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CELL CULTURE AND LIQUID HANDLING CATALOG



CORNING

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on Corning Life Sciences'
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Mixed Sources

Product group from well-managed
forests, controlled sources and
recycled wood or fiber

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ORDERING INFORMATION

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BASIC AND ADHERENT CELL CULTIVATION

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Cell Culture Flasks

Corning® and Costar® flasks are available in a variety of sizes, designs and cap styles to meet your needs.

- Corning CellBIND® Surface is a novel cell culture treatment that increases surface wettability for more even and consistent cell attachment
- Ultra-Low Attachment flasks feature a covalently bound hydrogel layer that minimizes cell attachment, protein absorption and cellular activation
- Corning not treated flasks for suspension cell culture
- Manufactured from optically clear virgin polystyrene
- Treated for optimal cell attachment
- Printed with lot numbers for ease in traceability
- 100% integrity tested
- Sterilized by gamma irradiation
- Certified nonpyrogenic

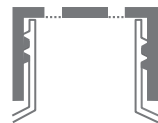
Flask Cap Styles



Plug seal caps feature one-piece linerless construction and are designed for use in closed systems, providing a liquid- and gas-tight seal. When loosened, this cap can also be used in open systems. This cap design was a Corning innovation that first appeared in 1974.



Phenolic style caps are designed (when loosened) for use in open systems requiring gas exchange. With the caps slightly loosened, gas is exchanged between the environments inside and outside of the flask.



Vent caps contain a 0.2 µm pore nonwetable membrane sealed to the cap, providing consistent, sterile gas exchange while minimizing the risk of contamination. These caps are highly recommended for use in all CO₂ incubators, especially for long-term use. The vent cap was a Corning innovation that first appeared in 1988.



Septum caps maintain a closed sterile environment within the RoboFlask™ vessel. The septum allows for adding or removing cells and solutions with a blunt tip cannula while reducing the opportunity for contamination. The septum is presplit to prevent coring of the septum by the cannula. The cap may also be removed to allow pipet access (up to 5 mL) or assist in harvest-ing of cells. This cap septum is validated for multiple entries.

Flask Neck Styles



Straight neck flasks are ideal for larger medium volumes since this design reduces medium sloshing into the cap.



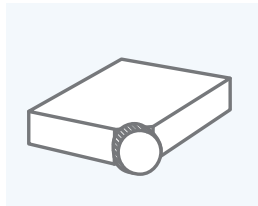
Canted neck flasks allow easier pouring and improved access to the flask for pipetting or scraping. The canted neck design was a Corning innovation that first appeared in 1974.



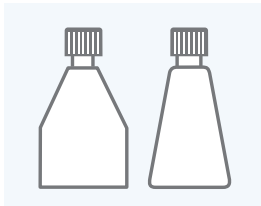
Angled neck improves pipet access and reduces medium sloshing into the neck. This patented design was a Corning innovation that first appeared in 1988.

Flask Shapes

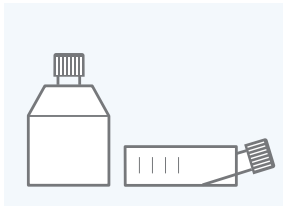
Choosing a flask shape is usually a matter of personal preference:



Low Profile flasks have reduced height for incubator space savings. The corner neck gives direct access to the flask corner.



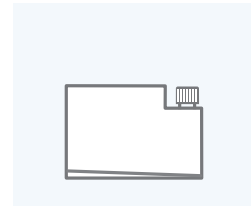
Triangular and modified triangular flasks offer good pipet and cell scraper access to the corners. The wider base provides added stability.



Rectangular flasks have a ramp from the bottom to the canted neck for easier pouring and pipet access. Most canted neck flasks also have an antitip skirt to enhance stability.



Angled neck and traditional straight neck flasks utilize the entire bottom area for cell growth. Their design saves on space and reduces medium sloshing into the neck.



RoboFlask™ vessels are robotics compatible cell culture flasks offering 92.6 cm² cell growth surface area. The flasks are designed for use in automated cell culture systems utilizing a microplate-size format.



3056 25 cm² Triangular Flask with Vent Cap



430639 25 cm² Canted Neck Flask with Vent Cap

Corning® Cell Culture Flasks Ordering Information

25 cm² Growth Area Flasks

VWR Cat. No.	Corning Cat. No.	Surface	Flask Style	Neck Style	Cap Style	Qty/ Pk	Qty/ Cs
29186-002	430168	TC	Rectangular	Canted	Plug Seal	20	500
29186-024	430372	TC	Rectangular	Canted	Phenolic-Style	20	500
29186-010	430639	TC	Rectangular	Canted	Vent Cap	20	200
29442-020	3055	TC	Triangular	Angled	Phenolic-Style	20	500
29442-002	3056	TC	Triangular	Angled	Vent Cap	10	200
46610-076	3289	Corning® CellBIND® Surface	Rectangular	Canted	Vent Cap	20	200
89089-876	3815	Ultra-Low Attachment	Rectangular	Canted	Vent Cap	6	24
89092-698	431463	Not Treated	Rectangular	Canted	Vent Cap	20	200

75 cm² Growth Area Flasks

VWR Cat. No.	Corning Cat. No.	Surface	Flask Style	Neck Style	Cap Style	Qty/ Pk	Qty/ Cs
29186-105	430641	TC	Rectangular	Canted	Vent Cap	5	100
29186-080	430720	TC	Rectangular	Canted	Plug Seal	5	100
29186-104	430725	TC	Rectangular	Canted	Phenolic-Style	5	100
29442-028	3275	TC	Modified triangular	Straight	Phenolic-Style	5	100
29186-008	3276	TC	Modified triangular	Straight	Vent Cap	5	100
46610-078	3290	Corning CellBIND Surface	Rectangular	Canted	Vent Cap	5	100
89089-878	3814	Ultra-Low Attachment	Rectangular	Canted	Vent Cap	4	24
89092-700	431464	Not Treated	Rectangular	Canted	Vent Cap	5	100

Cell Culture Tip

Check the Corning web site (www.corning.com/lifesciences) for technical cell culture application bulletins.



430641 75 cm² Canted Neck Flask with Vent Cap



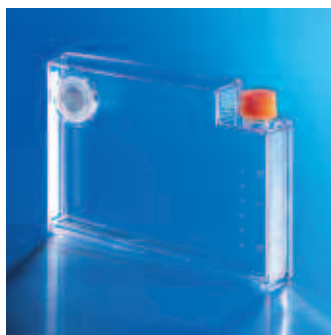
430725 25 cm² Canted Neck Flask with Phenolic Style Cap



3275 25 cm² Triangular Flask with Phenolic Style Cap

**Cell Culture Flask
Selection Tip**

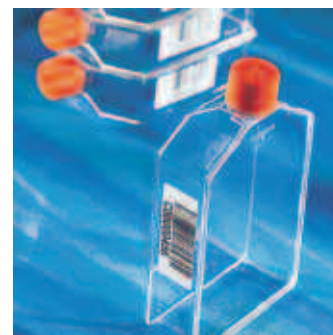
Corning's unique RoboFlask™ (U.S. Patent 7,078,228) Cell Culture Vessels are designed to an SBS standard microplate footprint for use in automated cell maintenance and assay systems.



3070 RoboFlask® Cell Culture Vessel with Septum Cap



430823 150 cm² Canted Neck Flask with Plug Seal Cap



431306 175 cm² Flask with Vent Cap and Bar Code

New!

3816 Low Profile Flask

**Cell Culture Flask
Selection Tip**

The Low Profile 100 cm² flask:

- ▶ gives 33% more area in the footprint of a T75 flask
- ▶ has a half-turn easy-opening cap
- ▶ saves 33% in incubator space
- ▶ uses 26% less plastic than a T75 flask

**Cell Culture Flask
Application Tip**

Corning recommends 0.2 to 0.3 mL of medium per cm² of growth area.

Corning® Cell Culture Flasks Ordering Information (Continued)**92.6 cm² Growth Area RoboFlask™ Vessels**

VWR Cat. No.	Corning Cat. No.	Description	Qty/Pk	Qty/Cs
89089-874	3070	RoboFlask Cell Culture Vessel for automation, tissue culture treated, with bar code, septum cap, sterile	20	100
22250-126	3071	RoboFlask Cell Culture Vessel for manual use, tissue culture treated, with bar code, flat cap (without septum), sterile	20	100
22250-128	3069	RoboFlask Cell Culture Vessel for automation, tissue culture treated, with bar code, septum cap, sterile	10	50
22250-130	3059	RoboFlask Cell Culture Vessel for manual use, tissue culture treated, with bar code, flat cap (without septum), sterile	10	50
89089-852	3067	RoboFlask Cell Culture Vessel for automation, Corning® CellBIND® surface treatment with bar code, septum cap, sterile	20	100
89089-850	3068	RoboFlask Cell Culture Vessel for automation, Corning CellBIND surface treatment with bar code, septum cap, sterile	10	50

100 cm² Growth Area Low Profile Flask

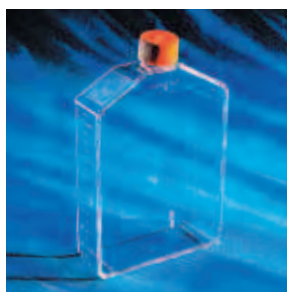
VWR Cat. No.	Corning Cat. No.	Description	Qty/Pk	Qty/Cs
89089-710	3816	Low Profile Flask, 100 cm², tissue culture surface with Vent Cap, Sterile	6	60

