Choosing a filter doesn't have to be complicated.

Corning has simplified the process. Just follow these four easy steps:

Step 1: Match your application with the best pore size.

Step 2: Select the best membrane and housing material for your application.

- Filter membrane characteristics
- Filter housing characteristics
- Chemical compatibility

Step 3: Select the correct membrane diameter to optimize flow rate and throughput.

Step 4: Choose the best filter design for your application.

- Disposable syringe/disc filters
- Disposable plastic vacuum filters
- Reusable glass vacuum filters
- Spin-X® disposable centrifuge filters

Using a filter should not be difficult either.

Corning has included helpful hints to help you improve your filter performance:

- Effect of pore size
- Effect of membrane area
- Effect of temperature
- Effect of prefiltration
- Effect of pressure differential
- Safety Precautions
- References

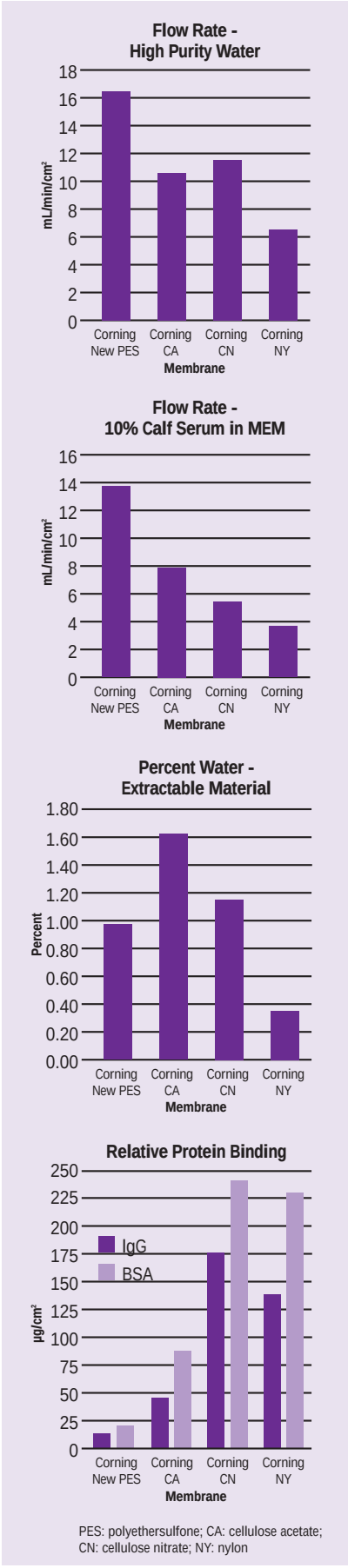
Step 1: Match your application with the best pore size.

The pore size is usually determined by your application or objective. Routine laboratory sterilization of most media, buffers, biological fluids and gases is usually done with 0.2 or 0.22 µM pore filter membranes. Clarification and prefiltration of solutions and solvents is best accomplished with 0.45 µM or larger filter membranes. Prefiltration to improve filter performance can also be accomplished by the use of glass fiber prefilters supplied with some Corning filter units. Use Table 1 to match your applications with a recommended membrane and pore size.

Table 1. Selecting the Pore Size

Application	Pore Size (µm)	Membrane Availability
Sterilization and Ultracleaning	0.20 to 0.22	All Membranes except Teflon® of Aqueous Solutions
Ultracleaning of Solvents (HPLC)	0.20 to 0.22	RC,* Teflon, Nylon
Clarification of Aqueous Solutions	0.45	All Membranes except Teflon
Clarification of Solvents (HPLC)	0.45	RC, Teflon, Nylon
Coarse Particle Removal	0.8	SFCA,* glass fiber prefilters

*RC = Regenerated Cellulose; SFCA = Surfactant-Free Cellulose Acetate



PES: polyethersulfone; CA: cellulose acetate; CN: cellulose nitrate; NY: nylon

Figure 1. Important Performance Characteristics of Corning Filter Membranes

Step 2: Select the best membrane and housing material for your application.

Corning Filter Membranes

Your filter unit must be fully compatible with the chemical characteristics of your sample. Some filter membranes contain non-toxic wetting agents that may interfere with some applications. Other membranes may bind proteins or other macromolecules leading to premature filter clogging or loss of valuable samples. Therefore, it is very important to understand their characteristics and the potential effects filter membranes can have on the solutions they contact.

