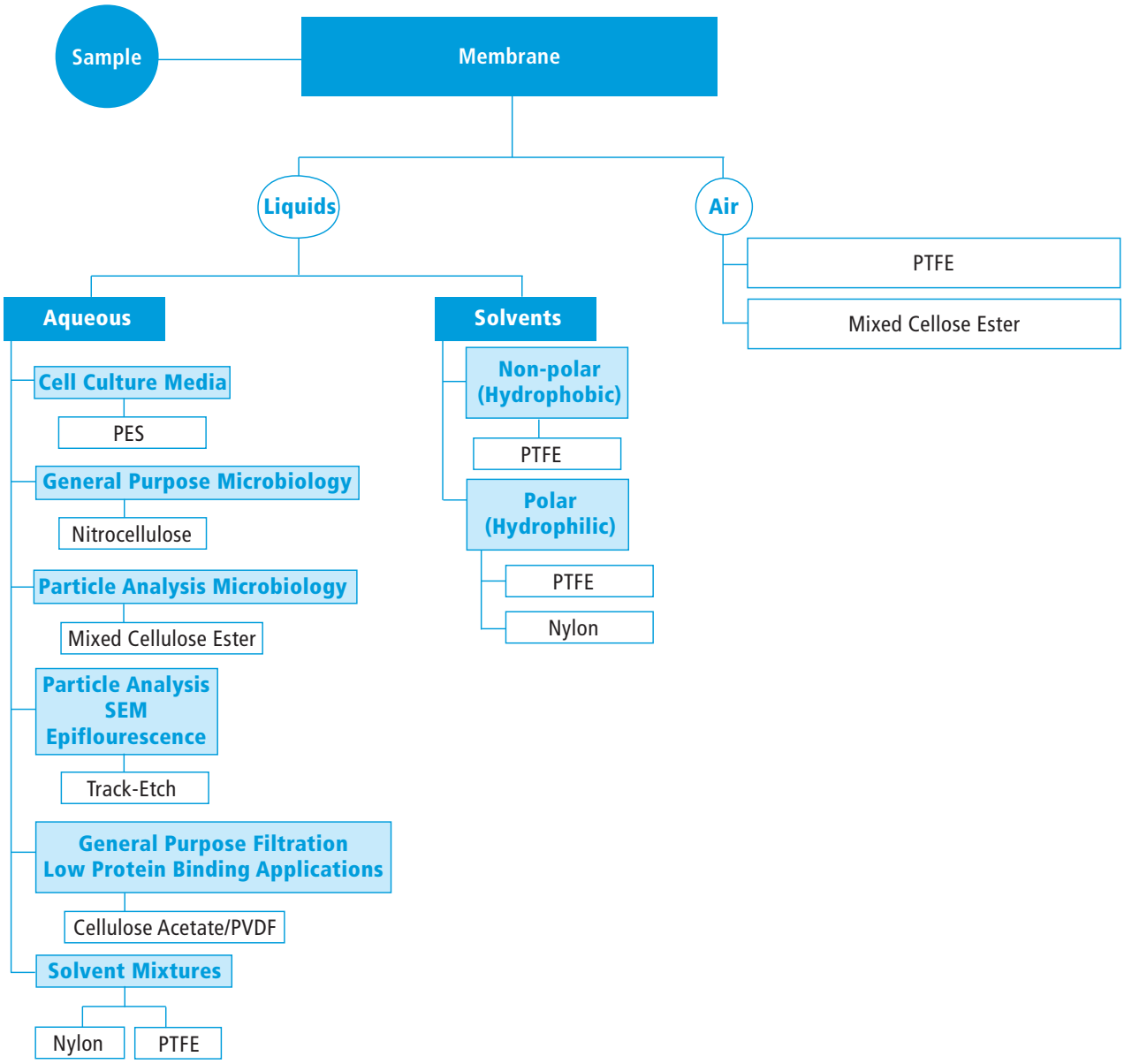
Membrane Filters

Whatman membranes are renowned for their consistent high quality and superior performance. There is a wide range of Whatman membrane products in various micron ratings and sizes* to meet your specific needs. This table will help you pick the appropriate product by type of membrane, pore size and diameter.

Membrane Media	Track-Etch Membranes		Cellulosic Membranes		Nylon (µm)	PTFE (µm)	Polypropylene (µm)	Anopore (µm)	PES (µm)
Material	Polyester Polyethylene terephthalate	Polycarbonate (µm) or Microns Polycarbonate (4, 4'ihydroxydip henyl-2,2'-propane)	Cellulose Nitrate (µm) or Microns Cellulose Nitrate	Mixed Cellulose Esters Mixed Esters (Cellulose Acetate and Nitrate)	Polymer (Hexamethylene-diamine; Nylon-66)	Polytetrafluoro-ethylene	Polypropylene	Aluminum Oxide	Polyether Sulfone
Pore Size (µm)	0.2, 0.4, 1.0	0.015, 0.03, 0.05, 0.08, 0.1, 0.2, 0.4, 0.6, 0.8, 1.0, 2.0, 3.0, 5.0, 8.0, 10.0, 12.0	0.45, 0.8, 1.0, 3.0, 5.0, 6.0	0.22, 0.45, 0.65, 0.8, 1.2, 3.0, 5.0	0.2, 0.45, 0.8	0.2, 0.5, 1.0	0.2, 0.45, 1.0	0.02, 0.1, 0.2	0.8
Diameter	25 mm	13, 25, 37, 47, 50, 76, 90, 142 mm	25, 47, 90 mm	13, 25, 47, 90, 142 mm	13, 25, 47, 90 mm	25, 47 mm	25, 47, 90 mm	13, 21, 43 mm	47 mm
Rectangular		8 x 10 mm 19 x 42 mm 25 x 80 mm		19 x 42 mm					
Brand Name	Cyclopore® Nuclepore®	8" x 10"		Membra-Fil® Whatman Brand				Anopore® Anodisc®	