150 cm² Growth Area Flasks

VWR Cat. No.	Corning Cat. No.	Surface	Flask Style	Neck Style	Cap Style	Qty/Pk	Qty/Cs
29186-160	430823	TC	Rectangular	Canted	Plug Seal	5	50
29186-192	430824	TC	Rectangular	Canted	Phenolic Style	5	50
29186-106	430825	TC	Rectangular	Canted	Vent Cap	5	50
46610-080	3291	Corning CellBIND Surface	Rectangular	Canted	Vent Cap	5	50
89092-702	431465	Not Treated	Rectangular	Canted	Vent Cap	5	50

162 cm² Growth Area Flasks

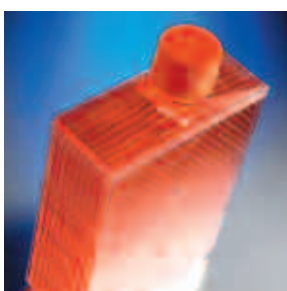
VWR Cat. No.	Corning Cat. No.	Surface	Flask Style	Neck Style	Cap Style	Qty/Pk	Qty/Cs
29442-024	3150	TC	Traditional	Straight	Phenolic Style	5	25
29442-004	3151	TC	Traditional	Straight	Vent Cap	5	25



431082 225 cm² Angled Neck Flask with Vent Cap



3001 225 cm² Canted Neck Flask with Vent Cap



10010 HYPERFlask Vessel

Corning® Cell Culture Flasks Ordering Information (Continued)

175 cm² Growth Area Flasks

VWR Cat. No.	Corning Cat. No.	Surface	Flask Style	Neck Style	Cap Style	Qty/Pk	Qty/Cs
89090-948	431079	TC	Rectangular	Angled	Plug Seal	5	50
89090-950	431080	TC	Rectangular	Angled	Vent Cap	5	50
29560-969	431085	TC	Rectangular	Angled	Phenolic Style	5	50
10010-366*	431306*	TC	Rectangular	Angled	Vent Cap	7	84
22250-134*	431328*	Corning CellBIND® Surface	Rectangular	Angled	Vent Cap	7	84
46610-082	3292	Corning CellBIND Surface	Rectangular	Angled	Vent Cap	5	50
22250-136	3298	Corning CellBIND Surface	Rectangular	Angled	Phenolic Style	5	50
89092-704	431466	Not Treated	Rectangular	Angled	Vent Cap	5	50

*Flask prelabeled with bar code, validated for use with Select™ Robotic System.

225 cm² Growth Area Flasks

VWR Cat. No.	Corning Cat. No.	Surface	Flask Style	Neck Style	Cap Style	Qty/Pk	Qty/Cs
29186-199	431081	TC	Traditional	Angled	Plug Seal	5	25
29560-959	431082	TC	Traditional	Angled	Vent Cap	5	25
22100-594	3000	TC	Rectangular	Canted	Phenolic Style	4	24
28199-730	3001	TC	Rectangular	Canted	Vent Cap	4	24
46610-084	3293	Corning CellBIND Surface	Traditional	Angled	Vent Cap	5	25

235 cm² Expanded Growth Area Flask

VWR Cat. No.	Corning Cat. No.	Surface	Flask Style	Neck Style	Cap Style	Qty/Pk	Qty/Cs
89089-834*	431346*	Corning CellBIND Surface	Rectangular	Angled	Vent Cap	7	42

*Flask prelabeled with bar code for use with Select Automation System with same footprint as the 175 cm² flask.

1720 cm² Growth Area HYPERFlask® Vessel

VWR Cat. No.	Corning Cat. No.	Description	Qty/Pk	Qty/Cs
89089-848*	10024*	HYPERFlask Vessel, 1720 cm ² , Corning CellBIND Surface, Bar Code, Sterile	4	24
89125-582	10020	HYPERFlask M Vessel, 1720 cm ² , Corning CellBIND Surface, Bar Code, Sterile	4	4
89125-584	10030	HYPERFlask M Vessel, 1720 cm ² , Corning CellBIND Surface, Bar Code, Sterile	1	4
89125-586	10034	HYPERFlask M Vessel, 1720 cm ² , Corning CellBIND Surface, Bar Code, Sterile	4	24

*Flask prelabeled with bar code for use with Select Robotic System.

Cell Yields and Recommended Medium Volume

Corning and Costar® Flasks	Approximate Growth Area (cm ²)	Average Cell Yield*	Recommended Medium Volume (mL)	Maximum Working Volume (mL)†
25 cm ²	25	2.5 x 10 ⁶	5 - 7.5	10
75 cm ² Canted neck	75	7.5 x 10 ⁶	15 - 22.5	60
75 cm ² Straight neck	75	7.5 x 10 ⁶	15 - 22.5	90
RoboFlask™ Vessel	93	9.4 x 10 ⁶	20 - 30	70
100 cm ²	100	1.0 x 10 ⁷	20 - 30	40
150 cm ²	150	1.5 x 10 ⁷	30 - 45	210
162 cm ²	162	1.6 x 10 ⁷	32 - 48	175
175 cm ²	175	1.75 x 10 ⁷	35 - 52.5	250
225 cm ²	225	2.25 x 10 ⁷	45 - 67.5	370
235 cm ²	235	2.35 x 10 ⁷	47 - 70.5	250
1720 cm ²	1720	2.5 x 10 ⁸	565	565

*Assumes an average yield of 1 x 10⁵ cells/cm² from a 100% confluent culture. Yields from many cell types can be lower than this.

†Maximum working volume is the amount a flask can hold in the horizontal position when filled to the neck.

Cell Culture Flask Selection Tip

The novel HYPERFlask Vessel offers high yield and high performance with 10 growth surfaces and 1720 cm² growth area in the same footprint as the 175 cm² flask.

Cell Culture Dishes

Corning® Cell Culture Treated Dishes

- ▶ Corning CellBIND® Surface is a novel cell culture treatment that increases surface wettability for more even and consistent cell attachment
- ▶ Ultra-Low Attachment dishes feature a covalently bound hydrogel layer that minimizes cell attachment, protein absorption and cellular activation
- ▶ 6-pack carriers with only 10 dishes/bag are available for 100 mm dishes (Cat No. 430293)
- ▶ 245 mm square dishes offer 500 cm² growth surface
- ▶ Manufactured from optically clear virgin polystyrene
- ▶ Sterilized by gamma radiation
- ▶ Certified nonpyrogenic
- ▶ Have stacking beads to aid in handling
- ▶ Supplied with vents to provide consistent gas exchange

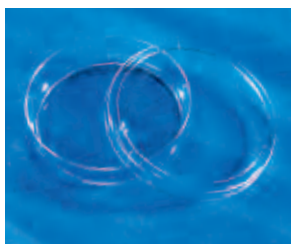
Cell Culture Tip

Check the Corning web site (www.corning.com/lifesciences) for technical cell culture application bulletins.

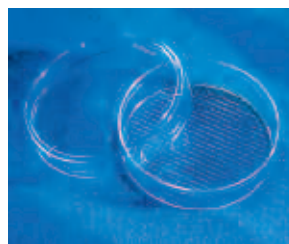
Corning Cell Culture Dishes Ordering Information

VWR Cat. No.	Corning Cat. No.	Dish Style* Surface	Approx. (mm)	Growth Height (mm)	Area (cm ²)	Qty/Pk	Qty/Cs
23864-065	3294	Corning CellBIND Surface	35	10	8	10	210
25382-348	430165	TC	35	10	8	20	500
25382-381	430166	TC	60	15	21	20	500
89089-844	3295	Corning CellBIND Surface	60	15	21	7	126
33500-730	3261	Ultra-Low Attachment	60	15	21	5	20
33500-732	3262	Ultra-Low Attachment	100	20	55	5	20
25382-392	430196	TC	60 with 2 mm grid	15	21	20	500
89089-840	3296	Corning CellBIND Surface	100	20	55	5	40
25382-428	430167	TC	100	20	55	20	500
25382-439	430293	TC	100	20	55	10	480
25382-442	430599	TC	150	25	148	5	60
29186-489	431110	TC	245	25	500	4	16

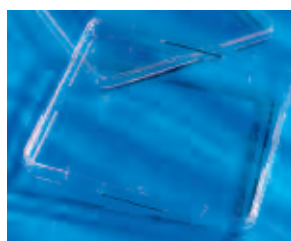
*Dish style (mm) = actual growth surface diameters: 35 mm dish = 34.4 mm; 60 mm dish = 52.1 mm; 100 mm dish = 83.8 mm; 150 mm dish = 139.1 mm. The square dishes have interior bottom dimensions of 224 mm x 224 mm.



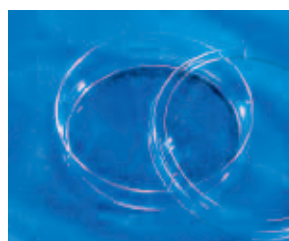
3296 Corning® CellBIND® Surface 100 mm Dish



430196 Gridded 60 mm Dish



431110 500 cm² Cell Culture Dish



430599 150 mm Dish

**Cell Culture Dish
Application Tips**

- The 150 and 245 mm culture dishes make excellent carriers and incubator trays for 35 and 60 mm dishes. This helps prevent spills and reduces opportunities for contamination.
- Corning recommends 0.2 to 0.3 mL of medium per cm² of growth area.

