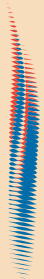


# Corning Liquid Handling Selection Guide



Life  
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Discovering Beyond Imagination

## Introduction

Corning Life Sciences is pleased to present our Liquid Handling Selection Guide. In this guide, you will find a selection of Corning's newest and most requested products.

For up-to-date information on Corning Life Sciences' comprehensive range of products and services, go to [www.corning.com/lifesciences](http://www.corning.com/lifesciences) where you can access:

- ▶ New Products Information
- ▶ Technical Information including:
  - Application Notes
  - Instruction Manuals
  - Product Bulletins
- ▶ Product Catalog Information
- ▶ Product Literature
- ▶ Complete Distributor Information

For additional product information, please visit our web site at [www.corning.com/lifesciences](http://www.corning.com/lifesciences), or call 1.800.492.1110.

International customers, please call 1.978.635.2200 or contact your local support office. See back cover.

## Ordering Information

Corning products are available through any authorized Corning support office or distributor. Please see our web site for a complete listing. To place an order, simply contact the distributor of your choice. For each requested product, provide the Corning catalog number, product description, and desired quantity.



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## Overview

### DESIGNED FOR PERFORMANCE

Corning Life Sciences offers a full line of liquid handling products that are manufactured under strict process controls guaranteeing consistent product performance. All Corning Life Sciences plastics manufacturing facilities are ISO 9002 registered. ISO registration is recognized worldwide as a standard of excellence for quality systems.

In addition, customers can now request a Certificate of Quality for any Corning® or Costar® liquid handling product. This certificate details lot-specific information on component materials, sterility testing and pyrogen testing. Also available are detailed product descriptions and drawings that highlight product dimensions and testing procedures. All are available with a 24-hour turn around simply by calling your local Corning Life Sciences office.

### NONPYROGENIC CERTIFICATION

Most Corning and Costar liquid handling products are certified non-pyrogenic with a documented endotoxin level of less than 0.5 EU/mL. Endotoxins have been shown to cause variability in cell culture. Non-pyrogenic certification is another way Corning helps ensure consistent cell culture results. Corning also offers a detailed technical bulletin on the effects of endotoxins in cell culture. This may be obtained by calling your local Corning Life Sciences office or by downloading the bulletin from the Corning web site [www.corning.com/lifesciences](http://www.corning.com/lifesciences).



# Pipets



## Stripette® Pipets

- ▶ Costar® Stripette pipets have larger, bolder graduations.
- ▶ Ideal for sterile applications such as tissue culture
- ▶ Choice of three packaging options:
  - Clear plastic wrap allows full view of pipet for easy size identification and reduces storage space requirements. “Banana-peel” plastic wrap provides easy, aseptic opening and pipet removal
  - Paper/plastic wrap allows easy opening by either pop-through or peel-apart techniques. It is also ideal for sterile tissue culture applications, especially while wearing latex gloves, as the wrap reduces static cling. Color-coding on paper allows easy size identification
  - Bulk pack pipets are ideal for large-scale sterile and nonsterile liquid handling applications

### Stripette Pipets Ordering Information

Cat. No.	Capacity (mL)	Graduations (mL)	Negative Grads. (mL)	Color Coded Stripe	Qty/Pk	Qty/Cs
<i>Individually Wrapped – Plastic Wrap</i>						
4011	1	1/100	0.2	Yellow	100/bag	1,000
4012	1	1/100	0.2	Yellow	100/bag	200
4021	2	1/100	0.2	Green	100/bag	1,000
4051	5	1/10	2.5	Blue	50/bag	200
4101	10	1/10	3.0	Orange	50/bag	200
4492*	10	1/10	3.0	Orange	50/bag	200
4251	25	2/10	10.0	Red	50/bag	200
4501	50	1/2	10.0	Purple	25/bag	100
4484	100	1/1	N/A	Aqua	10/bag	100
<i>Individually Wrapped – Paper/Plastic Wrap</i>						
4485	1	1/100	0.2	Yellow	50/bag	1,000
4486	2	1/100	0.2	Green	50/bag	1,000
4487	5	1/10	2.5	Blue	50/bag	200
4488	10	1/10	3.0	Orange	50/bag	200
4489	25	2/10	10.0	Red	25/bag	200
4490	50	1/2	10.0	Purple	25/bag	100
4491	100	1/1	N/A	Aqua	10/bag	100
<i>Bulk Packed in Bags</i>						
4010	1	1/100	0.2	Yellow	50/bag	1,000
4020	2	1/100	0.2	Green	50/bag	1,000
4050	5	1/10	2.5	Blue	50/bag	500
4100	10	1/10	3.0	Orange	50/bag	500
4250	25	2/10	10.0	Red	25/bag	200
4500	50	1/2	10.0	Purple	25/bag	100

\*Catalog number 4492 features a wide tip for handling viscous fluids.

## Aspirating Pipets

Costar aspirating pipets are sterile, ungraduated and unplugged polystyrene pipets for aspirating liquid using vacuum suction.

### Aspirating Pipets Ordering Information

Cat. No.	Volume (mL)	Qty/Pk	Qty/Cs
4975	1	50	1,000
9186	2	Individual	1,000
9099	5	Individual	200



## Pipetting Aids



### Stripettor Pipetting Aids

- ▶ Are lightweight, have adjustable speed control and are designed for use with all serological pipets
- ▶ Nose cones are autoclavable and have a replaceable 0.2  $\mu\text{m}$  hydrophobic sterilizing filter.
- ▶ Operates on a rechargeable 9V NiCd battery and features an LED light on the handle that lets the user know when to recharge.
- ▶ Unit is fully operational while recharging.

### Stripettor Pipetting Aid Ordering Information

Cat. No.	Product Description	Qty/Cs
4910	Stripettor with sterile filter, rechargeable battery and recharger/adaptor	1
4911	Grommet replacement (silicone pipet holder)	1
4922	0.2 $\mu\text{m}$ hydrophobic replacement filter	4
4923	0.2 $\mu\text{m}$ hydrophobic replacement filter	25
4914	Recharger/adaptor for 4910	1

## Pipettors



### Lambda® Single Channel Pipettor

- ▶ Corning® Lambda pipettors have a contoured handgrip and hook-style hand rest for greater comfort and less fatigue during prolonged use.
- ▶ Quick-turn volume adjustment knob and easy-to-read digital volume display make volume selection easier.
- ▶ Volume ranges include 0.1 to 2  $\mu\text{L}$ , 0.5 to 10  $\mu\text{L}$ , 2 to 20  $\mu\text{L}$ , 10 to 100  $\mu\text{L}$ , 20 to 200  $\mu\text{L}$ , and 100 to 1000  $\mu\text{L}$ .
- ▶ Lower unit is autoclavable.
- ▶ Backed by a three-year warranty

### Lambda Single Channel Pipettor Ordering Information

Cat. No.	Volume Range ( $\mu\text{L}$ )	Qty/Cs
4959	0.1-2.0	1
4960	0.5-10	1
4961	2-20	1
4962	10-100	1
4963	20-200	1
4964	100-1000	1
4958	Pipettor Stand	1

### 8-Pette® and 12-Pette® Multichannel Pipettors

- ▶ Costar® 8-Pette and 12-Pette multichannel pipettors feature a unique, ergonomic trigger-style aspiration and dispense control mechanism designed to reduce thumb fatigue during repetitive pipetting.
- ▶ Volume range is 20 to 200  $\mu\text{L}$ .
- ▶ Volume is adjusted with a vernier-scale spindle.
- ▶ Pipettors are entirely autoclavable.

