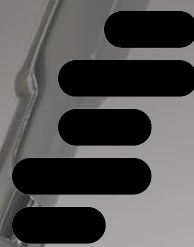


# Corning® Liquid Handling Product Selection Guide



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## Liquid Handling

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### Product Ordering Information

For information on Purchasing Options, Terms and Conditions of Sale, Return and Repair Policies, and Warranty/Guarantee Registration, visit [www.corning.com/how-to-buy](http://www.corning.com/how-to-buy).

*Products may not be available in all markets.*

# Overview

## Designed For Performance

Corning Life Sciences offers a full line of liquid handling products that are manufactured under strict process controls for consistent product performance.

In addition, customers can request a Certificate of Quality at [www.corning.com/resources](http://www.corning.com/resources). 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 simply by contacting your local Corning Life Sciences office.

## Nonpyrogenic Certification

Most Corning and Costar liquid handling products are certified nonpyrogenic with a documented endotoxin level of equal to or less than 0.1 EU/mL. Endotoxins have been shown to cause variability in cell culture. Nonpyrogenic certification is another way Corning helps ensure consistent cell culture results. Visit [www.corning.com/lifesciences](http://www.corning.com/lifesciences) for a detailed technical guide on Endotoxins and Cell Culture (CLS-TC-305).

# Pipets



Paper/plastic wrap



Clear plastic wrap



Bulk pack

## Stripette® Serological Pipets

- ▶ Manufactured and packaged with animal-free materials
- ▶ Sterility Assurance Level (SAL) of  $10^{-6}$
- ▶ RNase-/DNase-free
- ▶ Human DNA-free
- ▶ Nonpyrogenic
- ▶ Noncytotoxic
- ▶ Exclusive anti-drip tip assures accurate delivery
- ▶ Color-coded magnifier stripes make volume reading and size selection easier
- ▶ Bidirectional graduations provide choice of ascending and descending scales
- ▶ Negative graduations allow additional working volume
- ▶ Three packaging options:
  - Individually wrapped, paper/plastic
  - Individually wrapped, clear plastic
  - Bulk packed
- ▶ Volumetric accuracy of  $\pm 2\%$  at stated capacity
- ▶ Extractables data available upon request

### Individually Wrapped, Paper/Plastic Wrap

Cat. No.	Capacity (mL)	Graduations (mL)	Negative Grads. (mL)	Color-coded Stripe	Qty/Pk	Qty/Cs
4485	1	1/100	0.2	Yellow	50	1,000
4486	2	1/100	0.2	Green	50	1,000
4487	5	1/10	2.5	Blue	50	200
4488	10	1/10	3.0	Orange	50	200
4489	25	2/10	10.0	Red	25	200
4490	50	1/2	10.0	Purple	25	100
4491	100	1	n/a	Aqua	10	100

### Individually Wrapped, Clear Plastic Wrap

4011	1	1/100	0.2	Yellow	100	1,000
4012	1	1/100	0.2	Yellow	100	200
4021	2	1/100	0.2	Green	100	1,000
4051	5	1/10	2.5	Blue	50	200
4101	10	1/10	3.0	Orange	50	200
4492*	10	1/10	3.0	Orange	50	200
4251	25	2/10	10.0	Red	50	200
4501	50	1/2	10.0	Purple	25	100
4484	100	1	n/a	Aqua	10	100

\*Features a wide tip for handling viscous fluids.

### Bulk Packed in Bags

4010	1	1/100	0.2	Yellow	50	1,000
4020	2	1/100	0.2	Green	50	1,000
4050	5	1/10	2.5	Blue	50	500
4100	10	1/10	3.0	Orange	50	500
4250	25	2/10	10.0	Red	25	200
4500	50	1/2	10.0	Purple	25	100

For Falcon® serological pipets, see the **Falcon Product Selection Guide** (CLS-F-PSG-001).



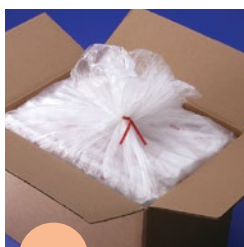


Triple bagged packaging

## Triple Bagged Packaging for Stripette® Serological Pipets

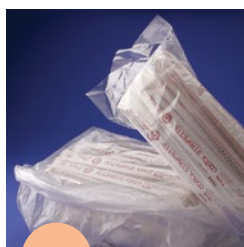
Corning's triple-bagged packaged Stripette pipets are a safety and convenience revolution. This packaging protects the product from external contamination and is ideal for laboratory clean rooms, such as cell-based vaccine or drug production facilities.

- Triple-bagged
- Each pipet is individually wrapped in easy open plastic/plastic or paper/plastic
- No need for decontamination spraying with alcohol
- RNase-/DNase-free, and human DNA-free
- Sterility Assurance Level (SAL) of  $10^{-6}$
- Extractables data available upon request



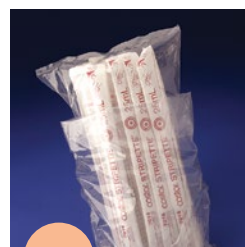
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Contained in a twist-tied liner (Bag 1), the entire case contents of triple-bagged pipets can easily be removed from the corrugated box for clean area storage.



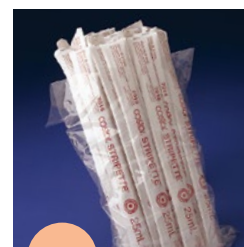
2

At the first stage, the liner (Bag 1) is opened and the double-bagged inner packs with their outer sterile barriers (Bag 2) are removed.



3

At the second stage, the outer sterile barrier (Bag 2) is opened and the inner sterile barrier (Bag 3) is removed.



4

Reaching the point of use, the inner sterile barrier (Bag 3) is opened, and the individually wrapped pipets are removed.

### Triple-bagged Packaging, Individually Wrapped, Paper/Plastic

Cat. No.	Capacity (mL)	Graduations (mL)	Negative Grads. (mL)	Color-coded Stripe	Qty/Pk	Qty/Cs
7041	1	1/100	0.2	Yellow	50	1,000
7042	2	1/100	0.2	Green	50	1,000
7045	5	1/10	2.5	Blue	50	200
7015	10	1/10	3.0	Orange	50	200
7016	25	2/10	10.0	Red	25	200
7017	50	1/2	10.0	Purple	25	100
7000	100	1	n/a	Aqua	10	100

### Triple-bag Packaging, Individually Wrapped, Plastic/Plastic

Cat. No.	Capacity (mL)	Graduations (mL)	Negative Grads. (mL)	Color-coded Stripe	Qty/Pk	Qty/Cs
7371	2	1/100	0.2	Green	100	1000
7372	5	1/10	2.5	Blue	50	200
7373	10	1/10	3.0	Orange	50	200
7374	25	2/10	10.0	Red	50	200
7375	50	1/2	10.0	Purple	25	100

## Aspirating Pipets

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

Cat. No.	Volume (mL)	Packaging	Qty/Pk	Qty/Cs
4975	1	Individually wrapped, bulk packed	50	1,000
9186	2	Individually wrapped, clear plastic wrap	100	1,000
9016	2	Individually wrapped, paper/plastic wrap	50	500
9099	5	Individually wrapped, clear plastic wrap	50	200

For Corning® Stripettor® and Lambda™ pipettors, see the Equipment Product Selection Guide (CLS-EQ-090).

For Falcon® aspirating pipets, see the **Falcon Product Selection Guide** (CLS-F-PSG-001).



# Pipet Tips

## Corning® DeckWorks™ Pipet Tip System

The Corning DeckWorks pipet tip system solutions includes:



### Corning DeckWorks Reload Systems

Corning DeckWorks reload systems allow for convenient and economical reloading of durable DeckWorks hinged racks. DeckWorks reload decks are packaged in transparent trays for easy tip identification, requires no transfer devices, saves space, and minimizes packaging waste. Nonsterile decks and racks are steam autoclavable.

DeckWorks low binding tips uses a proprietary low binding technology that reduces surface tension on the interior wall of the tip. Leaching and/or subsequent sample degradation associated with silicone-based tips are significantly reduced. DeckWorks low binding tips are ideal for quantitative assays in which sample binding can significantly alter results. Specific applications include accurate and precise pipetting of reagents, DNA, proteins, or peptides.



#### Standard Tips

Cat. No.	Volume Range (µL)	Color	Sterile	Decks/Pk	Tips/Pk	Pk/Cs
4125*	0.1 - 10	Natural	No	10	960	4
4126	1 - 200	Natural	No	10	960	4
4127	1 - 200	Yellow	No	10	960	4
4128*	1 - 300	Natural	No	10	960	4
4129*	100 - 1,000	Natural	No	8	768	4

#### Low Binding Tips

4153*	0.1 - 10	Natural	No	10	960	4
4154	1 - 200	Natural	No	10	960	4
4155*	1 - 300	Natural	No	10	960	4

### Corning DeckWorks Reload Systems Starter Kits

Corning DeckWorks starter kits contain one DeckWorks reload system with standard tips and empty hinged racks.