The four graphs (Figure 1, left) compare the flow rates, levels of extractable materials, and relative amounts of protein binding of four of the most popular membranes used in Corning filters. Combining this with the information from Tables 2 and 3 will help you choose the best Corning membranes for your applications:

Table 2. Characteristics of Corning Filter Membranes

	Cellulose Nitrate	Cellulose Acetate	Nylon	Polyether-sulfone	Regenerated cellulose	Teflon (PTFE)
Wetting Agents	Yes	Yes	No, naturally hydrophilic	No	Yes	Does not wet
Protein Binding	Very High	Very Low	Low to Moderate	Very low	Low	NA
DNA Binding	High	Very low	Very high	Very low	Low	NA
Chemical Resistance	Low	Low	Moderate to high	Low	Very high	Very high

Cellulose acetate (CA) membranes have a very low binding affinity for most macromolecules and are especially recommended for applications requiring low protein binding, such as filtering culture media containing sera. However, both cellulose acetate and cellulose nitrate membranes are naturally hydrophobic and have small amounts (less than 1%) of non-toxic wetting agents added during manufacture to ensure proper wetting of the membrane. If desired, these agents can be easily removed prior to use by filtering a small amount of warm purified water through the membrane or filter unit. Surfactant free cellulose acetate membranes, with very low levels of extractables, are available on some Corning syringe filters.

Cellulose nitrate (CN) membranes are recommended for filtering solutions where protein binding is not a concern. They are recommended for use in general laboratory applications such as buffer filtration. Corning's cellulose nitrate membranes are Triton X-100-free and noncytotoxic.

Nylon membranes are naturally hydrophilic and are recommended for applications requiring very low extractables since they do not contain any wetting agents, detergents or surfactants. Their greater chemical resistance makes them better for filtering more aggressive solutions, such as alcohols and DMSO. However, like cellulose nitrate membranes, they may bind greater amounts of proteins and other macromolecules than do the cellulose acetate or PES membranes. They are recommended for filtering protein-free culture media.

Polyethersulfone (PES) membranes are highly recommended for filtering cell culture media. PES has both very low protein binding and extractables. PES also demonstrates faster flow rates than cellulosic or nylon membranes.

Regenerated cellulose (RC) membranes are hydrophilic and have very good chemical resistance to solvents, including DMSO. They are used to ultraclean and de-gas solvents and mobile phases used in HPLC applications.

Teflon® (PTFE; polytetrafluorethylene) membranes are naturally and permanently hydrophobic. They are ideal for filtering gases, including humidified air. The

extreme chemical resistance of Teflon membranes makes them very useful for filtering solvents or other aggressive chemicals for which other membranes are unsuitable. Because of their hydrophobicity, Teflon membranes must be prewetted with a solvent, such as ethanol, before aqueous solutions can be filtered.

Glass fiber filters are used a depth filter for prefiltration of solutions. They have very high particle loading capacity and are ideal for prefiltering dirty solutions and difficult to filters biological fluids such as sera.

Corning Filter Housing Materials

The filter housing materials, as well as the filter membrane must be compatible with the solutions being filters

Polystyrene (PS) is used in the filter funnels and storage bottles for all of the Corning plastic vacuum filters. This plastic polymer should only be used in filtering and storing nonaggressive aqueous solutions and biological fluids. Refer to Table 3 for more chemical compatibility information.

Acrylic copolymer (AC) and **Polyvinyl chloride (PVC)** are used in some of the Corning syringe filter housings. These plastics should only be used in filtering nonaggressive aqueous solutions and biological fluids. Refer to Table 3 for more chemical compatibility information.

Polypropylene (PP) is used in the Spin-X centrifuge filters and some of the syringe and disc filter housings. This plastic polymer has very good resistance to many solvents, refer to Table 3 for more chemical compatibility information.

Borosilicate glass (Pyrex® and PyrexPlus® brand) is very resistance to virtually all laboratory solvents. However, it can be attacked by hydrofluoric or hot phosphoric acid etched by hot alkali. The coating of PyrexPlus brand labware is designed to resist leakage resulting from a brief chemical exposure that might occur if the vessel is broken. Prolonged and/or repeated chemical exposure of the coating to aldehydes, ketones, chlorinated solvents and concentrated acids should be avoided.

Chemical Compatibility

The mechanical strength, color, appearance, and dimensional stability of Corning filters are affected to varying degrees by the chemicals with which they come into contact. Specific operating conditions, especially temperature and length of exposure, will also affect their chemical resistance. Table 3 provides a general Guideline for the chemical resistance of Corning filter membranes and housings.

Table 3. Chemical Resistance Guide for Corning Filters*

	Filter Membranes						Housing materials				
Chemical Class	**CN**	**CA**	**NY**	**PES**	**RC**	**PTFE**	**PS**	**PP**	**AC**	**PYR**	**PVC**
Weak Acids	2	2	2	3	1	1	1	1	2	1	1
Strong Acids	3	2	3	3	3	1	2	1	3	2	1
Alcohols	3	1	1	1	1	1	2	1	3	1	1
Aldehydes	2	3	2	3	2	1	3	1	3	1	3
Aliphatic Amines	3	3	1	1	1	1	3	1	3	1	2
Aromatic Amines	3	3	2	3	1	1	3	1	3	1	3
Bases	3	3	2	3	2	1	1	1	2	2	1
Esters	3	3	1	3	1	1	3	2	2	1	3
Hydrocarbons	2	2	2	3	1	1	3	2	2	1	2
Ketones	3	3	2	3	1	1	3	2	3	1	3

Key:

1 = Recommended; 2 = May be suitable for some applications, a trial run is recommended; 3 = Not recommended; CN = cellulose nitrate; CA = cellulose acetate; NY = nylon; PYR = Pyrex Glass; PES = polyethersulfone; RC = regenerated cellulose; PS = polystyrene; PTFE = polytetrafluorethylene (Teflon); PP = polypropylene; PVC = polyvinylchlorides; AC = Acrylic copolymer.