Corning® Nontreated Cell Culture Dishes

- Manufactured from optically clear virgin polystyrene
- Not cell culture treated for applications where cell attachment is not desired
- Have stacking beads to aid in handling
- Supplied with vents to provide consistent gas exchange
- Sterilized by gamma radiation
- Certified nonpyrogenic

Expected Cell Yields and Recommended Medium Volumes

Corning Dishes	Approximate Growth Area (cm ²)	Average Cell Yield*	Recommended Medium Volume (mL) [†]
35 mm	9	9.0×10^5	1.8 - 2.7
60 mm	21	2.1×10^6	4.2 - 6.3
100 mm	55	5.5×10^6	11 - 16.5
150 mm	152	1.52×10^7	30.4 - 45.6
245 mm (square)	500	5.0×10^7	100 - 150

*Assumes an average yield of 1×10^5 cells/cm² from a 100% confluent culture.

[†]Yields from many cell types can be lower than this.

Corning Nontreated Cell Culture Dishes Ordering Information

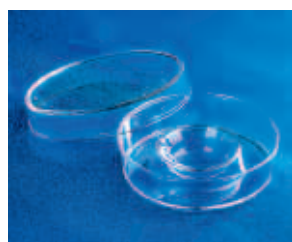
VWR Cat. No.	Corning Cat. No.	Dish Style* (mm)	Height (mm)	Approx. Growth Area (cm ²)	Qty/Pk	Qty/Cs
25382-450	430588	35	10	9	20	500
25382-452	430589	60	15	21	20	500
25382-456	430591	100	20	55	20	500
25382-470	430597	150	25	152	5	60
29186-491†	431111†	245	25	500	4	16

*Note: Dish style (mm) = actual growth surface diameters: 35 mm dish = 34.4 mm; 60 mm dish = 52.1 mm; 100 mm dish = 83.8 mm; 150 mm dish = 139.1 mm.

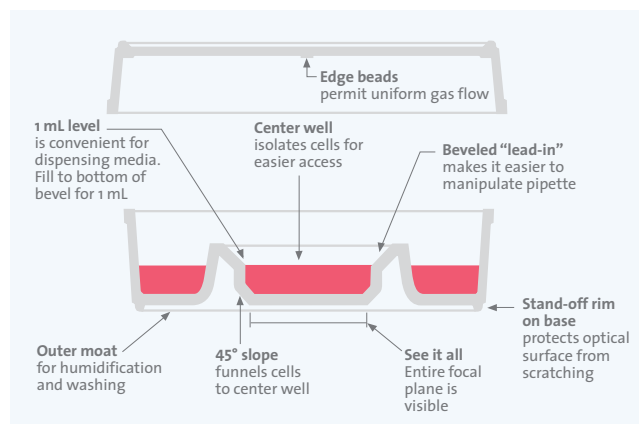
†Cat. No. 431111 is a square dish with interior bottom plate dimensions of 224 mm x 224 mm.

Costar® 60 mm Center Well Culture Dish

- 20 mm center well
- Inner well holds 3 mL of medium while the outer well holds 10 mL
- Treated for optimal cell attachment
- Sterilized by gamma radiation
- Certified nonpyrogenic
- For research use only

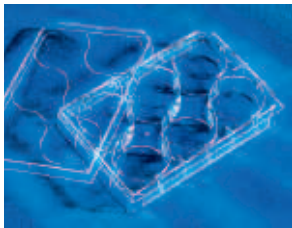


3260 60 mm Center Well Culture Dish

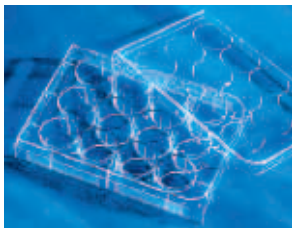
**Costar 60 mm Center Well Culture Dish Ordering Information**

VWR Cat. No.	Corning Cat. No.	Size (mm)	Description (mm)	Center Well (mm)	Qty/Pk	Qty/Cs
29442-026	3260	60	60 x 15	20	20	500

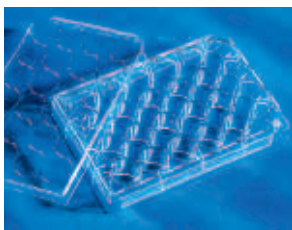
Note: Product is strictly *not* for human use. The center well dish is a class I medical device and should never be used in applications which require the product to be certified as a class II or class III medical device. This product is not CE marked.



3516 6 Well Culture Plate



3513 12 Well Culture Plate



3524 24 Well Culture Plate



3548 48 Well Culture Plate

Multiple Well Plates

Costar® 6, 12, 24, and 48 Well Cell Culture Plates

- ▶ Corning® CellBIND® Surface is a novel cell culture treatment that increases surface wettability for more even and consistent cell attachment
- ▶ Ultra-Low Attachment plates feature a covalently bound hydrogel layer that minimizes cell attachment, protein absorption and cellular activation
- ▶ Corning Not Treated plates for suspension cell culture
- ▶ Nonreversible lids with condensation rings to reduce contamination, uniform footprint for ease in stacking
- ▶ Individual alphanumeric codes for well identification, flat bottoms
- ▶ Treated for optimal cell attachment (except where noted)
- ▶ Sterilized by gamma irradiation, certified nonpyrogenic

6, 12, 24 and 48 Well Plates Ordering Information

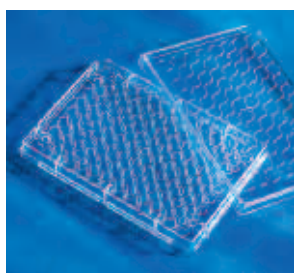
VWR Cat. No.	Corning Cat. No.	Surface	Plate Type	Qty/Pk	Qty/Cs
6 Well Plates					
22250-140	3335	Corning® CellBIND® Surface	Standard clear plate	5	50
29442-036	3506	TC	Standard clear plate	5	100
29442-042	3516	TC	Standard clear plate	1	50
29443-030	3471	Ultra-Low Attachment	Standard clear plate with hydrogel*	1	24
89093-494	3736	Not Treated	Standard clear plate	5	100
12 Well Plates					
22250-142	3336	Corning CellBIND Surface	Standard clear plate	5	50
29442-038	3512	TC	Standard clear plate	5	100
29442-040	3513	TC	Standard clear plate	1	50
89093-496	3737	Not Treated	Standard clear plate	5	100
24 Well Plates					
22250-144	3337	Corning CellBIND Surface	Standard clear plate	5	50
29442-044	3524	TC	Standard clear plate	1	100
29443-952	3526	TC	Standard clear plate	1	50
29444-580	3527	TC	Standard clear plate	5	100
29443-032	3473	Ultra-Low Attachment	Standard plate with hydrogel*	1	24
89093-498	3738	Not Treated	Standard clear plate	5	100
48 Well Plates					
89089-836	3338	Corning CellBIND Surface	Standard clear plate	5	50
29442-048	3548	TC	Standard clear plate	1	100

*This covalently bonded hydrogel surface minimizes cell attachment, protein absorption, enzyme activation and cellular activation. The surface is noncytotoxic, biologically inert and nondegradable.

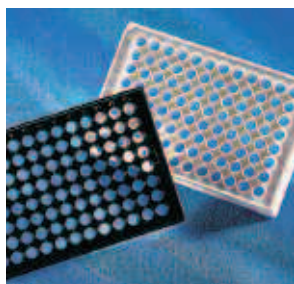
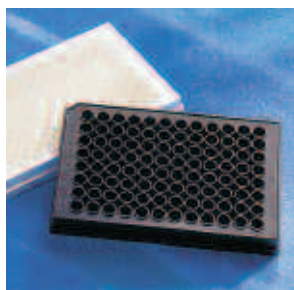
Well Dimensions, Expected Cell Yields, and Recommended Medium Volumes

Cell Culture Plates	Well Diameter (Bottom, mm)	Single Well Only				Entire Plate		
		Approx. Growth Area (cm ²)	Average Cell Yield*	Total Well Volume (mL)	Working Volume (mL)	Approx. Growth Area (cm ²)	Average Cell Yield*	Working Volume (mL)
6 well	34.8	9.5	9.5 x 10 ⁵	16.8	1.9 - 2.9	57	5.7 x 10 ⁶	11.4 - 17.1
12 well	22.1	3.8	3.8 x 10 ⁵	6.9	0.760 - 1.14	45.6	4.56 x 10 ⁶	9.1 - 13.7
24 well	15.6	1.9	1.9 x 10 ⁵	3.4	0.380 - 0.570	45.6	4.56 x 10 ⁶	9.1 - 13.7
48 well	11	0.95	9.5 x 10 ⁴	1.6	0.19 - 0.285	45.6	4.56 x 10 ⁶	9.1 - 13.7

*Assumes an average yield of 1 x 10⁵ cells/cm² from a 100% confluent culture. Yields from many cell types can be lower than this.



3596 96 Well Culture Plate

3610 and 3603
96 Well Clear Bottom Plates3917 and 3916
96 Well Solid Plates

Corning® and Costar® 96 Well Cell Culture Plates

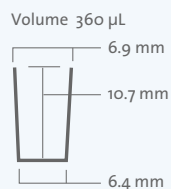
- Corning CellBIND® Surface is a novel cell culture treatment that increases surface wettability for more even and consistent cell attachment
- Ultra-Low Attachment plates feature a covalently bound hydrogel layer that minimizes cell attachment, protein absorption and cellular activation
- Corning Poly-D-Lysine (PDL) microplates are coated with PDL (molecular weight range of 70 to 150 kDa) giving the surface a net positive charge for better cell attachment.
- Nonreversible lids with condensation rings to reduce contamination (except where noted)
- Treated for optimal cell attachment (except where noted)
- Sterilized by gamma radiation, certified nonpyrogenic
- Individual alphanumeric codes for well identification, flat bottoms (except where noted)

Black plates are designed to lower background in fluorescent assays and reduce crosstalk. White plates are designed for luminescent assays. Some plates have the Corning CellBIND surface or a PDL coating to enhance cell attachment. Corning offers many other 96 well plate types for applications other than cell culture; for a complete listing, check the catalog at www.corning.com/lifesciences.