- ▶ 10 empty racks holds 10, 200, and 300 µL volume tips
- ▶ 8 empty racks holds 1,000 µL volume tips

Cat. No.	Volume Range (µL)	Color	Sterile	Decks/Pk	Tips/Pk	Pk/Cs
4130*	0.1 - 10	Natural	No	10	960	1
4131	1 - 200	Natural	No	10	960	1
4132	1 - 200	Yellow	No	10	960	1
4133*	1 - 300	Natural	No	10	960	1
4134*	100 - 1,000	Natural	No	8	768	1

\*Extended length design

## Corning® DeckWorks™ Hinged Rack Pipet Tips

### Standard Tips



Corning DeckWorks standard tips cover volume ranges from 0.1 - 10  $\mu$ L. The 10, 300, and 1000  $\mu$ L tips are extended length and allow for improved access into micro (1.5 mL) and standard conical bottom (15 and 50 mL) centrifuge tubes. Robust 96-tip racks are designed for repeated steam autoclave cycles and can be reused by removing the empty grey tip deck and replacing it with a new reload deck of 96 tips from the DeckWorks reload system. DeckWorks racked 300  $\mu$ L pipet tips are designed for most popular 300  $\mu$ L single- and multi-channel instruments.

Cat. No.	Volume Range ( $\mu$ L)	Color	Sterile	Decks/Pk	Tips/Pk	Pk/Cs
4120*	0.1 - 10	Natural	Yes	10	960	4
4115*	0.1 - 10	Natural	No	10	960	4
4121	1 - 200	Natural	Yes	10	960	4
4116	1 - 200	Natural	No	10	960	4
4122	1 - 200	Yellow	Yes	10	960	4
4117	1 - 200	Yellow	No	10	960	4
4123*	1 - 300	Natural	Yes	10	960	4
4118*	1 - 300	Natural	No	10	960	4
4124*	100 - 1,000	Natural	Yes	8	768	4
4119*	100 - 1,000	Natural	No	8	768	4

### Low Binding Tips

Proprietary low binding technology reduces surface tension on the interior wall of the tip. Leaching and/or subsequent sample degradation associated with silicone-based tips are significantly reduced. DeckWorks low binding tips are ideal for quantitative assays in which sample binding can significantly alter results. Specific applications include accurate and precise pipetting of reagents, DNA, proteins, or peptides.

Cat. No.	Volume Range ( $\mu$ L)	Color	Sterile	Decks/Pk	Tips/Pk	Pk/Cs
4150*	0.1 - 10	Natural	Yes	10	960	4
4147*	0.1 - 10	Natural	No	10	960	4
4151	1 - 200	Natural	Yes	10	960	4
4148	1 - 200	Natural	No	10	960	4
4152*	1 - 300	Natural	Yes	10	960	4
4149*	1 - 300	Natural	No	10	960	4

### Low Binding Barrier Tips

Corning DeckWorks low binding barrier tips feature an inert, high-density polyethylene barrier to reduce aerosol carryover contamination during critical pipetting procedures. DeckWorks low binding barrier tips will not trap liquids or inhibit PCR in the event of over pipetting.

Cat. No.	Volume Range ( $\mu$ L)	Color	Sterile	Decks/Pk	Tips/Pk	Pk/Cs
4135*	0.1 - 10	Natural	Yes	10	960	4
4136	1 - 20	Natural	Yes	10	960	4
4137	1 - 100	Natural	Yes	10	960	4
4138*	1 - 200	Natural	Yes	10	960	4
4139*	1 - 200	Natural	Yes	8	768	4
4140**	100 - 1,000	Natural	Yes	8	768	4

\*Extended length design

\*\*Extended length, not available in low binding



### Corning® DeckWorks™ Tip Station

Corning DeckWorks tip station maximizes bench space while minimizing plastic waste. Tip stations contain 960 tips, are available in extended-length (10 µL) and traditional (200 µL) sizes, and are the ideal single- and multi-channel pipetting stations. The 5-layer deck design (2 x 96) matches the microtiter plate format. This stable pipetting platform fits easily into sterile hood environments. Lids can be snap-positioned to expose a single side (96 tips) only. Applications include pre- and post-PCR procedures, cell culture, and assays requiring large tip quantities. DeckWorks tip stations are offered in both sterile and nonsterile format.

Cat. No.	Volume Range (µL)	Color	Sterile	Tips/Pk	Pk/Cs
4141*	0.1 - 10	Natural	No	960	5
4143*	0.1 - 10	Natural	Yes	960	5
4142	1 - 200	Natural	No	960	5
4144	1 - 200	Natural	Yes	960	5



### Corning DeckWorks Bulk Tips

Corning DeckWorks bulk pipet tips are compatible with DeckWorks racks, and are packaged in resealable polyethylene bags. Bulk tips are the most economical way to purchase tips.

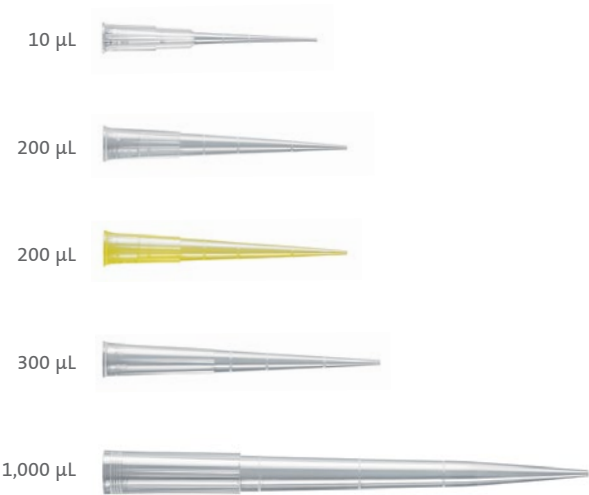
Cat. No.	Volume Range (µL)	Color	Sterile	Tips/Pk	Tips/Cs
4110*	0.1 - 10	Natural	No	1,000	10,000
4111	1 - 200	Natural	No	1,000	10,000
4112	1 - 200	Yellow	No	1,000	10,000
4114*	100 - 1,000	Natural	No	768	7,680

\*Extended length design

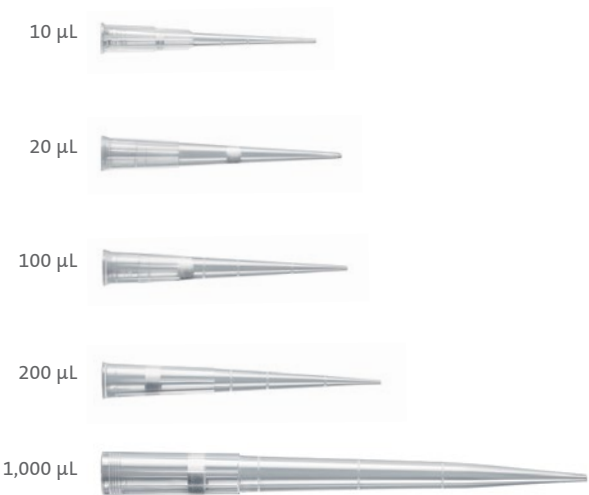


Corning® DeckWorks™ Pipet Tips Size Guide

Standard Tips



Barrier Tips



Extended-length Tips

Minimize contamination issues often associated with traditional pipet tip styles.

Standard tips: 10, 300, 1,000 µL  
Barrier tips: 10, 200, 1,000 µL



Corning DeckWorks Pipet Tips Pipettor Compatibility Guide

		Corning Lambda™ Plus Pipettor										Corning Lambda EliteTouch™ Pipettor										
		Channels	Single-channel					Multi-channel					Single-channel					Multi-channel				
		Volume Range	0.5-10 µL	2-20 µL	10-100 µL	20-200 µL	100-1000 µL	0.5-10 µL	5-50 µL	20-200 µL	50-300 µL	0.5-10 µL	2-20 µL	5-50 µL	10-100 µL	20-200 µL	100-1000 µL	0.5-10 µL	5-50 µL	10-200 µL	30-300 µL	
Cat. No.																						
4125	0.1-10 µL	•					•					•						•				
4135		•					•					•						•				
4136	1-20 µL		•										•									
4137	1-100 µL			•											•							
4126	1-200 µL		•	•	•			•	•				•	•	•	•			•	•		
4138					•				•							•				•		
4139						•				•						•				•		
4128	1-300 µL				•				•	•						•					•	
4129	100-1000 µL					•											•					
4140						•											•					



Racked pipet tips



Stack rack pipet tips



Bulk pack pipet tips



Universal fit hinged rack pipet tips

## Corning® Universal Fit 200 and 1000 µL Pipet Tips

- ▶ Corning universal fit tips are designed to provide a reliable fit with most major brand pipettors. (A Pipet Tip Compatibility Guide can be requested or downloaded from the Corning website).
- ▶ Beveled orifice helps ensure accurate fluid delivery.
- ▶ 1-200 µL universal fit tips are graduated at the 250, 500, and 1,000 µL volumes.
- ▶ Select from three packaging options:
  - 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 economical.
- ▶ RNase-/DNase-free
- ▶ Nonpyrogenic

### Racked Tips

Cat. No.	Volume Range (µL)	Format	Color	Sterile	Racks/Cs	Tips/Cs
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
4860	1 - 200	96 tips/rack	Yellow	Yes	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

### Stack Rack Pipet Tips

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

### Universal Fit Hinged Rack Pipet Tips

4711	1 - 200	96 tip hinged rack	Yellow	Yes	10	960
4712	1 - 200	96 tip hinged rack	Yellow	No	10	960
4710	1 - 200	96 tip insert for hinged rack	Yellow	No	10 Inserts	960
4714	100 - 1,000	100 tip hinged rack	Blue	Yes	10	1,000
4713	100 - 1,000	100 tip hinged rack	Blue	No	10	1,000
4715	100 - 1,000	100 tip insert for hinged rack	Blue	No	10 Inserts	1,000

### Bulk Packed Pipet Tips

4844	1 - 200	Bulk pack	Natural	No	1,000	10,000
4862	1 - 200	Bulk pack	Natural	No	1,000	1,000
4845	1 - 200	Bulk pack	Yellow	No	1,000	10,000
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



### Isotip™ Filtered Pipet Tips

- ▶ Isotip filtered pipet tips feature an inert, hydrophobic barrier that prevents aerosolized contaminants from coming in contact with pipettor shafts. (A Pipet Tip Compatibility Guide can be requested or downloaded from the Corning website.)
- ▶ Ideal for applications where avoiding cross contamination is critical, such as DNA amplification and radioisotope handling
- ▶ Packaged sterile
- ▶ RNase-/DNase-free
- ▶ Nonpyrogenic

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

\*Extended-length tip designed for use with 2 μL to 20 μL, 10 μL to 100 μL, and 20 μL to 200 μL pipettors.

