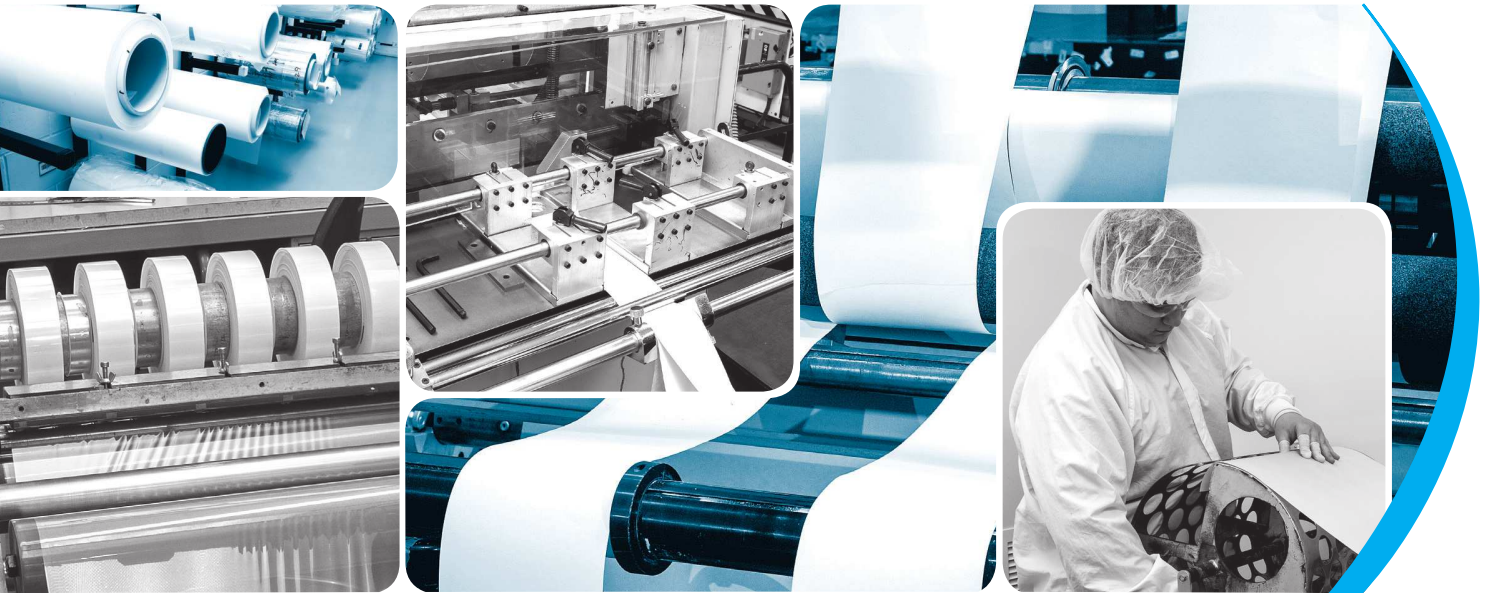


# OEM Membranes



[www.gvslifesci.com](http://www.gvslifesci.com)

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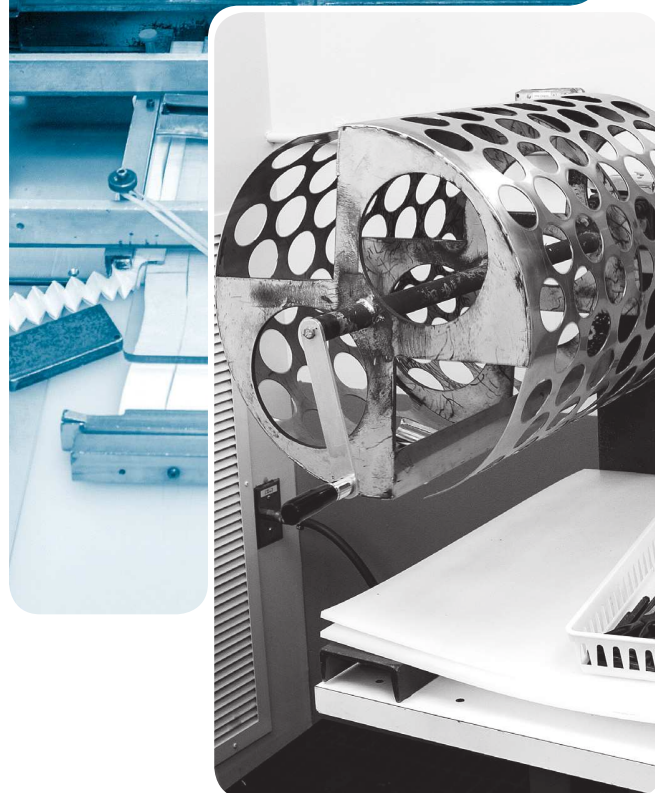
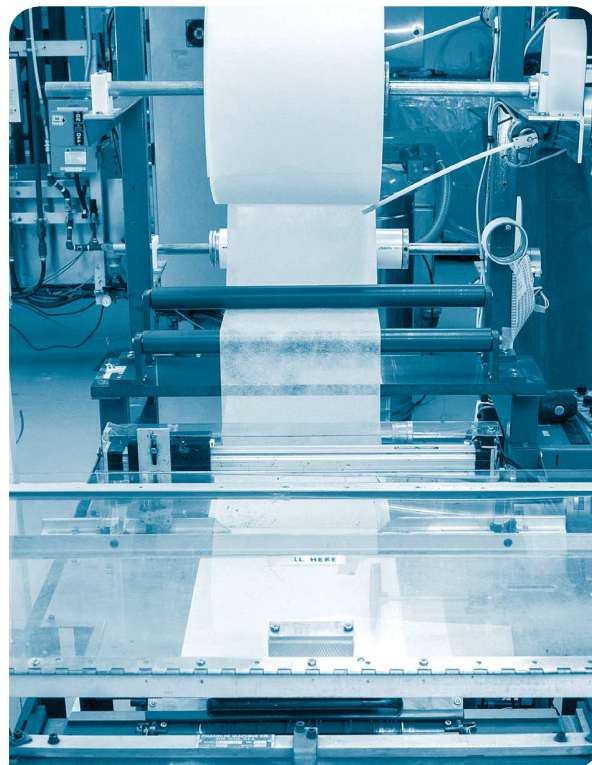
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# Application Guide

Let GVS Life Sciences be your one-source supplier for all your roll stock filtration needs. As the global leader with the widest microporous membrane portfolio, we can consolidate your supplier list. Our staff of scientific professionals have experience in many different industries and can be of assistance no matter what your industrial, bioprocess, or laboratory application may call for.