* This information has been developed from a combination of laboratory tests, technical publications, or material suppliers. It is believed to be reliable. Due to conditions outside of Corning's control, such as variability in temperatures, concentrations, duration of exposure and storage conditions, no warranty is given or is to be implied with respect to this information.

Step 3: Select the correct membrane diameter to optimize flow rate and throughput.

The third step is selecting a filter that will have enough volume capacity or throughput to process your entire sample quickly and efficiently. This is primarily determined by the effective surface area of the membrane. Table 4 shows the relationship between filter diameter, effective filtration surface area and expected throughput volumes. The lower values are typical of viscous or particle-laden solutions; the higher values are typical of buffers or serum-free medium.

Table 4. Typical Expected Throughput Volumes

Filter Diameter and Description	Effective Filter Area (cm^2)	Expected Throughput (mL)*
4 mm syringe/disc	0.07	0.05-3
15 mm syringe/disc	1.7	3-15
µStar™ syringe filter	3.0	15-100
25 mm syringe/disc	4.8	15-100
26 mm syringe/disc	5.3	15-100
50 mm disc	19.6	100-750
50 mm vacuum system	16.6	100-750
60 mm vacuum system	24.6	200-1000
70 mm vacuum system	38.5	300-1500
90 mm vacuum system	58.1	500-2000

*These values assume an aqueous solution and a 0.2 micron membrane. Solutions containing sera or other proteinaceous materials will be at the lower end of the range. Use of prefilters may extend the throughput 50-100% above the values shown.

Corning Syringe Filters

µStar Syringe Filters

Step 4: Choose the best filter design for your application.

Corning offers three basic filter types: positive pressure-driven syringe and disc filters, Spin-X® centrifuge tube filters driven by centrifugation, and vacuum-driven filters. The vacuum driven filters offer several different designs and styles in both reusable glass and disposable plastic products

Syringe/Disc filters

The smaller conventional **Corning syringe disc-type filters** (4, 15, and 25-26mm diameter) are used with syringes which serves as both the fluid reservoir and the pressure source. They are 100% integrity tested. The HPLC certified nonsterile syringe filters are available with nylon, regenerated cellulose or Teflon® (PTFE) membranes in polypropylene housing for extra chemical resistance. The sterile tissue culture tested syringe filters are available in PES, regenerated cellulose (ideal for use with DMSO-containing solutions) or surfactant-free cellulose acetate membranes in either polypropylene or acrylic copolymer housings.

The larger **50mm diameter disc filter** has a Teflon (PTFE) membrane and polypropylene housing with hose barb connectors. This product is ideal for filtering aggressive solvents or gases and applications requiring sterile venting of gases. Because they have a hydrophobic (will not pass aqueous solutions) membrane, they are also ideal for protecting vacuum lines and pumps.

In addition, the unique **µStar™ syringe filters** have a bi-directional flow pattern that eliminates the priming and air lock effects of conventional syringe tip filters. These filters have either cellulose nitrate or cellulose acetate filters in a PVC housing. µStar filters utilize all of the membrane surface area for a working volume up to 100 mL while minimizing fluid retention to less than 30 µL with an air purge. Integrity tested with a maximum operating pressure of 100 psi, the µStar filter is designed for sterilization and clarification of aqueous solutions including: media additives, serum, antibiotics, biological fluids, and virus suspensions.

Corning® Disposable Plastic Vacuum Filters

These sterile filters are available in four styles: complete filter/storage systems, bottle top filters, centrifuge tube top filters, or the new one-piece filter systems. Corning filters feature adapters that are color-coded by membrane type for easy product identification. Angled hose connector simplifies vacuum line attachment. Four membranes are available to meet all of your filtration needs: cellulose acetate, cellulose nitrate, nylon, or polyethersulfone.

Corning filter/storage systems consist of a polystyrene filter funnel joined by an adapter ring to a removable polystyrene storage bottle with a separate sterile polyethylene cap. Receiver bottles feature easy grip sides for improved handling. Additional Corning polystyrene receiver/storage bottles can be ordered separately to increase throughput.