### 1 μL 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
- ▶ Tips are 83 mm in length
- ▶ RNase-/DNase-free
- ▶ Nonpyrogenic

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 μL to 10 μL
- ▶ RNase-/DNase-free
- ▶ Nonpyrogenic

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

For reagent reservoirs, liquid transfer systems, and aspirators, the **Equipment Product Selection Guide** (CLS-EQ-090).

For Axygen® pipet tips, see the **Axygen Product Selection Guide** (CLS-A-PSG-001).



### Microvolume Pipet Tips

- ▶ Microvolume tips provide accurate, reliable performance in the 0.1 µL to 10 µL range for major brand ultra-micropipettors
- ▶ RNase-/DNase-free
- ▶ Nonpyrogenic

Cat. No.	Volume Range (µL)	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	0.1 - 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

## Vacuum Filtration



### 150 mL Tube Top Vacuum Filters

- ▶ 42 mm square membrane
- ▶ Minimizes unnecessary transfers by filtering directly into a 50 mL 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, nonpyrogenic

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

CA = cellulose acetate.

### Vacuum Filtration Systems

- ▶ Four sizes: 150 mL, 250 mL, 500 mL, and 1L
- ▶ Filters feature printing on the funnel for easy product identification.
- ▶ Angled hose connector simplifies vacuum line attachment.
- ▶ Receiver bottles feature easy grip sides for improved handling.
- ▶ Individually packaged, sterile, nonpyrogenic
- ▶ Caps for receiver bottles are sterile and individually packaged.
- ▶ Extra plastic storage bottles are available.
- ▶ Prefilters not included



#### 150 mL Capacity, 42 mm Square Membrane

Cat. No.	Membrane	Funnel/Bottle Volume (mL)	Pore Size (µm)	Qty/Cs
431153	PES	150/150	0.22	12
431154	CA	150/150	0.22	12
431155	CA	150/150	0.45	12

#### 250 mL Capacity, 49.5 mm Square Membrane

430756	CN	250/250	0.22	12
430767	CA	250/250	0.22	12
430768	CA	250/250	0.45	12
430771	NY	250/250	0.2	12
431096	PES	250/250	0.22	12

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

## Vacuum Filtration Systems (Continued)

### 500 mL Capacity, 63 mm Square Membrane

Cat. No.	Membrane	Funnel/Bottle Volume (mL)	Pore Size (μm)	Qty/Cs
430758	CN	500/500	0.22	12
430769	CA	500/500	0.22	12
430770	CA	500/500	0.45	12
430773	NY	500/500	0.2	12
431097	PES	500/500	0.22	12
431475	PES	500/500	0.1	12

### 1,000 mL Capacity, 79 mm Square Membrane

430186	CN	1,000/1,000	0.22	12
430515	NY	1,000/1,000	0.2	12
430516	CA	1,000/1,000	0.45	12
430517	CA	1,000/1,000	0.22	12
431098	PES	1,000/1,000	0.22	12
431205*	CA	500/1,000	0.22	12
431206*	CA	500/1,000	0.45	12
431474	PES	1,000/1,000	0.1	12

\*500 mL funnel with 63 mm membrane.

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

For technical information, refer to Technical Appendix.

## Bottle Top Vacuum Filters

- Individually packaged, sterile and nonpyrogenic
- Available in 33 mm and 45 mm neck sizes to fit most glass and plastic media storage bottles
- 45 mm neck sizes fit on Corning® plastic storage bottles (see below)

### 150 mL Capacity, 42 mm Square Membrane

Cat. No.	Membrane	Volume (mL)	Neck Size (mm)	Pore Size (μm)	Qty/Cs
430624	CA	150	33	0.22	48
430625	CA	150	33	0.45	48
430626	CA	150	45	0.22	48
430627	CA	150	45	0.45	48
431160	PES	150	33	0.22	48
431161	PES	150	45	0.22	48

### 500 mL Capacity, 63 mm Square Membrane

430049	NY	500	45	0.2	12
430512	CA	500	33	0.45	12
430513	CA	500	45	0.22	12
430514	CA	500	45	0.45	12
430521	CA	500	33	0.22	12
431117	PES	500	33	0.22	12
431118	PES	500	45	0.22	12

### 1,000 mL Capacity, 79 mm Square Membrane

430015	CA	1,000	45	0.22	12
431174	PES	1,000	45	0.22	12

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





## Corning® Glass Fiber Prefilters

For use with vacuum filtration systems or bottle top vacuum filters

Cat. No.	Shape	Filter Funnel (mL)	Qty/Cs
431410	42 mm square	150	100
431411	49.5 mm square	250	100
431412	63 mm square	500	100
431413	79 mm square	1000	100

For technical information, refer to Technical Appendix.

## Syringe Filters



- ▶ A variety of membranes are available to meet your needs: polyethersulfone (PES) – low protein binding and faster flow rates; surfactant-free cellulose acetate (SFCA) – lowest protein binding; polytetrafluorethylene (PTFE) – chemical resistance; regenerated cellulose (RC) – best choice for DMSO compatibility; nylon (NY) – hydrophilic, surfactant-free and lowest extractable
- ▶ 100% integrity tested, nonpyrogenic, noncytotoxic, and manufactured in accordance with ISO 9001 standards

Cat. No.	Diameter (mm)	Pore Size (µm)	Membrane Material	Housing Material	Sterile	Inlet/Outlet	Packaging	Qty/Cs
431215	15	0.2	RC	PP	Yes	LL/LS	Ind	50
431218	28	0.2	SFCA-PF	AC	Yes	LL/LS	Ind	50
431219	28	0.2	SFCA	AC	Yes	LL/LS	Ind	50
431220	28	0.45	SFCA	AC	Yes	LL/LS	Ind	50
431221	28	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	28	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 = polytetrafluorethylene, RC = regenerated cellulose, SFCA = surfactant-free cellulose acetate, SFCA-PF = surfactant-free cellulose acetate with prefilter.

\*Recommended as in-line air filter.

PP = polypropylene, AC = acrylic copolymer, LL = Luer lock/female, LS = Luer slip/male, HB = hose barb, NY = Nylon.

## Spin-X® Centrifuge Tube Filters



- ▶ Spin-X centrifuge tube filters consist of a membrane-containing filter unit within a microcentrifuge tube
- ▶ Uses:
  - Removing bacteria, cells, and particles from liquids
  - HPLC sample preparation
  - DNA removal from agarose or acrylamide gels. Maximum RCF is 16,000 x g

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

CA = cellulose acetate, NY = Nylon.

# Spin-X® UF Concentrators

For technical information, refer to Technical Appendix.

Spin-X UF centrifugal concentrators offer a simple, one step procedure for concentrating or desalting proteins and other biomolecules with 90% or better recovery.

- ▶ The vertical membrane design and thin channel filtration chamber minimizes membrane fouling and provides fast, high speed concentrating, even with particle laden solutions.
- ▶ Low binding polyethersulfone (PES) membranes are available with five molecular weight cut-offs (MWCO): 5,000, 10,000, 30,000, 50,000, and 100,000 to meet all of your concentrating needs. Choose an MWCO half to a third smaller than the protein to be concentrated.
- ▶ The MWCO and graduations are printed on the side of the concentrator tube to avoid mix-ups
- ▶ Spin-X UF 6 and 20 concentrators can be used with either swinging bucket or fixed angle rotors. Spin-X UF 500 concentrators require fixed angle rotors.