### 8-Pette and 12-Pette Multichannel Pipettors Ordering Information

Cat. No.	Volume Range ( $\mu\text{L}$ )	Channels	Qty/Cs
4880	20-200	1-12	1
4888	20-200	1-8	1





### Octapette® Multichannel Pipettors

- ▶ Costar® Octapette pipettors have 8 fixed-volume channels.
- ▶ Available in 25, 50, 100, and 200 µL dispensing volumes

#### Octapette Multichannel Pipettors Ordering Information

Cat. No.	Volume (µL)	Channels	Color Code	Qty/Cs
4825	25	1-8	Yellow	1
4850	50	1-8	Green	1
4800	100	1-8	Orange	1
4820	200	1-8	Blue	1

## Pipet Tips

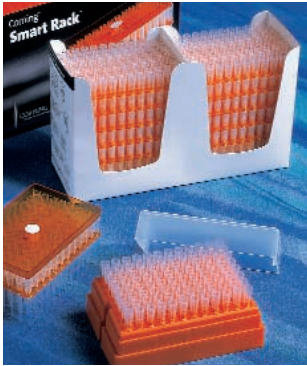


### Universal Fit 200 and 1000 µL Pipet Tips

- ▶ Corning® universal fit tips are designed to provide a reliable fit with all major brand pipettors. (A Pipet Tip Compatibility Guide can be ordered or downloaded from the Corning web site.)
- ▶ Beveled orifice helps ensure accurate fluid delivery.
- ▶ 1-200 µL universal fit tips are graduated at the 10, 50, and 100 µL volumes.
- ▶ Select from three packaging options:
  - Racked tips are certified RNase-/DNase-free and nonpyrogenic
  - Stack rack tips feature a stack of five racks, each containing 96 tips, for a total of 480 tips in a space-saving design
  - Bulk packed tips are nonsterile and very economical

#### Universal Fit 200 and 1,000 µL Pipet Tips Ordering Information

Cat. No.	Volume Range (µL)	Format	Color	Sterile	Racks/ Cs	Tips/ Cs
<i>Racked Tips</i>						
4860	1-200	96 Tips/Rack	Yellow	Yes	10	960
4863	1-200	96 Tips/Rack	Natural	No	10	960
4864	1-200	96 Tips/Rack	Natural	Yes	10	960
4865	1-200	96 Tips/Rack	Yellow	No	10	960
4867	100-1,000	100 Tips/Rack	Blue	No	10	1,000
9032	100-1,000	100 Tips/Rack	Blue	Yes	10	1,000
<i>Stack Rack Tips</i>						
4803	1-200	480 Tips/Stack Rack	Natural	No	10	4,800
4804	1-200	480 Tips/Stack Rack	Natural	Yes	10	4,800
4806	1-200	480 Tips/Stack Rack	Natural	No	2	960
<i>Bulk Packed Tips</i>						
4844	1-200	Bulk Pack	Natural	No	1,000	10,000
4845	1-200	Bulk Pack	Yellow	No	1,000	10,000
4862	1-200	Bulk Pack	Natural	No	1,000	1,000
4866	1-200	Bulk Pack	Yellow	No	1,000	1,000
4846	100-1,000	Bulk Pack	Blue	No	1,000	10,000
4868	100-1,000	Bulk Pack	Blue	No	1,000	1,000



### Smart Rack™ Pipet Tip Refill System

- ▶ Corning® Smart Rack makes refilling pipet tip racks easier than ever.
- ▶ Tips are contained on an autoclavable plastic reload card and transferred to a rack with a disposable reloading device (included).
- ▶ Compatible with many popular brand 200 µL 96-tip racks
- ▶ Two configurations are available – 94-tip and 96-tip. In the 94-tip configuration, each reload card contains 94 tips and two corner anchoring pins that secure the card to the rack
- ▶ The 96-tip configuration does not include the corner anchoring pins.
- ▶ Smart Rack tips are nonsterile, autoclavable, RNase-/DNase-free, nonpyrogenic, and DNA-free.

#### Smart Rack Pipet Tip Refill System Ordering Information

Cat. No.	Tip Volume (µL)	Color	Packs/Pack	Tips/Pack	Racks/Cs
4786	200	Natural	10	940	5
4787	200	Natural	10	960	5



### Pipet Tip Loading System

- ▶ The Corning pipet tip loading system makes reloading racks economical and effortless.
- ▶ The system consists of a one-piece base that attaches to a “magazine” consisting of 10 layers of 96 tips.
- ▶ Simply place the loader and magazine over an empty rack, lower the magazine, and “click” – the rack is loaded and ready for use.

#### Pipet Tip Loading System Ordering Information

Cat. No.	Description
4780	Starter Kit, natural 1-200 µL tips; includes 1 tip loader, 1 magazine with 960 tips and 10 empty racks
4781	Starter Kit, yellow 1-200 µL tips; includes 1 tip loader, 1 magazine with 960 tips and 10 empty racks

### Pipet Tip Loading System Refill Magazines

- ▶ Tip loading system refills consist of magazines containing 10 layers of 96 tips.
- ▶ Each magazine refills 10 racks.

#### Pipet Tip Loading System Refill Magazines Ordering Information

Cat. No.	Tip Volume (µL)	Color	Magazines/Cs	Tips/Magazine	Tips/Cs
4782	1-200	Natural	1	960	960
4783	1-200	Natural	5	960	4,800
4784	1-200	Yellow	1	960	960
4785	1-200	Yellow	5	960	4,800



**IsoTip™ Filtered Pipet Tips**

- ▶ Corning® IsoTip filtered pipet tips feature an inert, hydrophobic barrier that prevents aerosolized contaminants from coming in contact with pipettor shafts.
- ▶ Ideal for applications where avoiding cross contamination is critical, such as DNA amplification and radioisotope handling
- ▶ Packaged sterile
- ▶ Certified RNase-/DNase-free and nonpyrogenic
- ▶ The IsoTip plus tips (Cat. No. 4810) are designed for use with 2 to 20 µL, 10 to 100 µL, and 20 to 200 µL pipettors, eliminating the need to stock three different filter tips.
- ▶ A Pipet Tip Compatibility Guide can be ordered or downloaded from the Corning web site.

**IsoTip Filtered Pipet Tips Ordering Information**

Cat. No.	Volume Range (µL)	Precise Fit	Tips/Rack	Racks/Cs	Tips/Cs
4801	0.1-2.0	Gilson® and other popular ultra-micropipettors	96	10	960
4807	0.2-10	Gilson and other popular ultra-micropipettors	96	10	960
4808	0.5-10	Eppendorf® and other popular ultra-micropipettors	96	10	960
4821	1-30	All popular research-grade pipettors	96	10	960
4823	1-200	All popular research-grade pipettors	96	10	960
4810	1-200	All popular research-grade pipettors	96	10	960
4809	100-1,000	All popular research-grade pipettors	100	10	1,000

**1 to 200 µL Gel-Loading Pipet Tips**



- ▶ Corning gel-loading pipet tips feature a capillary end that allows easy access into vertical and horizontal electrophoresis gels.
- ▶ Total capacity of 200 µL
- ▶ Certified RNase-/DNase-free and nonpyrogenic
- ▶ Tips are 83 mm in length

**1 to 200 µL Gel-Loading Pipet Tips Ordering Information**

Cat. No.	Tip Shape	End Thickness (mm)	Sterile	Tips/Rack	Racks/Cs	Tips/Cs
4853	Round	0.5	No	200	2	400
4854	Flat	0.4	No	200	2	400
4884	Flat	0.2	No	200	2	400

**Microvolume Gel-Loading Pipet Tips**

- ▶ Corning microvolume gel-loading tips feature a capillary end for gel-loading and are designed for use with Gilson and other popular ultra-micropipettors.
- ▶ Working volume of 0.2 to 10 µL
- ▶ Certified RNase-/DNase-free and nonpyrogenic

**Microvolume Gel-Loading Pipet Tips Ordering Information**

Cat. No.	Tip Shape	End Thickness (mm)	Sterile	Tips/Rack	Racks/Cs	Tips/Cs
4815	Flat	0.2	No	200	2	400

### Microvolume Pipet Tips

- ▶ Microvolume tips provide accurate, reliable performance in the 0.2-10  $\mu\text{L}$  range for major brand ultra-micropipettors.
- ▶ All racked tips are certified RNase-/DNase-free and nonpyrogenic.

#### Microvolume Pipet Tips Ordering Information

Cat. No.	Volume Range ( $\mu\text{L}$ )	Fit	Sterile	Qty/Pk	Tips/Cs
4826	0.1-10	Gilson® and other popular ultra-micropipettors	No	96/rack	960
4894	0.1-10	Gilson and other popular ultra-micropipettors	Yes	96/rack	960
4840	0.2-10	Gilson and other popular ultra-micropipettors	No	1,000/bag	10,000
4830	0.5-10	Eppendorf® and other popular ultra-micropipettors	Yes	96/rack	960
4834	0.5-10	Eppendorf and other popular ultra-micropipettors	No	96/rack	960
4901	0.5-10	Eppendorf and other popular ultra-micropipettors	No	1,000/bag	10,000

## Reagent Reservoirs



Costar® Reagent Reservoirs are ideal for repetitively filling multichannel pipettors.

