



CHROMATOGRAPHIC SPECIALTIES INC.

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Technical Note CS35

Guide to Syringe Filter Selection

Proper filtration of samples removes unwanted particulate that could cause damage not only to the analytical column but to valuable instrumentation. Syringe filters are disposable filtration devices that consist of a membrane integrally sealed into a polymeric housing with fittings that connect the filter to a syringe or tubing. Contaminants which are larger than the pore size are trapped on the surface of the membrane; any particulate smaller than the pore size passes through. Glass pre-filters which are placed upstream of the membrane can extend the life and loading capacity of a membrane filter by removing larger particulate that would tend to clog the membrane.

Selecting the correct filter for an application depends on the conditions and objectives of the analysis.

Step 1 Determine Your Filtering Needs

The first step is to determine the amount of filtration required by determining particle retention efficiency. The pore size of a filter is defined as the diameter of the particle size that can be retained by the membrane; anything smaller than the specified pore size will pass through the membrane. Nominal or absolute are pore size ratings that refer to the size of a specific particle that can be retained. A nominal pore size rating refers to a filter's ability to retain 60-98% of the specified particle size. The percentage retained is dependent on the process conditions. Sample concentration and operating pressure all have an effect on the amount of particulate retained. An absolute pore size rating indicates that the filter can retain 100% of the specified particle size under specific conditions such as pressure, test organisms, concentration and method of detection.

Pore Sizes - Suggested Applications

0.2 micron	Remove fine particles from solution; and sterile venting
0.45 micron	Sample clarification of chromatography samples
1.0 micron +	Coarse particulate removal or processing viscous samples

Tech Tip: Difficult to filter solutions may require the use of a larger diameter syringe filter or a syringe filter with a 1.0 micron glass pre-filter to prevent membrane plugging



Step 2 Determination of Membrane Type

In determining which membrane to use, chemical resistance and wet strength should be considered.

Nylon is a general purpose membrane for general laboratory filtration and HPLC sample filtration. Nylon is hydrophilic and suitable for aqueous samples. This membrane has limited chemical resistance to acids and bases and tends to bind proteins, making it unsuitable for applications where protein recovery is critical.

Polytetrafluoroethylene (PTFE) is hydrophobic and chemically resistant to most solvents, acid and bases. This membrane does not impart any extractables into the filtrate. Since this membrane is hydrophobic, it blocks water vapors, making it ideal for transducer protectors and HPLC solvent filtration.

Polyvinylidene Difluoride (PVDF) is a hydrophilic, solvent resistant membrane that exhibits low levels of UV absorbing extractables. PVDF is also a low binding membrane which makes it ideal for HPLC sample filtration and general biological filtration.

Cellulose Acetate is a very low protein binding membrane for aqueous based samples. These membranes are the best choice when maximum protein recovery is required. When used with a glass pre-filter, cellulose acetate is ideal for tissue culture media filtration and biological samples.

Polypropylene is a hydrophilic membrane that exhibits a wide range of chemical compatibility for organic solvents. This membrane is low protein binding and suitable for general biological and HPLC filtration.

Polyethersulfone is a durable membrane with high temperature resistance and good chemical compatibility. This membrane is also low protein binding and suitable for the filtration of biological solutions where protein loss is critical.

Regenerated Cellulose is a hydrophilic, solvent resistant, low protein binding membrane which is suitable for removing particulates from HPLC solvents. This type of membrane is also compatible with aqueous solutions with a pH range from 3-12. Regenerated cellulose membranes exhibit low, non-specific absorption and are good for biological sample filtration. If used in combination with a glass prefilter, this filter is also ideal for tissue culture media filtration and general biological filtration.

Step 3 Determine the Syringe Filter Size

The diameter of the syringe filter that you choose is dependent on the sample volume to be filtered.

4 mm	For sample volumes up to 1 mL
13 mm	For sample volumes ranging from 1-10 mL
17 mm	For sample volumes up to 30 mL
25 mm	For sample volumes ranging from 10-100 mL
30 mm	For sample volumes up to 150 mL

For assistance in selecting the best filtration product for your particular application, contact our Technical Support Team at 1-800-267-8103 or by email at tech@chromspec.com. Be sure to ask about the availability of samples.