

Cellulose Nitrate Membranes

Recommended for the majority of routine applications, this membrane is manufactured under strictly controlled conditions. The user will benefit from the performance improvements, which are now available in Whatman membrane filters, including very narrow pore size distribution and low levels of extractables.

Higher Strength and Flexibility

Most membranes are inherently brittle and difficult to handle; it is not uncommon for filters to be damaged during loading into holders or while in use. Whatman cellulose nitrate membrane filters have a noticeably improved flexibility and are made to tolerate abuse during handling, loading and autoclaving without sacrificing integrity. These membranes are among the strongest of their type available, as measured and compared by burst pressure tests.

Low Extractable Levels

The level of extractables in membrane filters has become more important with advances in filtration or adsorption techniques. In particular, pharmaceutical, immunological and biomedical tissue culture and trace analysis applications can be adversely affected by high extractable levels. Whatman cellulose nitrate membrane filters have a low level of extractables, generally below that of other membranes of a similar type.

Narrow Pore Size Distribution

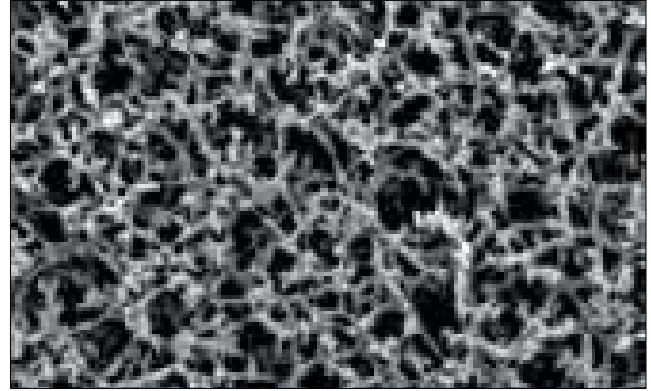
One of the major features of Whatman membrane filters is the narrow distribution of pore sizes. The rated pore size of these membranes is closely controlled due to the advanced manufacturing and control system. Additionally, the batch-to-batch variation is minimized, providing more consistent laboratory results.

Increased Temperature Stability

Membrane filters are normally autoclaved at 121°C without loss of integrity. Cellulose nitrate membranes are supplied as circles, sheets or reels.

Reduced Shrinkage

Excessive shrinkage can cause problems during autoclaving and is often the cause of membranes tearing in their holders after autoclaving. It may also cause a reduction in flow rate and total throughput. Whatman membranes exhibit a low shrinkage during autoclaving.



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

Filter Types

White Plain Filters

This is the standard membrane filter for the majority of laboratory applications involving particles and cells in the range of 0.1 µm to 12.0 µm. The residue after filtration is found to be almost completely on the surface of the membrane and allows physical recovery of deposits and microscopic examination.

Gridded Filters

Gridded filters make it easier to count particles, microorganisms and colonies. If a gridded membrane is required, please see Mixed Cellulose Ester Membranes.

Typical Data – Cellulose Nitrate Membranes

	Cellulose Nitrate
Thickness	105-140 µm
Burst strength	> 2 psi
Weight	3.6-5.5 mg/cm ²
Maximum service temperature	80°C
Porosity	66-84%
Steam autoclavable	Yes
Hydrophilic	Yes

Typical Applications – Cellulose Nitrate Membranes

Field of Application	Pore Size (µm)
General	
Microfiltration	0.1
Ultracleaning	0.1
Sterilizing	0.2
Bulk bacterial removal	0.45
Analytical precipitates	0.65
Clarifying filtration	1.0
Particle removal	5.0
Water Microbiology and Analysis	
Bacterial colony count	0.45 (gridded) – See Mixed Cellulose Ester Membranes
Sediment analysis	0.45
Suspended particles	5.0
Air Pollution Monitoring	
Asbestos Monitoring (NIOSH)	0.8
Food and Beverage QC	
<i>E. coli</i> and Coliforms	0.45 (gridded) – See Mixed Cellulose Ester Membranes
Total bacteria count	0.2
Tissue Culture	
Mycoplasma removal	0.1
Sterile filtration	0.2