## Spin-X UF 500

431477	Spin-X UF 500	500 µL	5,000 MWCO	25
431478	Spin-X UF 500	500 µL	10,000 MWCO	25
431479	Spin-X UF 500	500 µL	30,000 MWCO	25
431480	Spin-X UF 500	500 µL	50,000 MWCO	25
431481	Spin-X UF 500	500 µL	100,000 MWCO	25

## Spin-X UF 6

Cat. No.	Description	Capacity	Membrane	Qty/Pk
431482	Spin-X UF 6	6 mL	5,000 MWCO	25
431483	Spin-X UF 6	6 mL	10,000 MWCO	25
431484	Spin-X UF 6	6 mL	30,000 MWCO	25
431485	Spin-X UF 6	6 mL	50,000 MWCO	25
431486	Spin-X UF 6	6 mL	100,000 MWCO	25

## Spin-X UF 20

431487	Spin-X UF 20	20 mL	5,000 MWCO	12
431488	Spin-X UF 20	20 mL	10,000 MWCO	12
431489	Spin-X UF 20	20 mL	30,000 MWCO	12
431490	Spin-X UF 20	20 mL	50,000 MWCO	12
431491	Spin-X UF 20	20 mL	100,000 MWCO	12

## A Size to Fit All Your Concentrating Needs



Spin-X UF 500



Spin-X UF 6



Spin-X UF 20

For technical information, refer to Technical Appendix.

# Storage Bottles



Corning low profile easy grip style storage bottles



Costar traditional style storage bottles



## Corning® PS Storage Bottles

- Disposable polystyrene bottles for storage of media, buffers, and other aqueous solutions
- Corning low profile style has easy grip sides that facilitate handling
- Costar® 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 filtration systems with 45 mm neck sizes (see Accessories).
- Sterile
- Nonpyrogenic

### Corning Low Profile Easy Grip Style

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

### Costar Traditional Style

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

## Corning Square PC Storage Bottles

- Strong, easier to handle, require less space (13% to 20%) on the shelf or in the autoclave
- Ideal for mixing, sampling, and storage
- More break-resistant than glass or other plastic bottles
- Linerless, 45 mm one-piece autoclavable orange GL 45 threaded polypropylene plug seal cap
- Screened white enamel graduations are easier to see than molded graduations
- Bottles can be autoclaved once at 121°C and 15 psi. Repeated autoclaving weakens polycarbonate and is not recommended.
- Store up to -80°C
- Sterile

Cat. No.	Volume	Bottle Shape	Material	Neck Diam. (mm)	Qty/Bag	Qty/Cs
431430	150 mL	Square	PC	45	1	24
431431	250 mL	Square	PC	45	1	24
431432	500 mL	Square	PC	45	1	24
431433	1L	Square	PC	45	1	24

## Accessory Caps and Septa for Square PC Bottles

Corning offers reusable GL 45 septa caps for these storage bottles with a choice of silicone septa or PTFE-faced silicone septa.

Cat No.	Description	Thread Finish	Qty/Cs
1395-45HTSC	Cap, open top PBT high temperature	GL 45	10
1395-45SS	Septa, silicone	NA	10
1395-45TS	Septa, PTFE-faced silicone	NA	10

PBT = Polybutylene Terephthalate

**NOTE:** Most GL 45 threaded caps designed for glass storage bottles use a different sealing design and will not give a secure seal if used on these plastic bottles.

**CAUTION:** These square polycarbonate bottles should NOT be used with bottle top filter units or in other applications involving vacuum pressure, as breakage may occur. DO NOT tighten caps immediately after autoclaving as the vacuum resulting from cooling can cause breakage.



### Corning® Square PET Storage Bottles

- › Good for storage of media, buffers and other aqueous solutions
- › Available in four sizes: 125 mL, 250 mL, 500 mL, and 1L
- › Screened white enamel graduations are easier to read than molded graduations
- › Large white marking spot for easier identification
- › Bottles are validated USP Class VI, noncytotoxic, and nonpyrogenic
- › Individually packaged bottles have Sterility Assurance Level (SAL) of  $10^{-6}$

Cat. No.	Volume	Thread Finish	Approx. Diam. x Height (mm)	Grad. Range (mL)	Grad. Interval (mL)	Qty/Pk	Qty/Cs
431530	125 mL	GL 45	52.5 x 106.5	50 - 125	25	12	24
431531	250 mL	GL 45	59 x 142.5	50 - 250	25	12	24
431532	500 mL	GL 45	77 x 176	100 - 500	50	12	24
431533	1L	GL 45	92 x 216.5	100 - 1000	50	12	24

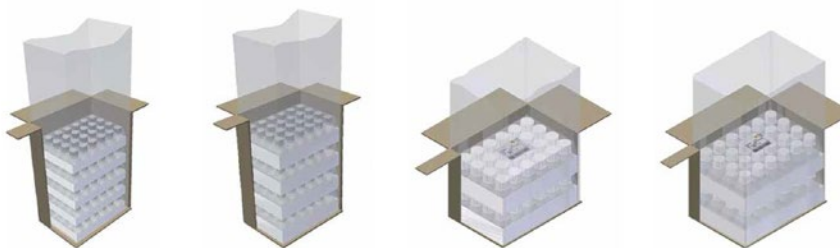


### Corning Octagonal PET Bottles

- › Triple-bagged PET Bottles for clean room applications. Bottles are packaged in convenient, shrink-wrapped trays within an outer bag to ensure cleanliness.
- › High leak-proof performance bottles for controlled environment
- › Triple bagged: shrink wrapped tray and two outer bags
- › Innovative HDPE screw cap is validated against IATA standards to ensure leak-proof air transport conditions (sizes 125 mL through 1L)
- › Bottles have Sterile Assurance Level (SAL) of  $10^{-6}$
- › Break resistant
- › Transparency equivalent to glass
- › Molded graduations
- › Ergonomic handling
- › Bottles are validated USP Class VI noncytotoxic, nonhemolytic, nonpyrogenic



Tamper-evident screw cap



Cat. No.	Volume	Screw Cap Color	Neck Diam. (mm)	Qty/Tray	Qty/Cs
431729	30 mL	Natural	18	24	120
432229	30 mL	Natural	18	24	240
431730	60 mL	Natural	18	24	96
432230	60 mL	Natural	18	24	192
431731	125 mL	Natural	31.7	24	48
432331	125 mL	Natural*	31.7	24	48
432231	125 mL	Natural*	31.7	24	96
431732	250 mL	Natural	31.7	24	48
432332	250 mL	Natural*	31.7	24	48
432232	250 mL	Natural*	31.7	24	72
431733	500 mL	Natural	31.7	12	24
432333	500 mL	Natural*	31.7	12	24
432233	500 mL	Natural*	31.7	12	48
431734	1L	Natural	31.7	12	24
432334	1L	Natural*	31.7	12	24
432234	1L	Natural*	31.7	12	24

\*Screw cap validated against IATA

For a complete list of Corning storage bottles, visit [www.corning.com/lifesciences](http://www.corning.com/lifesciences).

# Sample Containers



## Corning® Flexible Polypropylene Sample Container

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

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

## Corning Coliform Water Test Disposable Sample Container, Sterile with Sodium Thiosulfate Tablet



Sterile container used in testing for the presence of coliform, a microbiological contaminant in drinking water. Manufactured from pure polypropylene in a sterile environment. The one-piece container has attached lid to reduce chance of contamination. Locking arrow assures sterility has not been compromised. The EPA fill line of 100 mL  $\pm$  2.5% makes it easy to use. A sodium thiosulfate tablet has been added to each container thus saving lab prep time and expense. Leak-tight when sealed properly. An added benefit is the tie-down to protect from accidental opening and also serves as a custody seal. Sample label and instructions for use are supplied with each container. A low cost, convenient product which meets EPA requirements.

Cat. No.	Description	Capacity (mL)	Approx. Diam. x Height (mm)	Qty/Cs
1700-100	Container with tablet	100-120	65 x 120	100



## Corning Water Test Disposable Sample Container, Sterile without Sodium Thiosulfate Tablet

Sterile container used in the testing of non-chlorinated drinking water. Manufactured from pure, recyclable polypropylene. The one-piece container has attached lid to reduce chance of contamination. Locking arrow assures sterility has not been compromised. Leak-tight when sealed properly. An added benefit is the tie-down which protects against accidental opening.

Cat. No.	Description	Capacity (mL)	Approx. Diam. x Height (mm)	Qty/Cs
1705-100	Container without tablet	100-120	65 x 120	100



## Corning Snap-seal Disposable Plastic Sample Containers

Designed for a wide variety of applications, these containers provide a reliable leak-tight seal when closed properly. The Snap-Seal locking device keeps the cap closed and secure. The specially designed hinged cap stays in place in use, reducing the chance of sample contamination. The containers are made of recyclable polypropylene, in a translucent style for normal usage. The containers are graduated in both milliliters and ounces, and the cap has a rough surface for marking.

Cat. No.	Capacity	Color	Approx. Diam. x Height (mm)	Qty/Cs
1730-4H	4 oz. (120 mL)	Natural	45 x 91	200
1730-4L	4 oz. (120 mL)	Natural	68 x 52	200
1730-8	8 oz. (240 mL)	Natural	80 x 75	100
1730-10	10 oz. (300 mL)	Natural	63 x 112	100

For Falcon® containers, see the **Falcon Product Selection Guide** (CLS-F-PSG-001).



# Cylinder



## Corning® Graduated Cylinder

The 100 mL Corning optically clear polystyrene graduated cylinder is designed for aseptic and accurate dispensing of sterile culture media or other biological fluids. A polyethylene dust cover is included.