* Not all combinations may be offered

Membrane Filter Quick Pick Reference Chart



Anodisc® Inorganic Membranes

The Anopore inorganic membrane is ideal for a wide range of laboratory filtration applications. This unique material has a precise, non-deformable honeycomb pore structure that filters at precisely the stated cutoff, allowing no larger sized particles to pass through the membrane.

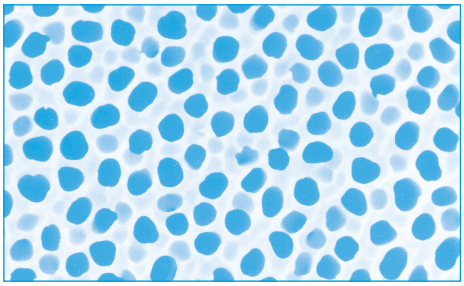
The precise pore structure and narrow pore size distribution of the Anopore membrane ensure a high level of particle removal efficiency. Micro-organisms and particulate material are captured on the surface of the membrane for subsequent analysis by light or electron microscopy. When wet, the membrane is virtually transparent, which means that retained particles do not need to be transferred to another surface before microscopic examination.

The membrane is hydrophilic and is compatible with most solvents and aqueous material. No monomers, plasticizers, adhesives, surfactants or wetting agents are used in the manufacturing process, which eliminates sample contamination and ensures low protein binding and minimal loss of sample.

The Anopore membrane is supplied in the form of Anodisc membrane filters. The membrane is peripherally bonded to an annular polypropylene ring (except the 13 mm diameter disc) for ease of handling and is suitable for both vacuum and pressure filtration.

Features and Benefits

- High pore density and narrow pore size distribution make it an extremely precise membrane
- Wide solvent compatibility reduces the need to stock a variety of membranes in the laboratory
- No additives used in the manufacturing process ensures minimal extractables and no sample contamination
- Extremely low protein binding minimizes sample loss
- Virtually transparent when wet making it ideal for microscopy studies



Applications

- HPLC mobile phase filtration and degassing
- Ultra cleaning of solvents
- Gravimetric analysis
- Liposome extrusion
- Scanning electron microscopy studies
- Bacterial analysis by epifluorescence light microscopy
- Micrometer and nanometer filtration
- Metal nanorods formation

Typical Data

	Anodisc 13	Anodisc 25	Anodisc 47
Average Membrane Thickness	60 µm	60 µm	60 µm
Membrane Diameter	13 mm	21 mm	43 mm
Membrane Type	Anopore	Anopore	Anopore
	aluminum oxide	aluminum oxide	aluminum oxide
Support Ring Material	None	Polypropylene	Polypropylene
Construction Process	None	Thermal weld	Thermal weld
Protein Adsorption	Low	Low	Low
Burst Strength	65–110 psi	65–110 psi	65–110 psi
Maximum Service Temperature	400°C	40°C	40°C
Porosity	25-50%	25–50%	25–50%
Autoclavable	No	No	No
Refractive Index	1.60	1.60	1.60

Ordering Information

Diameter (mm)	Membrane	Pore Size (µm)	Catalog Number	Hydrophilic	Protein Binding	Solvent Resistance	Quantity/Pack
13	Anodisc 13*	0.02	6809-7003	Yes	Low	Very Good	100
13	Anodisc 13*	0.1	6809-7013	Yes	Low	Very Good	100
13	Anodisc 13*	0.2	6809-7023	Yes	Low	Very Good	100
25	Anodisc 25	0.02	6809-6002	Yes	Low	Very Good	50
25	Anodisc 25	0.1	6809-6012	Yes	Low	Very Good	50
25	Anodisc 25	0.2	6809-6022	Yes	Low	Very Good	50
47	Anodisc 47	0.02	6809-5002	Yes	Low	Very Good	50
47	Anodisc 47	0.1	6809-5012	Yes	Low	Very Good	50
47	Anodisc 47	0.2	6809-5022	Yes	Low	Very Good	50

* No support ring

Cyclopore® Track-Etched Membranes

Whatman Cyclopore membranes are true pore size microporous membranes featuring sharp cut off and reproducible microfiltration performance characteristic of track-etched membranes. The smooth flat membrane ensures particles are retained on the surface so that they are easily visible under a microscope.

Cyclopore membranes are manufactured using proprietary Whatman technology to produce a precision membrane filter with a closely controlled pore size distribution.

Membranes are produced from a pure polymeric film and give exceptional chemical cleanliness. They are free of contaminants, have low tare weight, minimum water adsorption and very low levels of non-specific protein binding.

The polycarbonate membranes are hydrophilic and are available in a choice of diameters and pore sizes. The polyester membranes are resistant to most organic solvents, amides and halogenated hydrocarbons. This broad chemical compatibility makes them suitable for the detection of particles in many corrosive fluids.