Membrane Type	Characteristics	Applications	Industries
CA	Hydrophilic, low non-specific binding, low adsorption, thermally stable, uniform pore structure	Protein or enzyme filtration, protein recovery, tissue culture media filtration, wine filtration, prefiltration of plasma fractions and vaccines	Laboratory-Filtration; Environmental-Beverage and Water Testing
NC	Hydrophilic, resistant to mild acids, hydrocarbons, formaldehyde and petroleum ethers, high protein binding	Gravimetric and clarifications with aqueous solutions; microbial capture and detection	Laboratory-Filtration; Environmental-Beverage and Water Testing
NC transfer, unsupported	Highest sensitivity, no background, wets out naturally, easily blocked (unlike PVDF)	Nucleic acid and protein detection via Western, Southern, or Northern blotting	Laboratory-Molecular Biology and Diagnostics
NC transfer, supported	High sensitivity, low non-specific binding, internal polyester support for repeated probings	Protein or nucleic acid detection, immunoblotting	Laboratory-Molecular Biology and Diagnostics
NY	Hydrophilic, internally supported, high surface area, high protein binding, low extractables, supported for strength for automated equipment handling	HPLC sample prep, clarify aqueous and organic solvents, alkaline solutions, beverage and pharma processing	Laboratory-Filtration, Analytical, Bioprocessing; Pharmaceutical; Environmental-Beverage Testing
NY-transfer	Higher binding capacity than NC, internally supported, can withstand multiple reprobings	Nucleic acid detection via Southern and Northern blotting	Laboratory-Molecular Biology
PCTE	Hydrophilic, thin, smooth, low protein binding, non-reactive, tightly controlled pore size and air flow	Sterile filtration; DI water filtration, air monitoring, bacterial removal	Laboratory-Diagnostics, and Bioprocessing, Electronics Manufacturing; Industrial Hygiene
PCTE-AOX	Hydrophilic, AOX-certified absorbable organic halogen-free	Groundwater, wastewater testing for organic halides	Environmental-Water Testing
PCTE-PVDF	Hydrophobic, smooth surface allows for rapid cell migration, low extractables, lowest binding	Chemotaxis, cell culture, blood assays, cell growth venting applications	Laboratory-Diagnostics and Bioprocessing
PES	Hydrophilic, low protein binding, high throughput, asymmetric structure	Coarse particulate filtration (large pore), final filtration (small pore), biological sample prep	Environmental-Beverage Testing; Laboratory-Filtration
PETE	Hydrophilic w/no wetting agent, smooth/flat surface, precise pore size, wide solvent and chemical resistance	Trace element and aerosol analysis, batch filtration of aggressive solutions, cell studies, RBC removal from plasma	Laboratory-Diagnostics and Bioprocessing
PVDF	Naturally hydrophobic, unsupported, high sensitivity, low background, broad chemical compatibility	Protein detection via Western blotting, amino acid analysis, protein sequencing, GC sample prep	Laboratory-Molecular Biology and Diagnostics

# About Us

GVS Life Sciences is a fully integrated producer and supplier of membrane-based solutions for the life sciences, environmental monitoring and process filtration markets. Our membranes are used for laboratory research, food and beverage production, medical diagnostics, pharmaceutical research and bio-processing. All of our membranes are manufactured at our facilities in North America, allowing for easy and cost-effective customization. Because we manufacture more types of membranes than any other company, we are able to partner with you for all of your OEM Membrane needs.

## Our History

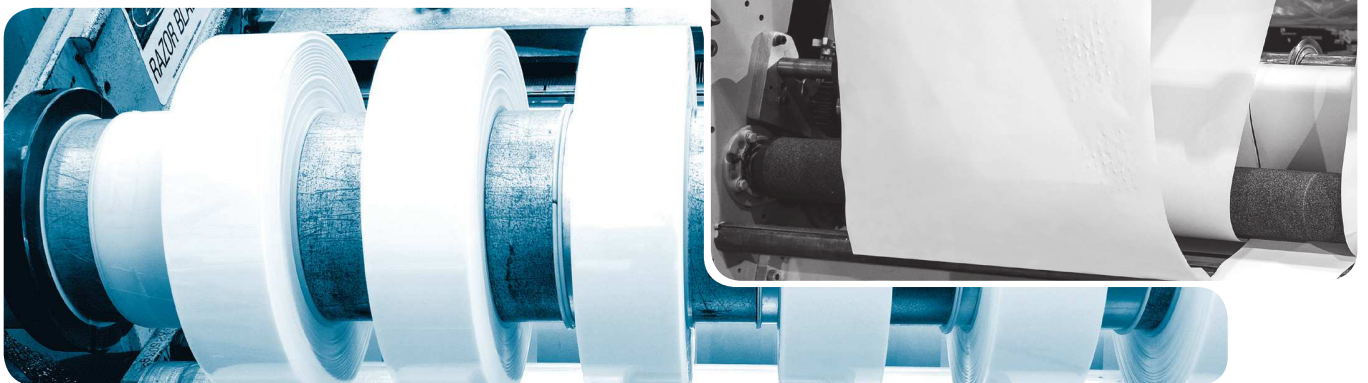
Our roots go back to Schleicher and Schuell Bioscience (S&S), a German-based company with expertise in membrane-based products for life sciences, diagnostics and microbial monitoring. When S&S was acquired by Whatman LLC in 2006, its US operations were moved to a new facility in Sanford, Maine. The state-of-the-art research and manufacturing facility combined expertise in filtration and track etched membranes with the life sciences applications. In 2010, Maine Manufacturing acquired the facility and began building a company dedicated to being the leader for membrane-based products. Over the next four years, through organic growth and strategic acquisitions, the company, now branded as GVS Life Sciences, became a leading OEM supplier, contract manufacturer and finished goods producer of filtration, life sciences and environmental monitoring consumables. We manufacture polyethersulfone (PES), nylon (NY), nitrocellulose (NC), cellulose acetate (CA), polyvinylidene difluoride (PVDF), polycarbonate track etched (PCTE), and polyester track etched (PETE) membranes and are recognized for our quality and responsiveness to our customers. Our focus remains on providing a high level of excellence and service to successfully partner with you.

## Our Facilities & Capabilities

GVS Life Sciences operates in a 90,000 ft<sup>2</sup> state-of-the-art manufacturing facility in Sanford, ME and a 30,000 ft<sup>2</sup> membrane casting facility in Westborough, MA.

- The Massachusetts facility includes five membrane casting lines for CA, PES, PVDF, NC and NY.
- The Maine facility includes several track etched membrane production lines for both PCTE and PETE.
- The Maine facility includes nearly 20,000 ft<sup>2</sup> of clean room for manufacturing space and 4,000 ft<sup>2</sup> of R&D laboratories.
- Our membrane conversion capabilities, including both razor slitters and rotary shears, provide a broad range of standard and custom roll stock slit widths from 0.64 cm (¼ inch) to master rolls up to 79 cm (31 in).

Our expertise and quality control ensure strict adherence to the tight tolerances and performance specifications required for your applications.



## Our Quality & Certifications

- ◆ GVS Life Sciences facilities are registered to the ISO 9001:2008 standard.
- ◆ Manufacturing clean rooms are rated to class 100,000.
- ◆ GVS Life Sciences operates a Quality Management System that ensures lot-to-lot consistency, traceability and full accountability.
  - Each roll stock order comes with a Certificate of Analysis showing the bubble point, flow rate and other specifications as well as the actual data from that lot of material.
- ◆ GVS Life Sciences uses outside laboratories to provide membrane testing to meet FDA regulations and other requirements.
- ◆ Most of our membranes have been tested for biocompatibility, toxicity, extractables and bacterial retention (for 0.22 µm pore sizes).