- ▶ Optically clear polystyrene
- ▶ Graduated for accurate dispensing
- ▶ Polyethylene dust cover included
- ▶ Sterile

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

# Spatulas



Spatulas



Microspatulas

## Disposable Anti-static Spatulas

- ▶ Corning spatulas are designed to save time and to provide contamination-free samples
- ▶ Eliminates the recycling and resterilizing necessary with reusable spatulas
- ▶ Available in five different configurations
- ▶ Microspatulas available in two configurations
- ▶ Individually packaged
- ▶ Antistatic
- ▶ Sterile
- ▶ RNase-/DNase-free
- ▶ Nonpyrogenic

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

For Falcon® spatulas, see the **Falcon Product Selection Guide** (CLS-F-PSG-001).

# Centrifuge Tubes



## 15 mL Centrifuge Tubes

- ▶ Corning® 15 mL and 50 mL centrifuge tubes feature black printed graduations and a large white marking spot
- ▶ Available with your choice of cap styles: the advanced Corning CentriStar™ cap or the original plug seal cap
- ▶ 95 kPa (14 psi) pressure tested – plug seal cap only
- ▶ Sterile
- ▶ RNase-/DNase-free
- ▶ Nonpyrogenic

Cat. No.	Material	Cap Style	Max. RCF	Qty/Pk	Qty/Cs
430053	PET	Plug seal	3,600	50/sleeve	500
430055	PET	Plug seal	3,600	50/rack	500
430052	PP	Plug seal	12,000	50/rack	500
430766	PP	Plug seal	12,000	50/sleeve	500
430790	PP	CentriStar	12,500	50/rack	500
430791	PP	CentriStar	12,500	50/sleeve	500
431470	PP	No cap (tube only)	12,000	25/sleeve	500
431471	PP	CentriStar cap only (no tube)	12,000	100/sleeve	500
431355	Foam centrifuge tube rack, 15 mL		—	—	20

PP = polypropylene, PET = polyethylene terephthalate, RCF = relative centrifugal force (x g).

## 50 mL Centrifuge Tubes

Cat. No.	Material	Cap Style	Max. RCF	Feature	Qty/Pk	Qty/Cs
430897	PP	Plug seal	3,000	Self-standing bottom	25/sleeve	500
430921	PP	CentriStar	3,000	Self-standing bottom	25/sleeve	500
430304	PET	Plug seal	3,600	Conical bottom	25/rack	500
430290	PP	Plug seal	15,500	Conical bottom	25/rack	500
430291	PP	Plug seal	15,500	Conical bottom	25/sleeve	500
430828	PP	CentriStar	17,000	Conical bottom	25/rack	500
430829	PP	CentriStar	17,000	Conical bottom	25/sleeve	500
4558	PP	CentriStar	17,000	Conical bottom	25/rack	300

PET = polyethylene terephthalate, 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
- ▶ Support cushions must be used with this product unless the rotor has appropriately shaped V-bottom holders
- ▶ Sterile
- ▶ Nonpyrogenic

Cat. No.	Description	Material	Cap Style	Max RCF	Qty/Pk	Qty/Cs
430776	250 mL tube	PP	Plug seal	6,000	6	102
430236	250 mL support cushion	PEI	N/A	N/A	N/A	6
431123	500 mL tube	PP	Plug seal	6,000	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).

For dimensions of Corning centrifuge tubes, visit [www.corning.com/lifesciences](http://www.corning.com/lifesciences).

For Falcon® centrifuge tubes, see the **Falcon Product Selection Guide** (CLS-F-PSG-001).

# Corning Centrifuge Bottles



- Two easy grip cap styles: standard and high performance with silicone O-ring
  - Note:** Caps are not interchangeable among different materials or sizes.
- Wide-mouth design improves liquid handling
- Compatible with most centrifuges and do not require special buckets
- Extra-thick walls for durability
- Leak-free processing at maximum rated speeds
- Polypropylene bottles are autoclavable at 121°C, 15 psi for 20 minutes

Cat. No.	Capacity (mL)	Material	Cap Style	RCF Rating	Qty/Pk	Qty/Cs
431840	250	Polypropylene	Silicone O-ring	27,500	4	36
431841	250	Polypropylene	Standard	13,500	4	36
431842	250	Polycarbonate	Silicone O-ring	27,500	4	36
431843	250	Polycarbonate	Standard	13,700	4	36
431844	500	Polypropylene	Silicone O-ring	13,700	4	24
431845	500	Polypropylene	Standard	13,700	4	24
431846	500	Polycarbonate	Silicone O-ring	13,700	4	24
431847	500	Polycarbonate	Standard	13,700	4	24

For Falcon® centrifuge tubes, see the **Falcon Product Selection Guide** (CLS-F-PSG-001).

# Microcentrifuge Tubes

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



## Costar® Snap Cap Polypropylene Microcentrifuge Tubes

- Supplied nonsterile and are autoclavable
- External graduations and frosted writing spot for easy sample identification
- Positive seal design allows 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
- RNase-/DNase-free

### Snap Cap Microcentrifuge Tubes

Cat. No.	Volume (mL)	Color	Qty/Pk	Qty/Cs
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

### Low Binding Snap Cap Microcentrifuge Tubes

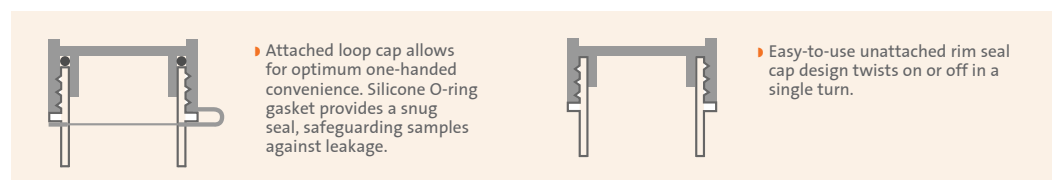
3206	0.65	Natural	500	500
3207	1.7	Natural	250	250

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

\*\*2.0 mL Dolphin style tube.

## Corning® 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
- Withstands a maximum 20,000 RCF
- Sterile



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



### Corning® 96-well Cluster Tubes

- Composed of 96 polypropylene tubes in a standard microplate format
- Features 1.2 mL tubes that are available individually or in strips of eight tubes
- Polyethylene tube caps are available in 8-cap strips

Cat. No.	Format	Sterile	Rack	Qty/Pk	Qty/Cs
4401	Individual	No	No	960/bag	960
4410	Individual	No	Yes	96/rack	960
4411	Individual	Yes	Yes	96/rack	960
4408	8-tube strip	No	No	120/bag	120
4412	8-tube strip	No	Yes	12/rack	120
4413	8-tube strip	Yes	Yes	12/rack	120
4418	8-cap strip	Yes	No	12/bag	120

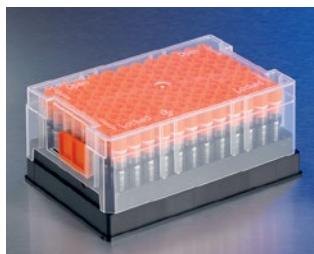
## Bar Coded Storage Tubes

### Corning 96 1D/2D Bar Coded Storage Tubes

#### A System Solution for Automated Sample Management

The 1D/2D storage line offers a superior storage solution designed to provide maximum identification

- Temperature-resistant polypropylene storage tubes withstand a temperatures range from -100°C to +110°C
- Maximum identification – Synchronized 2D and linear bar code along with marking spot
- Maximum information – 14 x 14 dot 2D bar code
- Bar code stability – Laser-etched for permanent identification
- Compound compatibility – Universal inert polypropylene construction throughout
- Nonsterile



#### Storage Tubes

Cat. No.	Description	Qty/Pk	Pk/Cs	Qty/Cs
8500	96 1D/2D bar coded storage tubes, 1.3 mL, without screw caps, bulk pack	96	10	960 tubes
8501	96 1D/2D bar coded storage tubes, 1.3 mL, without screw caps, racked, with cover	96/rack	10 racks	960 tubes
8502	96 1D/2D bar coded storage tubes, 1.3 mL, with screw caps, bulk pack	96	10	960 tubes
8503	96 1D/2D bar coded storage tubes, 1.3 mL, with screw caps, racked, with cover	96/rack	10 racks	960 tubes

#### Compatible Caps and Rack

8504	96 storage tube screw cap, polypropylene with O-ring, bulk pack	96	50	4,800 caps
8505	96 storage tube screw cap, polypropylene, with O-ring, on mat, 96 caps per mat, clear, with cover	480	10	4,800 caps
8506	Thermoplastic elastomer (TPE) 96 storage tube septum cap, bulk pack	96	100	9,600 caps
8507	Thermoplastic elastomer (TPE) 96 storage tube septum cap on mat, 96 caps per mat	960	5	4,800 caps
8508	Empty racks with lids for 96 screw capped or thermoplastic elastomer (TPE) capped storage tubes	5 racks	2	10 racks



## Corning 384 2D Bar Coded Storage Tubes

### A System Solution for Automated Sample Management

The 2D storage line offers a superior storage solution designed to provide maximum identification.