Corning Filter/Storage Systems

Corning Bottle Top Filters

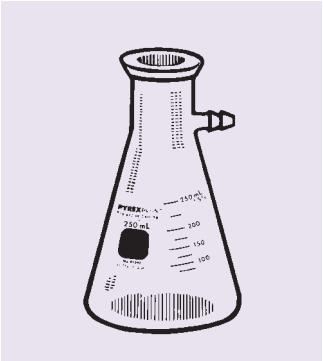
Corning 115 mL One-piece Vacuum Filter

Corning 150 mL Centrifuge Tube Top Filter

Corning bottle top filters have the same polystyrene filter funnel designs and capacities as the filter systems, but the adapter ring is designed for threading onto a glass bottle supplied by the user. Select either the 33 mm thread design for standard narrow glass mouth media bottles or the 45 mm design for Pyrex™ Media Bottles or PyrexPlus™ Media bottles. See Safety Precautions (below) for recommendations on using these products with glass bottles.

150 mL centrifuge tube top filters feature a 150 mL polystyrene filter funnel with a 50 mm diameter cellulose acetate membrane attached to a 50mL polypropylene centrifuge tube to minimize unnecessary transfers by filtering directly into centrifuge tube.

115 mL one-piece vacuum filters are completely self-contained with a separate pour spout for convenience. They are available with either cellulose acetate or nylon filter membranes in a polystyrene housing. They have a low center of gravity and wide base for stability; separate pour spout to remove the filtrate minimizing chances for contamination.



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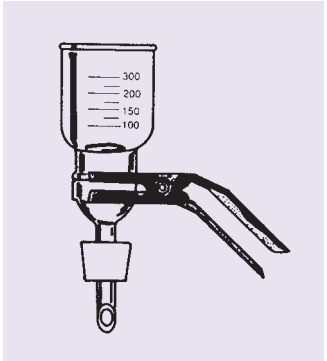

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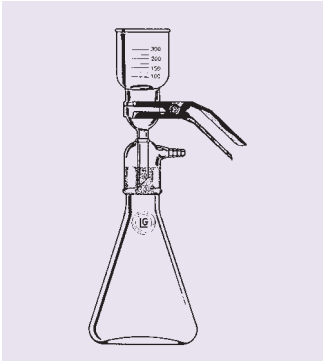


BP 1825

Corning ®Filterware™ Reusable Glass Vacuum Filters

Corning **Filterware reusable glass vacuum filters** are available with a choice of 47 mm or 90 mm fritted glass filters in an all-glass filter apparatus with a 40/35 glass joint connecting the filter support base to the filter flask.

These units are ideal for:

- HPLC Mobile Phase Filtration
- Analysis of Particulate or Bacterial Contamination
- General Laboratory Microfiltration

Similar Corning **Filterware reusable glass vacuum filters** that attach to standard glass filter flasks using a rubber stopper instead of a ground glass joint are also available with either 47 mm or 90 mm diameter fritted glass filters.

Pyrex® Glass Filter Vacuum flasks for use with the above Corning Filterware fritted glass filters are available in two styles: standard **Pyrex filter flasks** are blown in special molds, in shapes designed to give maximum mechanical strength; or **PyrexPlus® filter flasks** that features a protective PVC coating for longer product life and safety. The protective coating helps prevent glass from shattering and reduces spills and is autoclavable (121°C) and resistant to thermal shock.

Corning Spin-X Centrifuge Tube Filters

Corning Spin-X™ Centrifuge Tube Filters

Spin-X centrifuge tube filters consist of a membrane-containing (either cellulose acetate or nylon) filter unit within a polypropylene centrifuge tube. They filter small sample volumes by centrifugation for bacteria removal, particle removal, HPLC sample preparation, removal of cells from media and purification of DNA from agarose and polyacrylamide gels. (See Corning Technical Bulletin: Spin-X purification of DNA from agarose gels.)

Improving Filter Performance

Getting the best performance from your filtration products requires two very important steps: selecting the right products for the job, and then using these products effectively. The first part of this brochure covers the steps required to select the right filter for your applications; this section will help you optimize the filtration process by keying on the two most important areas: maximizing filter flow rate and throughput or capacity.

The flow rate and throughput of filters are dependent on many variables. Some variables, such as temperature, pressure, and especially, the characteristics of the sample, require special attention.