Ordering Information – Cellulose Nitrate Membrane Circles

Diameter (mm)	Pore Size (µm)	Catalog Number	Description	Quantity/Pack
13	0.2	7182-001	Plain (white)	100
13	0.45	7184-001	Plain (white)	100
25	0.025	10402206*	Plain (white)	100
25	0.1	7181-002	Plain (white)	100
25	0.2	7182-002	Plain (white)	100
25	0.2	10401306	Plain (white)	100
25	0.45	7184-002	Plain (white)	100
25	0.65	7186-002	Plain (white)	100
25	0.8	7188-002	Plain (white)	100
25	1.0	7190-002	Plain (white)	100
25	3.0	7193-002	Plain (white)	100
25	5.0	7195-002	Plain (white)	100
25	5.0	10400206	Plain (white)	100
25	8.0	10400106	Plain (white)	100
30	0.45	10401107	Plain (white)	100
37	0.45	7184-003	Plain (white)	100
37	0.8	7188-003	Plain (white)	100
37	8.0	10400109	Plain (white)	100
47	0.1	7181-004	Plain (white)	100
47	0.1	10402012	Plain (white)	100
47	0.2	7182-004	Plain (white)	100
47	0.2	10401312	Plain (white)	100
47	0.2	7187-114	Plain (white)	100
47	0.45	7184-004	Plain (white)	100
47	0.45	10401170	Plain (white), sterile	100
47	0.45	7153-004	Black gridded	100
47	0.45	7153-104	Black gridded, sterile	100
47	0.45	7155-004	Green gridded, sterile	100
47	0.65	7186-004	Plain (white)	100
47	0.8	7188-004	Plain (white)	100
47	1.0	7190-004	Plain (white)	100
47	3.0	7193-004	Plain (white)	100
47	5.0	7195-004	Plain (white)	100
47	5.0	10400212	Plain (white)	100
47	8.0	10400112	Plain (white)	100
47	12.0	10400012	Plain (white)	100
50	0.1	10402014	Plain (white)	100
50	0.2	10401314	Plain (white)	100
50	0.45	10401114	Plain (white)	100
50	0.45	7184-005	Plain (white)	100
50	1.2	7191-005	Plain (white)	100

* Product is only available in the U.S.

Diameter (mm)	Pore Size (µm)	Catalog Number	Description	Quantity/Pack
50	5.0	10400214	Plain (white)	100
50	8.0	10400114	Plain (white)	100
50	8.0	10405079	Plain (white), with hydrophobic rim	100
50	12.0	10400014	Plain (white)	100
82	0.45	7184-008	Plain (white)	25
90	0.2	7182-009	Plain (white)	25
90	0.45	10401118	Plain (white)	50
90	0.45	7184-009	Plain (white)	25
90	0.8	7188-009	Plain (white)	25
90	1.0	7190-009	Plain (white)	25
90	5.0	7195-009	Plain (white)	25
100	0.45	10401121	Plain (white)	50
100	8.0	10400121*	Plain (white)	50
110	0.45	10401126	Plain (white)	50
142	0.2	7182-014	Plain (white)	25
142	0.2	10401331	Plain (white)	25
142	0.45	7184-014	Plain (white)	25
142	0.45	10401131	Plain (white)	25
142	1.2	7191-014	Plain (white)	25
150	8.0	10400132	Plain (white)	25
293	0.45	7184-029	Plain (white)	25

* Product is only available in the U.S.