- ▶ Manufactured from modified polystyrene
- ▶ Sterile
- ▶ Disposable



#### Reagent Reservoirs Ordering Information

Cat No.	Volume (mL)	Color	Qty/Pk	Qty/Cs
4870	50	Natural	5/bag	200
4871	50	Natural	1/bag	100
4872	100	White	5/bag	200
4873	100	White	1/bag	100

## Transtar-96® Well Liquid Transfer System



- ▶ The Costar Transtar-96 System is a portable, autoclavable liquid handling device for use with 96 well plates.
- ▶ A sterile 96 tip disposable cartridge, which loads into the Transtar system, enables liquids to be aspirated, transferred and dispensed over a volume range of 25 to 200  $\mu\text{L}$  in 5  $\mu\text{L}$  increments.
- ▶ The Transtar-96 System is ideal for changing cell culture media and screening monoclonal antibodies.
- ▶ Transtar-96 System accuracy is rated at  $\pm 5\%$  at all volume levels.

#### Transtar-96 Well Liquid Transfer System Ordering Information

Cat. No.	Description	Sterile	Qty/Pk	Qty/Cs
4876	Transtar disposable reservoir liner, open	Yes	1	100
4877	Transtar disposable reservoir liner, 12-channel	Yes	1	100
4878	Transtar disposable reservoir liner, 8-channel	Yes	1	100
7605	Transtar-96, adjustable-volume pipettor	N/A	1	1
7606	Transtar elevator	N/A	1	1
7610	Transtar disposable cartridges	Yes	1	24



## Aspirator



The Costar® aspirator is an aspirating device for safe liquid removal/disposal from a variety of laboratory vessels.

### Aspirator Ordering Information

Cat. No.	Description
4930	Aspirator device (includes hand piece, grommet for accessory attachment, and single-channel adapter for use with disposable pipet tips)
4931	8-channel adapter for use with disposable pipet tips

## Vacuum Filters

Corning offers a variety of filter systems, membranes, pore sizes, and materials. For help in selecting the best filter combination for your research, please check our Technical Appendix for *Selecting the Best Filter for Your Application* on page 18.

### 115 mL Vacuum Filters

- ▶ 60 mm diameter membrane
- ▶ Low center of gravity and wide base for stability
- ▶ Separate pour spout to remove filtered sample which minimizes contamination
- ▶ Individually packaged, sterile, certified nonpyrogenic



### 115 mL Vacuum Filters Ordering Information

Cat. No.	Membrane	Volume (mL)	Pore Size (µm)	Qty/Cs
430944	CA	115	0.22	24
430945	CA	115	0.45	24

### 150 mL Tube Top Vacuum Filters

- ▶ 50 mm diameter membrane
- ▶ Minimizes unnecessary transfers by filtering directly into centrifuge tube
- ▶ Includes two centrifuge tube stands with each case
- ▶ Each polypropylene centrifuge tube is supplied with an individually wrapped cap for storage.
- ▶ Individually packaged, sterile, certified nonpyrogenic



### 150 mL Tube Top Vacuum Filters Ordering Information

Cat. No.	Membrane	Funnel Size/ Tube Size (mL)	Pore Size (µm)	Qty/Cs
430314	CA	150/50	0.45	12
430320	CA	150/50	0.22	12



### Vacuum Filter Systems

- ▶ Four sizes: 150 mL; 250 mL, 500 mL, and 1 L
- ▶ Adapters 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 nonpyrogenic
- ▶ Caps for receiver bottles are sterile and individually packaged.
- ▶ Extra plastic storage bottles are available, see page 11.
- ▶ Prefilters included

#### Vacuum Filter Systems Ordering Information

Cat. No.	Membrane	Funnel/Bottle Volume (mL)	Pore Size (µm)	Color-Coded Adapter	Qty/Cs
<i>150 mL Capacity, 50 mm Diameter Membrane</i>					
431153	PES	150/150	0.22	Yellow	12
431154	CA	150/150	0.22	Orange	12
431155	CA	150/150	0.45	Orange	12
<i>250 mL Capacity, 50 mm Diameter Membrane</i>					
430756	CN	250/250	0.2	Blue	12
430767	CA	250/250	0.22	Orange	12
430768	CA	250/250	0.45	Orange	12
430771	NY	250/250	0.2	Red	12
431096	PES	250/250	0.22	Yellow	12
<i>500 mL Capacity, 70 mm Diameter Membrane</i>					
430758	CN	500/500	0.2	Blue	12
430769	CA	500/500	0.22	Orange	12
430770	CA	500/500	0.45	Orange	12
430773	NY	500/500	0.2	Red	12
431097	PES	500/500	0.22	Yellow	12
<i>1,000 mL Capacity, 90 mm Diameter Membrane</i>					
430185	CN	1,000/1,000	0.45	Blue	12
430186	CN	1,000/1,000	0.2	Blue	12
430515	NY	1,000/1,000	0.2	Red	12
430516	CA	1,000/1,000	0.45	Orange	12
430517	CA	1,000/1,000	0.22	Orange	12
431098	PES	1,000/1,000	0.22	Yellow	12
431205*	CA	500*/1,000	0.22	Orange	12
431206*	CA	500*/1,000	0.45	Orange	12

\*500 mL Funnel with 70 mm membrane.

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



### Bottle Top Vacuum Filters

- Available in 33 mm and 45 mm neck sizes
- 45 mm neck sizes fit on Corning® plastic storage bottles, see page 11.
- Filters are color-coded by membrane type.
- Individually packaged, sterile and certified nonpyrogenic
- Prefilters included

#### Bottle Top Vacuum Filters Ordering Information

Cat. No.	Membrane	Volume (mL)	Neck Size (mm)	Pore Size (µm)	Color-Coded Adapter	Qty/Cs
<i>150 mL Capacity, 50 mm Diameter Membrane</i>						
430624	CA	150	33	0.22	Orange	48
430625	CA	150	33	0.45	Orange	48
430626	CA	150	45	0.22	Orange	48
430627	CA	150	45	0.45	Orange	48
431160	PES	150	33	0.22	Yellow	48
431161	PES	150	45	0.22	Yellow	48
431162	CN	150	33	0.2	Blue	48
<i>500 mL Capacity, 70 mm Diameter Membrane</i>						
430049	NY	500	45	0.2	Red	12
430512	CA	500	33	0.45	Orange	12
430513	CA	500	45	0.22	Orange	12
430514	CA	500	45	0.45	Orange	12
430521	CA	500	33	0.22	Orange	12
431117	PES	500	33	0.22	Yellow	12
431118	PES	500	45	0.22	Yellow	12
431168	CN	500	33	0.2	Blue	12
431171	CN	500	45	0.2	Blue	12
<i>1,000 mL Capacity, 90 mm Diameter Membrane</i>						
430014	CA	1,000	33	0.22	Orange	12
430015	CA	1,000	45	0.22	Orange	12
431173	PES	1,000	33	0.22	Yellow	12
431174	PES	1,000	45	0.22	Yellow	12

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

## Syringe Filters



### µStar® Syringe Filters

- Costar® µ-Star syringe filters have a bi-directional flow pattern that eliminates the priming and air lock effects of conventional syringe tip filters.
- Have a cellulose acetate membrane in a polyvinyl chloride (PVC) housing
- 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 filter, a Class II medical device, is designed for sterilization and clarification of aqueous solutions including: media additives, serum, antibiotics, biological fluids, radioactive tracers, and virus suspensions.
- Sterile, certified nonpyrogenic

#### µStar Syringe Filters Ordering Information

Cat. No.	Membrane	Color	Pore Size (µm)	Qty/Cs
8110	CA	Blue	0.22	50
8112	CA	Clear	0.45	50

CA = cellulose acetate.



### Syringe Filters

- Corning® syringe filters are 100% integrity tested, are certified nonpyrogenic and noncytotoxic, and are manufactured in accordance with ISO 9002 standards.
- A variety of membranes are available to meet your needs: PES for low protein binding and faster flow rates; surfactant-free cellulose acetate (SFCA) for the lowest protein binding; PTFE for chemical resistance; and regenerated cellulose (RC), the best choice for DMSO compatibility.

#### Syringe Filters Ordering Information

Cat. No.	Diameter (mm)	Pore Size (µm)	Membrane Material	Housing Material	Sterile	Inlet/Outlet	Packaging	Qty/Cs
431212	4	0.2	RC	PP	Yes	LL/LS	Ind	50
431215	15	0.2	RC	PP	Yes	LL/LS	Ind	50
431218	26	0.2	SFCA-PF	AC	Yes	LL/LS	Ind	50
431219	26	0.2	SFCA	AC	Yes	LL/LS	Ind	50
431220	26	0.45	SFCA	AC	Yes	LL/LS	Ind	50
431221	26	0.8	SFCA	AC	Yes	LL/LS	Ind	50
431222	25	0.2	RC	PP	Yes	LL/LS	Ind	50
431224	25	0.2	NY	PP	Yes	LL/LS	Ind	50
431225	25	0.45	NY	PP	Yes	LL/LS	Ind	50
431227*	50	0.2	PTFE	PP	Yes	HB/HB	Ind	12
431229	26	0.2	PES	AC	Yes	LL/LS	Ind	50
431231	25	0.45	PTFE	PP	No	LL/LS	Bulk	50

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.