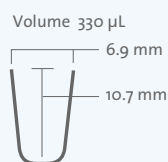
Corning Assay Surface Properties and Applications

Corning Surface	Applications	Binding Interaction	Sample Properties
Standard Tissue Culture Surface	Assays using standard attachment dependent cell lines	Hydrophilic and ionic interactions (negatively charged)	Allows cell attachment and binding
Corning CellBIND Surface	- Assays for difficult-to-attach cells - Help cells stay attached during washing steps	Hydrophilic and ionic interactions (negatively charged)	Enhances cell attachment uniformity and binding to polystyrene
Poly-D-Lysine-Coated Surface	- Assays for difficult-to-attach cells - Help cells stay attached during washing steps	Hydrophilic and ionic interactions (positively charged)	Enhances cell attachment and binding
Ultra-Low Attachment Surface	- Assays where preventing cell attachment is required - Hybridoma production and clonal isolation by limiting dilution	Nonionic hydrogel layer reduces or eliminates ionic and hydrophobic binding	Prevents or reduces cell attachment and binding
Corning Not Treated Surface	- Assays involving non-adherent cell culture - Bacterial cell culture assays	Hydrophobic interactions	Applications where cell attachment is not required

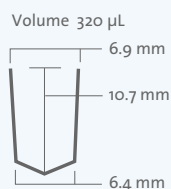
Well Geometry



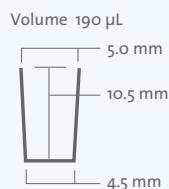
Flat Bottom



Round Bottom



V Bottom



Half Area

Cell Culture Tip

Check the Corning web site (www.corning.com/lifesciences) for technical cell culture application bulletins.

96 Well Plates Ordering Information

WVR Cat. No.	Corning Cat. No.	Surface	Description	Qty/ Pk	Qty/ Cs
Clear Plates					
66025-626	3300	Corning® CellBIND® Surface	Standard clear plate	5	50
29442-056	3596	TC	Standard clear plate	1	50
29443-954	3997	TC	Standard clear plate	10	50
29442-058	3598	TC	Standard clear plate	5	100
29442-060	3599	TC	Standard clear plate	1	100
29442-050	3585	TC	Standard clear plate with special low evaporation lid	5	50
29442-054	3595	TC	Standard clear plate with special low evaporation lid	1	50
29442-062	3696	TC	96 well half area, flat bottom clear plate	1	50
29444-316	3697	TC	96 well half area clear plate	20	100
29442-064	3790	Not Treated	96 well round bottom, polypropylene plate with polystyrene lid	1	50
29442-066	3799	TC	96 well round bottom clear plate	1	50
29442-068	3894	TC	96 well V-bottom clear plate	1	50
89092-706	3841	Poly-D-lysine	Standard clear plate, coated	20	100
29442-072	9102	TC	8-well strip plate, assembled 12 strips per plate	1	50
29443-034	3474	Ultra-Low Attachment	Standard clear plate with hydrogel*	1	24
89089-826	7007	Ultra-Low Attachment	96 well round bottom plate with hydrogel*	1	24
White Plates					
29444-041	3917	TC	Solid white plate	20	100
29444-458	3362	TC	Solid white plate without lid	25	100
29444-308	3688	TC	96 well half area solid white plate	20	100
33501-002	3885	TC	96 well half area white plate with clear bottom	20	100
29444-010	3610	TC	White plate with clear bottom	1	48
89091-014	3903	TC	White plate with clear bottom	20	100
89092-710	3843	Poly-D-lysine	White plate with clear bottom	20	100
Black Plates					
66025-630	3340	Corning CellBIND Surface	Black plate with clear bottom	5	50
29444-039	3916	TC	Solid black plate	20	100
33501-834	3875	TC	96 well half area solid black plate	20	100
33500-996	3882	TC	96 well half area black plate with clear bottom	20	100
29444-008	3603	TC	Black plate with clear bottom	1	48
89091-012	3904	TC	Black plate with clear bottom	20	100
89092-708	3842	Poly-D-lysine	Black plate with clear bottom	25	100
29444-332	3614	TC	Black plate with special optics, ultrathin, clear bottom, without lid	20	100
Lids and Tape					
29444-276	3099	—	Universal lid, sterile	25	50
80081-122	3345	—	Breathable Sealing tape, sterile	50	500
29444-032	3930	—	Rigid styrene lid with condensation rings, sterile	1	100
29444-034	3931	—	Rigid styrene lid with condensation rings, sterile	25	50

*This covalently bonded hydrogel surface minimizes cell attachment, protein absorption, enzyme activation and cellular activation. The surface is noncytotoxic, biologically inert and nondegradable.

96 Well Cell Culture Plates

Well Dimensions, Expected Cell Yields, and Recommended Medium Volume

Cell Culture Plates	Well Diameter (Bottom, mm)	Single Well Only				Entire Plate		
		Approx. Growth Area (cm ²)	Average Cell Yield*	Total Well Volume (mL)	Working Volume (mL)	Approx. Growth Area (cm ²)	Average Cell Yield*	Working Volume (mL)
96 well flat bottom	6.4	0.32	3.2×10^4	0.36	0.100 - 0.200	30.7	3.07×10^6	9.6 - 19.2
96 well round bottom	6.4	NA [†]	NA [†]	0.33	0.100 - 0.200	NA [†]	NA [†]	9.6 - 19.2
96 well V bottom	6.4	0.38	3.8×10^4	0.29	0.100 - 0.200	36.5	3.65×10^6	9.6 - 19.2
96 half area	4.5	0.16	1.6×10^4	0.19	0.050 - 0.100	15.4	1.54×10^6	4.8 - 9.6

*Assumes an average yield of 1×10^5 cells/cm² from a 100% confluent culture. Yields from many cell types can be lower than this.

[†]Because these wells are round, the surface area available for cell attachment is dependent on the medium volume used.

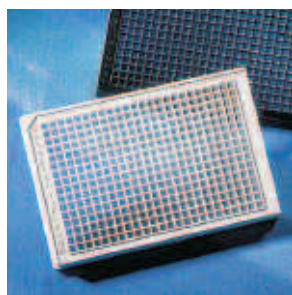
384 Well Cell Culture Plates

- ▀ Flat bottoms and lids
- ▀ New low volume plates have only a 50 μ L total well volume, with recommended working volume of 5 to 40 μ L
- ▀ Treated for optimal cell attachment
- ▀ Sterilized by gamma radiation
- ▀ Certified nonpyrogenic

Black plates are designed to lower background in fluorescent assays and reduce crosstalk. White plates are designed for luminescent assays. Some plates have the Corning® CellBIND® Surface or a Poly-D-lysine coating to enhance cell attachment. Corning offers many other 384 well plate types for applications other than cell culture; for a complete listing, check the catalog at www.corning.com/lifesciences.

384 Well Cell Culture Plates Ordering Information

VWR Cat. No.	Corning Cat. No.	Description	Surface	Qty/Pk	Qty/Cs
Clear Plates					
29444-094	3701	Standard clear plate, low flange	TC	20	100
89092-712	3844	Standard clear plate	Poly-D-lysine	25	100
White Plates					
89089-800	3570	Solid white plate	TC	10	50
29444-086	3707	White plate with clear bottom	TC	20	100
89092-716	3846	White plate with clear bottom	Poly-D-lysine	25	100
89089-870	3826	Solid white plate, low volume	TC	10	50
Black Plates					
89089-790	3571	Solid black plate, low flange	TC	10	50
29444-078	3712	Black plate with clear bottom	TC	20	100
89092-714	3845	Black plate with clear bottom	Poly-D-lysine	25	100
80079-948	3683	Black plate with clear bottom	Corning CellBIND Surface	10	50
89089-866	3542	Low volume, black plate with clear bottom	TC	10	50
89089-860	3822	Low volume, solid black plate	TC	10	50
77777-174	3985	Black optical imaging plate with clear bottom	TC	20	100



3707 and 3712
384 Well Clear Bottom Plates

Well Dimensions, Expected Cell Yields, and Recommended Medium Volumes

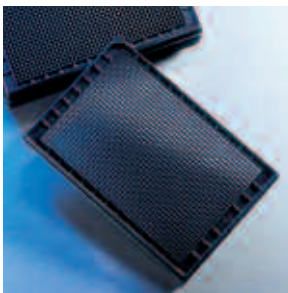
Cell Culture Plates	Well Diameter (Bottom, mm)	Single Well Only				Entire Plate		
		Approx. Growth Area (cm ²)	Average Cell Yield*	Total Well Volume (mL)	Working Volume (mL)	Approx. Growth Area (cm ²)	Average Cell Yield*	Working Volume (mL)
Standard 384 Well	2.7 x 2.7 [†]	0.056	5.6 x 10 ³	0.125	0.025 - 0.050	21.5	2.15 x 10 ⁶	9.6 - 19.2
Low Volume 384 Well	2.0	0.031	3.1 x 10 ³	0.050	0.005 - 0.040	12.0	1.2 x 10 ⁶	1.9 - 15.3

*Assumes an average yield of 1 x 10⁵ cells/cm² from a 100% confluent culture. Yields from many cell types can be lower than this.

[†]These wells are square.