- ▶ Temperature-resistant polypropylene storage tubes withstand a temperatures range from -100°C to +110°C
- ▶ Maximum information – 14 x 14 dot 2D bar code
- ▶ Bar code stability – Laser-etched for permanent identification
- ▶ Compound compatibility – Universal inert polypropylene construction throughout
- ▶ Nonsterile

#### Storage Tubes

Cat. No.	Description	Qty/Pk	Pk/Cs	Qty/Cs
8509	384 2D bar coded storage tubes, round, without plug caps, racked	384/rack	20	7,680 tubes
8510	384 2D bar coded storage tubes, square, racked	384/rack	20	7,680 tubes

#### Compatible Caps and Rack

8511	384 storage tubes plug cap for round tube, bulk pack	384	100	38,400 caps
8512	384 storage tubes plug cap on mats for round tube, 384 caps/mat	3,840	10	38,400 caps
8513	Empty racks with lids for 384 round or square storage tubes	1 rack	20	20 racks



# Technical Appendix

## Selecting the Best Filter for Your Application

Choosing a filter does not 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 area 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. Mycoplasma removal can be performed using a 0.1 µm pore filter. 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 that can be purchased separately. 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
Removing mycoplasma from solutions	0.1	Only PES
Sterilization of aqueous solutions	0.2 to 0.22	All membranes except PTFE
Ultracleaning of solvents (HPLC)	0.2 to 0.22	RC, Nylon, PTFE
Clarification of aqueous solutions	0.45	All membranes except PTFE
Clarification of solvents (HPLC)	0.45	RC, Nylon, PTFE
Course particle removal	0.8	SFCA

PES = polyethersulfone, SFCA = surfactant-free cellulose acetate, PTFE = polytetrafluorethylene, RC = regenerated cellulose.

### 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 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 information from Tables 2 and 3 will help you choose the best Corning® filter membranes for your applications.

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

	Cellulose Nitrate	Cellulose Acetate	Nylon	Polyether-sulfone	Regenerated cellulose	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	N/A
DNA Binding	High	Very low	Very high	Very low	Low	N/A
Chemical Resistance	Low	Low	Moderate to high	Low	Very high	Very high

PTFE = polytetrafluorethylene.

**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 nontoxic 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 ultra-clean and de-gas solvents and mobile phases used in HPLC applications.

**Polytetrafluorethylene (PTFE)** membranes are naturally and permanently hydrophobic. They are ideal for filtering gases, including humidified air. The extreme chemical resistance of PTFE membranes makes them very useful for filtering solvents or other aggressive chemicals for which other membranes are unsuitable. Because of their hydrophobicity, PTFE membranes must be prewetted with a solvent, such as ethanol, before aqueous solutions can be filtered.

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

### 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\***

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

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; 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 area 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 size, 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 Design and Dimensions	Effective Filter Area (cm <sup>2</sup> )	Expected Throughput (mL)*
4 mm diameter syringe/disc	0.07	0.05 - 3
15 mm diameter syringe/disc	1.7	3 - 15
25 mm diameter syringe/disc	4.8	10 - 50
26 mm diameter syringe/disc	5.3	10 - 50
28 mm diameter syringe/disc	6.2	10 - 50
50 mm diameter disc	19.6	100 - 500
150 mL filter funnel (42 x 42 mm)	13.6	100 - 500
250 mL filter funnel (49.5 x 49.5 mm)	19.6	200 - 750
500 mL filter funnel (63 x 63 mm)	33.2	300 - 1,500
1000 mL filter funnel (79 x 79 mm)	54.5	500 - 3,000

\*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 pre-filters with filter funnels may extend the throughput 50% to 100% above the values shown.

#### 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 disposable plastic products.

##### *Syringe/Disc Filters*



Corning syringe filters

The smaller conventional **Corning® syringe disc-type filters** (4, 15, 25, 26, and 28 mm 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 polytetrafluorethylene (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 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.

##### *Corning Disposable Plastic Vacuum Filters*



Corning filter/storage systems

These sterile filters are available in three styles: complete filter/storage systems, bottle top filters, and centrifuge tube top filters. Corning filters feature printed funnels that identify membrane type and product number for easy product identification. Angled hose connectors simplify 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 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 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 50 mL polypropylene centrifuge tube to minimize unnecessary transfers by filtering directly into centrifuge tube.

##### *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.



## Improving Filter Performance

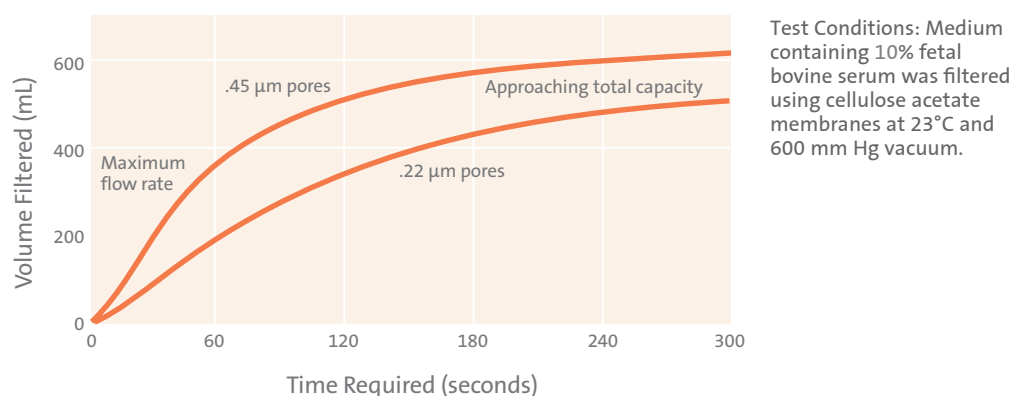
Getting the best performance from your filtration products requires two very important steps: selecting the right products for the job, and then using these products effectively. The first part of this filtration section covered the steps required to select the right filter for your applications; this 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.

### 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  $\mu\text{m}$  filter was approximately twice that of the .22  $\mu\text{m}$  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**



**Table 5. Corning Filter Designs**

Design	Sterile	Filter Diameters/ Dimensions (mm)	Available Membrane Materials	Pore Sizes ( $\mu\text{m}$ )	Special Features
Syringe Filters	Some	4, 15, 25, 26 and 28	RC, PES, SFCA, NY and PTFE	0.2, 0.45, and 0.8	Ideal for small volume pressure filtration
Disc Filters	Yes	50	PTFE	0.2	Ideal for filtering solvents and gases
Vacuum Filter Systems*	Yes	42, 49.5, 63, 79	PES, CA, CN and Nylon	0.2 (NY only), 0.22 (PES, CN), and 0.45 (CA only)	Easy grip bottles for storing filtrate
Bottle Top Vacuum Filters*	Yes	42, 63, 79	PES, CA, CN and Nylon	0.2 (NY only), 0.22 (PES, CA, CN), and 0.45 (CA only)	Two neck widths to fit most glass bottles
Tube Top Vacuum Filters*	Yes	42	CA	0.22 and 0.45	Minimizes unnecessary transfers by filtering into a 50 mL centrifuge tube
Spin-X® Centrifuge Filters	Some	7.7	CA and Nylon	0.22 and 0.45	Ideal for purifying DNA from agarose gels

CN = cellulose nitrate; CA = cellulose acetate; PES = polyethersulfone; RC = regenerated cellulose; PTFE = polytetrafluorethylene.

\*Vacuum filter systems, bottle top vacuum filters, and tube top vacuum filters have a square membrane.

### ***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. In some cases, however, 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 recommended. 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 particles 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 available for 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.
- ▶ Always use cylindrical bottles.
- ▶ Never use the 45 mm threaded bottle top filters on PYREX® or PYREXPLUS® media bottles larger than 2 liter capacity. Use of bottle top filters with PYREXPLUS media bottles (with plastic safety coatings) is highly recommended for vacuum filtration.
- ▶ Never use a square bottle for vacuum applications.
- ▶ Never use the 33 mm threaded bottle top filters on a glass media bottle that is larger than 500 mL.
- ▶ 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.

## Selecting the Best Spin-X® UF Concentrator for Your Application

Spin-X UF concentrators are disposable, single use only ultrafiltration devices with polyethersulfone membranes (PES) for the centrifugal concentration and/or purification of biological samples. This guide will help you choose the best Spin-X UF concentrator for your application.

### Major Uses for Ultrafiltration

Ultrafiltration is a convective process that uses anisotropic semi-permeable membranes to separate macromolecular species and solvents primarily on the basis of size. It is particularly appropriate for the concentration of macromolecules and can also be used to purify molecular species or for solvent exchange (Table 6). Ultrafiltration is a gentle, non-denaturing method that is more efficient and flexible than alternative processes.

### Solute Concentration

Ultrafiltration membranes are used to increase the solute concentration of a desired biological species. The filtrate is cleared of macromolecules which are significantly larger than the retentive membrane pores. Microsolute is removed convectively with the solvent.

### Solute Desalting or Purification

A solution may be purified from salts, non-aqueous solvents and generally from low molecular weight materials. Multiple solvent exchanges will progressively purify macromolecules from contaminating solutes. Microsolute is removed most efficiently by adding solvent to the solution being ultrafiltered at a rate equal to the speed of filtration. This is called diafiltration.

### Choosing the Right Concentrator

Corning offers Spin-X UF concentrators in three sizes. The information below and Tables 7 and 8 will help you find the best concentrator for your needs.

#### 1. Spin-X UF 500 for 100 to 500 µL Samples

Spin-X UF 500 µL centrifugal filter units offer a simple, one-step procedure for sample preparation. They can effectively be used in fixed angle rotors accepting 2.2 mL centrifuge tubes.

The vertical membrane design and thin channel filtration chamber minimizes membrane fouling and provides high speed concentrations, even with particle laden solutions.

