

## MICROFILTRATION AND ULTRAFILTRATION MEMBRANE AND FILTER SELECTION

Membrane Type	Application
<b>Regenerated Cellulose (RC)</b>	Regenerated cellulose is a hydrophilic, solvent resistant, low protein binding membrane. RC membrane is ideal for removing particulates from HPLC samples, prior to injection. This membrane is compatible with all HPLC solvents, and can be utilized for particle removal and de-gassing of these solvents. RC membranes are also compatible with aqueous solution in the pH range 3 to 12. Extractables with water are less than 1%. Regenerated Cellulose membranes exhibit low non-specific adsorption, thus they are well suited for filtration of biological samples, where maximum recovery of protein is important.
<b>Cellulose Acetate (CA)</b>	Cellulose Acetate is a very low protein binding membrane that is ideal for aqueous based samples. CA membranes are an excellent choice when maximum recovery in the filtrate is critical. Laboratory studies show that CA membranes bind less protein than PVDF or Polysulfone membranes. When used with a glass pre-filter in the same housing, these membranes are ideal for filtration of tissue culture media and sensitive biological samples. The pre-filter increases yield.
<b>Nylon</b>	New low extractable Nylon membranes combine the solvent resistance of Nylon with a membrane that exhibits very low extractable. Nylon is commonly used for general laboratory filtration, and filtration of HPLC samples prior to injection. Nylon binds protein, and should not be used when maximum protein recovery is important. Nylon can be sterilized by autoclaving at 120°C, gamma radiation or ethylene oxide.
<b>Polypropylene (PP)</b>	Polypropylene membrane is a hydrophilic membrane that exhibits a wide range of chemical compatibility to organic solvents. PP membranes are a good choice for filtration of HPLC samples when performing protein analysis by chromatography. In addition to being highly solvent resistant, these membranes are low-specific adsorbing membranes, which results in maximum protein recovery for critical analysis. PP membranes are also well suited for biological sample filtration.
<b>PVDF</b>	PVDF (Polyvinylidene difluoride) is a hydrophilic, solvent resistant membrane that exhibits low levels of UV adsorbing extractables. PVDF is useful for HPLC sample filtration, as well as general biological filtration. PVDF is considered to be one of the low protein binding membranes.
<b>Polyethersulfone (PES) Teflon (PTFE)</b>	Polyethersulfone is a hydrophilic membrane with high flow characteristics. PES membranes are moderate protein binding membranes. Solvent resistance is fair. Teflon (Polytetrafluoroethylene) is hydrophobic, and chemically resistant to all solvents, acids and bases. PTFE membrane does not impart any extractables to the filtrate. PTFE is an ideal membrane for transducer protectors since it blocks water vapour. PTFE is ideal for filtering and de-gassing chromatography solvents.

## FILTER HOUSING SELECTION

Housing Type	Application
<b>Modified Acrylic (MA)</b>	Modified Acrylic housings are only to be used with aqueous based samples. Even low concentrations of solvents will destroy Acrylic housings. The modified Acrylic resin used in Hypersil filter housings is USP XXII Class V1 plastics approved, and has passed all tests for cytotoxicity. This ensures that no cytotoxins that could cause cell death will leach from these filter housings. This resin is also gamma radiation resistant and does not discolour when sterilized.
<b>Polypropylene (PP)</b>	Polypropylene housings are solvent resistant and exhibit low extractables. PP housings combined with low extractable Nylon, Regenerated Cellulose, or PTFE membrane are ideal for filtering solvents and samples for chromatography. All PP housings are moulded with FDA approved food contact grade PP resin.