1536 Well Cell Culture Plates

- Superior performance compared to competitor plates: lower CVs, higher signal-to-noise ratios, and lower background fluorescence
- Compatible with bar coding, standard readers and automation
- Recommended working volume of up to 8 µL
- Treated for optimal cell attachment
- Flat bottoms and lids
- Sterilized by gamma radiation
- Certified nonpyrogenic



3893 1536 Well Culture Plates

Black plates are designed to lower background in fluorescent assays and reduce crosstalk. White plates are designed for luminescent assays. Corning offers other 1536 well plate types for applications other than cell culture; for a complete listing, check the catalog at www.corning.com/lifesciences.

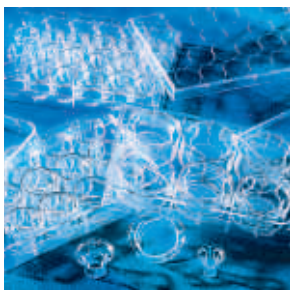
1536 Well Cell Culture Plates Ordering Information

VWR Cat. No.	Corning Cat. No.	Description	Surface	Qty/Pk	Qty/Cs
White Plates					
89089-746	3727	Solid white plate, hi base	TC	10	50
Black Plates					
89089-730	3726	Solid black plate, hi base	TC	10	50
66025-654	3893	Black clear bottom plate, hi base	TC	10	50

Well Dimensions, Expected Cell Yields, and Recommended Medium Volumes

Cell Culture Plates	Well Diameter (Bottom, mm)	Single Well Only				Entire Plate		
		Approx. Growth Area (cm ²)	Average Cell Yield*	Total Well Volume (µL)	Working Volume (µL)	Approx. Growth Area (cm ²)	Average Cell Yield*	Working Volume (mL)
1536 Well Clear Flat Bottom	1.63 x 1.63	0.025	2.5 x 10 ³	12.5	5 - 8	38.3	3.8 x 10 ⁶	7.7 - 15.4
1536 Well Solid Flat Bottom	1.53 x 1.53	0.023	2.3 x 10 ³	12.5	5 - 8	35.3	3.5 x 10 ⁶	7.7 - 15.4

*Assumes an average yield of 1 x 10⁵ cells/cm² from a 100% confluent culture. Yields from many cell types can be lower than this.



Corning® Transwell® Permeable Supports

Transwell cell culture inserts are convenient, easy-to-use permeable support devices for the study of both anchorage-dependent and anchorage-independent cell lines

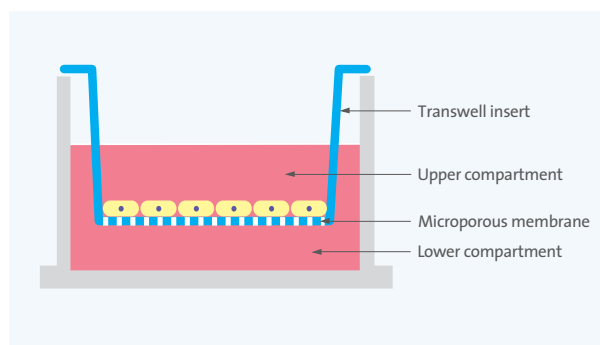
- Designed to produce a cell culture environment that closely resembles the *in vivo* state
- Allows polarized cells to feed basolaterally and thereby carry out metabolic activities in a more natural fashion
- Unique patented self-centered hanging design prevents medium wicking between the insert and outer well
- Permits access to the lower compartment through windows in the insert wall
- Suspended design allows for undamaged co-culturing of cells in the lower compartment
- Available in a range of pore sizes and different membranes to satisfy diverse experimental requirements

Characteristics of Transwell Membranes

Characteristics	Polyester (PET)	Polycarbonate	PTFE/Collagen
Optical properties	Clear	Translucent	Clear when wet
Cell visibility	Good	Poor	Cell outlines
Tissue culture treated	Yes	Yes	No
Membrane thickness	10 µm	10 µm	50 µm
Matrix/ECM coatable	Yes	Yes	Yes
Collagen treated	No	No	Yes
Available Pore Sizes (µm)	0.4, 1.0, 3.0, 8.0	0.4, 3.0, 5.0, 8.0	0.4, 3.0

Chemical Compatibility

All of the Transwell membranes are compatible with histological fixatives including methanol and formaldehyde. The polyester Transwell membranes have the best overall chemical resistance. These membranes (but not the polystyrene housings) are compatible with many alcohols, amines, esters, ethers, ketones, oils and some solvents, including many halogenated hydrocarbons and DMSO but are not recommended for use with strong acids and bases.



Transwell Permeable Supports Tip

Check the Corning web site (www.corning.com/lifesciences) for an extensive list of references, listed by application, citing the use of Transwell permeable supports in cell culture research.

Pore Density

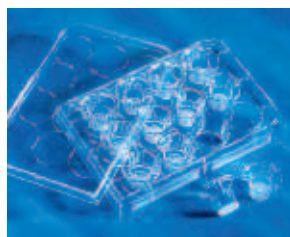
Of the three types of Transwell membranes, only the PTFE does not have a defined pore density because it is a tortuous path membrane. The two membranes with a nominally defined pore density are polycarbonate and polyester. The polyester Transwell membranes do not have as high a pore density as the polycarbonate Transwell but have better optical clarity as a result. The nominal pore densities for Corning Polycarbonate and Polyester (PET) membranes are given in the following table.

Packaging of Transwell Polycarbonate and Polyester Membrane Inserts

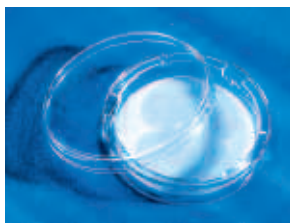
The cell culture inserts come prepackaged in the appropriate multiple well plate as follows:

- 24 mm diameter inserts are packaged 6 inserts in a 6 well plate, four 6 well plates per case, for a total of 24 inserts.
- 12 mm diameter inserts are packaged 12 inserts in a 12 well plate, four 12 well plates per case, for a total of 48 inserts.
- 6.5 mm diameter inserts are packaged 12 inserts in a 24 well plate, four 24 well plates per case, for a total of 48 inserts.

All Transwell-COL collagen coated inserts are individually packaged and each case includes the appropriate multiple well plate.



3401 12 mm Polycarbonate Transwell Insert



3419 75 mm Polycarbonate Transwell Insert

Nominal Pore Densities for Corning® Transwell® Polyester and Polycarbonate Membranes

Pore Size	Nominal Pore Density	
	Polycarbonate Membrane Transwell (pores/cm ²)	Transwell-Clear Polyester Membrane (pores/cm ²)
0.4 µm	1 x 10 ⁸	4 x 10 ⁶
1.0 µm	n/a	1.6 x 10 ⁶
3.0 µm	2 x 10 ⁶	2 x 10 ⁶
5.0 µm	4 x 10 ⁵	n/a
8.0 µm	1 x 10 ⁵	1 x 10 ⁵

Growth Areas and Recommended Medium Volumes for Transwell Permeable Supports

Multiple Well Plate or Dish Type	Transwell Insert Diameter (mm)	Insert Membrane Growth Area (cm ²)	Volume Added per Plate Well	Volume Added to Inside of Transwell Insert (mL)
HTS 96	4.26	0.143	0.235	0.075
HTS 24	6.5	0.33	0.6	0.1
24 well	6.5	0.33	0.6	0.1
12 well	12	1.12	1.5	0.5
6 well	24	4.67	2.6	1.5
100 mm dish	75	44	13	9

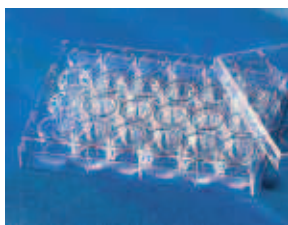
Corning Transwell Polycarbonate Membrane Inserts

- 10 µm thick translucent membrane
- Pore sizes ranging from 0.4 µm to 8 µm diameters
- Treated for optimal cell attachment
- Supplied in multiple well plates
- Membrane must be stained for cell visibility
- Sterilized by gamma radiation

Transwell Polycarbonate Membrane Permeable Supports Ordering Information

VWR Cat. No.	Corning Cat. No.	Membrane Diameter (mm)	Growth Surface Area (cm ²)	Membrane Pore Size (µm)	Tissue Culture Treated	Inner Packaging*	Inserts/Cs
29442-106	3413	6.5	0.33	0.4	Yes	12/plate*	48
29442-110	3415	6.5	0.33	3.0	Yes	12/plate*	48
29442-118	3421	6.5	0.33	5.0	Yes	12/plate*	48
29442-120	3422	6.5	0.33	8.0	Yes	12/plate*	48
29442-086	3401	12	1.12	0.4	Yes	12/plate	48
29442-088	3402	12	1.12	3.0	Yes	12/plate	48
29442-104	3412	24	4.67	0.4	Yes	6/plate	24
29442-108	3414	24	4.67	3.0	Yes	6/plate	24
29442-130	3428	24	4.67	8.0	Yes	6/plate	24
29442-114	3419	75	44	0.4	Yes	1/dish	12
29442-116	3420	75	44	3.0	Yes	1/dish	12

*6.5 mm membrane diameter are packaged 12 inserts in a 24 well plate, 4 plates per case.