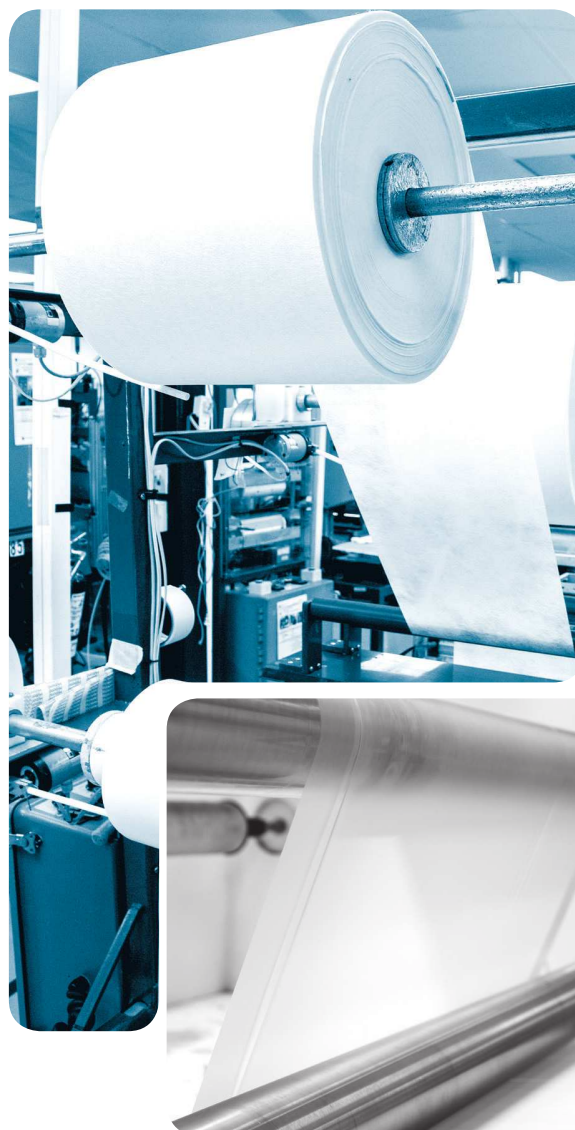
Our facilities have been audited by many of our major customers, and we welcome your visit and audit.

## Our Commitment

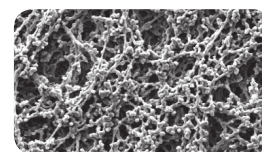
- ◆ **Performance** - GVS Life Sciences membranes have a long history of use in many applications. From development through continuous improvement and investment, we strive to offer membranes that exceed performance specifications.
- ◆ **Consistency** - The GVS Life Sciences Quality Management System ensures adherence to ISO guidelines, providing a quality product with every run, every time. Documentation and support are there to ensure you meet your regulatory and customer requirements. Our commitment to quality and consistency is evidenced by repeat business from many major life science customers.
- ◆ **Support** - A membrane research team of five Ph.D.s and nine engineers provides the expert technical assistance you need to choose the membrane type and dimension to suit your specific applications.
- ◆ **Product Range** - Our seven casting lines combined with the depth of our knowledge make us uniquely qualified in the field of membrane-based life science solutions.

- ◆ **Flexibility/customization** - Our in-house casting capabilities combined with our conversion facilities allow us to customize almost any offering.
- ◆ **Efficiency** - GVS Life Sciences is a nimble and efficient company with low overhead and administrative burdens. Our size and structure help us to control costs and provide you direct access to the decision-makers and technical experts.

**We're here for you at every step. Please feel free to contact us at any time for more information: [info@gvslifesci.com](mailto:info@gvslifesci.com), Customer Response at 866-736-1250 x1210.**



# Cellulose Acetate (CA) Filtration Membrane



## Description

GVS Life Sciences Cellulose Acetate (CA) Filtration Membrane is a supported, hydrophilic membrane that exhibits naturally low protein binding. Composed of cellulose acetate internally supported by an inert polyester web, the resulting membrane has dimensional stability. This provides higher throughputs than competitor offerings and reduces the amount of filter changes needed during filtration of proteinaceous solutions. It is ideal for use in filtration applications where maximal recovery of protein is critical.

GVS Life Sciences CA Membrane is available in roll widths from 25 mm (1 in) to 30 cm (12 in), as well as in sheets and disks that can be customized to meet your application and size requirements.

## Features & Benefits

- Superior strength to withstand aggressive handling or use with automated equipment without breaking or tearing
- Low protein binding (BSA binding capacity of 3.8 µg/cm<sup>2</sup>) minimizes retention of proteins in solution
- Low extractables ensure tests will be clean with consistent results
- Lot-to-lot consistency ensures consistent flow and diffusion rates for dependable results every time

- Non-lysing of cells prevents contamination of critical solutions
- Passes USP Class VI Toxicity testing, ensuring suitability for use in medical devices
- The materials in this membrane are FDA approved for food contact under the applicable regulations in 21 CFR

## Product Characteristics

- Hydrophilic
- Thermally stable with a maximum operating temperature of 274°F (135°C)
- Autoclavable
- Broad sealing compatibility, including ultrasonic, heat, radio frequency and insert molding

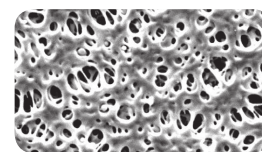
## Typical Applications

- Protein and enzyme filtration
- Biological fluid sterilization
- Tissue culture media sterilization
- Cold sterilization
- Wine filtration
- Prefiltration of plasma fractions and vaccines

## Specifications

Pore Size	Flow Time (secs)	Volume / Vacuum (mls / in Hg)	Flow Rate (ml / min / cm <sup>2</sup> @10psi)	Bubble Point (psi)	Thickness
0.22 µm	70-155	250/20	22.72-10.60	50-72	65-110 µm
0.45 µm	20-49	250/20	79.53-32.46	30-45	65-110 µm
0.65 µm	15-40	250/20	105.04-39.77	18-32	65-110 µm
0.8 µm	13-36	250/20	122.36-44.18	14-28	65-110 µm
1.2 µm	40-248	500/5	318-51	11-22	65-110 µm
5.0 µm	23-59	500/5	553-216	6-16	65-110 µm
10.0 µm	16-38	500/5	795-335	5-11	65-130 µm
20.0 µm	6-30	500/5	2545-424	3-10	65-130 µm

# Polyethersulfone (PES) Filtration Membrane



## Description

GVS Life Sciences Polyethersulfone (PES) Filtration Membrane is naturally hydrophilic, has low extractables and is cast from pure polyethersulfone polymer. This strong, microporous membrane is constructed from a high-temperature polyethersulfone polymer that is acid and base resistant. Its strength and durability are advantageous during usage that involves aggressive handling or automated equipment. It is designed to remove particulates during general filtration, and its low protein and drug binding characteristics make it ideally suited for use in life sciences applications.

GVS Life Sciences PES Filtration Membrane is available in roll widths from 1.27 cm (0.5 in) to 79 cm (31 in), as well as in cut sheets and disks that can be customized to meet your application and size requirements.

