120.025	28
A300A142C	7	GA100.035	27	GD120.037	28
A300A293C	7	GA100.037	27	GD120.045	28
A300G047A	16	GA100.045	27	GD120.047	28
A300G050A	16	GA100.047	27	GD120.055	28
A500A013A	7	GA100.055	27	GD120.070	28
A500A025A	7	GA100.070	27	GD120.090	28
A500A047A	7	GA100.090	27	GD120.110	28
A500A050A	7	GA100.110	27	GD120.125	28
A500A090C	7	GA100.125	27	GD120.150	28
A500A142C	7	GA100.150	27	GD120.810	28
A500A293C	7	GA100.810	27	GF075.025	29
B200G047A	17	GA200.025	27	GF075.037	29
C020A013A	9	GA200.037	27	GF075.045	29
C020A025A	9	GA200.045	27	GF075.047	29
C020A037A	9	GA200.047	27	GF075.055	29
C020A047A	9	GA200.055	27	GF075.070	29
C020A090C	9	GA200.070	27	GF075.090	29
C020A142C	9	GA200.090	27	GF075.110	29
C020A293C	9	GA200.110	27	GF075.125	29
C020G047A	16	GA200.125	27	GF075.150	29
C045A013A	9	GA200.150	27	GF075.810	29
C045A025A	9	GA200.810	27	GS025.025	29
C045A037A	9	GB100R.025	27	GS025.037	29
C045A047A	9	GB100R.037	27	GS025.045	29
C045A090C	9	GB100R.045	27	GS025.047	29
C045A142C	9	GB100R.047	27	GS025.055	29
C045A293C	9	GB100R.055	27	GS025.070	29
C045G047A	16	GB100R.070	27	GS025.090	29
C045G085A	16	GB100R.090	27	GS025.110	29
C080A013A	9	GB100R.110	27	GS025.125	29
C080A025A	9	GB100R.125	27	GS025.150	29
C080A037A	9	GB100R.150	27	GS025.810	29
C080A047A	9	GB100R.810	27	H010A013A	11
C080A090C	9	GB140.025	28	H010A025A	11
C080A142C	9	GB140.037	28	H010A047A	11
C080A293C	9	GB140.045	28	H010A090C	11
C300A013A	9	GB140.047	28	H010A142C	11
C300A025A	9	GB140.055	28	H010A293D	11
C300A037A	9	GB140.070	28	H020A013A	11
C300A047A	9	GB140.090	28	H020A025A	11
C300A090C	9	GB140.110	28	H020A047A	11
C300A142C	9	GB140.125	28	H020A090C	11
C300A293C	9	GB140.150	28	H020A142C	11
DP070.035	29	GB140.810	28	H020A293D	11
DP070.037	29	GC050.025	28	H050A013A	11
DP070.045	29	GC050.037	28	H050A025A	11
DP070.047	29	GC050.045	28	H050A047A	11
DP070.055	29	GC050.047	28	H050A090C	11
DP070.070	29	GC050.055	28	H050A142C	11
DP070.090	29	GC050.070	28	H050A293D	11
DP070.110	29	GC050.090	28	H100A013A	11
DP070.125	29	GC050.110	28	H100A025A	11
DP070.150	29	GC050.125	28	H100A047A	11
DP070.810	29	GC050.150	28	H100A090C	11
GA055.025	27	GC050.810	28	H100A142C	11
GA055.037	27	GC090.025	28	H100A293D	11
GA055.045	27	GC090.037	28	J010A013A	12
GA055.047	27	GC090.045	28	J010A025A	12

# Index – Catalogue Nos.

Cat. No.	Page	Cat. No.	Page	Cat. No.	Page
J010A037A	12	PF040.300300	45	S045A304D	49
J010A047A	12	PF050.047	45	S045A330R	49
J010A050A	12	PF050.055	45	T010A013A	13
J010A090C	12	PF050.070	45	T010A025A	13
J010A142C	12	PF050.090	45	T010A047A	13
J010A293D	12	PF050.110	45	T010A090C	13
J020A013A	12	PF050.125	45	T010A142C	13
J020A025A	12	PF050.150	45	T010A293D	13
J020A037A	12	PF050.300300	45	T020A013A	13
J020A047A	12	PF060.047	45	T020A025A	13
J020A050A	12	PF060.055	45	T020A047A	13
J020A090C	12	PF060.070	45	T020A090C	13
J020A142C	12	PF060.090	45	T020A142C	13
J020A293D	12	PF060.110	45	T020A293D	13
J050A013A	12	PF060.125	45	T050A013A	13
J050A025A	12	PF060.150	45	T050A025A	13
J050A037A	12	PF060.300300	45	T050A047A	13
J050A047A	12	PF100.047	45	T050A090C	13
J050A050A	12	PF100.055	45	T050A142C	13
J050A090C	12	PF100.070	45	T050A293D	13
J050A142C	12	PF100.090	45	T080A013A	13
J050A293D	12	PF100.110	45	T080A025A	13
J100A013A	12	PF100.125	45	T080A047A	13
J100A025A	12	PF100.150	45	T080A090C	13
J100A037A	12	PF100.300300	45	T080A142C	13
J100A047A	12	PG60.025	32	T080A293D	13
J100A050A	12	PG60.026	32	T100A013A	13
J100A090C	12	PG60.037	32	T100A025A	13
J100A142C	12	PG60.045	32	T100A047A	13
J100A293D	12	PG60.047	32	T100A090C	13
K010A013A	14	PG60.055	32	T100A142C	13
K010A025A	14	PG60.070	32	T100A293D	13
K010A047A	14	PG60.090	32	T300A013A	13
K020A013A	14	PG60.110	32	T300A025A	13
K020A025A	14	PG60.125	32	T300A047A	13
K020A047A	14	PG60.150	32	T300A090C	13
K020N025A	14	PG60.810	32	T300A142C	13
K020N047A	14	QR100.025	30	T300A293D	13
K040A013A	14	QR100.037	30	Y008A035A	10
K040A025A	14	QR100.045	30	Y008A047A	10
K040A047A	14	QR100.047	30	Y008A076A	10
K040N025A	14	QR100.055	30	Y008A090A	10
K040N047A	14	QR100.070	30	Y008A124A	10
K080A013A	14	QR100.090	30	Y008A142A	10
K080A025A	14	QR100.110	30	Y008A257A	10
K080A047A	14	QR100.125	30	Y008A293A	10
K800A013A	14	QR100.150	30	Y020A035A	10
K800A025A	14	QR100.810	30	Y020A047A	10
K800A047A	14	QR200.025	30	Y020A076A	10
M-085	81	QR200.037	30	Y020A090A	10
PF020.047	45	QR200.045	30	Y020A124A	10
PF020.050	45	QR200.047	30	Y020A142A	10
PF020.055	45	QR200.055	30	Y020A257A	10
PF020.070	45	QR200.070	30	Y020A293A	10
PF020.090	45	QR200.090	30	Y100A035A	10
PF020.110	45	QR200.110	30	Y100A047A	10
PF020.125	45	QR200.125	30	Y100A076A	10
PF020.150	45	QR200.150	30	Y100A090A	10
PF020.300300	45	QR200.810	30	Y100A124A	10
PF040.047	45	S020A082C	49	Y100A142A	10
PF040.050	45	S020A085C	49	Y100A257A	10
PF040.055	45	S020A224D	49	Y100A293A	10
PF040.070	45	S020A304D	49		
PF040.090	45	S020A330R	49		
PF040.110	45	S045A082C	49		
PF040.125	45	S045A085C	49		
PF040.150	45	S045A224D	49		







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