3458 6.5 mm Polycarbonate Transwell Cultrex Insert

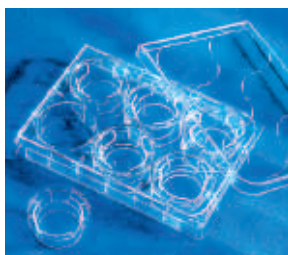
Corning® Transwell® Invasion Inserts

Transwell Polycarbonate Membrane Insert Coated with Cultrex® Basement Membrane Extract

- ▶ 8 µm pore size membrane, 10 µm thick
- ▶ Coated with Cultrex basement membrane extract
- ▶ For cell invasion assays
- ▶ Supplied in 24 well plates, 12 inserts per plate

Transwell Cultrex Polycarbonate Membrane Permeable Supports Ordering Information

VWR Cat. No.	Corning Cat. No.	Membrane Diameter (mm)	Growth Surface Area (cm ²)	Membrane Pore Size (µm)	Tissue Culture Treated	Inner Packaging*	Inserts/Cs
89090-258	3458	6.5	0.33	0.8	Yes	12/plate	24



3450 24 mm Transwell-Clear Insert

Corning Transwell-Clear Polyester Membrane Inserts

- ▶ 10 µm transparent membrane
- ▶ Treated for optimal cell attachment
- ▶ Excellent visibility under phase contrast microscopy
- ▶ Supplied in multiple well plates
- ▶ Sterilized by gamma radiation

Transwell-Clear Inserts Ordering Information

VWR Cat. No.	Corning Cat. No.	Membrane Diameter (mm)	Growth Surface Area (cm ²)	Membrane Pore Size (µm)	Inner Packaging*	Inserts/Cs
29442-074	3450	24	4.67	0.4	6/plate	24
29442-076	3452	24	4.67	3.0	6/plate	24
29442-078	3460	12	1.12	0.4	12/plate	48
29442-080	3462	12	1.12	3.0	12/plate	48
29442-082*	3470*	6.5	0.33	0.4	12/plate*	48
29442-084*	3472*	6.5	0.33	3.0	12/plate*	48

*6.5 mm membrane diameter are packaged 12 inserts in a 24 well plate, 4 plates per case.



3491 24 mm Transwell-COL Collagen-Coated Insert

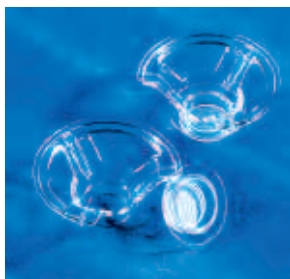
Corning Transwell-COL Collagen-Coated Membrane Inserts

- ▶ Transparent collagen treated PTFE membrane
- ▶ Promotes cell attachment and spreading
- ▶ Equimolar mixture of types I and III collagen
- ▶ Individually packaged
- ▶ Multiple well plates included in each case
- ▶ Supplied sterile

Transwell-COL Inserts Ordering Information

VWR Cat. No.	Corning Cat. No.	Membrane Diameter (mm)	Growth Surface Area (cm ²)	Membrane Pore Size (µm)	Inner Packaging	Multiple Well Plate	Inserts/Cs
29442-125	3491	24	4.67	0.4	Individual	6 well	24
29442-112	3492	24	4.67	3.0	Individual	6 well	24
29442-092	3493	12	1.12	0.4	Individual	12 well	24
29442-094	3494	12	1.12	3.0	Individual	12 well	24
29442-129*	3495*	6.5	0.33	0.4	Individual	24 well	24
29442-126*	3496*	6.5	0.33	3.0	Individual	24 well	24

*Includes twenty-four 6.5 mm inserts packaged separately with two 24 well plates.



3407 12 mm Snapwell Inserts

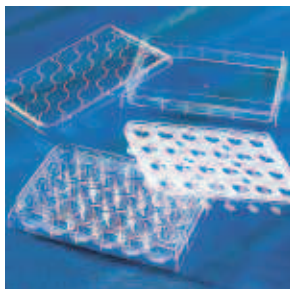
Snapwell™ Inserts

- A modified Transwell permeable support containing a 12 mm diameter membrane supported by a detachable ring
- Once cells are grown to confluence on the Snapwell insert, the ring can be placed in a vertical or horizontal diffusion chamber*
- Sterilized by gamma radiation
- Packaged in 6 well plates

Snapwell Inserts Ordering Information

VWR Cat. No.	Corning Cat. No.	Membrane Pore Size (μm)	Membrane	Inner Packaging	Inserts/ Cs
29442-160	3407	0.4	Polycarbonate	6/plate	24
29442-284	3802	3.0	Polycarbonate	6/plate	24
29442-282	3801	0.4	Clear Polyester	6/plate	24

*Diffusion Chambers are available through Harvard Apparatus (www.harvardapparatus.com).



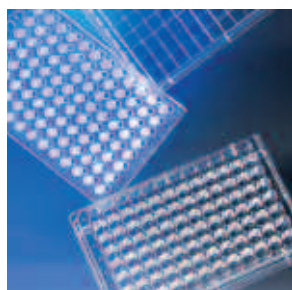
HTS Transwell-24 Well Permeable Support

Corning® HTS Transwell®-24 Well Permeable Supports

- The HTS Transwell-24 Well Permeable Support has an array of 24 wells with membrane inserts connected by a rigid, robotics-friendly tray that enables all 24 Transwell supports to be handled as a single unit
- Cell growth area is 0.33 cm²/well
- Choice of either polyester (PET) membrane (0.4 μm pore size) or polycarbonate (PC) membrane (0.4 μm, 3.0 μm pore sizes)
- Treated for optimal cell attachment
- Individual pack has 2 HTS Transwell-24 units loaded into two open reservoir trays and two individually wrapped 24 well plates
- Bulk pack has 12 HTS Transwell-24 units loaded into 24 well plates only. Reservoirs may be purchased separately
- Sterilized by gamma radiation

Corning HTS Transwell-24 Well Permeable Supports Ordering Information

VWR Cat. No.	Corning Cat. No.	Description	Membrane Pore Size (μm)	Membrane	Qty/ Pk	Plates/ Cs
29445-098	3396	HTS Transwell-24, individual	0.4	PC	1	2
29445-100	3397	HTS Transwell-24, bulk	0.4	PC	12	12
29445-102	3398	HTS Transwell-24, individual	3.0	PC	1	2
29445-104	3399	HTS Transwell-24, bulk	3.0	PC	12	12
29445-096	3395	HTS Transwell nontreated reservoir	—	—	12	48
66025-540	3378	HTS Transwell-24, bulk	0.4	PET	12	12
46610-178	3379	HTS Transwell-24, individual	0.4	PET	1	2



HTS Transwell-96 System

Corning® HTS Transwell®-96 Well Permeable Support Systems and Plates

- The HTS Transwell-96 Well Permeable Support has an array of 96 wells with membrane inserts connected by a rigid, robotics-friendly tray that enables all 96 inserts to be handled as a single unit
- Choice of either polyester (PET) membrane (1.0 μm , 8.0 μm pore sizes) or polycarbonate (PC) membrane (0.4 μm , 3.0 μm , 5.0 μm pore sizes)
- 0.143 cm^2 membrane area per well, providing 20 to 50% more surface area for cell growth than other commercially available systems
- Large apical and basolateral access ports allow efficient media sampling and facilitate automated or manual access
- Optimized for automation, with multichannel feeder ports, improved gripping surface, and standard bar codes
- The reservoir plate allows for simultaneous feeding of 96 wells and comes with a removable media stabilizer to reduce the risk of spills during handling
- The receiver plate isolates each well to enable 96 individual assays
- Sterilized by gamma radiation
- The HTS Transwell-96 Systems (0.4 μm PC and 1.0 μm PET) are packaged with the 96 well insert plate in a reservoir plate and includes the 96 well receiver plate with lid.
- The HTS Transwell-96 Well Plates (3.0 and 5.0 μm PC, 8.0 μm PET) are packaged with the 96 well insert plate in the 96 well receiver plate with lid. Reservoir plates may be purchased separately.

Corning HTS Transwell-96 Well Permeable Supports Ordering Information

VWR Cat. No.	Corning Cat. No.	Description	Membrane Pore Size (μm)	Mem- brane	Qty/ Pk	Qty/ Cs
89089-922	3381	HTS Transwell-96 System, reservoir and receiver plates with 2 lids	0.4	PC	1	1
89089-924	3391	HTS Transwell-96 System, reservoir and receiver plates with 2 lids	0.4	PC	5	5
89089-926	3380	HTS Transwell-96 System, reservoir and receiver plates with 2 lids	1.0	PET	1	1
89089-928	3392	HTS Transwell-96 System, reservoir and receiver plates with 2 lids	1.0	PET	5	5
89089-930	3385	HTS-Transwell-96 Well Plate, receiver plate and lid, individual	3.0	PC	1	2
89089-932	3386	HTS-Transwell-96 Well Plate, receiver plate and lid, bulk	3.0	PC	4	8
89089-936	3387	HTS-Transwell-96 Well Plate, receiver plate and lid, bulk	5.0	PC	4	8
89089-934	3388	HTS-Transwell-96 Well Plate, receiver plate and lid, individual	5.0	PC	1	2
89089-938	3374	HTS-Transwell-96 Well Plate, receiver plate and lid, individual	8.0	PET	1	2
89089-940	3384	HTS-Transwell-96 Well Plate, receiver plate and lid, bulk	8.0	PET	4	8
89089-944	3382	HTS Transwell-96 receiver plate with lid, tissue culture treated	n/a	n/a	10	10
89089-946	3383	HTS Transwell-96 reservoir plate with removable media stabilizer and lid, not treated	n/a	n/a	10	10
89089-942	3583	HTS Transwell-96 black receiver plate with lid, tissue culture treated	n/a	n/a	10	10



Netwell Inserts

Netwell™ Inserts

- Costar® Netwell inserts have polyester mesh bottoms attached to polystyrene rings or housing
- 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 for 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 plates
- 24 mm Netwell inserts fit in Corning® 50 mL plastic centrifuge tubes
- Netwell inserts are not RCF rated