Features and Benefits

- Low affinity for stains providing higher optical contrast and making visibility under a microscope easy
- True surface capture provides easy examination of samples and short analysis times
- Totally transparent membranes available
- Negligible absorption and adsorption of filtrate; non-hygroscopic
- Low tare weights
- No particle shedding provides ultra clean filtrate
- Biologically inert

Typical Data

	Polycarbonate	Polyester	Black Polycarbonate
Thickness	7–20 µm	9–23 µm	7–20 µm
Burst Strength	>10 psi	>10 psi	>10 psi
Weight	0.7–2.0 mg/cm^2	0.9–2.3 mg/cm^2	0.7–2.0 mg/cm^2
Maximum Service Temperature	140°C	150°C	140°C
Porosity (Void Vol.)	4–20%	4–20%	4–20%
Ash Weight	0.6 µg/cm^2	2.3 µg/cm	20.6 µg/cm^2
Pore Density	10^5 - 6x10^8 pores/cm^2	10^5 - 6x10^8 pores/cm^2	10^5 - 6x10^8 pores/cm^2
Opacity	Translucent or transparent	N/A	N/A
Autoclavable	30 minutes at 121°C	30 minutes at 121°C	30 minutes at 121°C
Specific Gravity	1.21 g/cm^2	1.39 g/cm^2	—
Flammability	Slow burn	Slow burn	Slow burn
Fiber Releasing	No	No	No
Leachables	Negligible	Negligible	Negligible
Biological Compatibility	Inert	Inert	Inert

Applications

- Air monitoring
- Sample preparation
- Water analysis
- Blood cell analysis
- Electron, epifluorescence and optical microscopy
- Nucleic acid studies
- Analysis of microorganisms
- Tissue culture
- Oceanographic plankton analysis

Typical Applications

Air monitoring

Trace elements (chemicals, radioactivity) and particulate analysis (dust, pollens and airborne particles)

Analytical methods

Gravimetric analysis, densitometry, emission spectroscopy, X-ray fluorescence and infrared analysis

Water analysis

Absorbable organic halides (AOX), direct count of microorganisms, marine biology and dissolved phosphates, nitrates and ammonia analysis

Blood filtration and cell analysis

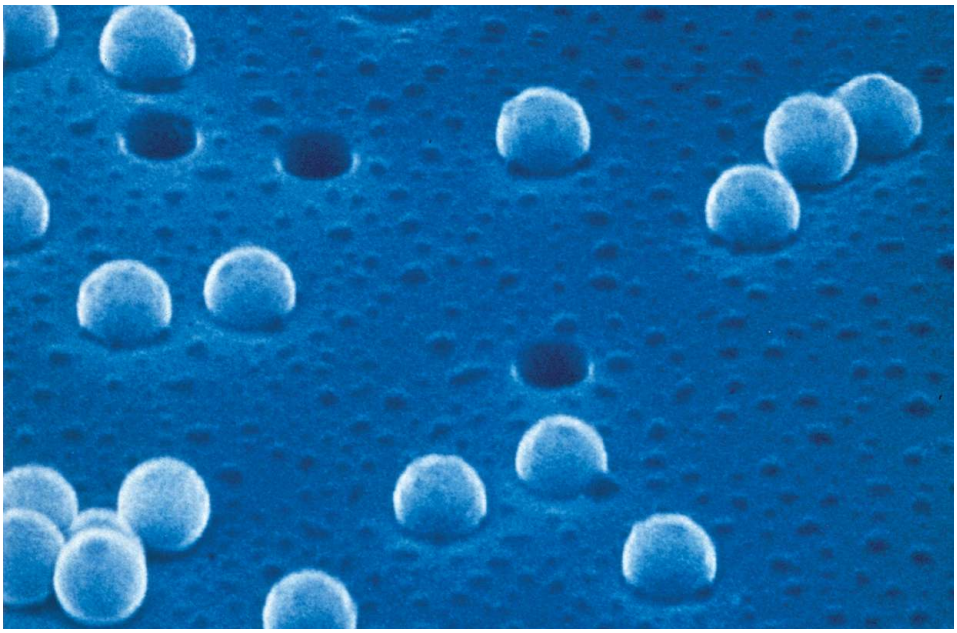
RBC deformability, leukocytes removal, RBC filtration and plasmaphoresis, chemotaxis, cytology and cell culture

General filtration

Particulate and bacteria removal, cross-flow filtration, HPLC sample preparation and solution filtration

Microscopy

Electron microscopy, epifluorescence microscopy and direct optical microscopy



Electron micrograph of a 0.4 µm Cyclopore membrane showing the retention of 0.42 µm latex spheres.

Microorganisms analysis

Direct total microbial count, harvesting, concentration, fractionation, yeast, molds, giardia, legionella, coliform and canine microfilaria

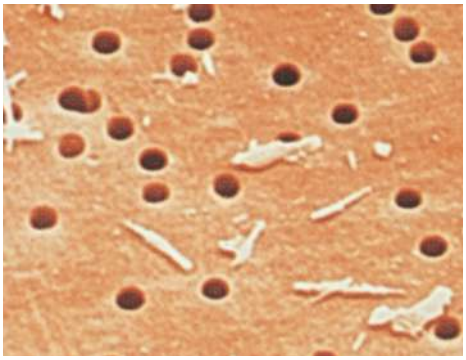
Nucleic acid studies

Alkaline elution and DNA fragment fractionation

Oceanographic studies

Transparent polycarbonate membrane filters provide a new tool for studying planktonic organisms. These ultra-thin transparent membranes are strong yet flexible, allowing for planktonic samples to be filtered and the membranes to be mounted directly onto microscope slides.