\*Recommended as in-line air filter.

### Spin-X® Centrifuge Tube Filters



- Costar® Spin-X centrifuge tube filters consist of a membrane-containing filter unit within a centrifuge tube.
- Uses:
  - Removing bacteria, cells and particles from liquids
  - HPLC sample preparation
  - DNA removal from agarose or acrylamide gels. Maximum RCF (Relative Centrifugal Force [x g]) is 16,000

#### Spin-X Centrifuge Tube Filters Ordering Information

Cat. No.	Membrane Material	Working Volume (µL)	Pore Size (µm)	Tube Size (mL)	Qty/Cs
8160	CA	500	0.22	2.0	96
8161*	CA	500	0.22	2.0	100
8162	CA	500	0.45	2.0	96
8163*	CA	500	0.45	2.0	100
8169*	NY	500	0.22	2.0	200
8170*	NY	500	0.45	2.0	200

CA = Cellulose Acetate, NY = Nylon.

\*Indicates that the product is nonsterile and certified nonpyrogenic.

## Storage Bottles



- ▶ Disposable polystyrene bottles for storage of media, buffers and other aqueous solutions
- ▶ Two styles:
  - Low profile, easy grip style has sides that facilitate handling
  - Traditional style has smooth sides
- ▶ Plug seal caps (45 mm) provide an airtight seal and help minimize the risk of contamination.
- ▶ Bottles can be used with Corning® Vacuum Filter Systems.
- ▶ Sterile, certified nonpyrogenic

### Corning Easy Grip Style Storage Bottles Ordering Information

Cat. No.	Volume (mL)	Neck Size (mm)	Qty/Pk	Qty/Cs
431175	150	45	2	24
430281	250	45	2	24
430282	500	45	2	24
430518	1,000	45	2	24

### Costar® Traditional Style Storage Bottles Ordering Information

Cat. No.	Volume (mL)	Neck Size (mm)	Qty/Pk	Qty/Cs
8388	125	45	1	24
8390	250	45	1	12
8393	500	45	1	12
8396	1,000	45	1	12

## Containers



- ▶ Flexible polypropylene bottom with snap-on polyethylene lid serves as a beaker or storage container.
- ▶ Graduated in both milliliters and ounces
- ▶ Certified nonpyrogenic

### Containers Ordering Information

Cat. No.	Description	Sterile	Capacity (mL)	Qty/Pk	Qty/Cs
430179	Container and Lid	Yes	250	1	100
430180	Container Only	Yes	250	20	500
430181	Lid Only	Yes	n/a	20	500

## Cylinder



- ▶ Corning optically clear polystyrene graduated cylinder is designed for sterile, accurate dispensing of culture media or other biological fluids.
- ▶ A polyethylene dust cover is included.

### Cylinder Ordering Information

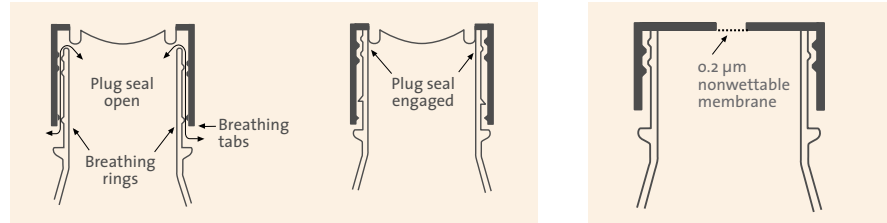
Cat. No.	Capacity (mL)	Graduation (mL)	Sterile	Qty/Pk	Qty/Cs
430182	100	1	Yes	1	50

# Erlenmeyer Flasks



## Polycarbonate Erlenmeyer Flasks

- ▶ Made from optically clear polycarbonate
- ▶ Ideal for shaker culture applications
- ▶ Two-position polypropylene plug seal caps can be open for gas exchange or closed for liquid-tight seal.
- ▶ Vent caps available for applications requiring sterile gas exchange.
- ▶ Sterilized by gamma radiation
- ▶ Certified nonpyrogenic



Breathable two-position plug seal caps feature one-piece linerless construction with a flexible plug for a gas- and liquid-tight seal. In addition, the unique breathable cap design allows use in either an open or closed mode.

Vent caps contain a 0.2 µm non-wettable membrane sealed to the cap, providing consistent, sterile gas exchange while minimizing the risk of contamination.

## Polycarbonate Erlenmeyer Flasks Ordering Information

Cat. No.	Capacity (mL)	Graduation (mL)	Neck Diameter (mm)	Cap Style	Qty/Pk	Qty/Cs
430421	125	25	26	Plug Seal	1	50
431143	125	25	26	Vent Cap	1	50
430183	250	25	31	Plug Seal	1	50
431144	250	25	31	Vent Cap	1	50
430422	500	50	43	Plug Seal	1	25
431145	500	50	43	Vent Cap	1	25
431146	1,000	50	43	Plug Seal	1	25
431147	1,000	50	43	Vent Cap	1	25



431255 2L Erlenmeyer Flask



431252 3L Fernbach Culture Flask

## Polycarbonate 2L and 3L Flasks

- ▶ Made from optically clear polycarbonate
- ▶ Ideal for shaker and suspension culture applications
- ▶ Flasks are available with or without baffled bottoms.
- ▶ Vent caps are supplied in every case and feature a hydrophobic membrane for applications requiring sterile gas exchange.
- ▶ Sterilized by gamma radiation
- ▶ Certified nonpyrogenic

## Polycarbonate 2L and 3L Flasks Ordering Information

Cat. No.	Description	Sterile	Qty/Cs
431255	Erlenmeyer Flask, 2L, Polycarbonate	Yes	6
431256	Erlenmeyer Flask, 2L, Polycarbonate, Baffled Bottom	Yes	6
431252	Fernbach Culture Flask, 3L, Polycarbonate	Yes	4
431253	Fernbach Culture Flask, 3L, Polycarbonate, Baffled Bottom	Yes	4

## Spatulas



Spatulas



Microspatulas

- ▶ Corning® spatulas are designed to save researcher's time and to provide them with contamination-free samples.
- ▶ Each spatula is individually packaged, RNase-/DNase-free, nonpyrogenic, antistatic and sterile.
- ▶ They are specifically targeted toward researchers interested in eliminating the recycling and resterilizing necessary with reusable spatulas.
- ▶ Spatulas are available in five different configurations.

### Spatulas Ordering Information

Cat. No.	Description	Qty/Cs
3003	Spatula, Tapered Blade/Spoon	100
3004	Spatula, Small Spoon/Spoon	100
3005	Spatula, Round End/Spoon	100
3006	Spatula, V-Scoop/Spoon	100
3007	Spatula, Flat End/Spoon	100
3012	Microspatula, tapered end/scoop	50
3013	Microspatula, rounded end/scoop	50

## Centrifuge Tubes



### 15 mL Centrifuge Tubes

- ▶ Corning 15 mL centrifuge tubes feature black printed graduations and a large white marking spot.
- ▶ Tubes are available with your choice of cap styles; the original plug seal or flat cap. Both provide a tight, secure seal.
- ▶ Tubes are available in racks or bulk packed and are sterile and certified nonpyrogenic.

### Centrifuge Tubes Ordering Information

Cat. No.	Material	Cap Style	Max. RCF	Qty/Pk	Qty/Cs
430053	PET	Plug Seal	3,600	25/Sleeve	500
430055	PET	Plug Seal	3,600	50/Rack	500
430788	PET	Flat Top	3,600	50/Rack	500
430789	PET	Flat Top	3,600	25/Sleeve	500
430052	PP	Plug Seal	8,400	50/Rack	500
430766	PP	Plug Seal	8,400	25/Sleeve	500
430790	PP	Flat Top	8,400	50/Rack	500
430791	PP	Flat Top	8,400	25/Sleeve	500
430630	OPP	Plug Seal	6,000	50/Rack	500

PP = Polypropylene, OPP = Opaque Polypropylene, PET = Polyethylene Terephthalate, RCF = Relative Centrifugal Force (x g).

### 50 mL Centrifuge Tubes

- ▶ Corning 50 mL centrifuge tubes feature black printed graduations and a large white marking spot.
- ▶ These tubes are available with your choice of cap styles; the original plug seal or flat cap. Both provide a tight, secure seal.
- ▶ Tubes are available in racks or bulk packed and are sterile and certified nonpyrogenic.