Netwell Inserts Ordering Information

VWR Cat. No.	Corning Cat. No.	Membrane Dia. (mm)	Polyester Membrane Mesh Size (µm)	Sterile	Inner Packaging	Inserts/ Cs
29442-132	3477	15	74	Yes	12/plate	48
29442-134	3478	15	500	Yes	12/plate	48
29442-136	3479	24	74	Yes	6/plate	48
32817-098	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

VWR Cat. No.	Corning Cat. No.	Description	Qty/Cs
29442-152	3517	Netwell Reagent Tray, black	200
29442-154	3519	Netwell Reagent Tray, white	200
29442-156	3520	Netwell Carrier Kit, 15 mm	8
29442-158	3521	Netwell Carrier Kit, 24 mm	8



Netwell Accessories

Cell Scrapers and Cell Lifter

- Useful for the manual harvesting of cells
- Blade design minimizes cell damage and ensures even contact with the growth surface
- Cell lifter is useful for harvesting cells (especially stem cells) in dishes
- Scrapers designed for use in flasks
- Individually wrapped
- Sterilized by gamma radiation
- Certified nonpyrogenic



3008 Cell Lifter



3010 Small Cell Scraper

Cell Scraper and Lifter Ordering Information

VWR Cat. No.	Corning Cat. No.	Description	Blade Length (cm)	Handle Length (cm)	Qty/Pk	Qty/Cs
29442-200	3008	Cell lifter	1.9	18	1	100
29442-202	3010	Small scraper	1.8	25	1	100
29442-204	3011	Large scraper	3.0	39	1	100



Spatulas



Microspatulas

Spatulas

- ▶ Corning® spatulas are designed to save time and to provide contamination-free samples
- ▶ Individually packaged, certified RNase-/DNase-free, nonpyrogenic, antistatic and sterile
- ▶ Eliminates the recycling and resterilizing necessary with reusable spatulas
- ▶ Available in five different configurations
- ▶ Microspatulas are available in two configurations

Spatulas Ordering Information

VWR Cat. No.	Corning Cat. No.	Description	Qty/Cs
38888-610	3003	Spatula, Tapered Blade/Spoon	100
38888-612	3004	Spatula, Small Spoon/Spoon	100
38888-614	3005	Spatula, Round End/Spoon	100
38888-616	3006	Spatula, V-Scoop/Spoon	100
38888-618	3007	Spatula, Flat End/Spoon	100
7776-848	3012	Microspatula, Tapered End/Scoop	50
7776-850	3013	Microspatula, Rounded End/Scoop	50

Roller Bottles and Caps

- ▶ Manufactured from virgin polystyrene
- ▶ Treated for optimal cell attachment
- ▶ One piece seamless construction
- ▶ Most bottles have graduations.
- ▶ All bottles have printed lot numbers to aid in product traceability.
- ▶ Sterilized by gamma radiation
- ▶ Certified nonpyrogenic

430849 850 cm² Roller Bottle

Roller Bottle Application Tips

- ▶ Corning recommends 0.2 to 0.3 mL of medium per cm² of growth area.
- ▶ Corning recommends setting roller rack speeds to provide 0.5 to 1.0 rpm.

Roller Bottles Ordering Information

VWR Cat. No.	Corning Cat. No.	Surface	Surface Area (cm ²)	Cap Style	Graduations	Qty/ Pk	Qty/ Cs
62404-370	430195	TC	490	Plug Seal	No	2	40
62404-440	430699	TC	1,750	Easy Grip	Yes	10	20
62404-442	430849	TC	850	Easy Grip	Yes	2	40
21008-660	431133	TC	850	Easy Grip	Yes	20	20
25382-462	431198	TC	850	Easy Grip Vent	Yes	2	40
62404-444	430851	TC	850	Easy Grip	Yes	5	40
33502-074	431321	TC	850	Easy Grip	Yes	22	44
33500-694	3907	Corning CellBIND® Surface	850	Easy Grip	Yes	2	40
22250-132	431329	Corning CellBIND Surface	850	Easy Grip Vent	Yes	2	40
89089-838	431344	Corning CellBIND Surface	850	Easy Grip	Yes	22	44



430852 Expanded Surface Roller Bottle

Expanded Surface Roller Bottles

- Same features as standard roller bottles
- Ribbed design provides twice the surface area with the same exterior dimensions

Expected Cell Yields and Recommended Medium Volumes

Corning Roller Bottles	Approximate Growth Area (cm ²)	Average Cell Yield*	Recommended Medium Volume (mL)
490 cm ² roller bottle	490	4.9 x 10 ⁷	100 - 150
850 cm ² roller bottle	850	8.5 x 10 ⁷	170 - 255
1700 cm ² roller bottle	1,700	1.7 x 10 ⁸	340 - 510
1750 cm ² roller bottle	1,750	1.75 x 10 ⁸	350 - 525

*Assumes an average yield of 1×10^5 cells/cm² from a 100% confluent culture. Yields from many cell types can be lower than this.

Expanded Surface Roller Bottles Ordering Information

VWR Cat. No.	Corning Cat. No.	Surface	Surface Area (cm ²)	Cap Style	Graduations	Qty/Pk	Qty/Cs
62404-446	430852	TC	1,700	Easy Grip	Yes	2	40
62404-448	430853	TC	1,700	Easy Grip	Yes	5	40
46610-074	431134	Corning® CellBIND® Surface	1,700	Easy Grip	Yes	20	20
21008-662	431135	TC	1,700	Easy Grip	Yes	20	20
29442-914	431191	TC	1,700	Easy Grip Vent	Yes	20	20

Polyethylene Roller Bottle Caps

Caps are sold separately and are available individually wrapped in either Easy Grip or Easy Grip Vent Cap designs.

Polyethylene Roller Bottle Caps Ordering Information

VWR Cat. No.	Corning Cat. No.	Cap Style	Qty/Pk	Qty/Cs
62404-412	430698	Easy Grip	1	100
29444-292	431132	Easy Grip Vent	1	300

Corning is committed to partnering with you, our customer, to provide solutions that increase your efficiency and productivity. We offer the ability to customize packaging and cap design to meet your specific requirements. Minimum order quantities apply. Please call us or contact your local Corning Office for more details. See back cover for contact information.



Easy Grip Cap features large knurls designed for ergonomic handling.

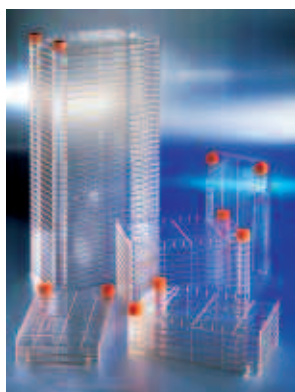


Easy Grip Vent Cap is designed for applications requiring consistent gas exchange.

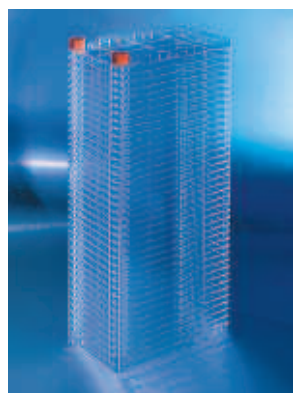


Plug Seal Cap, designed for use in closed systems, provides a liquid- and gas-tight seal. When loosened, this cap can be used in open systems.

Corning® CellSTACK® Culture Chambers and Accessories



Corning CellSTACK Culture Chambers



CellSTACK Chamber, 40-Stack

- ▶ Available in Five Sizes:
 - 1-Stack with 636 cm² cell growth area
 - 2-Stack with 1,272 cm² cell growth area
 - 5-Stack with 3,180 cm² cell growth area
 - 10-Stack with 6,360 cm² cell growth area
 - 40-Stack with 25,440 cm² cell growth area
- ▶ Choice of traditional surface treatment, new Corning CellBIND® Surface for enhanced cell attachment, or Ultra-Low Attachment Surface for reduced cell attachment
 - Corning CellBIND Surface:
 - Better attachment increases cell yields
 - May eliminate need for expensive coatings
 - Great for reducing serum levels
 - Corning Ultra-Low Attachment Surface:
 - Maintain cells in a suspended, unattached state
 - Prevent stem cells from attachment-mediated differentiation
 - Prevent anchorage-dependent cells from dividing
 - Reduce binding of attachment and serum proteins to the substrate
- ▶ Greater Chamber Durability
 - Superior mechanical strength and structural integrity
 - Self venting caps prevent pressure build-up during transport
 - 100% leak tested prior to shipping
- ▶ Greater Cleanliness
 - Improved assembly procedures reduce particulates
 - Certified nonpyrogenic and sterilized by gamma irradiation
- ▶ Continuous Supply Reliability
 - Manufactured in the U.S.A. under GMP conditions
- ▶ Easier to Use
 - Larger openings with threaded closures and vented caps
 - Footprint identical to competitor's product

Corning CellSTACK Culture Chambers Ordering Information

VWR Cat. No.	Corning Cat. No.	Surface	Growth Area (cm ²)	Description	Qty/ Pk	Pk/ Cs
89089-960	3303	Ultra-Low Attachment Surface	636	CellSTACK-1 Chamber	1	8
66025-624	3330	Corning CellBIND Surface	636	CellSTACK-1 Chamber	1	8
33500-818	3268	TC	636	CellSTACK-1 Chamber	1	8
66025-618	3310	Corning CellBIND Surface	1,272	CellSTACK-2 Chamber	1	5
33500-820	3269	TC	1,272	CellSTACK-2 Chamber	1	5
66025-628	3311	Corning CellBIND Surface	3,180	CellSTACK-5 Chamber	1	2
66025-656	3319	TC	3,180	CellSTACK-5 Chamber	1	2
22250-152	3313	TC	3,180	CellSTACK-5 Chamber	1	8
66025-620	3320	Corning CellBIND Surface	6,360	CellSTACK-10 Chamber	1	6
22250-138	3312	Corning CellBIND Surface	6,360	CellSTACK-10 Chamber	1	2
33500-824	3271	TC	6,360	CellSTACK-10 Chamber	1	6
33500-822	3270	TC	6,360	CellSTACK-10 Chamber	1	2
66025-622	3321	Corning CellBIND Surface	25,440	CellSTACK-40 Chamber	1	2
16001-330	3272	TC	25,440	CellSTACK-40 Chamber	1	2



CellSTACK Accessories



3328 Fill Cap, Female MPC Coupling



3281 0.2 µm Vent Cap



3284 Bacterial Air Vent

Corning® CellSTACK® Accessories are Simply Better!