Mixed Cellulose Ester Membranes

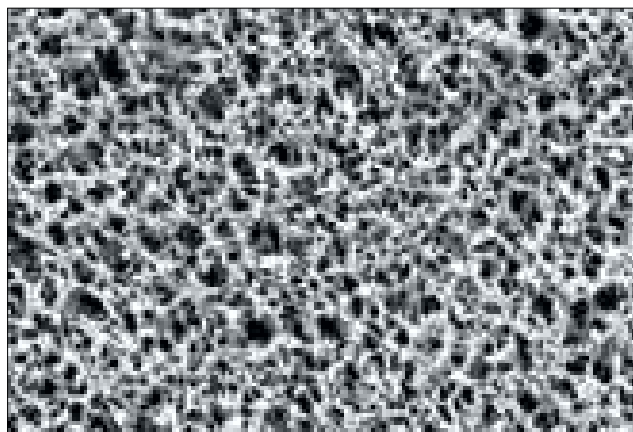
Whatman mixed cellulose ester membranes are composed of cellulose acetate and cellulose nitrate. These membranes are characterized by a smoother and more uniform surface than pure nitrocellulose filters. Also, the color contrast provided by the filter surface facilitates particle detection and minimizes eye fatigue. The ME range has a lower cellulose acetate content compared to the WME range of membranes.

Eased Counting Process

In microbiological colony counting procedures, the color contrast between the surface and the colonies facilitates the counting process.

Plain or Gridded

Many microbiological techniques include colony counting after incubation as the standard method of quantification. Whatman gridded filters have clearly defined grid lines spaced at 3.1 or 5 mm intervals. The special ink used is nontoxic and completely free from bacterial growth inhibitors.



Whatman black mixed cellulose esters are available plain for automatic colony counting applications, as well as gridded to assist in manual counting procedures. Black membranes provide contrast between residue or cell colors and the filter without having to counter-stain the membrane.

Sterile Filters

For those laboratories preferring to use membranes sterilized by autoclaving for microbiological work, Whatman provides black gridded membranes in packs with pads ready for laboratory autoclaving.

Features and Benefits

- Sterile options available for critical applications
- Excellent contrast for easier particle detection
- Grids are nontoxic and do not inhibit bacterial growth, ensuring sample integrity
- Black plain and black gridded membranes have a mix of cellulose nitrate and cellulose acetate
- The membrane offers a high degree of internal surface area for greater adsorption of product
- Higher dirt loading capacity
- Biologically inert with good thermal stability
- No surfactants to contaminate samples
- Uniform microporous structure of membrane gives high flow rates
- Thermally stable

Applications

The membrane is particularly effective in applications requiring higher flow rates and larger volume filtration, including clarification or sterilization of aqueous solutions, particulate analysis and removal, air monitoring and microbial analysis. Other applications include:

- Clarification or sterilization of aqueous solutions
- Cytology
- Air monitoring
- HPLC samples (aqueous)
- Virus concentration
- Particulate analysis
- Biological assays
- Food microbiology, including enumeration of *E. coli* in foods
- Bacteriological studies
- Particle counting from liquids and aerosols
- Yeasts and molds

Typical Data – Mixed Cellulose Ester Membranes

General	
Burst strength	> 10 psi
Weight	4.3-5.0 mg/cm ²
Maximum service temperature	130°C
Porosity	74-77%
Steam autoclavable	Yes
Solvent resistancy	Medium
Protein binding	Medium

Product Selection – Mixed Cellulose Ester Membranes

Membrane Type	Pore Size (µm)	Thickness (µm)	Water Flow Rate Δp = 0.9 bar (s/100 ml/12.5 cm ²)	Air Flow Rate Δp = 3 mbar (s/100 ml)	Bubble Point (psi)	Bubble Point (bar)
WME Product Range		140	-	-	-	-
ME Product Range						
ME 24	0.2	135	20	-	53.65	3.7
ME 25	0.45	145	12.5	-	40.6	2.8
ME 26	0.6	135	48	21	27.55	1.9
ME 27	0.8	140	2.8	11.6	18.85	1.3
ME 28	1.2	140	2	9.3	11.6	0.8
ME 29	3	150	1.2	6.7	10.15	0.7