### 50 mL Centrifuge Tubes Ordering Information

Cat. No.	Material	Cap Style	Max. RCF	Qty/Pk	Qty/Cs
430290	PP	Plug Seal	9,400	25/Rack	500
430291	PP	Plug Seal	9,400	25/Sleeve	500
430304	PET	Plug Seal	3,600	25/Rack	500
430522	OPP	Plug Seal	6,000	25/Rack	500
430828	PP	Flat Top	9,400	25/Rack	500
430829	PP	Flat Top	9,400	25/Sleeve	500

PP = Polypropylene, OPP = Opaque Polypropylene, PET = Polyethylene Terephthalate, RCF = Relative Centrifugal Force (x g).



### Self-Standing 50 mL Centrifuge Tubes

- All Corning® 50 mL centrifuge tubes feature black printed graduations and a large white marking spot.
- Tubes are available with your choice of cap styles; the original plug seal or flat cap. Both provide a tight, secure seal.
- Tubes are bulk packed and are sterile and certified nonpyrogenic.

#### Self-Standing 50 mL Centrifuge Tubes Ordering Information

Cat. No.	Material	Cap Style	Max. RCF	Qty/Pk	Qty/Cs
430897	PP	Plug Seal	3,000	25	500
430921	PP	Flat Top	3,000	25	500

PP = Polypropylene, RCF = Relative Centrifugal Force (x g).

### 250 mL and 500 mL Centrifuge Tubes and Support Cushions

- Corning 250 mL and 500 mL polypropylene tubes are ideal for applications requiring large-volume centrifugation.
- Each case of tubes contains a rack to facilitate handling.
- Support cushions must be used with this product unless the rotor has appropriately shaped V-bottom holders.
- Tubes are sterile and certified nonpyrogenic.

#### 250 mL and 500 mL Centrifuge Tubes Ordering Information

Cat. No.	Description	Material	Cap Style	Max RCF	Qty/Pk	Qty/Cs
430776	250 mL Tube	PP	Plug	6000	6	102
430236	250 mL Support Cushion	PEI	n/a	n/a	n/a	6
431123	500 mL Tube	PP	Plug	6000	6	36
431124	500 mL Support Cushion	PEI	n/a	n/a	n/a	6

PP = Polypropylene, PEI = Polyetherimide, RCF = Relative Centrifugal Force (x g).



431123 500 mL Centrifuge Tube

## Microcentrifuge Tubes

Corning offers two styles of microcentrifuge tubes: traditional snap cap tubes for quick access or screw cap tubes for greater sealing security.

### Snap Cap Polypropylene Microcentrifuge Tubes

- Costar® microcentrifuge tubes are certified RNase-/DNase-free.
- Supplied nonsterile and are autoclavable
- External graduations and frosted writing spot for easy sample identification.
- Positive seal design allows for repeated opening and closing.
- Flat cap surface for convenient labeling
- Withstands a maximum RCF of 17,000 x g
- Costar low binding microcentrifuge tubes feature a bonded polymer technology that reduces protein and nucleic acid binding, resulting in better sample recovery.



#### Snap Cap Polypropylene Microcentrifuge Tubes Ordering Information

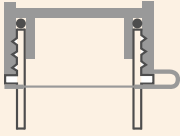
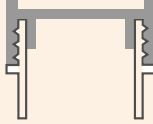
Cat. No.	Volume (mL)	Color	Qty/Pk	Qty/Cs
<i>Snap Cap Microcentrifuge Tubes</i>				
3208	0.65	Natural	500	1,000
3209*	0.65	Rainbow*	200	1,000
3620	1.7	Natural	500	500
3621	1.7	Natural	500	5,000
3622*	1.7	Rainbow*	100	500
3213	2.0	Natural	500	1,000
<i>Low Binding Snap Cap Microcentrifuge Tubes Ordering Information</i>				
3206	0.65	Natural	500	500
3207	1.7	Natural	250	250

\*Rainbow pack includes one bag each of blue, green, yellow, red, and orange tubes.

### Screw Cap Polypropylene Microcentrifuge Tubes



- ▶ Corning® polypropylene microcentrifuge tubes feature screw caps that provide a tight secure seal.
- ▶ Choice of attached cap with silicone O-ring or unattached rim seal cap
- ▶ All tubes have a large white marking spot.
- ▶ Withstands a maximum RCF of 13,000 x g
- ▶ Sterile



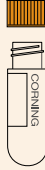
	<ul style="list-style-type: none"> <li>• Attached loop cap allows for optimum one-handed convenience. Silicone O-ring gasket provides a snug seal, safeguarding samples against leakage.</li> </ul>		<ul style="list-style-type: none"> <li>• Easy-to-use unattached rim seal cap design twists on or off in a single turn.</li> </ul>
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#### Screw Cap Polypropylene Microcentrifuge Tubes Ordering Information

Cat. No.	Volume (mL)	Cap Style	O-ring	Self Standing	Qty/Cs
430909	1.5	Attached	Yes	No	500
430915	2.0	Attached	Yes	Yes	500
430917	2.0	Unattached	No	Yes	500

## Cryogenic Vials and Accessories

Corning offers three styles of cryogenic vials as well as storage racks and boxes.

	<p><b>External Thread Cryogenic Vial</b></p> <ul style="list-style-type: none"> <li>▶ Color-coded polypropylene cap inserts simplify vial identification. Available in variety packs of white, blue, green, red, and yellow.</li> <li>▶ Silicone washer provides a secure seal.</li> <li>▶ Easy-to-read black graduations for partial volumes</li> <li>▶ Self-standing base, self-locking skirt</li> </ul>		<p><b>Internal Thread Cryogenic Vial</b></p> <ul style="list-style-type: none"> <li>▶ Color-coded polypropylene cap inserts simplify vial identification. Available in variety packs of white, blue, green, red, and yellow.</li> <li>▶ Silicone washers or rubber O-rings provide a secure seal.</li> <li>▶ Easy-to-read black graduations for partial volumes</li> <li>▶ Self-standing base, self-locking skirt</li> </ul>		<p><b>External Thread Plug Seal Cap</b></p> <ul style="list-style-type: none"> <li>▶ Sure-grip plug seal screw cap</li> <li>▶ Inner cap ring assures a tight seal.</li> </ul>
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### External Thread Cryogenic Vials



- ▶ Manufactured from polypropylene to withstand temperatures down to -196°C
- ▶ Larger marking spot
- ▶ Black graduations
- ▶ Certified RNase-/DNase-free
- ▶ Vials have a silicone washer for a secure seal.
- ▶ Vials may be color coded with inserts (Cat. No. 430499).
- ▶ Self-standing vials have a special base design allowing them to be locked into cryogenic rack and tray (Cat. No. 430525 or 431131) for single-handed manipulation.
- ▶ Sterilized by gamma radiation
- ▶ Certified nonpyrogenic
- ▶ Free foam rack with each case

#### External Thread Cryogenic Vials Ordering Information

Cat. No.	Capacity (mL)	Style	Self-Standing	Qty/Pk	Qty/Cs
430658	1.2	Conical Bottom	Yes	50	500
430659	2.0	Round Bottom	Yes	50	500
430661	2.0	Round Bottom	No	50	500
430662	4.0	Round Bottom	Yes	50	500
430663	5.0	Round Bottom	Yes	50	500

**Warning!** Do not use cryogenic vials for storage in the liquid phase of liquid nitrogen. Only store vials in the vapor phase above the liquified gas. Always use appropriate safety equipment when removing vials from cryogenic storage.



### Internal Thread Cryogenic Vials

- ▶ Manufactured from polypropylene to withstand temperatures down to -196°C
- ▶ Larger marking spot
- ▶ Black graduations
- ▶ Certified RNase-/DNase-free
- ▶ Vials have a silicone washer or rubber O-ring for a secure seal.
- ▶ Vials may be color coded with inserts (Cat. No. 430499).
- ▶ Self-standing vials have a special base design allowing them to be locked into cryogenic rack and tray (Cat. No. 430525 or 431131) for single-handed manipulation.
- ▶ Sterilized by gamma radiation
- ▶ Certified nonpyrogenic
- ▶ Free foam rack with each case

#### Internal Thread Cryogenic Vials Ordering Information

Capacity Cat. No.	(mL)	Style	Self- Standing	Seal Type	Qty/Pk	Qty/Cs
430487	1.2	Conical Bottom	Yes	Washer	50	500
2012	1.2	Conical Bottom	Yes	O-Ring	50	250
430488	2.0	Round Bottom	Yes	Washer	50	500
430489	2.0	Round Bottom	No	Washer	50	500
2027	2.0	Round Bottom	No	O-Ring	50	250
2028	2.0	Round Bottom	Yes	O-Ring	50	250
430490	4.0	Round Bottom	No	Washer	50	500
430491	4.0	Round Bottom	Yes	Washer	50	500
430492	5.0	Round Bottom	No	Washer	50	500
430656	5.0	Round Bottom	Yes	Washer	50	500
2051	5.0	Round Bottom	No	O-Ring	50	250

**Warning!** Do not use cryogenic vials for storage in the liquid phase of liquid nitrogen. Only store vials in the vapor phase above the liquified gas. Always use appropriate safety equipment when removing vials from cryogenic storage.