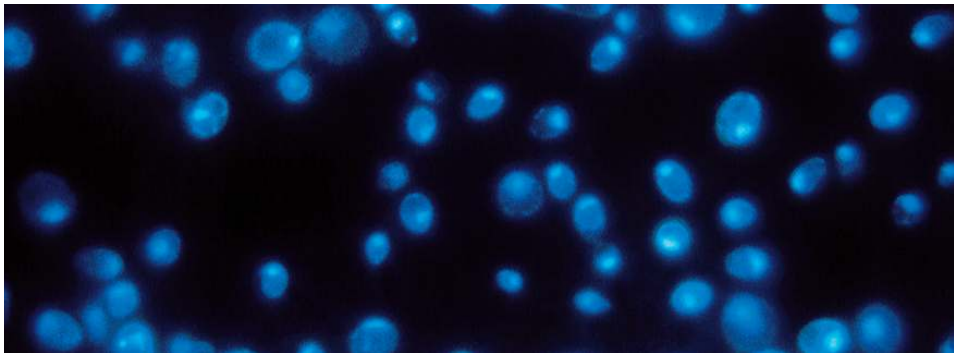
(Ref: Hewes et al. 1998; Graham & Mitchell 1999; Graham 1999.)



Asbestos fibers on a Cyclopore polycarbonate membrane.

Black Cyclopore® Track-Etched Membranes

Black Cyclopore membranes are ideal for epifluorescence and other microscopy applications requiring a contrasting background. The polycarbonate membrane is used to filter the sample and is then used directly for analysis. The dark membrane gives lower background fluorescence and improves the sensitivity of the test.



Yeast cells on black Cyclopore with DAPI stain.

Typical Properties

Pore Size (µm)	Nominal Thickness (µm)	Rated Pore Density (pores/cm^2)	Mean Porosity (%)	Bubble Point in Water (bar)*	Burst Strength (bar)*
Polycarbonate Microporous					
0.1	20	6×10^8	4	>6.9	>1.4
0.2	20	5×10^8	13	4	>1
0.4	20	1.5×10^8	15	2.2	>1
0.8	20	4×10^7	16	0.7	>1.4
1.0	19	2.2×10^7	14	0.95	>3.4
3.0	17	3×10^6	17	0.15	>3.4
5.0	15	4×10^5	6	>0.15	>3.4
8.0	12	10^5	4	>0.15	>3.4
10.0	10	10^5	6	<0.07	>3.4
12.0	8	10^5	5	<0.07	>3.4
Polycarbonate Transparent					
3.0	17	4×10^5	2.83	N/A	>4.1
Polyester Microporous					
1.0	22	2.2×10^7	14	0.95	>3.4

* 1 Bar=14.7 psi

Ordering Information

Cyclopore Track-Etched Membranes							
Diameter (mm)	Pore Size (µm)	Membrane	Catalog Number	Hydrophilic	Protein Binding	Solvent Resistance	Quantity/Pack
25	0.1	Polycarbonate	7060-2501	Yes	Low	Medium	100
25	0.2	Polyester	7061-2502	Yes	Low	Medium	100
25	0.2	Polycarbonate (black)	7063-2502	Yes	Low	Medium	100
25	0.4	Polyester	7061-2504	Yes	Low	Medium	100
25	1.0	Polyester	7061-2510	Yes	Low	Medium	100
25	5.0	Polycarbonate	7060-2513	Yes	Low	Medium	100
47	0.2	Polycarbonate	7060-4702	Yes	Low	Medium	100
47	0.4	Polycarbonate	7060-4704	Yes	Low	Medium	100
47	1.0	Polycarbonate	7060-4710	Yes	Low	Medium	100
47	5.0	Polycarbonate	7060-4713	Yes	Low	Medium	100
47	12.0	Polycarbonate	7060-4716	Yes	Low	Medium	100

Ordering Information continued

Special Clear							
Diameter (mm)	Pore Size (µm)	Membrane	Catalog Number	Hydrophilic	Protein Binding	Solvent Resistance	Quantity/Pack
25	0.4	Polycarbonate	7060-2504	Yes	Low	Medium	100
25	0.6	Polycarbonate	7060-2506	Yes	Low	Medium	100
25	0.8	Polycarbonate	7060-2508	Yes	Low	Medium	100
25	1.0	Polycarbonate	7060-2510	Yes	Low	Medium	100
25	2.0	Polycarbonate	7060-2511	Yes	Low	Medium	100
47	0.2	Polyester	7061-4702	Yes	Low	Medium	100
47	1.0	Polycarbonate	7091-4710	Yes	Low	Medium	100

Nuclepore® Track-Etched Membranes

Polycarbonate Membranes

Nuclepore polycarbonate track-etched membranes are manufactured from high quality polycarbonate film and have sharply defined pore sizes, high flow rates and excellent chemical and thermal resistance. The membranes have a smooth flat surface and exhibit very low levels of extractables.