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

Ordering Information – Mixed Cellulose Ester Membranes

Diameter (mm)	Pore Size (µm)	Catalog Number	Description	Quantity/Pack
ME Range – ME 24, Plain				
25	0.2	10401706	Plain	100
47	0.2	10401712	Plain	100
47	0.2	10401770	Plain	100
50	0.2	10401714	Plain	100
50	0.2	10401772	Plain, sterile	100
100	0.2	10401721	Plain	50
110	0.2	10401726	Plain	50
142	0.2	10401731	Plain	25
ME Range – ME 25, Plain				
25	0.45	10401606	Plain	100
47	0.45	10401612	Plain	100
47	0.45	10401670	Plain	100
50	0.45	10401614	Plain	100
50	0.45	10401662	Without interleaving paper	100
50	0.45	10401672	Plain	100
90	0.45	10401618	Plain	50
100	0.45	10401621	Plain	50
110	0.45	10401626	Plain	50
142	0.45	10401631	Plain	25
ME Range – ME 26, Plain				
25	0.6	10401506	Plain	100
47	0.6	10401512	Plain	100
50	0.6	10401514	Plain	100
100	0.6	10401521	Plain	100
ME Range – ME 27, Plain				
25	0.8	10400906	Plain	100
37	0.8	10400909	Plain	100
47	0.8	10400912	Plain	100
47	0.8	10400970	Plain	100
50	0.8	10400914	Plain	100
100	0.8	10400921	Plain	50
ME Range – ME 28, Plain				
25	1.2	10400806	Plain	100
47	1.2	10400812	Plain	100
50	1.2	10400814	Plain	100
100	1.2	10400821	Plain	50

* Product is only available in the U.S.

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FILTER PAPERS AND MEMBRANES | TRACK-ETCHED PC AND PE MEMBRANES

Diameter (mm)	Pore Size (µm)	Catalog Number	Description	Quantity/Pack
ME Range – ME 29				
25	3	10400706	Plain	100
47	3	10400712	Plain	100
50	3	10400714	Plain	100
50	3	10400772	Plain, sterile	100
100	3	10400721*	Plain	50
ME Range – ME 24, Gridded				
47	0.2	10406970	White/black grid 3.1 mm, sterile	100
50	0.2	10406914	White/black grid 3.1 mm	100
50	0.2	10406972	White/black grid 3.1 mm, sterile	100
ME Range – ME 25, Gridded				
47	0.45	10406812	White/black grid 3.1 mm	100
47	0.45	10407970	White/black grid 3.1 mm, sterile	100
47	0.45	10406871	White/black grid 3.1 mm, sterile	1000
47	0.45	10406512	White/black grid 5 mm	100
47	0.45	10406570*	White/black grid 5 mm, sterile	100
47	0.45	10409712	Black/white grid 3.1 mm	100
47	0.45	10409770	Black/white grid 3.1 mm, sterile	100
47	0.45	10409771	Black/white grid 3.1 mm, sterile	1000
47	0.45	10409414	Green/black grid 3.1 mm	1000
47	0.45	10409471*	Green/black grid 3.1 mm, sterile	1000
50	0.45	10406814	White/black grid 3.1 mm	100
50	0.45	10406862	White/black grid 3.1 mm, without interleaving paper	100
50	0.45	10406873	White/black grid 3.1 mm, sterile	1000
50	0.45	10406514	White/black grid 5 mm	100
50	0.45	10406572	White/black grid 5 mm, sterile	100
50	0.45	10406562	White/black grid 5 mm, without interleaving paper	100
50	0.45	10409714	Black/white grid 3.1 mm	100
50	0.45	10409772	Black/white grid 3.1 mm, sterile	100
50	0.45	10409773*	Black/white grid 3.1 mm, sterile	1000
50	0.45	10409462	Green/black grid 3.1 mm, without interleaving paper, sterile	100
50	0.45	10409473	Green/black grid 3.1 mm, sterile	1000
ME Range – ME 26, Gridded				
50	0.6	10409814	Black/white grid 3.1 mm	100
ME Range – ME 27, Gridded				
47	0.8	10408970	White/black grid 3.1 mm, sterile	100
47	0.8	10409970	White/black grid 3.1 mm with pad, sterile	100
47	0.8	10409270	Black/white grid 3.1 mm, sterile	100
50	0.8	10405672	Green/black grid 3.1 mm, sterile	100
ME Range – ME 28, Gridded				
50	1.2	10408372	Black/white grid 3.1 mm, sterile	100
50	1.2	10408472	Green/black grid 3.1 mm, sterile	100

* Product is only available in the U.S.

cont.