## Features & Benefits

- Low extractables ensure clean results
- Low drug and protein binding maximize sample recovery
- Superior burst strength protects integrity of membrane under high pressures

- Lot-to-lot consistency for reproducible results every time
- Endotoxin and USP Class VI test results ensure membrane is suitable for use in medical devices
- The materials in this membrane are FDA approved for food contact under the applicable regulations in 21 CFR

## Product Characteristics

- Hydrophilic
- Maximum operating temperature: 266°F (130°C)
- Autoclavable
- Broad sealing compatibility, including ultrasonic, heat, radio frequency and insert molding

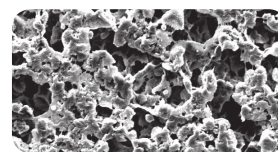
## Typical Applications

- Protein and enzyme filtration and sterilization
- Biological fluid filtration and sterilization
- Pharmaceutical sterilization
- Environmental water studies
- Coarse particulate filtration (large pore)
- Clarification and final filtration (small pore)

## Specifications

Pore Size	Flow Time (secs)	Volume / Vacuum (mls / in Hg)	Flow Rate (ml / min / cm <sup>2</sup> @10psi)	Bubble Point (psi)	Thickness
0.03 µm	200-500	250/20	7.95-3.18	90-110	110-150 µm
0.1 µm	100-200	250/20	15.91-7.95	70-90	110-150 µm
0.22 µm	35-70	250/20	45.45-22.72	50-70	110-150 µm
0.45 µm	20-40	250/20	79.53-39.77	35-50	110-150 µm
0.65 µm	12-25	250/20	132.55-63.63	21-32	110-150 µm
0.8 µm	80-160	500/5	159-80	13-28	110-150 µm
1.2 µm	65-130	500/5	196-98	11-22	110-150 µm
5.0 µm	50-100	500/5	255-127	6-13	110-150 µm

# Nylon (NY) Membrane



## Description

GVS Life Sciences Nylon (NY) Membrane is a supported, naturally hydrophilic membrane designed to wet out evenly and retain its superior strength during use in general filtration or medical assays. The membrane is internally supported with an inert polyester support web, giving it added dimensional strength and stability that prevents cracking, tearing, curling and breaking. This is advantageous during usage that involves aggressive handling or automated equipment. GVS Life Sciences NY Membrane is produced in filtration and hybridization grades to specifications optimized for those particular applications.

GVS Life Sciences NY Membrane is available in roll widths of 1.27 cm (0.5 in) to 33 cm (13 in), as well as in cut sheets and disks that can be customized to meet your application and size requirements.

## Features & Benefits

- Superior strength for easy handling
- Lot-to-lot consistency provides reproducible results every time
- Passes USP Class VI toxicity testing, for use in medical devices

## NY Filtration Membrane

### Typical Applications

- Sterilization and clarification of aqueous, alkaline and organic solvent solutions
- HPLC sample preparation
- Beverage and pharma processing

### Specifications

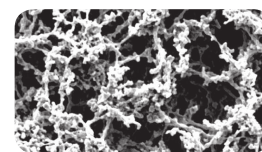
Pore Size	Flow Time (secs)	Volume / Vacuum (mls / in Hg)	Flow Rate (ml / min / cm <sup>2</sup> @10psi)	Bubble Point (psi)	Thickness
0.1 µm	300-553	250/20	5.30-2.88	70-100	65-130 µm
0.22 µm	113-255	250/20	14.08-6.24	50-72	65-130 µm
0.45 µm	44-84	250/20	36.15-18.94	30-45	65-130 µm
0.65 µm	18-48	250/20	88.37-33.14	18-32	65-130 µm
0.8 µm	13-37	250/20	122.36-43.99	13-28	65-130 µm
1.2 µm	40-248	500/5	318-51	11-22	65-130 µm
5.0 µm	28-57	500/5	454-223	6-13	65-130 µm
10.0 µm	16-38	500/5	795-335	5-11	65-130 µm
20.0 µm	6-30	500/5	2545-424	3-10	65-130 µm

- High nucleic acid binding capacity of 350-450 µg/cm<sup>2</sup> makes this membrane suitable for molecular biology applications and allows binding of a broad range of nucleic acid fragment sizes (75 bp - 50 kbp)
- Low extractables ensure clean results
- The materials in this membrane are FDA compliant for food contact under the applicable regulations in 21 CFR

### Product Characteristics

- Hydrophilic
- Maximum operating temperature: 356°F (180°C)
- Autoclavable
- Broad sealing compatibility, including ultrasonic, heat, radio frequency and insert molding





## Neutral Nylon Molecular Transfer (Blotting) Membrane

### Description

GVS Life Sciences Neutral Nylon Molecular Transfer Membrane is a pure polymer cast on an inert polyester web.

### Typical Applications

- ◆ Southern and Northern blots (nucleic acids)
- ◆ Microarrays
- ◆ Macroarrays
- ◆ Dot/slot blots
- ◆ Radiolabeled detection systems
- ◆ Non-radiolabeled detection systems
- ◆ Colony lifts
- ◆ Plaque lifts
- ◆ Library screening

### Specifications

Pore Size	Part Number	Flow Time (secs)	Volume / Vacuum (mls / in Hg)	Flow Rate (ml / min / cm <sup>2</sup> @10psi)	Bubble Point (psi)	Thickness
0.1 µm	1211763	300-580	250/20	5.30-2.74	70-100	140-190 µm
0.22 µm	1211773	113-277	250/20	14.08-5.74	40-68	140-190 µm
0.45 µm	1211782	65 205	250/20	24.47-7.76	32-57	140-190 µm
0.6 µm	1228309	18-48	250/20	88.37-33.14	>19	125-175 µm

## Reprobing, Positively Charged NY Molecular Transfer (Blotting) Membrane

### Description

This NY Molecular Transfer Membrane variation is an inherently charged nylon membrane, specifically designed to allow for numerous reproblings. GVS Life Sciences reprobing, positively charged NY membrane has been tested to provide consistent results through 12 or more reproblings.

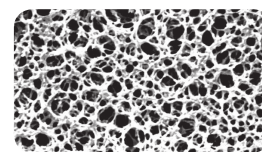
### Typical Applications

- ◆ Radiolabeled and non-radiolabeled detection systems
- ◆ Northern and Southern blots (nucleic acids)
- ◆ Multiple reproblings
- ◆ Alkaline transfers
- ◆ DNA fingerprinting
- ◆ UV crosslinking

### Specifications

Pore Size	Part Number	Flow Time (secs)	Volume / Vacuum (mls / in Hg)	Flow Rate (ml / min / cm <sup>2</sup> @10psi)	Bubble Point (psi)	Thickness
0.45 µm	1220976	20-75	250/20	79.53-21.21	14-20	120-190 µm

# Nitrocellulose (NC) Membrane



## Description

GVS Life Sciences Nitrocellulose (NC) Membrane is produced as an unsupported filtration membrane and as a supported or unsupported molecular transfer membrane for bio-analyses. Specifications for each type of NC membrane are optimized for its specific application.

NC membranes are naturally hydrophilic with a rapid flow rate and high throughput, which makes them ideal for use in diagnostic and filtration kit manufacturing applications. These membranes are composed of a mixture of inert cellulose nitrate and cellulose acetate polymers. For gravimetric analysis using ashing techniques, NC Membranes from GVS Life Sciences yield a residue of less than 0.045% of their initial weight. For food and beverage and other microbiological applications, NC membranes are available with a black dye to increase optical contrast.

GVS Life Sciences NC Filtration Membrane is available in roll widths from 25 mm (1 in) to 11 cm (31 in), as well as in cut sheets and disks that can be customized to meet your application and size requirements.