Features and Benefits

- Low protein binding and low extractables ensuring no sample contamination
- High chemical resistance and good thermal stability for a wide range of samples
- Low, consistent ash and tare weights
- Smooth flat surface for good visibility of particles

Applications

- Epifluorescence microscopy
- Environmental analysis
- Cell biology
- EPA testing
- Fuel testing
- Bioassays
- Parasitology
- Air analysis
- Water microbiology

Typical Data

	Polycarbonate
Thickness	6–11 µm
Burst Strength	>10 psi
Weight (Tare)	0.6–1 mg/cm^2
Specific Gravity Bulk Material	1.20 g/cm^3
Heat Sealing Range	230°C–275°C
Maximum Service Temperature	140°C
Flammability	Slow burn
Ash Weight	0.92 µg/cm^2
Porosity	<15%
Rated Pore Size	0.05–12.0 µm
Rated Pore Density	1 x 10^5–6 x 10^8 pores/cm^2
Surface Texture	Flat & smooth
Optical	Translucent
Refractive Index	1.584–1.625 (birefringent)
Hydrophobic	No
Fiber Releasing	No
Autoclavable	121°C

Ordering Information

Nuclepore Track-Etched Membranes				
Diameter (mm)	Membrane	Pore Size (µm)	Catalog Number	Quantity/ Box
13				
	Polycarbonate	0.015	110401	100
	Polycarbonate	0.1	110405	100
	Polycarbonate	0.2	110406	100
	Polycarbonate	0.4	110407	100
	Polycarbonate	0.8	110409	100
	Polycarbonate	1.0	110410	100
	Polycarbonate	3.0	110412	100
	Polycarbonate	5.0	110413	100
	Polycarbonate	8.0	110414	100
	Polycarbonate	10.0	110415	100
	Polycarbonate PVP-free	8.0	150446	100
	Gold Coated PC	0.8	800195	10
25				
	Polycarbonate	0.015	110601	100
	Polycarbonate	0.03	110602	100
	Polycarbonate	0.05	110603	100
	Polycarbonate	0.08	110604	100
	Polycarbonate	0.1	110605	100
	Polycarbonate	0.2	110606	100
	Polycarbonate	0.4	110607	100
	Polycarbonate	0.6	110608	100
	Polycarbonate	0.8	110609	100
	Polycarbonate	1.0	110610	100
	Polycarbonate	2.0	110611	100
	Polycarbonate	3.0	110612	100
	Polycarbonate	5.0	110613	100
	Polycarbonate	8.0	110614	100
	Polycarbonate	10.0	110615	100
	Polycarbonate	12.0	110616	100
	Polycarbonate AOX	0.4	110637	100
	Gold Coated PC	0.4	170607	50
	Gold Coated PC	0.8	117197	50
37				
	Polycarbonate	0.4	110807	100
	Polycarbonate	0.8	110809	100
47				
	Polycarbonate	0.015	111101	100
	Polycarbonate	0.05	111103	100
	Polycarbonate	0.08	111104	100
	Polycarbonate	0.1	111105	100
	Polycarbonate	0.2	111106	100
	Polycarbonate	0.4	111107	100

Diameter (mm)	Membrane	Pore Size (µm)	Catalog Number	Quantity/ Box
47 continued				
	Polycarbonate	0.6	111108	100
	Polycarbonate	0.8	111109	100
	Polycarbonate	1.0	111110	100
	Polycarbonate	2.0	111111	100
	Polycarbonate	3.0	111112	100
	Polycarbonate	5.0	111113	100
	Polycarbonate	8.0	111114	100
	Polycarbonate	10.0	111115	100
	Polycarbonate	12.0	111116	100
	Polycarbonate AOX	0.4	111137	100
	Polycarbonate AERO	0.4	111130	100
50				
	Polycarbonate	0.2	111206	100
	Polycarbonate	0.4	111207	100
	Polycarbonate	5.0	111213	100
	Polycarbonate	12.0	111216	100
76				
	Polycarbonate	0.1	111505	100
90				
	Polycarbonate	0.05	111703	25
	Polycarbonate	0.1	111705	25
	Polycarbonate	0.2	111706	25
	Polycarbonate	0.4	111707	25
	Polycarbonate	1.0	111710	25
	Polycarbonate	2.0	111711	25
142				
	Polycarbonate	0.08	112104	25
	Polycarbonate	0.1	112105	25
	Polycarbonate	0.2	112106	25
	Polycarbonate	0.4	112107	25
	Polycarbonate	0.6	112108	25
	Polycarbonate	1.0	112110	25
293				
	Polycarbonate	0.2	112806	25
	Polycarbonate	0.4	112807	25
	Polycarbonate	1.0	112810	25
	Polycarbonate	2.0	112811	25
8 x 10 inch				
	Polycarbonate	0.03	113502	25
19 x 42				
	Polycarbonate	5.0	113313	100
25 x 80				
	Polycarbonate PVP-free	8.0	155846	100

AOX–suitable for AOX analysis (Adsorbable Organic Halogens)

PVP-free–hydrophobic

Black Nuclepore® Polycarbonate Track-Etched Membranes for Use with Epifluorescence Microscopy

Nuclepore black dyed polycarbonate membranes are high performance membranes ideally suited for applications using Epiflourescence Microscopy. Black membranes greatly reduce background fluorescence, which results in improved micro-organism and particulate visibility.

Using these membranes in combination with the EpiCount® Method, rapid enumeration of viable and nonviable microorganisms and particulate matter can be conducted in 30 minutes or less. Conventional culturing methods require incubation times of more than 24 hours. Use black track-etched membranes and the EpiCount Method to achieve rapid, direct enumeration of microorganisms.