Table 5. Corning Filter Designs

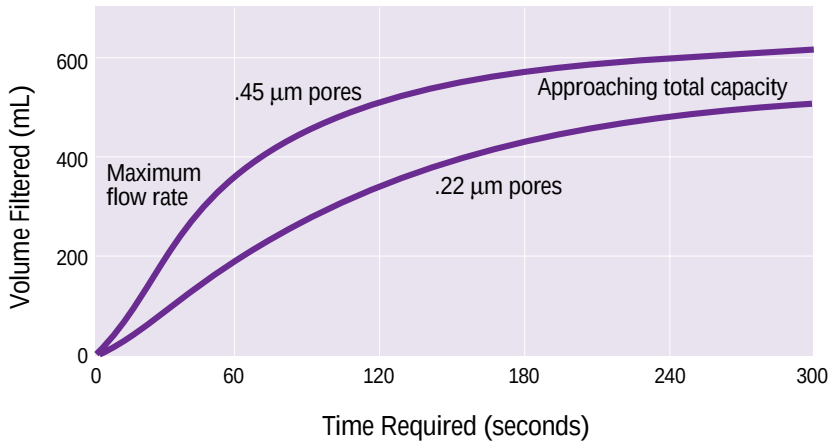
Design	Sterile	Filter Diameters (mm)	Available Membrane materials	Pore Sizes (µm)	Special Features
Syringe Filters	Some	4, 15, 25, and 26	RC, PES, SFCA, NY, & PTFE	0.2, 0.45, and 0.8	Ideal for small volume pressure filtration
µStar Syringe Filters	Yes	Not applicable	CA and CN	0.22, 0.45, and 0.8	Ideal for sterilizing aqueous solutions and biological fluids
Disc filters	Yes	50	PTFE	0.2	Ideal for filtering solvents and gases
Vacuum Filter Storage Systems	Yes	50, 70 and 90	PES, CA, CN, and Nylon	0.2 (NY only) 0.22 and 0.45 (PES, CA, CN)	Easy grip bottles for storing filtrate
Bottle Top Vacuum Filters	Yes	50, 70 and 90	PES, CA, CN, and Nylon	0.2 (NY only) 0.22 and 0.45 (PES, CA, CN)	Two neck widths to fit most glass bottles
Tube Top Vacuum Filters	Yes	50	CA	0.22 and 0.45	Minimizes unnecessary transfers by filtering into a 50 mL centrifuge tube
One piece Vacuum Filters	Yes	60	CA and CN	0.22 and 0.45	Very economical with separate pour spout
Spin-X Centrifuge Filters	Some	7.7	CA and Nylon	0.22 and 0.45	Ideal for purifying DNA from agarose gels
Glass Vacuum Filters	No	47 and 90	Fritted glass	Not applicable	Ideal for filtering solvents for HPLC applications

Key: CN = cellulose nitrate; CA = cellulose acetate; PES = polyethersulfone; RC = regenerated cellulose; PTFE = polytetrafluoroethylene (Teflon); SFCA = surfactant-free cellulose acetate.

Effect of Pore Size

The pore size of filter membranes is usually dictated by the requirements of the filter application rather than the desired flow rate. Larger pore membranes usually have both faster flow rates and greater capacity before pore clogging slows the flow. Figure 2 indicates the effect of pore size on filter performance. As expected, the initial flow rate (steep part of the curve) of the .45 µm filter was approximately twice that of the .22 µm filter, although its capacity or throughput prior to clogging (the area at the plateau) was only about 20% greater.

Figure 2. Effect of Pore Size on Performance



Test Conditions: Medium containing 10% fetal bovine serum was filtered using cellulose acetate membranes at 23°C and 600 mm Hg vacuum.

Effect of Membrane Area

The easiest and most practical way to increase filter flow rate is to increase the effective surface area of the filter membrane. Corning offers both syringe and vacuum filter units with a choice of membrane diameters that give a wide range of flow rates and throughputs (See Table 4).

Effect of Fluid Temperature

For most applications, filtering solutions at room temperature is fine. Usually increasing the temperature of a solution will increase the flow rate. For example, increasing the temperature of cell culture medium from 4°C to 37°C resulted in a doubling of the flow rate. This is most likely due to a decrease in the viscosity of the medium. However, in some cases, filtration at lower temperatures may increase the overall throughput, especially with protein and lipid containing solutions such as serum.

Effect of Pressure Differential

For vacuum driven filtration a pressure differential (vacuum) of 400 mm Hg (7.73 psig) is good. Increasing the pressure differential further will slightly increase the flow rate, but it may also result in excess foaming as the gases in the filtrate come out of solution as bubbles. This is especially a problem with filtering bicarbonate-buffered cell culture media. The dissolved carbon dioxide in the medium will evolve quickly at higher-pressure differentials leading to a rise in pH and excessive foaming if serum proteins are present.

Effect of Prefiltration

A simple way to improve filter performance is to pretreat your solution. High speed centrifugation will remove most suspended particle and reduce filter clogging, extending both flow rate and throughput. (Corning® 250 and 500 mL centrifuge bottles are ideal for centrifuging larger liquid volumes.) Prefiltration through a glass fiber pad or depth filter will also reduce particle load and premature membrane clogging. The use of a glass fiber prefilter has been demonstrated to more than double the throughput when filtering calf serum. These glass fiber prefilters are included with all Corning vacuum filter systems and bottle top filters. For particularly difficult to filter solutions, it may be helpful to first prefilter the solution through a larger pore membrane filter.