Diameter (mm)	Pore Size μm	Catalog Number	Description	Quantity/Pack
WME Range, Gridded				
25	0.45	7141-002	White/black grid 3.1 mm	100
25	0.8	7148-002	White/black grid 3.1 mm	100
47	0.45	7140-104	Plain, sterile	100
47	0.2	7187-114	White/black grid 3.1 mm	100
47	0.45	7141-004	White/black grid 3.1 mm	100
47	0.45	7141-104	White/black grid 3.1 mm, sterile	100
47	0.45	7141-114	White/black grid 3.1 mm, sterile, without pad	100
47	0.45	7141-124	White/black grid 3.1 mm, sterile	200
47	0.45	7141-154	White/black grid 3.1 mm, sterile, without pad	1000
47	0.45	7141-204	White/black grid 3.1 mm, autoclave pack, sterile	100
47	0.45	7153-004	Black/white grid 3.1 mm	100
47	0.45	7153-104	Black/white grid 3.1 mm, sterile	100
47	0.45	7155-004	Green/black grid 3.1 mm, sterile	100

Teflon® (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 nonwoven polypropylene support web for improved strength and handling and can be used at temperatures up to 120°C.

Chemically Stable and Inert

PTFE is the membrane of choice for use with aggressive solvents, liquids, and gases that can attack other membranes. It is resistant to most acids, alkalis, and solvents.

Applications

One of the major applications for the PTFE membrane is the clarification of corrosives, solvents, and aggressive fluids. This includes the important requirement in HPLC analysis for sample filtration where any solid particles can cause permanent damage to the column. The 0.5 μm pore size is normally used. Air and gas sterilization make use of the hydrophobic characteristics of PTFE membranes and their ability to stop aqueous aerosols. Usual pore sizes are 0.2 μm and 0.5 μm . Sterile venting of vacuum manifolds, fermentation vessels, and sterile filtrate tanks and containers utilize PTFE 0.2 μm membranes.



PTFE membrane

WTP and TE Membrane Ranges

WTP membranes use a polypropylene grid as the support material whereas the TE range uses a randomly arranged polypropylene support material.

Typical Data – Teflon (PTFE) Membranes

Membrane Type	Thickness (µm)	Porosity (%)	Liquid Flow Rate Δp = 0.9 bar (s/100 ml/12.5 cm ²)	Liquid Flow Rate @ 10 psi Vacuum (ml/min/cm ²)	Air Flow Rate Δp = 3 mbar (s/100 ml)	Air Flow Rate @ 10 psi Vacuum (l/min/cm ²)	Bubble Point (psi)	Bubble Point (bar †)	Max. Temp. (°C)
TE Range									
0.2 µm (TE 35)	240	-	24*	-	70	-	1.29	18.8	100
0.45 µm (TE 36)	220	-	12*	-	60	-	0.89	13	100
1.0 µm (TE 37)	275	-	5.4*	-	24	-	0.24	3.5	100
5.0 µm (TE 38)	265	-	2.2*	-	3.5	-	0.19	2.9	100
WTP Range									
0.2 µm	130	72	-	61.4**	-	4.5	0.89	13	120
0.5 µm	120	74	-	110**	-	7.5	0.41	6	120
1.0 µm	90	76	-	445**	-	17	0.21	3	120

* Measured with ethanol

** Measured with acetone

† Measured using 2-propanol

Ordering Information – Teflon (PTFE) Membranes

Diameter (mm)	Pore Size (µm)	Catalog Number	Quantity/Pack
WTP Range			
25	0.2	7582-002	100
25	1.0	7590-002	100
37	1.0	7590-003	100
47	0.2	7582-004	100
47	0.5	7585-004	100
47	1.0	7590-004	100
TE Range – TE 35			
25	0.2	10411405	50
47	0.2	10411411	50
50	0.2	10411413	50
TE Range – TE 36			
25	0.45	10411305	50
47	0.45	10411311	50
50	0.45	10411313	50
TE Range – TE 37			
25	1.0	10411205	50
47	1.0	10411211	50
50	1.0	10411213	50

cont.