Features and Benefits

- Polycarbonate track-etched membrane dyed black with Irgalan Black
- Flat, smooth surface assures surface capture of microorganisms and particles
- Extremely low non-specific absorption

Applications

- Potable water
- Ultrapure water
- Food and dairy
- Wine and beverages
- Clinical
- Electronics

Ordering Information

Black Nuclepore Polycarbonate Track-Etched Membranes			
Diameter (mm)	**Catalog Number**	**Pore Size (µm)**	**Quantity/Pack**
25	110656	0.2	100
25	110657	0.4	100
25	110659	0.8	100
47	111156	0.2	100
47	111157	0.4	100

Chemotaxis Membranes

Hemafil™ Polycarbonate Track-Etched Membranes

Whatman Hemafil polycarbonate track-etched membranes, part of the Whatman family of Nuclepore membranes, are specially selected for measuring erythrocyte deformability to assure a uniform flow rate and pore size. Select membranes for quantitative assessment of erythrocyte (red blood cell) deformability. Healthy erythrocytes have a mean diameter of approximately 7.5 µm but pass through capillaries as small as 3.0 µm (dia) due to their ability to deform.

Ordering Information

Hemafil™ Polycarbonate Track-Etched Membranes		
Diameter (mm)	**Catalog Number**	**Quantity/Pack**
13	110424	100

Additional Polycarbonate Track-Etched Membranes for Cell Culture Applications

Features and Benefits

- For the analysis of cell migration toward a chemical stimulus
- Thin and uniform; cylindrical pores facilitate rapid cell migration
- Reduces incubation time and the need to sterilize
- Offered without the standard wetting agent (PVP-free membranes) for increased cellular adhesion (e.g., neutrophil chemotaxis)

Ordering Information

Additional Polycarbonate Track-Etched Membranes for Cell Culture Applications				
Diameter (mm)	**Pore Size (µm)**	**Catalog Number**	**Surface**	**Quantity/Pack**
13	3.0	110412	Standard	100
13	5.0	110413	Standard	100
13	8.0	110414	Standard	100
13	5.0	150445	PVP-free	100
13	8.0	150446	PVP-free	100
25	2.0	110611	Standard	100
25	3.0	110612	Standard	100
25	5.0	110613	Standard	100
25	8.0	110614	Standard	100
25 x 80	8.0	155814	Standard	100
25 x 80	5.0	155845	PVP-free	100
25 x 80	8.0	155846	PVP-free	100

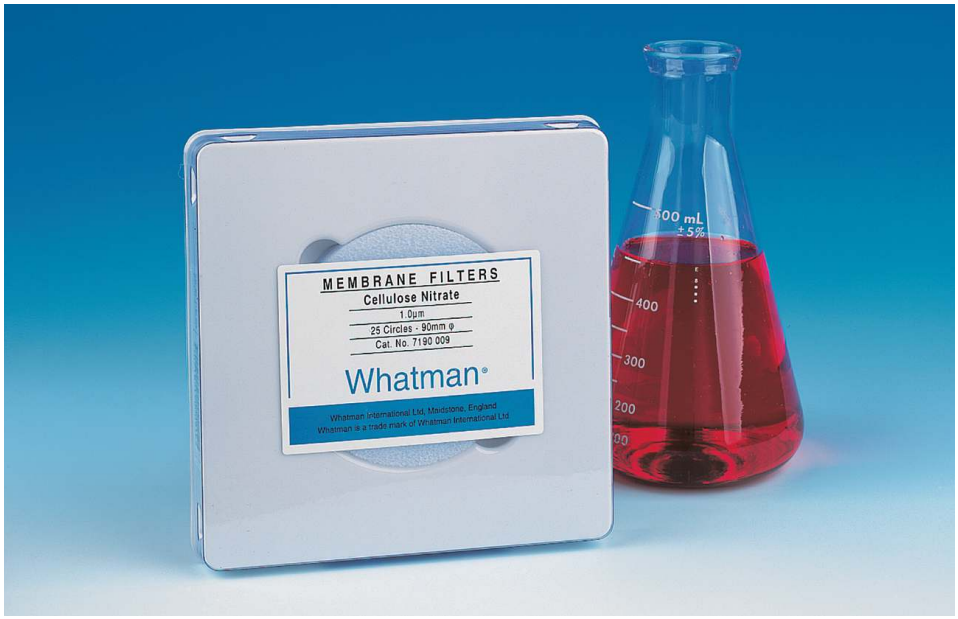
Cellulosic Membranes

Whatman offers cellulosic membranes in two formulations: (a) pure cellulose nitrate, and (b) mixed esters of cellulose nitrate and cellulose acetate.

Cellulose Nitrate

Whatman cellulose nitrate membranes are recommended for routine laboratory applications involving aqueous solutions. The membranes exhibit very narrow pore size distribution and have low levels of extractables.

The membranes are strong and flexible and can withstand handling and autoclaving procedures without loss of integrity. Cellulose nitrate membranes are supplied as circles, sheets or reels.



Features and Benefits

- Narrow pore size distribution for improved surface capture and analysis
- Low levels of extractables to ensure sample integrity

Applications

- Sample preparation
- Microbiological studies
- Filtration of aqueous solutions

Whatman Brand Mixed Cellulose Ester Membranes

Whatman mixed cellulose ester membranes are suitable for routine applications involving aqueous solutions. Compared to pure nitrocellulose filters, these membranes have a smoother and more uniform surface as well as offering excellent color contrast for particle detection.

The membranes are also available in black and are gridded to assist in manual counting procedures. The grids are printed using non-toxic ink and are completely free from bacterial growth inhibitors. The membranes provide excellent contrast between the residue or cell colonies and the filter, eliminating the need to counterstain the membrane.