Safety Precautions

Corning filter units are intended for use by persons knowledgeable in safe laboratory practices. Safety is one of the most critical concerns of any lab. Because of variations in conditions, Corning cannot guarantee any glassware or plasticware against breakage under vacuum or pressure. Failure can result from surface damage, improper pressure or temperature, or use with incompatible chemicals. Adequate precautions should always be taken to protect personnel doing such work. To help improve lab safety, Corning has compiled these common sense suggestions concerning the safe use of filtration products:

- Use of vacuum-driven filters on glass or plastic bottles may cause personal injury if they implode during use. Eye protection is strongly recommended whenever glass or plastic vessels are used under partial vacuum negative pressure to guard against these injuries. Only bottles specifically designed for these applications should be used.
- Never use the 45 mm threaded bottle top filters on Pyrex® or PyrexPlus® brand Media Bottles larger than 2 liter capacity or that are square. Use of bottle top filters with PyrexPlus Media Bottles (with plastic safety coatings) is highly recommended for vacuum filtration.
- Never use the 33 mm threaded bottle top filters on standard glass media bottles that are larger than 500 mL or on bottles that are not cylindrical.

- Never use plastic roller bottles as substitute receiver bottles during vacuum filtration.
- Do not use a bottle for vacuum applications if it is not designed to withstand a vacuum; if the bottle is scratched, chipped or cracked; if the bottle is clamped in such a way as to induce stress; or if the bottle is being hand held.
- Care must be taken when using syringe filters with small syringes (5 mL or less) as the pressures generated may exceed the 75 psi limit, causing a possible membrane or housing failure. Loss of valuable contents and personal injury may result. If clogging causes slower flow rates, we recommend that you replace filters rather than increase the pressure.

References

Brock, T.S. Membrane Filtration: A User's Guide and Reference Manual. Science Tech, Inc. Madison, WI, 1883, 381 pp.

Lukaszewicz, R.C. and Fisher, R. Mechanisms of Membrane Filtration for Particulate and Microbial Retention in Critical Applications. Pharmaceutical Technology, Vol. 5: June 1981.

Walsh, R.L. and Coles, M.E. Binding of IgG and other Proteins to Microfilters. Clin. Chem. 26(3):496-498, 1981.

Ordering Information

Corning Syringe Filters

The Corning syringe filter units are of the conventional, round design with products ranging from 3 mm to 50 mm in diameter. The 50mm diameter filter has a hydrophobic PTFE membrane in a polypropylene housing with two hose barbs. It is designed for sterile venting, protecting vacuum lines and pumps, or filtering gases and non-aqueous solvents.

Corning Cat. No.	Diam. (mm)	Filter Pore Size (µm)	Membrane Material	Housing Material	Sterile	Inlet/ Outlet	Pkg.	Qty/Cs	List Per Case (US$)
431212	4	0.2	RC	PP	Yes	LL/LS	Ind	50	$50.00
431213	4	0.45	RC	PP	Yes	LL/LS	Ind	50	50.00
431214	4	0.2	PTFE	PP	No	LL/LS	Bulk	50	50.00
431215	15	0.2	RC	PP	Yes	LL/LS	Ind	50	65.00
431216	15	0.45	RC	PP	Yes	LL/LS	Ind	50	65.00
431217	15	0.2	PTFE	PP	No	LL/LS	Bulk	50	65.00
431218	26	0.2	SFCA-PF	AC	Yes	LL/LS	Ind	50	105.00
431219	26	0.2	SFCA	AC	Yes	LL/LS	Ind	50	90.00
431220	26	0.45	SFCA	AC	Yes	LL/LS	Ind	50	90.00
431221	26	0.8	SFCA	AC	Yes	LL/LS	Ind	50	90.00
431222	25	0.2	RC	PP	Yes	LL/LS	Ind	50	90.00
431223	25	0.45	RC	PP	Yes	LL/LS	Ind	50	90.00
431224	25	0.2	NY	PP	Yes	LL/LS	Ind	50	90.00
431225	25	0.45	NY	PP	Yes	LL/LS	Ind	50	90.00
431226	25	0.2	PTFE	PP	No	LL/LS	Bulk	50	90.00
431227	50	0.2	PTFE	PP	Yes	HB/HB	Ind	12	85.00
431229	26	0.2	PES	AC	Yes	LL/LS	Ind	50	85.00
431230	15	0.45	PTFE	PP	No	LL/LS	Bulk	50	65.00
431231	25	0.45	PTFE	PP	No	LL/LS	Bulk	50	$90.00

PP = Polypropylene, AC = Acrylic Copolymer, LL = Luer Lock-Female, LS = Luer Slip/Male, HB = Hose Barb, NY = Nylon, PES = Polyethersulfone, PTFE = Teflon, RC = Regenerated Cellulose, SFCA = Surfactant Free Cellulose Acetate, SFCA-PF = Surfactant Free Cellulose Acetate with Prefilter

Corning µStar Syringe Filters

µStar units have a bi-directional flow pattern that eliminates the priming and air lock effects of conventional syringe tip filters. µStar utilizes all of the membrane surface area for a working volume up to 100 mL while minimizing fluid retention to less than 30 µL with an air purge. Integrity tested with a maximum operating pressure of 100 psi, the µStar, a Class II medical device, is designed for sterilization and clarification of aqueous solutions including: media additives, serum, antibiotics, biological fluids, radio-tracers, and virus suspensions. Sterile, certified non-pyrogenic.