## NC Filtration Membrane

### Typical Applications

- Air monitoring
- Aqueous filtration
- Sterility testing
- Gravimetric analysis with ashing technique
- Microbiological and particulate analysis
- Cytology
- HPLC samples
- Food and beverage (black variation only)

## Features & Benefits

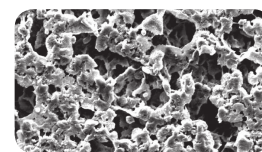
- High flow rate provides faster filtration
- Lot-to-lot consistency for reliable results every time
- Low extractables ensures clean results
- Passes USP Class VI toxicity testing for use in medical devices
- High protein binding makes this membrane suitable for molecular biology applications

## Product Characteristics

- Hydrophilic
- Maximum operating temperature: 356°F (180°C)
- Autoclavable
- Broad sealing compatibility including ultrasonic, heat, radio frequency and insert molding

## Specifications

Pore Size	Flow Time (secs)	Volume / Vacuum (mls / in Hg)	Flow Rate (ml / min / cm <sup>2</sup> @10 psi)	Bubble Point (psi)	Thickness
0.1 µm	198-263	250/20	8.03-6.05	80-110	110-190 µm
0.22 µm	60-136	250/20	26.51-11.70	52-65	110-190 µm
0.45 µm	23-46	250/20	69.16-34.58	30-42	110-190 µm
0.8 µm	5-18	250/20	318.13-88.37	11-19	110-190 µm
1.2 µm	30-80	500/5	424-159	9-18	110-190 µm
5.0 µm	13-36	500/5	979-353	6-15	110-190 µm
8.0 µm	3-25	500/5	4242-509	4-11	110-190 µm



## Unsupported NC Molecular Transfer (Blotting) Membrane

### Typical Applications

- ◆ Western blots (proteins)
- ◆ Protein and immunoblotting
- ◆ Northern and Southern blots (nucleic acids)
- ◆ Dot/slot blots
- ◆ Radiographic, chromogenic and chemiluminescent detection systems

### Specifications

Pore Size	Flow Time (secs)	Volume / Vacuum (mls / in Hg)	Flow Rate (ml / min / cm <sup>2</sup> @10psi)	Bubble Point (psi)	Thickness
0.22 μm	80-160	250/20	19.88-9.94	60-80	110-190 μm
0.45 μm	60-130	250/20	26.51-12.24	45-65	110-190 μm

## Supported NC Molecular Transfer (Blotting) Membrane

### Description

This variation of molecular transfer NC is cast on a polyester web to provide increased strength while retaining the binding characteristics of traditional NC. Supported NC may be substituted for unsupported NC without requiring any change of protocol.

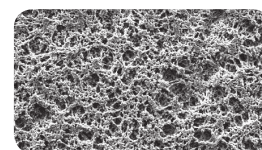
### Typical Applications

- ◆ Western blots (proteins)
- ◆ Northern and Southern Blots (nucleic acids)
- ◆ Multiple rehybridizations
- ◆ Colony/plaque lifts
- ◆ Dot/slot blots
- ◆ Radiographic detection systems
- ◆ Chemiluminescent detection systems
- ◆ Biotinylated detection systems

### Specifications

Pore Size	Flow Time (secs)	Volume / Vacuum (mls / in Hg)	Flow Rate (ml / min / cm <sup>2</sup> @10psi)	Bubble Point (psi)	Thickness
0.22 μm	70-150	250/20	22.72-10.60	50-75	100-140 μm
0.45 μm	50-130	250/20	31.81-12.24	30-55	100-130 μm

# Polyvinylidene Difluoride (PVDF) Molecular Transfer (Blotting) Membrane



## Description

GVS Life Sciences Polyvinylidene Difluoride (PVDF) Molecular Transfer Membrane is a naturally hydrophobic unsupported hybridization membrane. It has a high binding capacity and low backgrounds and is ideal for use in protein binding applications such as Western blots, solid phase assays and immunoblotting procedures. PVDF ensures reproducible results with maximum sensitivity. Proteins can be electroblotted from a variety of gel matrices. In addition, PVDF membrane will not degrade, distort or shrink when using a high concentration of methanol for destaining. The exceptional tensile strength allows for easy removal of target bands without concern for the membrane tearing, fracturing or curling.

GVS Life Sciences PVDF Transfer Membrane is available in roll widths from 25 mm (1.0 in) to 30 cm (12 in), as well as in sheets and cut disks that can be customized to meet your application and size requirements.

## Features & Benefits

- Broad chemical compatibility allows for the use of all commonly used stains
- Low backgrounds ensure the highest sensitivities across a broad range of molecular weights

- High sensitivity provides detection of low-level proteins
- High protein binding capacity (125 µg/cm<sup>2</sup> for immunoglobulins) allows capture of proteins across a broad range of concentrations
- Strong binding affinity prevents protein from passing through the membrane
- Strict quality control prevents signal variation across membrane lots
- Superior strength prevents distortion and breaking with aggressive handling and processing

## Product Characteristics

- Hydrophobic
- Durable

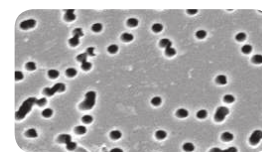
## Typical Applications

- Western blots (protein)
- Protein sequencing
- Amino acid analysis
- Dot/slot blots

## Specifications

Low backgrounds ensure	Flow Time (secs)	Volume / Vacuum (mls / in Hg)	Flow Rate (ml/min/cm <sup>2</sup> @10psi)	Bubble Point (psi)	Thickness
0.22 µm	100-500	250/20	15.91-318	40-60	140-250 µm
0.45 µm	35-200	250/20	45.45-7.95	25-40	140-250 µm

# Polycarbonate Track Etched (PCTE) Membrane



## Description

GVS Life Sciences Polycarbonate Track Etched (PCTE) Membrane is made from a thin polycarbonate film with precisely defined pores. It is ideally suited for use in cellular-based filtration assays as well as filtration applications where high purity is required. The membrane is produced through a two-step, proprietary manufacturing process that employs high quality standards. In the first step, polycarbonate film is exposed to ion particles that pass through it. As the ions pass through the film, they create “tracks” where the polymer is damaged. The beamed film is then exposed to a chemical that etches out the tracks creating precise, cylindrical pores. Pore density is controlled by the number of tracks per unit area, and pore size is controlled by varying the temperature, strength and time of exposure to the etching solution. This unique process allows for increased control over pore size and density to ensure the physical properties of each membrane precisely fit your specifications. The resulting membrane is a thin, translucent polycarbonate film with a smooth, flat surface. All particles larger than the pore size are captured on its surface.

To optimize the suitability of PCTE, we offer a variety of products with unique characteristics:

- PVP (polyvinylpyrrolidone)-treated for a hydrophilic membrane
- AOX-certified for applications requiring extremely low extractables
- Black-dyed membrane for staining applications
- PVP-free for a hydrophobic membrane

GVS Life Sciences PCTE Membrane is available in roll widths from 6.35 mm (0.25 in) to 51 cm (20 in) as well as in sheets and cut disks that can be customized to meet your application and size requirements.