### External Thread Cryogenic Vials with Plug Seal Cap



- ▶ Manufactured from polypropylene to withstand temperatures down to -196°C
- ▶ Vials feature an external thread with a traditional plug seal cap design for a secure seal.
- ▶ Cap does not accept color-coded inserts.
- ▶ Sterilized by gamma radiation
- ▶ Certified nonpyrogenic

#### External Thread Cryogenic Vials with Plug Seal Cap Ordering Information

Cat. No.	Capacity (mL)	Style	Self-Standing	Qty/Pk	Qty/Cs
430289	2.0	Round Bottom	No	50	500

**Warning!** Do not use cryogenic vials for storage in the liquid phase of liquid nitrogen. Only store vials in the vapor phase above the liquified gas. Always use appropriate safety equipment when removing vials from cryogenic storage.

### Cap Inserts for Cryogenic Vials



- ▶ Caps inserts provide color-coding for easy sample identification.
- ▶ Inserts are packaged in resealable bags.
- ▶ Nonsterile
- ▶ Cap inserts fit all Corning® cryogenic vials except Cat. No. 430289.

#### Cryogenic Vials Cap Inserts Ordering Information

Cat. No.	Description	Qty/Pk	Qty/Cs
430499	Assorted colors, polypropylene cap inserts: 100 each of white, blue, red, green, and yellow	50	500



### Cryogenic Vial Racks and Storage Boxes

- ▶ Reusable racks are designed for use with most cryogenic vials.
- ▶ Cat. No. 430525 has a locking feature for use with all Corning® self-standing vials.

#### Cryogenic Vial Racks and Storage Boxes Ordering Information

Cat. No.	Description	Qty/Pk	Qty/Cs
430525	Polycarbonate rack and tray, holds 30 vials; self-locking design in ice/water bath	1	1
430526	Polycarbonate rack only, holds 30 vials; self-locking design	1	1
431131	Reusable orange polypropylene vial rack, holds 50 vials; self-locking design	2	2
431119	81 count (9 x 9 array) Cryogenic Box, for 1-2 mL vials	5	10
431120	81 count (9 x 9 array) Cryogenic Box, for 4-5 mL vials	5	10
431121*	100 count (10 x 10 array) Cryogenic Box, for 1-2 mL vials	5	10

\*431121 accepts internally threaded cryogenic vials only.

## Netwell™ Inserts and Accessories



### Netwell Inserts

- ▶ Costar® Netwell inserts have polyester mesh bottoms attached to polystyrene inserts.
- ▶ They are used as tissue carriers, supports and strainers for culture of small organs, tissue slices or explants at the air-media interface.
- ▶ Handy carrier during immunocytochemical staining of tissue slices (see accessories below)
- ▶ Provides coarse filtration of tissue homogenates, cell suspensions and microcarriers
- ▶ Available in two mesh sizes and diameters
- ▶ Supplied sterile and preloaded in 6- or 12-well microplates
- ▶ 24 mm Netwell inserts fit in Corning 50 mL plastic centrifuge tubes.

#### Netwell Inserts Ordering Information

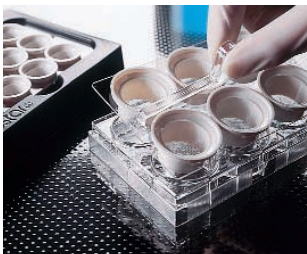
Cat. No.	Membrane Dia. (mm)	Polyester Membrane Mesh Size (µm)	Sterile	Inner Packaging	Inserts/Cs
3477	15	74	Yes	12/plate	48
3478	15	500	Yes	12/plate	48
3479	24	74	Yes	6/plate	48
3480	24	500	Yes	6/plate	48

### Netwell Accessories

- ▶ Specially designed Netwell carriers and handles allow simultaneous processing of up to 12 samples per carrier.
- ▶ Polystyrene reagent trays are available in white for colorimetric reaction contrast, or black for better visibility of tissue sections.
- ▶ Each carrier kit contains eight carriers and eight handles.

#### Netwell Accessories Ordering Information

Cat. No.	Description	Qty/Cs
3517	Netwell Reagent Tray, black	200
3519	Netwell Reagent Tray, white	200
3520	Netwell Carrier Kit, 15 mm	8
3521	Netwell Carrier Kit, 24 mm	8



# Technical Appendix

## SELECTING THE BEST FILTER FOR YOUR APPLICATION

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.**
- Step 3: Select the correct membrane diameter to optimize flow rate and throughput.**
- Step 4: Choose the best filter design for your application.**

### 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.

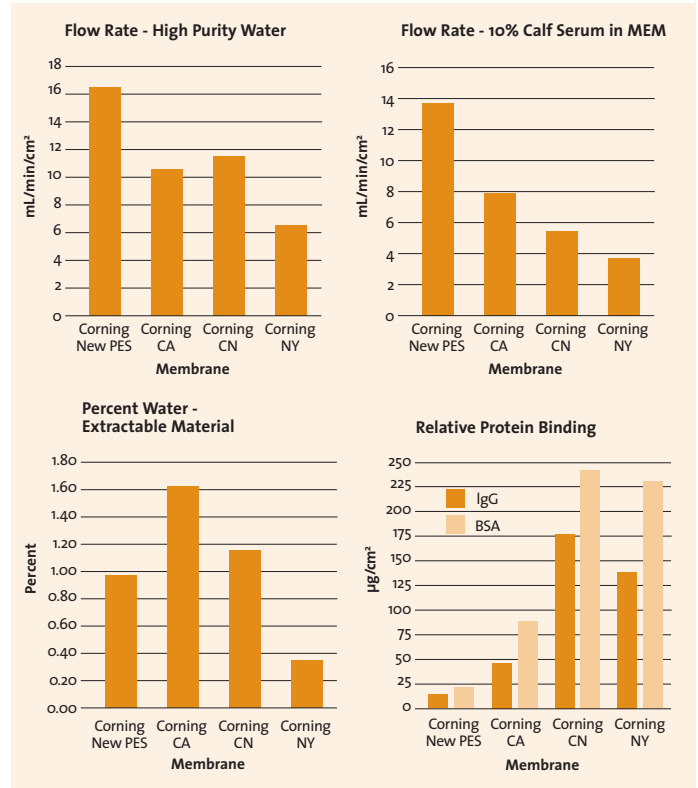
### Step 2: Select the Best Membrane and Housing Material for Your Application

Your filter unit must be fully compatible with the chemical characteristics of your sample.

- ▶ Some filter membranes contain nontoxic 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 following four graphs (Figure 1)

**Figure 1. Important Performance Characteristics of Corning Filter Membranes**



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

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 (page 19) will help you choose the best Corning membranes for your applications.

### Corning Filter Membrane Materials

**Polyethersulfone (PES)** membranes are the best for filtering cell culture media. PES has very low protein binding and extractables. PES also demonstrates faster flow rates than cellulose or nylon membranes.

**Table 1. Selecting the Pore Size**

Application	Pore Size (µm)	Membrane Availability
Sterilization and Ultracleaning of Aqueous Solutions	0.20 to 0.22	All Membranes except Teflon™
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.

**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.

**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; polytetrafluoroethylene)** 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 as depth filters for prefiltering solutions. They have very high particle loading capacity and are ideal for prefiltering dirty solutions and difficult to filter biological fluids such as sera.

**Table 2. Characteristics of Corning Filter Membranes**

	Cellulose Nitrate	Cellulose Acetate	Nylon	Polyether-Sulfone	Regenerated Cellulose	Teflon (PTFE)
Flow rates for medium with 10% serum	Good	Very Good	Poor	Best	NA	NA
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

**Table 3. Chemical Resistance Guide for Corning Filters**

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.