#### 2. Spin-X UF 6 for 2 to 6 mL Samples

Spin-X UF 6 mL concentrators offer increased volume flexibility and performance. Spin-X UF 6 concentrators can process up to 6 mL in swing bucket or fixed angle rotors accepting standard 15 mL conical bottom tubes. In a single spin, solutions can be concentrated in excess of 100-fold. Samples are typically concentrated in 10 to 30 minutes with macromolecular recoveries in excess of 95%.



**Table 6. Typical Ultrafiltration Applications**

- ▶ General purpose laboratory concentration and desalting of proteins, enzymes, cells, biomolecules, antibodies, and immunoglobulins
- ▶ Removal of labeled amino acids and nucleotides
- ▶ HPLC sample preparation
- ▶ Deproteinization of samples
- ▶ Recovery of biomolecules from cell culture supernatants, lysates

The Spin-X UF 6 features twin vertical membranes for unparalleled filtration speeds and 100X plus concentrations. Remaining volume is easy to read off the printed scale on the side of the concentrator and the modified dead stop pocket further simplifies direct pipet recovery of the final concentrate.

#### 3. Spin-X UF 20 for 5 to 20 mL Samples

Spin-X UF 20 mL centrifugal concentrators offer increased volume flexibility and performance. Spin-X UF 20 handles up to 20 mL in swing bucket centrifuges and 14 mL in 25° fixed angle rotors accepting 50 mL centrifuge tubes.

Featuring twin vertical membranes for unparalleled filtration speeds the Spin-X UF 20 can achieve 100X plus concentrations. The remaining volume is easy to read off of the printed scale on the side of the concentrator, and the modified dead stop pocket further simplifies direct pipet recovery of the final concentrate.

## Choosing the Best Molecular Weight Cut-off (MWCO) Membrane

Spin-X® UF concentrators use general purpose polyethersulfone membranes that provide excellent performance with most solutions when retentate recovery is of primary importance. Polyethersulfone membranes exhibit no hydrophobic or hydrophilic interactions and are usually preferred for their low fouling characteristics, exceptional flux, and broad pH range.

The advanced designs and low adsorption materials that characterize Spin-X UF products offer a unique combination of faster processing speeds and higher recovery of the concentrated sample. Providing that the appropriate device size (Table 7) and membrane cut-off (Table 8) are selected, Spin-X UF products will typically yield recoveries of the concentrated sample in excess of 90% when the starting sample contains over 0.1 mg/mL of the solute of interest (Table 9). Most of the loss is caused by nonspecific binding both to the membrane surface and to exposed binding sites on the plastic of the sample container.

### Adsorption to the Membrane

Depending on sample characteristics relative to the membrane type used, solute adsorption on the membrane surface is typically 2 to 10 µg/cm<sup>2</sup>. This can increase to 20 to 100 µg/cm<sup>2</sup> when the filtrate is of interest and the solute must pass through the whole internal structure of the membrane. Typically, a higher cut-off membrane will bind more than a low molecular weight cut-off membrane.

### Adsorption to the Sample Container

Although every effort is made to minimize this phenomenon by the selection of low adsorption materials and tool production to optical standards, some solute will bind to the internal surface of the sample container. While the relative adsorption will be proportionately less important on the sample container than on the membrane, due to the higher total surface area, this can be the major source of yield loss.

**Table 7. Technical Properties of Spin-X UF Concentrators**

Concentrator	Spin-X UF 500	Spin-X UF 6	Spin-X UF 20
<b>Concentrator Capacity</b>			
Swing Bucket Rotor	Do not use	6 mL	20 mL
Fixed Angle Rotor	500 µL	6 mL	14 mL
Minimum Rotor Angle	40°	25°	25°
<b>Dimensions</b>			
Total Length	50 mm	122 mm	116 mm
Width	11 mm	17 mm	30 mm
Active Membrane Area	0.5 cm <sup>2</sup>	2.5 cm <sup>2</sup>	6.0 cm <sup>2</sup>
Membrane Hold Up Volume	<5 µL	<10 µL	<20 µL
Dead Stop Volume*	5 µL	30 µL	50 µL
<b>Materials of Construction</b>			
Body	PC	PC	PC
Filtrate Vessel	PP	PC	PC
Concentrator Cap	PP	PP	PP
Membrane	PES	PES	PES

\*Dead stop volume as designed in molding tool. This volume may vary depending on sample, sample concentration, operation temperature, and centrifuge rotor.  
PC = polycarbonate, PP = polypropylene, PES = polyethersulfone.

**Table 8. PES Membrane Selection Guide (Recommended MWCO\*)**

Application	<5,000	10,000	30,000	50,000	100,000
Bacteria					■
Enzymes	■	■			
Growth factors	■	■			
Immunoglobulins			■	■	■
MAB			■	■	■
Peptides	■		■	■	
Virus			■	■	■
Yeast					■

\*For highest recovery, select a membrane MWCO which is at least half of the molecular weight of the solute to be retained.

**Table 9. Spin-X UF Concentrators Performance Characteristics**

(Time in minutes to concentrate up to 30X at 20°C and solute recovery %)

Concentrator	Spin-X UF 500		Spin-X UF 6				Spin-X UF 20			
Rotor	40° Fixed Angle		Swing Bucket		25° Fixed Angle		Swing Bucket		25° Fixed Angle	
Start Volume	500 µL		6 mL		6 mL		20 mL		14 mL	
	Min.	Rec.	Min.	Rec.	Min.	Rec.	Min.	Rec.	Min.	Rec.
<b>BSA 1.0 mg/mL (66,000 MW)</b>										
5,000 MWCO PES	15	96%	20	98%	12	98%	23	99%	29	99%
10,000 MWCO PES	5	96%	13	98%	10	98%	16	98%	17	98%
30,000 MWCO PES	5	96%	12	98%	9	97%	13	98%	15	98%
<b>IgG 0.25 mg/mL (160,000 MW)</b>										
30,000 MWCO PES	10	96%	18	96%	15	95%	27	97%	20	95%
50,000 MWCO PES	10	96%	17	96%	14	95%	27	96%	22	95%
100,000 MWCO PES	10	96%	15	91%	12	91%	25	91%	20	90%

Helpful Hints

Flow Rate

Filtration rate is affected by several parameters, including MWCO, porosity, sample concentration, viscosity, centrifugal force, and temperature. Expect significantly longer spin times for starting solutions with over 5% solids. When operating at 4°C, flow rates are approximately 1.5 times slower than at 25°C. Viscous solutions such as 50% glycerin will take up to 5 times longer to concentrate than samples in a predominantly buffer solution.

Pre-rinsing

Membranes fitted to Spin-X® UF concentrators contain trace amounts of glycerin and sodium azide. Should these interfere with analysis, they can be removed by rinsing fill volume of buffer solution or deionized water through the concentrator. Decant filtrate and concentrate before processing sample solution. If you do not want to use the pre-rinsed device immediately, store it in the refrigerator with buffer or water covering the membrane surface. Please do not allow the membrane to dry out.

Sterilization of Polyethersulfone Membranes

Polyethersulfone membranes should not be autoclaved as high temperatures will substantially increase membrane MWCO. To sanitize or sterilize these devices, use a 70% ethanol solution or sterilizing gas mixture.

Optimizing Solute Recovery

When highest solute recoveries are most important, in particular when working with solute quantities in the microgram range, Corning recommends considering the following key points:

- Select the smallest device that suits the sample volume. Additionally, take advantage of the extra speed of Spin-X UF concentrators by refilling a smaller concentrator repeatedly.
- Select the lowest MWCO membrane that suits the application.
- When available, use swing bucket rotors rather than fixed angle rotors. This reduces the surface area of the concentrator that will be exposed to the solution during centrifugation.
- Reduce centrifugal force to approximately half of the maximum recommended (Table 10).
- Avoid over concentration. The smaller the final concentrate volume, the more difficult it is to achieve complete recovery. If feasible, after a first recovery, rinse the device with one or more drops of buffer and then recover again.
- Pre-treat the device overnight with a passivation solution, such as 5% SDS, Tween 20, or Triton™ X in distilled water. Then, rinse thoroughly before use.