Corning Cat. No.	Membrane	Color	Pore Size (µm)	Qty/Cs	List Per Case (US$)
8110	CA	Blue	0.22	50	$98.00
8112	CA	Clear	0.45	50	98.00
8113	CA	Green	0.80	50	98.00
8119	CN	Smoke	0.22	50	98.00

CA - cellulose acetate, CN - cellulose nitrate

Corning Spin-X Centrifuge Tube Filters

Spin-X centrifuge tube filters consist of a membrane-containing filter unit within a centrifuge tube. They filter by centrifugation for bacteria removal, particle removal, HPLC sample preparation, removal of cells from media and DNA removal from agarose or acrylamide gels. Maximum Relative Centrifugal Force (RCF) is 16,000. Unless noted, product is sterile and certified non-pyrogenic.

Corning Cat. No.	Membrane Material	Working Volume (µL)	Pore Size (µm)	Tube Size (mL)	Qty/Cs	List Per Case (US$)
8160	CA	500	0.22	2.0	96	$138.00
8161*	CA	500	0.22	2.0	100	118.00
8162	CA	500	0.45	2.0	96	138.00
8163*	CA	500	0.45	2.0	100	118.00
8169*	NY	500	0.22	2.0	200	212.00
8170*	NY	500	0.45	2.0	200	212.00

* Indicates that the product is non-sterile and is not certified non-pyrogenic.
CA = cellulose acetate, NY = nylon

Corning Bottle Top Filters

Available in 33 mm and 45 mm neck sizes. The 150mL filter is available in CA, CN, and NY in both 0.2 µm and .45 µm pore sizes. The PES is available in only 0.22 µm pore size. Filters are color-coded by membrane type. Individually packaged, sterile and certified non-pyrogenic. Prefilters included.

Corning Cat. No.	Membrane Material	Volume (mL)	Neck Size (mm)	Pore Size (µm)	Color-Coded Adapter	Qty/Cs	List Per Case (US$)
430624	CA	150	33	0.22	Orange	48	$187.00
430625	CA	150	33	0.45	Orange	48	$187.00
430626	CA	150	45	0.22	Orange	48	$187.00
430627	CA	150	45	0.45	Orange	48	$187.00
431160	PES	150	33	0.22	Yellow	48	$188.00
431161	PES	150	45	0.22	Yellow	48	$188.00
431162	CN	150	33	0.22	Blue	48	$192.00
431163	CN	150	33	0.45	Blue	48	$192.00
431164	NY	150	33	0.2	Red	48	$204.00
431165	CN	150	45	0.22	Blue	48	$200.00
431166	CN	150	45	0.45	Blue	48	$200.00
431167	NY	150	45	0.2	Red	48	$220.00

PES = polyethersulfone, CA = cellulose acetate, CN = cellulose nitrate, NY = nylon

Corning Vacuum Filter Systems

Corning filters feature adapters that are color-coded by membrane type for easy product identification. Angled hose connector simplifies vacuum line attachment. Receiver bottles feature easy grip sides for improved handling. Individually packaged sterile, certified non-pyrogenic. Caps for receiver bottles are supplied sterile and individually packaged. Prefilters included.

Corning 150 mL Vacuum Filter Systems with 50 mm Diameter Membranes

Corning Cat. No.	Membrane Material	Funnel/Bottle Volume (mL)	Pore Size (µm)	Color-Coded Adapter	Qty/Cs	List Per Case (US$)
431153	PES	150/150	0.22	Yellow	12	$59.59
431154	CA	150/150	0.22	Orange	12	59.59
431155	CA	150/150	0.45	Orange	12	59.59
431156	CN	150/150	0.22	Blue	12	57.57
431157	CN	150/150	0.45	Blue	12	57.57
431158	NY	150/150	0.2	Red	12	62.62
431159	NY	150/150	0.45	Red	12	62.62

PES = polyethersulfone, CA = cellulose acetate, CN = cellulose nitrate, NY = nylon

Corning 250 mL Vacuum Filter Systems with 50mm Diameter Membranes

Corning Cat. No.	Membrane Material	Funnel/Bottle Volume (mL)	Pore Size (µm)	Color-Coded Adapter	Qty/Cs	List Per Case (US$)
430756	CN	250/250	0.22	Blue	12	$62.62
430757	CN	250/250	0.45	Blue	12	62.62
430767	CA	250/250	0.22	Orange	12	64.64
430768	CA	250/250	0.45	Orange	12	64.64
430771	NY	250/250	0.2	Red	12	67.67
430772	NY	250/250	0.45	Red	12	67.67
431096	PES	250/250	0.22	Yellow	12	66.66