Chemical Class	Filter Membranes								Housing Materials				
	CN	CA	PC	NY	PES	RC	PTFE	PET	PS	PP	AC	PYR	PVC
Weak Acids	2	2	1	2	3	1	1	1	1	1	2	1	1
Strong Acids	3	2	3	3	3	3	1	3	2	1	3	2	1
Alcohols	3	1	1	1	1	1	1	1	2	1	3	1	1
Aldehydes	2	3	2	2	3	2	1	1	3	1	3	1	3
Aliphatic Amines	3	3	3	1	1	1	1	1	3	1	3	1	2
Aromatic Amines	3	3	3	2	3	1	1	2	3	1	3	1	3
Bases	3	3	3	2	3	2	1	3	1	1	2	2	1
Esters	3	3	2	1	3	1	1	1	3	2	2	1	3
Hydrocarbons	2	2	2	2	3	1	1	1	3	2	2	1	2
Ketones	3	3	2	2	3	1	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, PC = polycarbonate, PES = polyethersulfone, PET = polyethylene terephthalate, RC = regenerated cellulose, PS = polystyrene, PTFE = polytetrafluoroethylene (Teflon), PP = polypropylene, PVC = polyvinylchloride, AC = Acrylic copolymer.

## Corning® Filter Housing Materials

The filter housing materials also must be compatible with the solutions being filtered.

**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 (page 19) 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 less aggressive 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.

## 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 basic information on the chemical resistance of Corning filter membranes and housings.

## 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.

## Step 4: Choose the Best Filter Design for Your Application

### 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 one-piece filter systems. Four membranes are available to meet all of your filtration needs: cellulose acetate, cellulose nitrate, nylon, or polyethersulfone.

### Disposable Syringe/Disc Filters

The smaller conventional Corning syringe disc-type filters (4, 15, 25, and 26 mm diameter) are used with syringes which

**Table 4. Typical Expected Throughput Volumes**

Filter Diameter and Description	Area (cm <sup>2</sup> ) Throughput (mL)*	Effective Filter Expected
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	200-1,000
70 mm vacuum system	38.5	300-1,500
90 mm vacuum system	58.1	500-2,000

\*These values assume an aqueous solution and a 0.2 µm 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 to 100% above the values shown.

serves as both the fluid reservoir and the pressure source. 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 50 mm 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.

## Spin-X® Disposable Centrifuge Tube Filters

Costar® 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*).

## Corning FiltrEX™ 96 and 384 Well Filter Plates

Information on Corning FiltrEX 96 and 384 well filter plates can be found in the Corning Genomics Selection Guide or on the Corning Life Sciences web site [www.corning.com/lifesciences](http://www.corning.com/lifesciences).

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, and 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, 0.22, and 0.45	Easy grip bottles for storing filtrate
Bottle Top Vacuum Filters	Yes	50, 70 and 90	PES, CA, CN, and Nylon	0.2, 0.22, and 0.45	2 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 50mL centrifuge tube
115 One Piece Vacuum Filters	Yes	60	CA and CN	0.2 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
FiltrEX™ 96 and 384 Well Filter Plates	Some	6.4, 3.2	PVDF, GlassFiber, PES, NC, and UF	0.2, 0.45, 1.2 and others	Clear, opaque, or solvent resistant*

\*Call for specific details; several custom-made products available.

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

## CHARACTERISTICS OF CORNING PLASTICWARE

		Polystyrene	Polyethylene (High Density)	Polypropylene	Polycarbonate	Nylon	P.T.F.E. (Teflon®)
<b>Physical Characteristics</b>	Basic Properties	Biologically inert, hard, excellent optical qualities	Biologically inert, high chemical resistance	Biologically inert, high chemical resistance, exceptional toughness	Clear, very tough, inert, high temperature resistance	Tough, heat resistant, machinable, high moisture vapor transmission	Biologically and chemically inert, high resistant slippery surface
	Clarity	Clear	Opaque	Translucent	Clear	Opaque	Opaque
	Autoclave Results	Melts	May distort	Withstands several cycles	Withstands one cycle	OK	OK
	Heat Distortion Point	147-175°F 64-80°C	250°F 121°C	275°F 135°C	280-290°F 138-143°C	300-356°F 150-180°C	250°F 121°C
	Burning Rate	Slow	Slow	Slow	Self-extinguishing	Self-extinguishing	None
<b>Effects of Laboratory Reagents</b>	Weak Acids	None	None	None	None	None	None
	Strong Acids	Oxidizing acids attack	Oxidizing acids attack	Oxidizing acids attack	May be attacked	Attacked	None
	Weak Alkalies	None	None	None	None	None	None
	Strong Alkalies	None	None	None	Slowly attacked	None	None
	Organic Solvents	Soluble in aromatic chlorinated hydrocarbons	Resistant below 80°C	Resistant below 80°C	Soluble in chlorinated hydrocarbons; partly soluble in aromatics	Resistant	Resistant
<b>Gas Permeability of Thin Wall Products*</b>	O <sub>2</sub>	Low	High	High	Very low	Very low	-
	N <sub>2</sub>	Very low	Low	Low	Very low	Very low	-
	CO <sub>2</sub>	High	Very high	Very high	Low	-	-

Portions of this table courtesy of Modern Plastics Encyclopedia. Most data are from tests by A.S.T.M. methods. Tables show averages or ranges. Many properties vary with manufacturer, formulation, testing laboratory, and the specific operating conditions.

\*Obtained from a table which lists gas permeability in CC/100 sq. inches per 24 hrs./mil.

## CHEMICAL COMPATIBILITY OF CORNING PLASTICWARE

	PS	PP	PVC	CA	PC	CN	NY	MCE	PTFE	PET
<i>Acids</i>										
Hydrochloric acid (25%)	G	G	G	N	R	R	N	O	R	R
Hydrochloric acid (concentrated)	F	G	F	N	R	N	N	N	R	O
Nitric acid (concentrated)	P	P	P	N	R	N	N	N	O	N
Nitric acid (25%)	P	G	F	N	R	L	N	O	R	R
<i>Alcohols</i>										
Butanol	G	G	G	R	R	R	R	R	R	R
Ethanol	G	G	G	R	R	N	R	O	R	R
Methanol	G	G	G	R	R	N	R	O	R	R
<i>Amines</i>										
Aniline	G	G	P	N	N	R	R	N	R	O
Dimethylformamide	P	G	F	N	N	N	R	N	R	N
<i>Bases</i>										
Ammonium hydroxide (25%)	F	G	G	R	N	R	R	O	N	O
Ammonium hydroxide (1N)	F	G	G	N	N	R	R	O	N	N
Sodium hydroxide	G	G	G	N	N	N	R	N	R	N
<i>Hydrocarbons</i>										
Hexane	P	G	F	R	R	R	R	R	R	R
Toluene	P	G	P	R	O	R	R	R	R	N
Xylene	P	F	P	R	R	R	R	R	R	N
Dioxane	P	G	P	N	N	N	R	N	R	R
Dimethylsulfoxide (DMSO)	P	G	P	N	N	N	R	N	R	O*
<i>Halogenated Hydrocarbons</i>										
Chloroform	P	G	P	N	N	R	R	N	R	R
Methylene chloride	P	F	P	N	N	R	R	N	R	N
<i>Ketones</i>										
Acetone	P	G	P	N	O	N	R	N	R	R
Methyl ethyl diketone	P	G	P	N	O	N	R	O	R	R

\*Can be used with aqueous solutions containing up to 20% DMSO.

R = Recommended, L = Limited Resistance, N = Not Recommended, O = Testing Advised, F = Fair, G = Good, P = Poor, PP = Polypropylene, PVC = Polyvinyl Chloride, CA = Cellulose Acetate, PC = Polycarbonate, PTFE = Polytetrafluoroethylene PS = Polystyrene, CN = Cellulose Nitrate, NY = Nylon, MCE = Mixed Cellulose Esters, PET = Polyethylene Terephthalate.

## CHARACTERISTICS OF CORNING® CENTRIFUGE TUBES

The following information is provided to serve as a general guideline for determining suitability of Corning centrifuge tubes for your applications. In addition, Corning recommends following the procedures outlined by the centrifuge manufacturer, as well as conducting a trial run to determine proper conditions before beginning any critical applications.

Corning centrifuge tubes are tested for leakage. They should not break or leak if used in a properly balanced rotor with suitable carriers, holders, and adapters that fully support the tubes when run in accordance with the guidelines in this section. These tubes are intended for one-time use only; reuse is not recommended as breakage or leakage may occur.

The recommended working temperature range for Corning centrifuge tubes is 0 to 40°C. The suitability of these tubes for storage below 0°C depends on both the solution and the

storage conditions. In general, the polypropylene and PET tubes are more resistant to stress at low temperatures than polystyrene. It is strongly recommended that a trial run be performed under actual conditions to test the suitability of the tubes for frozen storage.