Diameter (mm)	Pore Size (µm)	Catalog Number	Quantity/Pack
TE Range – TE 38			
37	5.0	10411108	50
47	5.0	10411111	50
50	5.0	10411113	50
90	5.0	10411116	50
150	5.0	10411130	50

PM 2.5 Air Monitoring Membrane

A high-purity, thin PTFE membrane in a sequentially numbered chemically resistant polypropylene support ring for PM 2.5 ambient air monitoring. Whatman PM 2.5 membranes have low tare mass for accurate gravimetric determinations. The thermally stable design eliminates curling, keeps the membrane flat, and makes the filter robot-friendly.

The PM 2.5 PTFE membranes are manufactured under clean room conditions. These chemically resistant, low chemical background filters permit sensitive, interference-free determinations. No glues or adhesives are used in making these 46.2 mm diameter products.

Statement of Conformance

PTFE Filters for EPA PM 2.5 Reference Method. Under the requirements of 40 CFR Part 50, Appendix L, shown below, the manufacturer must perform the following tests as listed.

Any filter manufacturer or vendor who sells or offers to sell filters specifically identified for use with this PM 2.5 reference method shall certify that the required number of filters from each lot (0.1% or 10, whichever is greater) of filters offered for sale have been tested as specified for the following tests and meet 90% of each of the design and performance specifications:

- Loose, surface particle contamination (drop test – weight loss stability)
- Temperature stability (temperature – weight loss stability)

Any filter manufacturer or vendor who sells or offers to sell filters specifically identified for use with this PM 2.5 reference method shall certify that a minimum number of 50 filters from each lot of filters offered for sale have been tested as specified for the following tests and meet 90% of each of the design and performance specifications:

- Filter type
- Filter diameter
- Filter thickness
- Filter pore size
- Support ring width
- Support ring thickness (total)
- Maximum pressure drop (clean filter)
- Maximum moisture pickup
- Collection efficiency
- Alkalinity
- Special requirements



These include trace metal analysis by XRF and visual inspection for defects such as pinholes, support ring separation, chaff or flashing, loose material, discoloration, filter nonuniformity or any other obvious filter defect.

Whatman hereby states that every manufacturing lot that is offered for sale, and is identified for use with the PM 2.5 reference method, conforms to EPA acceptance criteria.

Technical Specifications – PTFE Filters for use in US EPA PM 2.5 Ambient Air Monitoring

Property	Test Method	Unit of Measure	Value	Range
PTFE filter media	N/A	N/A	PTFE	-
Filter thickness	-	µm	40	± 10
Filter diameter	Template	mm	46.2	± 0.25
Filter pore size	ASTM F 316-94	µm	2.0	Maximum
Support ring media	N/A	N/A	Polypropylene	-
Total support ring thickness	-	mm	0.38	± 0.04
Support ring width	Template	mm	3.68	± 0.00 - 0.51
Particle retention (0.3 µm)	ASTM D 2986-95a	%	99.7	Minimum
Pressure drop (0.3 µm) @ 16.67 l/min	ASTM D 2986-95a	cm water	30	Maximum
Alkalinity	Section 2.12 EPA/600/R-94/038b	µeq/g of filter	< 25	Maximum
Temperature weight loss stability	as above	µg	< 20	Maximum
Drop test weight loss stability	as above	µg	< 20	Maximum
Moisture weight gain stability	as above	µg	< 10	Maximum