Features and Benefits

- Sterile options available for critical applications
- Excellent contrast for easier particle detection
- Grids are non-toxic and do not inhibit bacterial growth, ensuring sample integrity
- Autoclavable for repeated use
- Black plain and black gridded membranes have 80:20 ratio of CN:CA
- Gridded/Sterile Gridded/Autoclave Packs have 90:10 ratio of CN:CA

Applications

- Bacteriological studies
- Particle counting from liquids and aerosols

Typical Data

	Cellulose Nitrate	Mixed Cellulose Esters
Thickness	125 µm	140 µm
Burst Strength	>2 psi	>10 psi
Weight	3.6–5.5 mg/cm^2	4.3–5.0 mg/cm^2
Maximum Service Temperature	80°C	130°C
Porosity	66–84%	74–77%
Steam Autoclavable	Yes	Yes

Typical Applications

Field of Application	Type	Pore Size (µm)
General		
Microfiltration	WCN/WCA	0.1
Ultracleaning	WCN/WCA	0.1
Sterilizing	WCN/WCA	0.2
Bulk Bacterial Removal	WCN/WCA	0.45
Analytical Precipitates	WCN	0.65
Clarifying Filtration	WCN	1.0
Particle Removal	WCN	5.0
Aggressive Fluids Sterilization	WTP	0.2
Air and Gas Sterilization	WTP	0.2, 0.5
Water Microbiology and Analysis		
Bacterial Colony Count	WCN	0.45 (grid)
Sediment Analysis	WCN	0.45
Suspended Particles	WCN	5.0
Yeasts and Moulds	WME	0.45 (black)
Air Pollution Monitoring		
Particle Detection	WME	0.45 (green)
Asbestos Monitoring (NIOSH)	WCN	0.8
Food and Beverage QC		
E. coli and Coliforms	WCN	0.45 (grid)
Total Bacteria Count	WCN	0.2
Tissue Culture		
Mycoplasma Removal	WCN	0.1
Sterile Filtration	WCN/WCA	0.2

Ordering Information

Diameter (mm)	Pore Size (µm)	Membrane	Catalog Number	Type	Hydrophilic	Protein Binding	Solvent Resistance	Quantity/ Pack
13	0.2	Cellulose Nitrate	7182-001	Plain	Yes	High	Medium	100
25	0.65	Cellulose Nitrate	7186-002	Plain	Yes	High	Medium	100
25	0.8	Cellulose Nitrate	7188-002	Plain	Yes	High	Medium	100
25	1.0	Cellulose Nitrate	7190-002	Plain	Yes	High	Medium	100
25	3.0	Cellulose Nitrate	7193-002	Plain	Yes	High	Medium	100
25	5.0	Cellulose Nitrate	7195-002	Plain	Yes	High	Medium	100
47	0.2	Mixed Esters	7187-114†	Gridded	Yes	High	Medium	100
47	0.45	Cellulose Nitrate	7141-004	Plain	Yes	High	Medium	100
47	0.45	Cellulose Nitrate	7141-104†	Gridded	Yes	High	Medium	100
47	0.45	Cellulose Nitrate	7141-114*†	Gridded	Yes	High	Medium	100
47	0.45	Cellulose Nitrate	7141-204**	Gridded	Yes	Medium	Medium	100
47	0.45	Mixed Esters	7153-004	Black Gridded	Yes	Medium	Medium	100
47	0.45	Mixed Esters	7153-104†	Black Gridded	Yes	Medium	Medium	100
47	0.45	Mixed Esters	7141-124†	Gridded	Yes	Medium	Medium	200
47	0.45	Cellulose Nitrate	7141-154***†	Gridded	Yes	High	Medium	1000
47	0.8	Cellulose Nitrate	7188-004	Plain	Yes	High	Medium	100
47	1.0	Cellulose Nitrate	7190-004	Plain	Yes	High	Medium	100
47	3.0	Cellulose Nitrate	7193-004	Plain	Yes	High	Medium	100
47	6.0	Cellulose Nitrate	7195-004	Plain	Yes	High	Medium	100
90	0.8	Cellulose Nitrate	7188-009	Plain	Yes	High	Medium	25
90	1.0	Cellulose Nitrate	7190-009	Plain	Yes	High	Medium	25
90	5.0	Cellulose Nitrate	7195-009	Plain	Yes	High	Medium	25
142	0.2	Cellulose Nitrate	7182-014	Plain	Yes	High	Medium	25

Sterile membranes are packed individually with an absorbent pad. Sterilized using ethylene oxide gas.

The ink used in the gridded filters is non-toxic and is free of bacterial growth inhibitors. Each line is spaced at 3.1 mm intervals.

* Packed without pad.

** Autoclave pack contains 10 sealed envelopes. Each envelope contains 10 filters with 10 pads.

*** 1000/box without absorbent pad.

† Sterile

Membra-Fil® Membranes (Mixed Cellulose Esters)

Features and Benefits

- Low protein binding
- Do not contain surfactants
- Uniform microporous structure of these membranes yields high flow rates
- Biologically inert
- Thermally stable
- Made with 80:20 ratio of cellulose nitrate to cellulose acetate

Applications

- Microbiological analysis
- Clarification or sterilization of aqueous solutions
- Cytology
- HPLC samples (aqueous)
- Particulate removal
- Air monitoring
- Biological assays

Ordering Information

Membra-Fil® Membranes (Mixed Cellulose Esters)			
Diameter (mm)	**Pore Size (µm)**	**Catalog Number**	**Quantity/Pack**
13	0.45	140418	100
13	5.0	140413	100
25	0.22	140628	100
25	0.45	140618	100
25	1.2	140627	100
25	5.0	140613	100
47	0.22	141128	100
47	0.45	141118	100
47	0.65	141119	100
47	0.8	141109	100
47	1.2	141127	100
47	3.0	141112	100
47	5.0	141113	100
90	0.45	141718	100
142	0.22	142128	25
142	0.45	142118	25
142	0.8	142109	25

Nylon Membranes

High quality nylon membranes are suitable for filtering aqueous solutions and most organic solvents. The membranes are suitable for use with a wide range of biological preparations and can be used where other membranes are unsuitable or difficult to use.