### Suggestions for Safe Centrifugation

- ▶ **Caution:** When centrifuging pathogenic organisms, clinical specimens known or suspected of being infectious, or any other potentially biohazardous materials, approved safety containment systems should be used. Contact your centrifuge manufacturer for appropriate accessories or recommendations.
- ▶ Read protocols and instruction manuals carefully. Do not confuse speed or revolutions per minute (RPM) with relative centrifugal force (RCF). Instructions for centrifuging a sample at a given RPM and time are incomplete unless the rotor or radius is specified. Protocols should always state the time and RCF value for centrifuging a sample.

- Proper balancing and distribution of the load in a centrifuge is critical for optimum performance and to prevent damage to the tubes or centrifuge. Opposing buckets or loads should always be balanced within the range specified by the manufacturer. Tubes should always be distributed in the buckets with respect to the center of rotation as well as the pivotal axis of the bucket. Failure to do this may prevent the bucket from achieving a horizontal position during the centrifugation run. Uneven separations or tube failure may result.

These centrifuge tubes are intended for use by persons knowledgeable in safe laboratory practices. Failure can result from surface damage, exceeding the specified RCF values, using unsuitable support systems, improper temperatures, or incompatible chemicals.

The RCF ratings for Corning® disposable centrifuge tubes have been established at room temperature using tubes filled to nominal capacity with water and spun in a horizontal rotor

centrifuge for 5 minutes. The centrifuge must be equipped with the recommended carriers, adapters, and cushions that fully support the tubes. If an angle head rotor is used or proper support is not provided, RCF values will be lower. Use of liquid other than water may also lower RCF values. Please consult your centrifuge specifications and the nomogram table (page 24) to determine speeds at which maximum RCF is achieved.

### Chemical Compatibility of Disposable Plastic Centrifuge Tubes

The mechanical strength, flexibility, color, weight and dimensional stability of all plastic centrifuge tubes are affected to varying degrees by the chemicals with which they come in contact. Specific operating conditions, especially temperature, RCF, rotor type, carrier design, and run length will also affect tube performance.

### Physical Properties of Disposable Plastic Centrifuge Tubes

	Clear Polypropylene	Opaque Polypropylene	New Polyethylene Terephthalate
Recommended Working Temp*	0-40°	0-40°	0-40°
Heat Distortion Point	121°	121°	70°
Flexibility	Moderate	Moderate	Rigid
Transparency	Clear	Opaque	Clear
Maximum RCF:			
15 mL Tube	8,400 x g	6,000 x g	3,600 x g
50 mL Tube	9,400 x g	6,000 x g	–
250 mL Tube	–	6,000 x g	–
500 mL Tube	–	6,000 x g	–

\*At room temperature for 24 hours.

### Chemical Resistance of Disposable Plastic Centrifuge Tubes\*

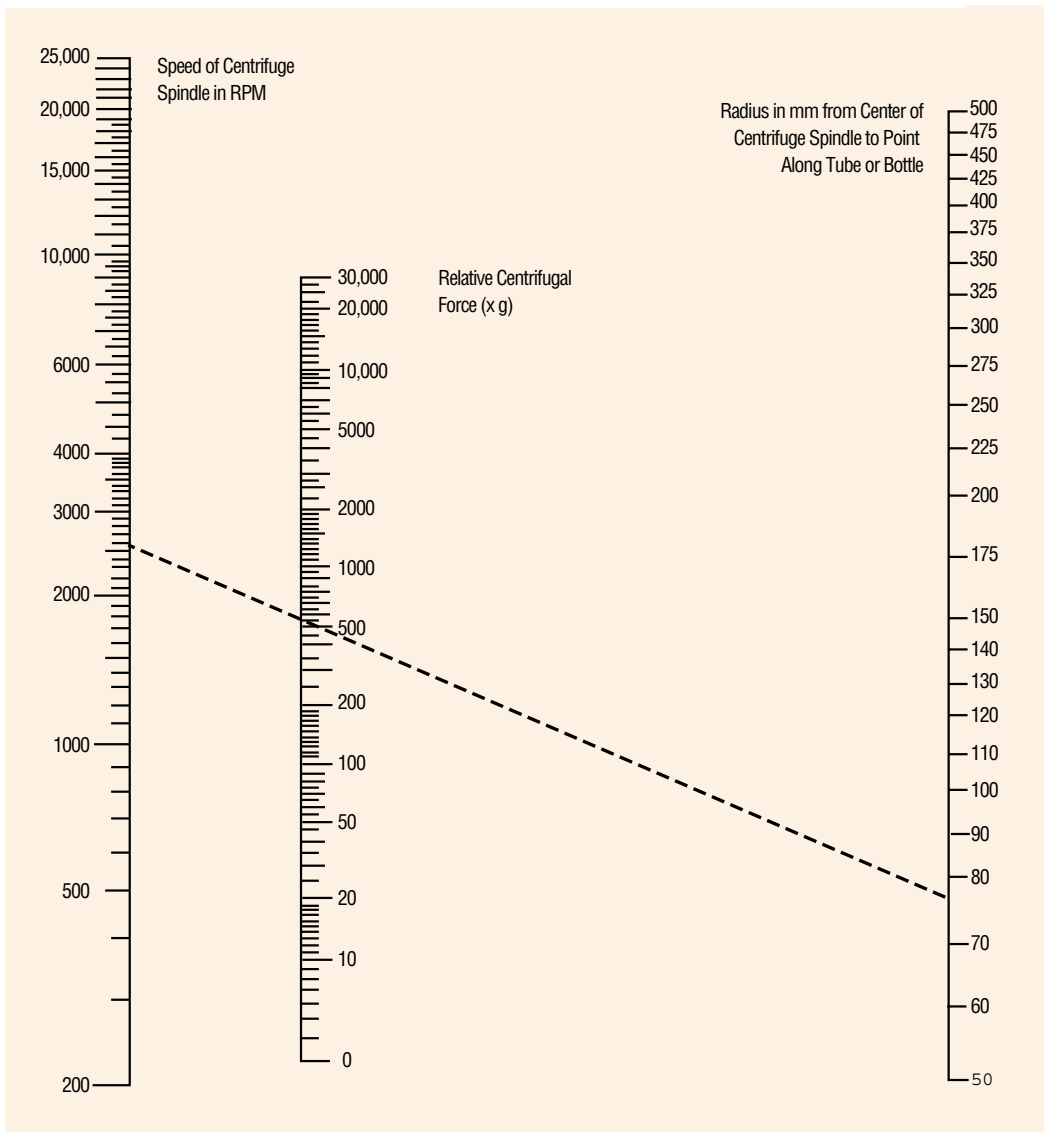
Chemical Class	Polyethylene Terephthalate	Polypropylene	Polyethylene Caps
Acids (weak)	1	1	1
Acids	3	1	1
Alcohols	1	1	1
Aldehydes	3 <sup>a</sup>	2 <sup>a</sup>	1
Bases	3	1	1
Esters	2	2	2
Hydrocarbons:			
Aliphatic	1	2	3
Aromatic	3	3 <sup>b</sup>	3
Halogenated	2	3	3
Ketones	2	2 <sup>c</sup>	2

\*At room temperature for 24 hours.

1 = Recommended; 2 = Suitable for most applications. However, a trial run under specific operating conditions is recommended; 3 = Not recommended.

Note: a = Formaldehyde, rated 1; b = Phenol, rated 1; c = Acetone, rated 1.

### Nomogram for Computing Relative Centrifugal Force



To calculate the RCF value at any point along the tube or bottle, measure the radius, in mm, from the center of the centrifuge spindle to the particular point. Draw a line from the radius value on the right hand column to the appropriate centrifuge speed on the left-hand column. The RCF value is the point where the line crosses the center column. The nomogram is based on the formula:

$$RCF = (11.17 \times 10^{-7}) RN^2$$

where:

R = Radius in mm from centrifuge spindle to point in tube bottom

N = Speed of spindle in RPM

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4051 .....1	4853 .....5	8160 .....10	430491 .....16	430921 .....14	431252 .....12
4100 .....1	4854 .....5	8161 .....10	430492 .....16	430944 .....7	431253 .....12
4101 .....1	4860 .....3	8162 .....10	430499 .....16	430945 .....7	431255 .....12
4250 .....1	4862 .....3	8163 .....10	430512 .....9		431256 .....12
4251 .....1	4863 .....3	8169 .....10	430513 .....9	<b>431096-431256</b>	
4484 .....1	4864 .....3	8170 .....10	430514 .....9	431096 .....8	
4485 .....1	4865 .....3			431097 .....8	

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