Maximum Trace Element Concentration by X-Ray Fluorescence

Ion	ng/cm ²	Ion	ng/cm ²	Ion	ng/cm ²	Ion	ng/cm ²	Ion	ng/cm ²	Ion	ng/cm ²
Al	94.4	Sc	7.2	Ni	3.0	Br	2.0	Pd	9.6	Cs	25
Si	32.8	Ti	13.8	Cu	2.8	Rb	2.0	Ag	9.6	Ba	32.2
P	22.6	V	4.8	Zn	2.2	Sr	2.2	Cd	10.8	La	87.6
S	13.4	Cr	2.2	Ga	1.8	Y	14.6	Sn	15.2	W	5
Cl	9.4	Mn	2.2	Ge	3.0	Zr	13.2	Sb	14.4	Au	4.4
K	5.6	Fe	5.8	As	2.8	Mo	11.6	Te	16.2	Hg	4.4
Ca	8.2	Co	4.0	Se	1.6	Rh	9.4	I	18.6	Pb	4.8

Ordering Information – PM 2.5 Air Monitoring Membrane

Diameter (mm)	Catalog Number	Description	Quantity/Pack
46.2	7592-104	With support ring, sequentially numbered	50

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 135°C.

Applications

- Filtration of aqueous and organic mobile phases
- Vacuum degassing
- Filtration of tissue culture media, microbiological media, buffers, and solutions

Typical Data – Nylon Membranes

Pore Size (µm)	Thickness (µm)	Fiber Releasing	Water Flow Rate @ 5 psi	Bubble Point (psi)	Maximum Temperature (°C)
0.2	150-187	No	> 50 ml/min	40-49	135
0.45	150-187	No	> 60 ml/min	34-42	135
0.8	137-200	No	> 180 ml/min	> 13	135

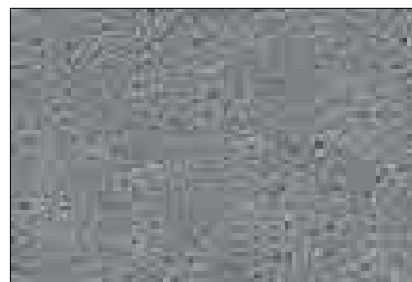
Ordering Information - Nylon Membrane Circles

Diameter (mm)	Pore Size (µm)	Catalog Number	Quantity/Pack
13	0.2	7402-001	100
13	0.45	7404-001	100
25	0.2	7402-002	100
25	0.45	7404-002	100
47	0.2	7402-004	100
47	0.45	7404-004	100
47	0.8	7408-004	100
47	1.0	7410-004	100
90	0.2	7402-009	50
90	0.45	7404-009	50

Polyamide Membranes

Whatman polyamide membranes are made from pure polyamide, making them the universal filter for clarification and sterile filtration.

Polyamide membrane filters are mechanically very strong and exhibit excellent wet strength and dry strength. They are hydrophilic, making them suitable for aqueous and organic solutions. The membrane filters can be used up to 135°C.



Polyamide membrane (0.45 µm, Type NL 17) electronic micrograph (magnification 1000×)

Typical Data – Polyamide Membranes

Pore Size (µm)	Thickness (µm)	Water Flow Rate Δp = 0.9 bar (ml/min/cm ²)	Air Flow Rate Δp = 3 mbar (bar) (ml/min/cm ²)	Bubble Point (bar)	Maximum Temperature (°C)
0.2 (NL 16)	110	0.2	10	4.2	135
0.45 (NL 17)	110	0.45	20	2.8	135

Ordering Information – Polyamide Membrane Circles

Diameter (mm)	Pore Size (µm)	Catalog Number	Membrane Type	Quantity/Pack
25	0.2	10414006	NL 16	100
25	0.45	10414106	NL 17	100
47	0.2	10414012	NL 16	100
47	0.45	10414112	NL 17	100
50	0.2	10414014	NL 16	100
50	0.45	10414114	NL 17	100
142	0.45	10414131	NL 17	25

Polyethersulfone (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. The Whatman PES membrane has a smooth surface that allows for easy enumeration of artifacts.

Ordering Information – PES Membrane Circles

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



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