Nylon membranes are hydrophilic, eliminating the need for wetting agents that could be extracted when filtering aqueous solutions. The membranes are flexible, durable and tear resistant, and can be autoclaved at 121°C.

Typical Data

	Nylon		
	0.2 µm	**0.45 µm**	**0.8 µm**
Thickness	150–187 µm	150–187 µm	137–200 µm
Fiber Releasing	No	No	No
Bubble Point	40–49 psi	34–42 psi	>13 psi
Water Flow Rate @ 5 psi	>50 mL/min	>60 mL/min	>180 mL/min
Maximum Temperature	135°C	135°C	135°C

Applications

- Filtration of aqueous and organic mobile phases
- Vacuum degassing

Ordering Information

Nylon Membranes							
Diameter (mm)	**Membrane**	**Pore Size (µm)**	**Catalog Number**	**Hydrophilic**	**Protein Binding**	**Solvent Resistance**	**Quantity/Pack**
13	Nylon	0.2	7402-001	Yes	High	Good	100
13	Nylon	0.45	7404-001	Yes	High	Good	100
25	Nylon	0.2	7402-002	Yes	High	Good	100
25	Nylon	0.45	7404-002	Yes	High	Good	100
47	Nylon	0.2	7402-004	Yes	High	Good	100
47	Nylon	0.45	7404-004	Yes	High	Good	100
47	Nylon	0.8	7408-004	Yes	High	Good	100
90	Nylon	0.2	7402-009	Yes	High	Good	50
90	Nylon	0.45	7404-009	Yes	High	Good	50

PTFE Membranes

Whatman PTFE membranes are chemically stable and inert. They are suitable for applications involving aggressive organic solvents, strong acids and alkalis. PTFE membranes are particularly suitable for preparing samples for HPLC analysis. The hydrophobic nature of the membrane also has applications for air and gas sterilization. The membrane is laminated onto a non-woven polypropylene support web for improved strength and handling and can be used at temperatures up to 150ºC.

Applications

- HPLC sample preparation
- HPLC mobile phase filtration
- Sample clarification
- Sterile venting of vacuum manifolds, fermentation vessels and sterile filtrate tanks and containers
- Air and gas sterilization

Typical Data

	PTFE		
	0.2 µm	0.5 µm	1.0 µm
Thickness	130 µm	120 µm	90 µm
Porosity	72%	74%	76%
Fiber Releasing	No	No	No
Air Flow Rate @ 10 psi Vacuum	4.5 L/min/cm^2	7.5 L/min/cm^2	17 L/min/cm^2
Bubble Point	13 psi	6 psi	3 psi
Maximum Temperature	150ºC	150ºC	150ºC

Ordering Information

PTFE Membranes							
Diameter (mm)	Membrane	Pore Size (µm)	Catalog Number	Hydrophilic	Protein Binding	Solvent Resistance	Quantity/Pack
25	PTFE	0.2	7582-002	No	Low	Very Good	100
47	PTFE	0.2	7582-004	No	Low	Very Good	100
47	PTFE	0.5	7585-004	No	Low	Very Good	100
47	PTFE	1.0	7590-004	No	Low	Very Good	100

Polypropylene Membranes

Whatman polypropylene membrane filters are ideal for numerous applications in chromatography and biotechnology laboratories. They come in a range of diameters and pore sizes (from 0.2 µm to 1.0 µm). These membranes are also conveniently packaged 50 or 100 filters per package.

Easy Handling

Whatman polypropylene membrane filters are flexible, durable and virtually indestructible. The exceptionally uniform strength means that the membrane will not crack, tear, break or distort when picked up by hand or forceps.

Versatility

These membranes are temperature tolerant, which means they are not affected by autoclaving. This temperature resistance gives users autoclaved membranes with flow rates and throughput at least 80% higher than those of autoclaved cellulosic membranes. The membranes are also compatible with organic solvents, making them highly suitable for HPLC mobile phase filtering and degassing, especially acetonitrile.

Ordering Information

Polypropylene (Type WPP) Membranes			
Diameter (mm)	**Pore Size (µm)**	**Catalog Number**	**Quantity/Pack**
25	0.2	7002-0225	100
25	0.45	7002-0425	100
47	0.2	7002-0247	100
47	0.45	7002-0447	100
47	1.0	7002-1047	100
90	0.2	7002-0290	50

PES Membranes

Whatman polyethersulfone (PES) membranes are hydrophilic, low protein binding and stable in alkaline pH. Available in a 0.8 µm pore size, the PES membrane is recommended for aqueous applications and for biological samples. Whatman PES membranes have a smooth surface that allows for easy enumeration of artifacts.

Ordering Information

PES Membranes			
Diameter (mm)	**Pore Size (µm)**	**Catalog Number**	**Quantity/Pack**
47	0.8	111164	100