## Features & Benefits (of all PCTE variations)

- Absolute pore size and density allows for precise size separation
- Direct thickness and pore size measurements provide accurate characteristics
- Smooth, thin, glass-like surface is suitable for microscopy and cellular applications
- Superior strength allows for aggressive handling
- Low protein binding ensures clean results
- Resists chemical staining to ease microscopic visualization
- Passes USP VI Class toxicity testing for use in medical devices
- Low cytotoxicity offers biocompatibility

## Product Characteristics (of all PCTE variations)

- Membrane thickness 5-12  $\mu\text{m}$
- Maximum operation temperature: 284°F (140°C)
- Autoclavable
- Broad sealing compatibility including ultrasonic, heat, radio frequency and insert molding

## PCTE PVP-Treated (Hydrophilic)

### Typical Applications

- General filtration
- Removal of red blood cells from plasma
- Flow control of reagents through assays
- Precise filtration and prefiltration
- Fuel testing
- Cytology
- Microscopy

## Polycarbonate Track Etched (PCTE) Membrane *Continued*

### PCTE AOX (Hydrophilic)

#### Description

GVS Life Sciences PCTE AOX-certified membrane is made from the same thin, microporous polycarbonate film that is the base for our standard PCTE products. AOX-certified membrane is further tested to provide a PCTE membrane with the level of trace volatile, chlorinated organics in the base film at or below 0.03 µg/cm (or 0.15 µg for a 25 mm membrane) by EPA method 8010. It is ideally suited for use in groundwater and wastewater testing to determine the level of organic halides. Halide levels are often regulated and their presence is frequently used as a pollution indicator.

#### Features & Benefits

- ◆ AOX-certified for halide measurement using regulated tests
- ◆ Low levels of trace volatile, chlorinated organics eliminates interference with result

#### Typical Applications

- ◆ Groundwater testing
- ◆ Wastewater testing
- ◆ Food and dairy testing

### PCTE Black (Hydrophilic)

#### Description

GVS Life Sciences PCTE Membrane is available with a black surface for staining applications. Treatment of GVS Life Sciences PCTE with a proprietary black dye makes this membrane appear dark gray. The membrane exhibits essentially no autofluorescence and is ideal for direct microscopy applications.

#### Typical Applications

- ◆ Epifluorescence
- ◆ Observation of microorganisms
- ◆ Direct counting of microorganisms
- ◆ Water testing

#### Features & Benefits

- ◆ Smooth, thin, glass-like surface ensures no microorganisms are caught within the filter structure
- ◆ Microorganisms are retained on one plane allowing for easy microscopic visualization
- ◆ Lack of staining, negligible autofluorescence and non-specific absorption ensures low backgrounds

#### Product Characteristics

- ◆ Hydrophilic
- ◆ Dark gray
- ◆ Similar characteristics, except for transparency, as standard PCTE membrane

### PCTE PVP-Free (Hydrophobic)

#### Description

GVS Life Sciences PCTE Membrane is also available as a hydrophobic membrane ideally suited for cellular assays, bioprocessing and diagnostics. This membrane is not treated with PVP, so it retains its natural hydrophobicity. Other characteristics and specifications are similar to those of the PCTE membrane.

#### Features & Benefits

- ◆ Naturally hydrophobic

#### Product Characteristics

- ◆ Hydrophobic

#### Typical Applications

- ◆ Cellular assays
- ◆ Tissue culture
- ◆ Chemotaxis
- ◆ Diagnostics

## Polycarbonate Track Etched (PCTE) Membrane *Continued*

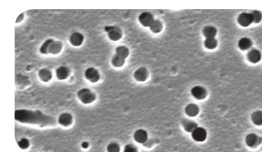
### Typical Specifications (all PCTE variations)

Pore Size Minimum	Pore Size Maximum	Pore Density (pores / cm <sup>2</sup> )	Minimum Air Flow Rates @ 10 psi (l / min / cm <sup>2</sup> )	Target Water Flow Rates @ 10 psi (ml / min / cm <sup>2</sup> )	Minimum Bubble Point (psi)
0.008* μm	0.010* μm	6.0 x 10 <sup>8</sup>	0.008	NA	NA
0.024* μm	0.030 μm	6 x 10 <sup>8</sup>	0.08	NA	NA
0.04* μm	0.050* μm	6 x 10 <sup>8</sup>	0.4	0.4	50
0.064 μm	0.080 μm	4 x 10 <sup>8</sup>	0.8	0.6	38
0.08 μm	0.1 μm	4 x 10 <sup>8</sup>	1.6	2.5	30
0.16 μm	0.20 μm	3 x 10 <sup>8</sup>	3	10	20
0.32 μm	0.40 μm	1 x 10 <sup>8</sup>	7.5	33	12
0.36 μm	0.45 μm	7 x 10 <sup>7</sup>	8	40	11
0.48 μm	0.6 μm	3 x 10 <sup>7</sup>	7.5	60	9
0.64 μm	0.8 μm	3 x 10 <sup>7</sup>	18	90	7
0.8 μm	1.0 μm	2 x 10 <sup>7</sup>	20	130	6
1.6 μm	2.0 μm	2 x 10 <sup>6</sup>	16.5**	200	3
2.4 μm	3.0 μm	2 x 10 <sup>6</sup>	37.5**	440	2
4.0 μm	5.0 μm	4 x 10 <sup>5</sup>	30**	700	1.2
6.4 μm	8.0 μm	1 x 10 <sup>5</sup>	30**	1000	0.7
9.0 μm	10.0 μm	1 x 10 <sup>5</sup>	34.5**	1150	0.5
11.0 μm	12.0 μm	1 x 10 <sup>5</sup>	64**	1250	0.4
13.0 μm	14.0 μm	5 x 10 <sup>4</sup>	64**	1400	0.2
15.0 μm	16.0 μm	4 x 10 <sup>4</sup>	12**	NA	NA
17.0 μm	18.0 μm	4 x 10 <sup>4</sup>	12**	NA	NA
19.0 μm	20.0 μm	4 x 10 <sup>4</sup>	12**	NA	NA

\*Reference use only

\*\* Air flow @ 5 psi

# Polyester (PETE) Track Etched Membrane



## Description

GVS Life Sciences PETE Membrane is made from a thin polyester film with a high density of solvent resistance. It is ideal for use in blood assays or general filtration where chemically aggressive solvents may be used. The membrane is produced through a two-step proprietary manufacturing process similar to that of the PCTE membrane. In the first step, polyester film is exposed to ion particles that pass through the film. As the ions pass through the film, they create “tracks” where the polymer is damaged. The beamed film is then exposed to a chemical solution which etches out the tracks creating precise, cylindrical pores. Pore density is controlled by the number of tracks per unit area, and pore size is controlled by varying the temperature, strength and time of exposure to the etching solution. This unique process allows for increased control over pore size and density to ensure the physical properties of each membrane precisely fit your specifications. The resulting membrane is a thin, translucent polyester film with a smooth, flat surface containing pores of controlled diameter and number. The membrane has better solvent resistance than polycarbonate and captures all particles larger than the precisely controlled pore size on its surface.

GVS Life Sciences PETE is available in roll widths from 6.35 mm (0.25 in) to 51 cm (20 in), as well as in sheets and cut disks that can be customized to meet your application and size requirements.

