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 streched biaxially to form the porous structure
– PCTE membranes are track etched.

Performance characteristics of Advantec membranes

- **Strong:**
  Advantec membranes are monitered for both burst (longitudinal) and tensile (lateral) strenght. 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^2 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

A | **020** | **A** | **293** | **C**

Quantity per package

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

Diameter [mm]

13 = 013	47 = 047	90 = 090	142 = 142
20 = 020	50 = 050	100 = 100	293 = 293
25 = 025	82 = 082	102 = 102	
37 = 037	85 = 085	137 = 137	

Sheets/rolls [cm]

20 x 20 = 204
22 x 22 = 224
30 x 30 = 304
33 cm x 3 m = 330

Surface/Type

Packaging	Non-sterile packages		Pre-sterile packages	
			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*

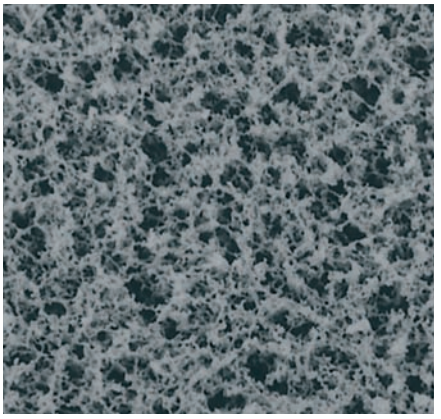
Membrane pore size [µm]

5.0 = 500	0.8 = 080	0.45 = 045	0.10 = 010	CMF (nominal µm)
3.0 = 300	0.65 = 065	0.30 = 030		10 = 100
1.0 = 100	0.50 = 050	0.20 = 020		2 = 020
				0.8 = 008

Type of filter

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	

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 biologocal 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[1]		Flow Rate[2]		Porosity[3] [%]	Thickness [µm]
			[MPa]	[psi]	Water [ml/min/cm²]	Air [L/min/cm²]		
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 prevet 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/cm²

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

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

Mixed Cellulose Ester Membranes (MCE)

Ordering Information

White – Non-sterile

Pore Size [µm]	Diameter [mm]	Surface	Packing	Cat. No.
0.1	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
0.2	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
0.3	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
0.45	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.
0.65	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
0.8	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
1.0	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
3.0	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
5.0	13	Plain	100	A500A013A
	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.
0.45	13	Plain	100	A045N013A
	13	Grid	100	A045P013A
	25	Plain	100	A045N025A
	25	Grid	100	A045P025A
	37	Plain	100	A045N037A
	37	Grid	100	A045P037A
	47	Plain	100	A045N047A
	47	Grid	100	A045P047A
0.8	13	Plain	100	A080N013A
	13	Grid	100	A080P013A
	25	Plain	100	A080N025A
	25	Grid	100	A080P025A
	47	Plain	100	A080N047A
	47	Grid	100	A080P047A

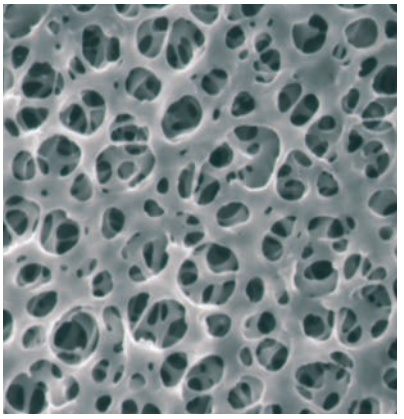
Green – Non-sterile

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

Opticlear – Non-sterile (continued)

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

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[1]		Flow Rate[2]		Porosity[3] [%]	Thickness[4] [µm]
	[MPa]	[psi]	Water [ml/min/cm²]	Air [L/min/cm²]		
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

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

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
3. Porosity refers to the percent open area
4. Average thickness

- 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

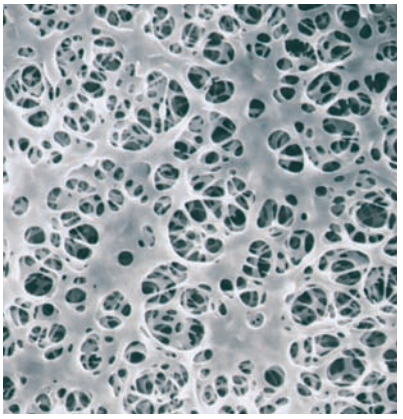
White – Non-sterile

Pore Size [µm]	Diameter [mm]	Surface	Packing	Cat. No.
0.2	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
0.45	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.
0.8	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
3.0	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[1]		Flow Rate[2]		% Latex Particle Retention [particle size in µm]							
	[MPa]	[psi]	Water [ml/min/cm²]	Air [L/min/cm²]	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