## FILTER MEMBRANE CHEMICAL COMPATIBILITY CHART

Chemical	Nylon	PTFE	PVDF	PS	CA	RC	PP
<b>ACIDS</b>							
Acetic, Glacial	LC	C	C	C	NC	C	C
Acetic, 25%	C	C	C	C	C	C	C
Hydrochloric, Concentrated	NC	C	C	C	NC	NC	C
Hydrochloric, 25%	NC	C	C	C	NC	NC	C
Sulfuric, Concentrated	NC	C	NC	NC	NC	NC	C
Sulfuric, 25%	NC	C	C	C	NC	LC	C
Nitric, Concentrated	NC	C	C	NC	NC	NC	C
Nitric, 25%	NC	C	C	C	NC	NC	C
Phosphoric, 25%	NC	C	ND	ND	C	LC	C
Formic, 25%	NC	C	ND	ND	LC	C	C
Trichloroacetic, 10%	NC	C	ND	ND	C	C	C
<b>ALKALIES</b>							
Ammonium Hydroxide, 25%	C	C	LC	C	C	LC	C
Sodium Hydroxide, 3 Normal	C	C	LC	C	C	LC	C
<b>ALCOHOLS</b>							
Methanol, 98%	C	C	C	C	C	C	C
Ethanol, 98%	C	C	C	C	C	C	C
Ethanol, 70%	LC	C	C	C	LC	C	C
Isopropanol, n-propanol	C	C	C	C	C	C	C
Amyl alcohol, Butanol	C	C	C	C	C	C	C
Benzyl alcohol	C	C	C	ND	LC	C	C
Ethylene glycol	C	C	C	C	C	C	C
Propylene glycol	C	C	C	C	LC	C	C
Glycerol	C	C	C	C	C	C	C
<b>HYDROCARBONS</b>							
Hexane, Xylene	C	C	C	NC	C	C	NC
Toluene, Benzene	C	C	C	NC	C	C	NC
Kerosene, Gasoline	C	C	C	LC	C	C	LC
Tetralin, Decalin	ND	C	C	ND	C	C	ND
<b>HALOGENATED HYDROCARBONS</b>							
Methylene Chloride	LC	C	C	NC	NC	C	LC
Chloroform	C	C	C	NC	NC	C	LC
Trichloroethylene	C	C	C	NC	C	C	LC
Monochlorobenzene, Freon	C	C	C	LC	C	C	C
Carbon Tetrachloride	C	C	C	NC	LC	C	LC
<b>KETONES</b>							
Acetone, Cyclohexanone	C	C	NC	NC	NC	C	C
Methyl Ethyl Ketone	C	C	LC	NC	LC	C	LC
Isopropylacetone	C	C	NC	NC	C	C	ND
Methyl Isobutyl Ketone	ND	C	LC	NC	ND	C	LC
<b>ESTERS</b>							
Ethyl Acetate & Methyl Acetate	C	C	C	NC	NC	C	LC
Amyl, Propyl, & Butyl Acetate	C	C	ND	NC	LC	C	LC

~Continued overleaf~

## FILTER MEMBRANE CHEMICAL COMPATIBILITY CHART

Chemical	Nylon	PTFE	PVDF	PS	CA	RC	PP
<b>ESTERS</b>							
Propylene Glycol Acetate	ND	C	ND	NC	NC	C	C
2-Ethoxyethyl Acetate	ND	C	ND	NC	LC	C	ND
Methyl Cellosolve Acetate	ND	C	ND	NC	NC	C	C
Benzyl Benzoate	C	C	ND	NC	C	C	ND
Isopropyl Myristate	C	C	ND	NC	C	C	ND
Tricresyl Phosphate	ND	C	ND	NC	C	C	ND
<b>OXIDES-ETHERS</b>							
Ethyl Ether	C	C	C	C	C	C	LC
Dioxan & Tetrahydrofuran	C	C	LC	NC	NC	C	C
Dimethylsulfoxide (DMSO)	C	C	NC	NC	NC	C	C
Isopropyl Ether	ND	C	C	C	C	C	C
<b>SOLVENT WITH NITROGEN</b>							
Dimethyl Formamide	LC	C	NC	NC	NC	LC	C
Diethylacetamide	C	C	ND	ND	NC	C	ND
Triethanolamine	C	C	ND	ND	C	C	ND
Aniline	ND	C	ND	ND	NC	C	ND
Pyridine	C	C	C	NC	NC	C	LC
Acetonitrile	C	C	C	NC	NC	C	LC
<b>MISCELLANEOUS</b>							
Phenol, Aqueous, 10%	ND	C	LC	NC	NC	NC	C
Formaldehyde Solution, 30%	C	C	C	C	C	LC	C
Hydrogen Peroxide, 30%	C	C	ND	ND	C	C	ND
Silicone Oil & Mineral Oil	ND	C	C	C	C	C	C
Pyridine	C	C	C	NC	NC	C	LC

C = Compatible LC = Limited Compatibility—Membrane Swells and Shrinks NC = Not Compatible ND = No Data Available  
 PTFE = \*Teflon® PVDF = Polyvinylidene Difluoride PS = Polysulfone RC = Regenerated Cellulose PP = Polypropylene  
 \*Teflon® is a registered trademark of E.I.Du Pont de Nemours Co.

## MICROFILTRATION GUIDE

Application	Membrane	Application notes
CHROMATOGRAPHY SAMPLES	0.45µ Nylon 66 or 0.45µ RC	For general filtration of chromatography samples prior to injection. Removal of particulates from samples is important to prevent blockage or damage to instruments. Both Nylon 66 and RC have good solvent resistance and exhibit low extractables. Use with a pre-filter when samples contain large amounts or particulates.
SOLVENT FILTRATION AND DEGASSING VENTING, AND TRANSDUCING PROTECTION	1.0µ, 0.45µ or 0.2µ PTFE	PTFE membranes are resistant to all solvents and acids. This membrane is ideal for filtration and degassing of chromatography solvents. For sterile venting use 0.2µ pore size, and for transducer protection or air/gas filtration use 1.0µ or 0.45µ PTFE.