## Typical Applications

- General filtration
- Removal of red blood cells from plasma
- Flow control of reagents through assays
- Precise filtration and prefiltration
- Air analysis
- Filtration of aggressive solutions
- Cellular assays and diagnostics
- Trace element analysis

## Features & Benefits

- Broad range of chemical compatibility for a wide range of applications
- Direct thickness and pore size measurements ensure accurate characteristics
- Naturally hydrophilic so pre-treatments and wetting agents are not required
- Smooth, thin, glass-like surface for microscopic visualization
- Low protein binding ensures clean results

## Product Characteristics

- Membrane thickness: 10-20  $\mu\text{m}$
- Naturally hydrophilic
- Maximum operating temperature: 284°F (140°C)
- Autoclavable
- Broad sealing compatibility including ultrasonic, heat, radio frequency and insert molding

## Typical Specifications

Pore Size Minimum	Pore Size Maximum	Pore Density (pores / $\text{cm}^2$ )	Minimum Air Flow Rates @ 10 psi (l / min / $\text{cm}^2$ )	Target Water Flow Rates @ 10 psi (ml / min / $\text{cm}^2$ )	Minimum Bubble Point (psi)
0.16 $\mu\text{m}$	0.20 $\mu\text{m}$	$3 \times 10^8$	3	10	20
0.32 $\mu\text{m}$	0.40 $\mu\text{m}$	$1 \times 10^8$	7.5	33	12
0.48 $\mu\text{m}$	0.6 $\mu\text{m}$	$3 \times 10^7$	7.5	60	9
0.64 $\mu\text{m}$	0.8 $\mu\text{m}$	$3 \times 10^7$	18	90	7
0.8 $\mu\text{m}$	1.0 $\mu\text{m}$	$2 \times 10^7$	20	130	6
1.6 $\mu\text{m}$	2.0 $\mu\text{m}$	$2 \times 10^6$	16.5*	200	3
2.4 $\mu\text{m}$	3.0 $\mu\text{m}$	$2 \times 10^6$	37.5*	440	2
4.0 $\mu\text{m}$	5.0 $\mu\text{m}$	$4 \times 10^5$	30*	700	1.2
6.4 $\mu\text{m}$	8.0 $\mu\text{m}$	$1.0 \times 10^5$	30*	1000	0.7
9.0 $\mu\text{m}$	10.0 $\mu\text{m}$	$1 \times 10^5$	34.5*	1150	0.5

\*Air flow @ 5 psi



# Selected Products

Cellulose Acetate	Custom widths available: 25 mm (1 in) to 30 cm (12 in) +/- 0.13 mm	
Item Number	Pore Size	Slit Widths
3054597	0.22 µm	25 mm (1.0 in)
3098337	0.45 µm	11cm (4.5 in)
3032542	1.2 µm	38 mm (1.5 in)
3007245	5.0 µm	25 cm (10 in)

Nylon Filtration	Nylon widths available: 1.27 cm (0.5 in) to 33 cm (13 in) +/- 0.13 mm	
Item Number	Pore Size	Slit Widths
3024651	0.03 µm	25 cm (10 in)
3027309	0.1 µm	30 cm (12 in)
3054906	0.2 µm	38 mm (1.5 in)
3053323	0.8 µm	33 mm (1.3 in)
1221147	1.2 µm	64 mm (2.5 in)
3025372	5.0 µm	33 cm (13 in)
1263858	10.0 µm	25 cm (10 in)

Nylon Transfer Membrane		
Item Number	Pore Size	Slit Widths
3057186	0.45 µm	30 cm (12 in)

Nitrocellulose Filtration	Nitrocellulose widths available: 25mm (1 in) to 40 cm (15 in) +/- 0.13 mm	
Item Number	Pore Size	Slit Widths
3053980	0.22 µm	25 mm (1 in)
3055967	0.45 µm	38 cm (15 in)
1215913	3.0 µm	33 cm (13 in)
3034840	5.0 µm	15 cm (6 in)
1268884	8.0 µm	25 mm (1 in)

Nitrocellulose Transfer Membrane		
Item Number	Pore Size	Slit Widths
3048841	0.45 µm	30 cm (12 in)

PCTE Filtration Membrane PVP-Treated	PCTE widths available: 25 mm (1 in) to 50 cm (20 in), +/- 0.4 mm	
Item Number	Pore Size	Slit Widths
1232505	0.01 µm	51 mm (2 in)
1268122	0.03 µm	25 cm (10 in)
3058826	0.1 µm	10 cm (4 in)
1234432	0.4 µm	33 cm (13 in)
1264146	3.0 µm	31 mm (1.13 in)
1240068	12.0 µm	33 cm (13 in)

Black-Dyed, PVP-Treated		
Item Number	Pore Size	Slit Widths
1264414	0.2 µm	20 cm (7.87 in)
3020163	0.4 µm	15 cm (5.9 in)
1240031	0.5 µm	30 cm (12 in)

Black Dyed, PVP-Free		
Item Number	Pore Size	Slit Widths
3044624	8.0 µm	28 mm (1.1 in)

PVP-Free Membrane		
Item Number	Pore Size	Slit Widths
1267015	0.2 µm	35 cm (14 in)
3023502	0.4 µm	32 mm (1.3 in)
1225895	3.0 µm	16 cm (6.25 in)
3013822	5 µm	50 cm (20 in)
1231162	12.0 µm	25 mm (1in)

PES Filtration Membrane	Custom widths available: 1 cm (0.39 in) -79 cm (31 in) +/- 0.13 mm	
Item Number	Pore Size	Slit Widths
3049396	0.03 µm	25 cm (10 in)
1236394	0.1 µm	30 cm (12 in)
3099465	0.22 µm	20 cm (8 in)
3061149	0.45 µm	25 mm (1 in)
1229283	0.8 µm	32 mm (1.3 in)
3012607	1.2 µm	79 cm (31 in)
3056057	5 µm	17 cm (6.5 in)

PETE Filtration Membrane	Custom widths available: 1 cm (0.39 in) -79 cm (31 in) +/- 0.13 mm	
Item Number	Pore Size	Slit Widths
1264519	0.2 µm	50 cm (20 in)
3031799	0.4 µm	35 mm (1.38 in)
1262525	1 µm	11 cm (4.5 in)
1262784	3 µm	25 cm (10 in)
1264418	8 µm	50 cm (20 in)

PVDF Transfer Membrane	Custom widths available: 25 mm (1 in) - 30 cm (12 in) +/- 0.13 mm	
Item Number	Pore Size	Slit Widths
3042090	0.22 µm	25 cm (10 in)
3057291	0.45 µm	30 cm (12 in)
3055673	5 µm	25 mm (1 in)
1264418	8 µm	50 cm (20 in)