Table 10. Maximum Recommended Centrifugal Force

Concentrator	Spin-X UF 500	Spin-X UF 6	Spin-X UF 20
Maximum Centrifugal Force – Swing Bucket			
5,000 to 50,000 MWCO PES	Do not use	4,000 x g	4,000 x g
>100,000 MWCO PES	Do not use	4,000 x g	3,000 x g
Maximum Centrifugal Force – Fixed Angle			
5,000 to 50,000 MWCO PES	12,000 x g	8,000 x g	6,000 x g
>100,000 MWCO PES	12,000 x g	6,000 x g	6,000 x g

Table 11. Chemical Compatibility\*

(2-hour contact time; compatible pH range, pH 1-9)

Acetic Acid (25.0%)	1	Lactic Acid (5.0%)	1
Acetone (10.0%)	3	Mercaptoethanol (10 mL)	1
Acetonitrile (10.0%)	3	Methanol (60%)	2
Ammonium Hydroxide (5.0%)	2	Nitric Acid (10.0%)	1
Ammonium Sulphate (saturated)	1	Phenol (1.0%)	2
Benzene (100%)	3	Phosphate Buffer (1.0M)	1
n-Butanol (70%)	1	Polyethylene Glycol (10%)	1
Chloroform (1.0%)	3	Pyridine (100%)	2
Dimethyl Formamide (10.0%)	2	Sodium Carbonate (20%)	2
Dimethyl Sulfoxide (5.0%)	1	Sodium Deoxycholate (5.0%)	1
Ethanol (70.0%)	1	Sodium Dodecylsulfate (0.1M)	1
Ethyl Acetate (100%)	3	Sodium Hydroxide	3
Formaldehyde (30%)	1	Sodium Hypochlorite (200 ppm)	2
Formic Acid (5.0%)	1	Sodium Nitrate (1.0%)	1
Glycerine (70%)	1	Sulfamic Acid (5.0%)	1
Guanidine HCl (6M)	1	Tetrahydrofuran (5.0%)	3
Hydrocarbons, aromatic	3	Toluene (1.0%)	3
Hydrocarbons, chlorinated	3	Trifluoroacetic Acid (10%)	1
Hydrochloric Acid (1M)	1	Tween 20 (0.1%)	1
Imidazole (500 mM)	1	Triton X-100 (0.1%)	1
Isopropanol (70%)	1	Urea (8M)	1

\*1 = acceptable; 2 = questionable, testing advised; 3 = not recommended

Chemical Compatibility

Spin-X UF concentrators are designed for use with biological fluids and aqueous solutions. For chemical compatibility details, refer to Table 11.

## Characteristics of Corning® Plasticware

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.

	Polystyrene	Polyethylene (High Density)	Polypropylene	Polycarbonate	Nylon	Polytetra- fluorethylene (PTFE)	Polyethylene Terephthalate (PET)
<b>Physical Characteristics</b>							
<b>Basic Properties</b>	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	Biologically inert, hard, tough, excellent optical qualities
<b>Clarity</b>	Clear	Opaque	Translucent	Clear	Opaque	Opaque	Clear
<b>Autoclave Results</b>	Melts	May	Withstands distort	Withstands several cycles	OK one cycle	OK	Melts
<b>Heat Distortion Point</b>	147°F - 175°F 64°C - 80°C	250°F 121°C	275°F 135°C	280°F - 290°F 138°C - 143°C	300°F - 356°F 150°C - 180°C	250°F 121°C	158°F 70°C
<b>Burning Rate</b>	Slow	Slow	Slow	Self-extinguishing	Self-extinguishing	None	—
<b>Effects of Laboratory Reagents</b>							
<b>Weak Acids</b>	None	None	None	None	None	None	None
<b>Strong Acids</b>	Oxidizing acids attack	Oxidizing acids attack	Oxidizing acids attack	May be attacked	Attacked	None	Oxidizing acids attack
<b>Weak Alkalies</b>	None	None	None	None	None	None	None
<b>Strong Alkalies</b>	None	None	None	Slowly attacked	None	None	Attacked
<b>Organic Solvents</b>	Soluble in aromatic chlorinated hydrocarbons	Resistant below 80°C	Resistant below 80°C	Soluble in chlorinated hydrocarbons; partly soluble in aromatics	Resistant	Resistant	Soluble in aromatic or chlorinated hydrocarbons
<b>Gas Permeability of Thin Wall Products*</b>							
<b>O<sub>2</sub></b>	Low	High	High	Very low	Very low	—	Very low
<b>N<sub>2</sub></b>	Very low	Low	Low	Very low	Very low	—	Very low
<b>CO<sub>2</sub></b>	High	Very high	Very high	Low	—	—	Low

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



## Chemical Compatibility of Corning® Plasticware

	PS	PP	PVC	CA	PC	CN	NY	MCE	PTFE	PET
<b>Acids</b>										
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
<b>Alcohols</b>										
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
<b>Amines</b>										
Aniline	G	G	P	N	N	R	R	N	R	O
Dimethylformamide	P	G	F	N	N	N	R	N	R	N
<b>Bases</b>										
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
<b>Hydrocarbons</b>										
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*
<b>Halogenated Hydrocarbons</b>										
Chloroform	P	N	P	N	N	R	R	N	R	N
Methylene chloride	P	F	P	N	N	R	R	N	R	N
<b>Ketones</b>										
Acetone	P	G	P	N	O	N	R	N	R	N
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°C 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, specimens known or suspected of being infectious, or any other potentially infectious or hazardous 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 (see Technical Appendix) 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

	Polycarbonate	Clear Polypropylene	New Polyethylene Terephthalate
Recommended Working Temperature*	4°C to 20°C	4°C to 20°C	4°C to 20°C
Heat Distortion Point	121°C	121°C	70°C
Flexibility	Rigid	Moderate	Rigid
Transparency	Extremely clear	Clear	Optically clear
Maximum RCF:			
15 mL Tube	—	12,000/12,500 x g**	3,600 x g
50 mL Tube	—	15,500/17,500 x g**	3,600 x g
250 mL Tube	—	6,000 x g**	—
500 mL Tube	—	6,000 x g**	—
250 mL Flat-bottom Tube	13,500 x g/27,500 x g**	13,700 x g/27,500 x g**	—
500 mL Flat-bottom Tube	13,700 x g	13,700 x g**	—

\*At room temperature for 24 hours.

\*\*Depends on closure.

### 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	3	3	3
Ketones	2	2 <sup>c</sup>	2

\*At room temperature for 24 hours.

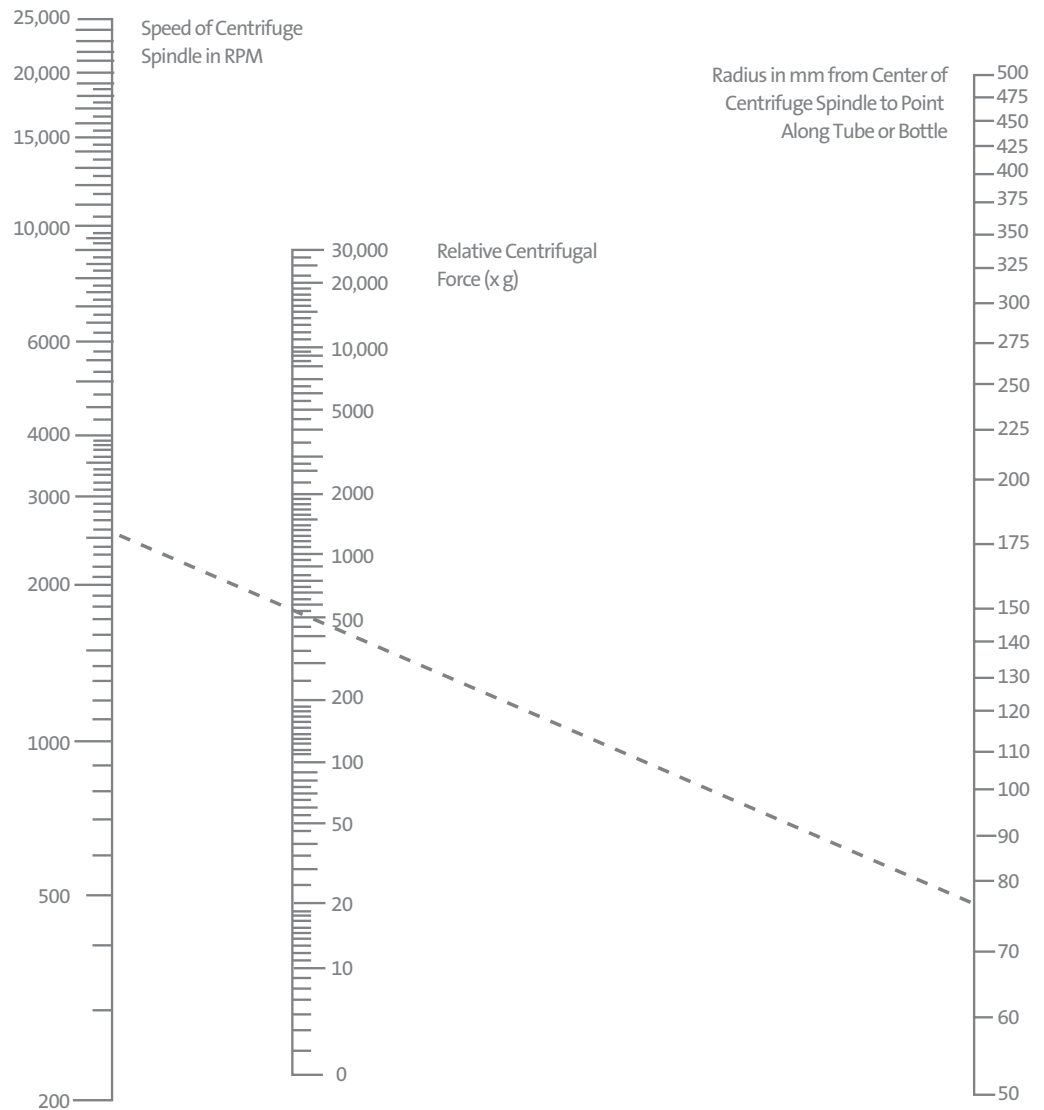
1 = Recommended, 2 = Suitable for most applications. However, a trial run under specific operating conditions is recommended, 3 = Not recommended.

<sup>a</sup>Formaldehyde, rated 1.

<sup>b</sup>Phenol, rated 1.

<sup>c</sup>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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