PES = polyethersulfone, CA = cellulose acetate, CN = cellulose nitrate, NY = nylon

Corning 500 mL Vacuum Filter Systems with 70 mm Diameter Membranes

Corning Cat. No.	Membrane Material	Funnel/Bottle Volume (mL)	Pore Size (µm)	Color-Coded Adapter	Qty/Cs	List Per Case (US$)
430755	NY	500/500	0.45	Red	12	$116.15
430758	CN	500/500	0.22	Blue	12	109.08
430759	CN	500/500	0.45	Blue	12	109.08
430769	CA	500/500	0.22	Orange	12	110.09
430770	CA	500/500	0.45	Orange	12	110.09
430773	NY	500/500	0.2	Red	12	116.15
431097	PES	500/500	0.22	Yellow	12	110.09

PES = polyethersulfone, CA = cellulose acetate, CN = cellulose nitrate, NY = nylon

Corning 1000 mL Vacuum Filter Systems with 90mm Diameter Membranes

Corning Cat. No.	Membrane Material	Funnel/Bottle Volume (mL)	Pore Size (µm)	Color-Coded Adapter	Qty/Cs	List Per Case (US$)
430185	CN	1000/1000	0.45	Blue	12	$160.59
430186C	N	1000/1000	0.22	Blue	12	160.59
430515	NY	1000/1000	0.2	Red	12	170.69
430516	CA	1000/1000	0.45	Orange	12	162.61
430517	CA	1000/1000	0.22	Orange	12	162.61
430519	NY	1000/1000	0.45	Red	12	170.69
431098	ES	1000/1000	0.22	Yellow	12	163.62
431205	CA	500*/1000	0.22	Orange	12	140.39
431206	CA	500*/1000	0.45	Orange	12	140.39

* 500 mL Funnel with 70 mm membrane

PES = polyethersulfone, CA = cellulose acetate, CN = cellulose nitrate, NY = nylon

Corning 150 mL Tube Top Filter with 50mm Membranes

Minimizes unnecessary transfers by filtering directly into centrifuge tube. Includes two (2) centrifuge tube stands with each case. The polypropylene tube is supplied with an individually wrapped cap for storage. Individually packaged, sterile, certified non-pyrogenic.

Corning Cat. No.	Membrane Material	Funnel/Bottle Volume (mL)	Pore Size (µm)	Qty/Cs	List Per Case (US$)
430314	CA	150/50	0.45	12	$51.00
430320	CA	150/50	0.22	12	51.00

CA = cellulose acetate

Corning 115 mL One-piece Vacuum Filters with 60mm Membrane Diameter

Low center of gravity and wide base for stability; separate pour spout to remove filtered sample which minimizes contamination. Individually packaged, sterile, certified non-pyrogenic.

Corning Cat. No.	Membrane Material	Funnel/Bottle Volume (mL)	Pore Size (µm)	Qty/Cs	List Per Case (US$)
430944	CA	115	0.22	24	$90.90
430945	CA	115	0.45	24	90.90
430946	CN	115	0.22	24	90.90
430947	CN	115	0.45	24	90.90

CA = cellulose acetate, CN = cellulose nitrate

Corning Filterware Reusable Glass Vacuum Filters

Available with a choice of 47 mm or 90 mm fritted glass filters in an all-glass filter apparatus with a 40/35 glass joint connecting the filter support base of 47 mm or 90 mm and a filter flask.

Corning Cat. No.	Exp	Description	Qty. Per Case	List Per Case (US$)
BP-1825-000	•	All-Glass Filter Apparatus, 47mm, 300 mL Funnel, 1 liter Flask	1	$228.00
BP-1825-002	•	All-Glass Filter Apparatus, 47mm, 500 mL Funnel, 2 liter Flask	1	296.00
BP-1825-004	•	All-Glass Filter Apparatus, 47mm, 1000 mL Funnel, 4 liter Flask	1	310.40
BP-1825-090	•	All-Glass Filter Apparatus, 90mm, 1000 mL Funnel, 4 liter Flask	1	550.00
BP-1755-000	•	Funnel/Glass Support Assembly with 47 mm glass frit	1	104.69
BP-1755-090	•	Funnel/Glass Support Assembly with 9 0mm glass frit	1	385.00
BP-1760-000	•	Filter Flasks 1000mL filter flask with #8 Rubber Stopper Joint, #2 Hose Connector	1	35.70
BP-1760-002	•	2000mL filter flask with #8 Rubber Stopper Joint, #2 Hose Connector	1	67.00
BP-1760-004		4000 mL filter flask, #8 Rubber Stopper Joint, #2 Hose Connector	1	98.00

• in the Exp field denotes a Corning EXPRESS item. For additional information, refer to the catalog or the ordering section of the ...

MISSING TEXT