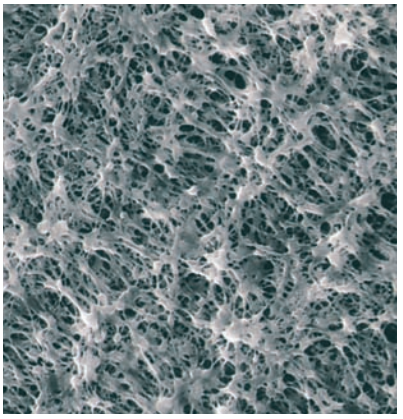
White – Non-sterile

Pore Size [µm]	Diameter [mm]	Surface	Packing	Cat. No.
0.8	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
2.00	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.
10.00	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[1]		Flow Rates[2]		Porosity[3] [%]	Thickness [µm]	Max. Operating Temperature [°C]
	[MPa]	[psi]	Water [ml/min/cm²]	Air [L/min/cm²]			
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

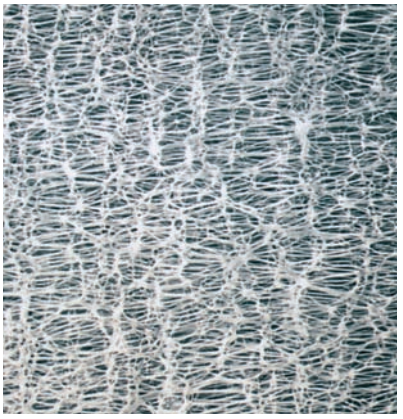
White – Non-sterile

Pore Size [µm]	Diameter [mm]	Surface	Packing	Cat. No.
0.10	13	Plain	100	H010A013A
	25	Plain	100	H010A025A
	47	Plain	100	H010A047A
	90	Plain	25	H010A090C
	142	Plain	25	H010A142C
	293	Plain	10	H010A293D
0.20	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.
0.50	13	Plain	100	H050A013A
	25	Plain	100	H050A025A
	47	Plain	100	H050A047A
	90	Plain	25	H050A090C
	142	Plain	25	H050A142C
	293	Plain	10	H050A293D
1.00	13	Plain	100	H100A013A
	25	Plain	100	H100A025A
	47	Plain	100	H100A047A
	90	Plain	25	H100A090C
	142	Plain	25	H100A142C
	293	Plain	10	H100A293D

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[1]		Flow Rates[2]		Porosity[3] [%]	Maximum Operating Temperature [°C]	Water Break Through		Thickness
	[MPa]	[psi]	Acetone [ml/min/cm²]	Air [L/min/cm²]			[MPa]	[psi]	[µm]
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/cm² (10 psi)
3. Porosity refers to the percent open area

Ordering Information

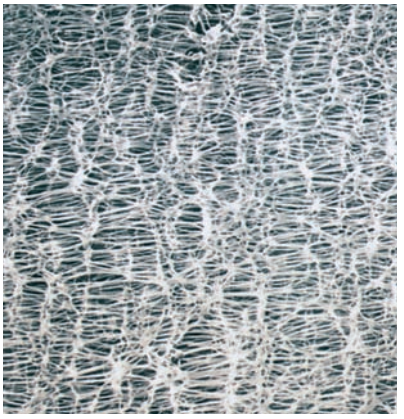
White – Non-sterile

Pore Size [µm]	Diameter [mm]	Surface	Packing	Cat. No.
0.10	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
0.20	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.
0.50	13	Plain	100	J050A013A
	25	Plain	100	J050A025A
	37	Plain	100	J050A037A
	47	Plain	100	J050A047A
	50	Plain	100	J050A050A
	90	Plain	25	J050A090C
	142	Plain	25	J050A142C
	293	Plain	10	J050A293D
1.00	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[1]		Flow Rates[2]	Porosity[3] [%]	Thickness [µm]	Max. Operating Temp. [°C]
	[MPa]	[psi]	Acetone [ml/min/cm²]			
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

Definitions:
1. Bubble point is the minimum pressure required to force air through a membrane which has been prevet with isopropylalcohol
2. Flow rates determined under constant vacuum 0.7 kg/cm² (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.