# Chemical Compatibility

Chemical		Membrane						
		CA	NC	NY	PC	PES	PET	PVDF
Acids	Acetic Acid, 5%	R	R	R	R	R	R	R
	Acetic Acid, 10%	N	N	L	R	R	R	R
	Acetic Acid, Glacial	N	N	N	L	R	R	R
	Boric Acid	R	R	L	R	T	R	R
	Hydrochloric, 6N	L	N	N	R	R	L	R
	Hydrochloric, Conc.	N	N	N	R	R	N	R
	Hydrofluoric, 10%	N	N	N	R	T	R	R
	Hydrofluoric, 35%	N	N	N	R	T	R	R
	Nitric Acid, 6N	L	R	N	R	N	R	R
	Nitric Acid, Conc.	N	N	N	R	N	N	L
	Sulfuric Acid, 6N	L	R	N	R	T	R	R
	Sulfuric Acid, Conc.	N	N	N	N	N	N	R
Alcohols	Amyl Alcohol	R	N	R	R	N	R	R
	Benzyl Alcohol	L	R	L	L	N	R	R
	Butyl Alcohol	R	R	R	R	R	R	R
	Butyl Cellosolve	L	N	R	L	T	R	R
	Ethyl Alcohol <80%	R	R	R	R	R	R	R
	Ethyl Alcohol >80%	R	L	R	R	R	R	R
	Ethylene Glycol	R	L	R	R	R	R	R
	Glycerine (Glycerol)	R	R	R	R	R	R	R
	Isobutyl Alcohol	R	R	R	R	T	R	R
	Isopropanol	R	L	R	R	R	R	R
	Methanol	R	N	L	R	R	R	R
	Methyl Cellosolve	L	L	R	N	T	R	R
	Propanol	R	R	R	R	T	R	R
	Bases	Ammonium Hydroxide, 6N	N	N	N	N	R	L
Potassium Hydroxide, 6N		N	N	R	N	T	N	R
Sodium Hydroxide, 6N		N	N	N	N	R	L	R
Solvents	Acetone	N	N	R	L	N	R	L
	Acetonitrile	N	N	R	L	R	R	R
	Amyl Acetate	L	N	R	R	L	R	R
	Aniline	N	N	R	N	R	R	R
	Benzene	L	R	R	L	R	R	R
	Bromoform	N	R	R	N	T	R	T
	Butyl Acetate	L	N	R	R	L	R	L
	Carbon Tetrachloride	L	R	R	L	R	R	R
	Cellosolve	R	N	R	R	T	R	L
	Chloroform	N	R	R	N	N	R	R

## Chemical Compatibility *Continued*

	Chemical	Membrane						
		CA	NC	NY	PC	PES	PET	PVDF
	Cyclohexanone	N	N	R	L	N	R	N
	Diethyl Acetamide	N	N	R	L	T	R	R
	Dimethyl Formamide	N	N	R	N	N	R	N
	Dimethyl Sulfoxide (DMSO)	N	N	R	N	N	R	R
	Dioxane	N	N	R	N	L	R	L
	Ethyl Ether	L	L	R	R	R	R	R
	Ethylene Dichloride	L	L	R	N	T	R	R
	Formaldehyde	L	N	R	R	R	R	R
	Freon TF	R	R	R	R	R	R	R
	Gasoline	R	R	R	R	T	R	R
	Hexane	R	R	R	R	T	R	R
	Isopropyl Acetate	N	N	R	R	T	R	N
	Kerosene	R	R	R	R	T	R	R
	Methyl Acetate	N	N	R	N	T	R	L
	Methyl Ethyl Ketone (MEK)	N	N	R	L	N	R	L
	Methyl Isobutyl Ketone	N	N	R	L	T	T	N
	Methylene Chloride	N	N	L	N	N	R	L
	Nitrobenzene	N	N	R	N	N	R	L
	Pentane	R	R	R	R	R	R	R
	Perchloroethylene	R	R	R	R	N	T	R
	Pyridine	N	N	R	N	N	R	L
	Tetrahydrofuran	N	N	L	N	N	R	L
	Toluene	L	R	R	L	N	R	R
	Trichloroethane	L	N	R	N	R	T	R
	Trichlorethylene	R	R	R	B	R	R	R
	Triethylamine	R	L	R	L	T	R	R
	Xylene	R	R	R	R	L	R	R
	Cottonseed Oil	R	R	R	R	T	T	R
	Hydrogen Peroxide (30%)	R	R	R	R	T	R	R
	Kodak KMER FTFR	N	N	R	R	T	R	T
	Peanut Oil	R	R	R	R	T	R	R
	Petroleum Oils	T	R	T	R	L	R	R
Miscellaneous	Sesame Oil	R	R	R	R	T	R	R
	Shipley (AS-111,340,1350)	N	N	R	R	T	R	T
	Silicone Oils	R	R	R	R	R	R	R
	Turpentine	R	R	R	R	T	R	R

### Key

R= Recommended

L= Limited Resistance (testing before use is recommended)

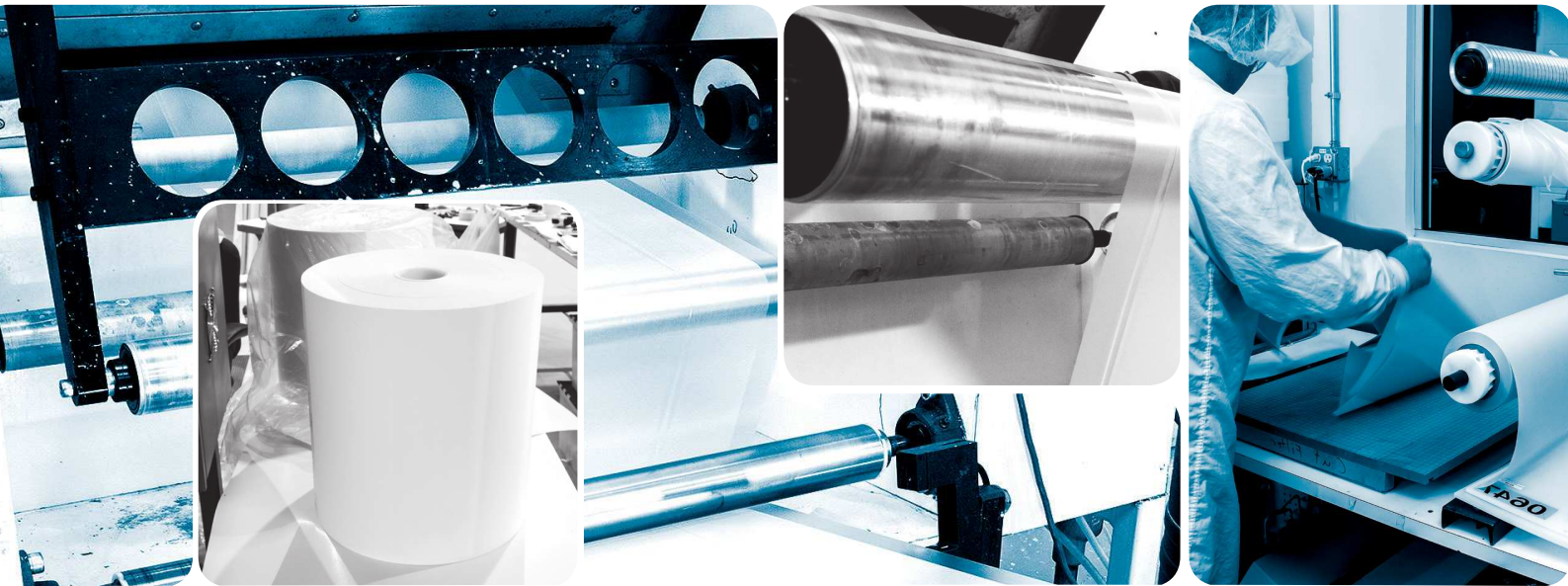
N= Not Recommended

T= Not Tested



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