Trace Metal Content [µg/g]

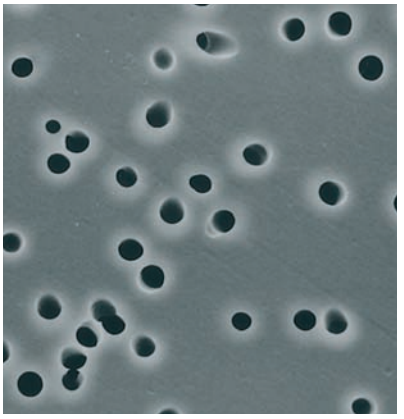
Al	0.001	K	<0.1
Ca	0.001	Mg	0.005
Cr	0.001	Mn	<0.001
Cu	0.01	Na	<0.05
Fe	<0.001	Ni	0.005

Ordering Information

Pore Size [µm]	Diameter [mm]	Surface	Packing	Cat. No.
0.10	13	Plain	100	T010A013A
	25	Plain	100	T010A025A
	47	Plain	100	T010A047A
	90	Plain	25	T010A090C
	142	Plain	25	T010A142C
	293	Plain	10	T010A293D
0.20	13	Plain	100	T020A013A
	25	Plain	100	T020A025A
	47	Plain	100	T020A047A
	90	Plain	25	T020A090C
	142	Plain	25	T020A142C
	293	Plain	10	T020A293D
0.50	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.
0.80	13	Plain	100	T080A013A
	25	Plain	100	T080A025A
	47	Plain	100	T080A047A
	90	Plain	25	T080A090C
	142	Plain	25	T080A142C
	293	Plain	10	T080A293D
1.00	13	Plain	100	T100A013A
	25	Plain	100	T100A025A
	47	Plain	100	T100A047A
	90	Plain	25	T100A090C
	142	Plain	25	T100A142C
	293	Plain	10	T100A293D
3.00	13	Plain	100	T300A013A
	25	Plain	100	T300A025A
	47	Plain	100	T300A047A
	90	Plain	25	T300A090C
	142	Plain	25	T300A142C
	293	Plain	10	T300A293D

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[1]		Flow Rate[2]		Nominel Thickness [µm]
	[MPa]	[psi]	Water [ml/min/cm²]	Air [L/min/cm²]	
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.
0.10	13	Plain	100	K010A013A
	25	Plain	100	K010A025A
	47	Plain	100	K010A047A
0.20	13	Plain	100	K020A013A
	25	Plain	100	K020A025A
	47	Plain	100	K020A047A
0.40	13	Plain	100	K040A013A
	25	Plain	100	K040A025A
	47	Plain	100	K040A047A
0.80	13	Plain	100	K080A013A
	25	Plain	100	K080A025A
	47	Plain	100	K080A047A
8.00	13	Plain	100	K800A013A
	25	Plain	100	K800A025A
	47	Plain	100	K800A047A

Black – Non-sterile

Pore Size [µm]	Diameter [mm]	Surface	Packing	Cat. No.
0.20	25	Plain	100	K020N025A
	47	Plain	100	K020N047A
0.40	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^2)

- **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 cerevisieae. 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 appropiate 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.

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.
3.00	47	Plain	100	A300G047A
	50	Plain	100	A300G050A
1.00	47	Plain	100	A100G047A
	47	Grid	100	A100H047A
	50	Grid	100	A100H050A
0.80	47	Plain	100	A080G047A
	47	Grid	100	A080H047A
	47	Grid	1000	A080H047W
	50	Plain	100	A080G050A
	50	Grid	100	A080H050A
0.65	47	Plain	100	A065G047A
	47	Grid	100	A065H047A
	50	Grid	100	A065H050A
0.45	47	Plain	100	A045G047A
	47	Grid	100	A045H047A
	47	Grid	1000	A045H047W
	50	Plain	100	A045G050A
	50	Grid	100	A045H050A
	82	Grid	100	A045H082A
	85	Grid	100	A045H085A
0.20	47	Plain	100	A020G047A
	47	Grid	100	A020H047A

CA – White

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

MCE – Black

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

MCE – Green

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

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