Corning offers a variety of accessories to simplify handling and reduce contamination risks when processing CellSTACK Chambers.

For Better Filling

A variety of optional filling caps are available to allow direct aseptic transfer of media and cells via pumping or gravity feed. Several coupling devices are available on these filling caps with or without integrally sealed USP Class VI certified C-Flex® tubing. Optional filling caps with attached filters with hydrophobic membranes provide for gas exchange and faster aseptic venting during liquid transfers. Sterile vented or unvented 33 mm replacement caps are also available.

For Better Stacking

Reusable stacking devices fit between CellSTACK Chambers to keep them level and optimize incubator space while providing clearance for gas exchange.

For Better Options

Sometimes, currently available accessories do not fit your needs. This is why Corning will work with you to design a CellSTACK Chamber accessory that will make your work flow process more efficient and reliable.

For large scale production using CellSTACK-40 Chambers, there are automated systems that can save on labor while increasing reliability and efficiency.

Call us to discuss your specific requirements.

Corning CellSTACK Accessories Ordering Information

VWR Cat. No.	Corning Cat. No.	Description	Qty/ Pk	Qty/ Cs
66025-658	3331	Stacking device, ABS, nonsterile	1	5
89089-656	3332	Universal cap,* with vented overcap, sterile	1	4
89089-766	3969	Solid cap, sterile	1	6
89089-776	3968	Vent cap, 0.2 µm membrane, sterile	1	6
33500-828	3281	Vent cap, 3/8" (9.5 mm) ID tubing, 7 cm length, Pall® Acro 50, PVDF filter, sterile	1	5
33500-950	3282	Fill cap, 1/8" (3.2 mm) ID tubing, female luer lock with male luer plug, sterile	1	5
33500-952	3283	Fill cap, 3/8" (9.5 mm) ID tubing and 5/16" (7.94 mm) barbed fitting, sterile	1	5
80081-106	3284	Vent cap, 3/8" (9.5 mm) ID tubing, 7 cm length, Pall Bacterial Air Vent, sterile	1	4
82020-002	3324	Two vented over caps and one solid over cap for the Universal Cap, sterile	5	100
82020-000	3333	Fill cap,* 1/4" (6.4 mm) ID tubing, 70 cm length, male MPC coupling with female end cap, sterile	1	4
89089-768	3328	Fill cap, female MPC coupling, 1/4" (6.4 mm) ID barbed fitting with male end cap, sterile	1	4
89089-770	3329	Fill cap, female MPC coupling, 3/8" (9.5 mm) ID barbed fitting with male end cap, sterile	1	4
89089-772	3334	Fill cap, male MPC coupling, 1/4" (6.4 mm) ID barbed fitting with female end cap, sterile	1	4
89089-774	3339	Fill cap, male MPC coupling with male end cap, 3/8" (9.5 mm) ID barbed fitting with female end cap, sterile	1	4

*All caps are 33 mm thread caps.



3333 Fill Cap, Male MPC Coupling



3331 Stacking Device



3332 Universal Cap

Technical Appendix: Cell Culture

Corning® Cell Culture Surfaces

Introduction

For over eighty years, Corning has been developing products and surfaces for cell culture. Corning currently offers six polystyrene-based surfaces (Table 1) for growing cells including the most recent technology revolution, the patented Corning CellBIND® surface (U.S. Patent 6,617,152):

Most of these early plastic vessels were made from polystyrene, a long carbon chain polymer with benzene rings attached to every other carbon. Polystyrene was chosen because it has excellent optical clarity, is easy to mold and is relatively inexpensive. However, it also has one significant drawback: it is a very hydrophobic (nonwettable) polymer to which cells have difficulty attaching. Fortunately, the surface of polystyrene can be easily modified by a variety of chemical (sulfuric acid) and physical (corona discharge, gas-plasma or irradiation) methods. Using these methods, hydroxyl, ketone, aldehyde, carboxyl and amine groups can readily be grafted onto the polymer (Figure 1). These groups modify the surface characteristics changing the uncharged hydrophobic surface into a more ionic hydrophilic surface. Polystyrene can also be modified through chemical reactions to allow the covalent attachment of a variety of reactive groups that can be used for the subsequent covalent immobilization of biomolecules. For additional information, please check the References.

Corning CellBIND® Surface

The Corning CellBIND culture surface, the first novel cell culture surface treatment in over 20 years, is designed to improve cell attachment under difficult conditions, such as reduced-serum or serum-free medium, resulting in higher cell yields. It is also useful for growing “difficult” cells such as primary cultures or transfected cells over expressing proteins. Developed by Corning scientists, this patented technology (U.S. Patent 6,617,152) uses a novel microwave plasma process for treating the culture surface. This process improves cell attachment by incorporating significantly more oxygen into the cell culture surface than traditional plasma or corona discharge treatments, rendering it more hydrophilic (wettable) and increasing the stability of the surface.

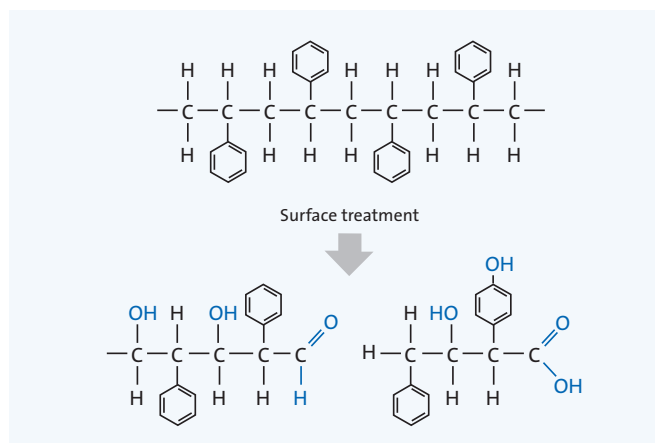


Figure 1. Polystyrene can be surface modified by the addition of a variety of different chemical groups, by breaking the carbon chain backbone, or by opening the benzene ring (not shown).

Unlike biological coatings, the Corning CellBIND surface is a non-biological surface that requires no special handling or storage. Because the polymer is treated, rather than coated, the surface is more consistent and stable. This enhanced cell performance has already led to a major biotechnology company choosing Corning roller bottles with the Corning CellBIND surface for producing a new FDA approved protein therapeutic.

Corning CellBIND surface benefits:

- ▶ Quickly adapts cells to reduced serum or serum-free conditions
- ▶ May eliminate the need for tedious, time-consuming, expensive and low stability biological coatings
- ▶ Stable at room temperature, requires no refrigeration or special handling
- ▶ Gives more consistent and even cell attachment for difficult to attach cell lines, especially transfected cells
- ▶ Reduces premature cell detachment from confluent cultures especially in roller bottles and during cell-based assays

The Corning CellBIND surface is available on flasks, multiple well plates, CellSTACK® Culture Chambers, roller bottles, 96 well plates, 384 well plates, and dishes.

Table 1. Corning Cell Culture Surfaces

Corning Surface	Binding Interaction	Sample Properties
Corning CellBIND Surface modified polystyrene surface	Hydrophilic and ionic (negatively charged)	Improves cell attachment and binding to polystyrene
Standard Tissue culture treated polystyrene	Hydrophilic and ionic (negatively charged)	Allows cell attachment and binding to polystyrene
Untreated polystyrene	Hydrophobic	Significantly reduces the attachment of most cells
Ultra Low Attachment coated polystyrene	Hydrophilic and nonionic	Hydrogel layer prevents the attachment of almost all cells
Poly-D-lysine coated polystyrene	Hydrophilic and ionic (positively charged)	Improves cell attachment and binding to polystyrene

Ultra-Low Attachment Coated Polystyrene Surface

The Corning® Ultra-Low Attachment surface is a covalently bound hydrogel layer that is hydrophilic and neutrally charged. Since proteins and other biomolecules passively adsorb to polystyrene surfaces through either hydrophobic or ionic interactions, this hydrogel surface naturally inhibits nonspecific immobilization via these forces, thus inhibiting subsequent cell attachment. This surface is very stable, noncytotoxic, biologically inert and non-degradable. Corning offers the Ultra-Low Attachment surfaces on dishes, plates, flasks, and CellSTACK® Culture Chamber 1-Stack.

This Ultra-Low Attachment surface has been shown to successfully inhibit attachment of anchorage dependent MDCK, VERO, and C6 cells grown for a period of time equal to that necessary to obtain confluent cell growth on the control surface (standard tissue culture treated polystyrene; Figure 2). This surface has also been shown to inhibit the attachment and activation of macrophages and neutrophils.

Ultra-Low Attachment culture vessels are useful for:

- ▶ Studying tissue-specific functions of certain cancer cells (i.e., MCF-7 breast cancer cells)
- ▶ Preventing stem cells from attachment-mediated differentiation
- ▶ Selectively culturing tumor or virally transformed cells as unattached colonies (substitute for soft agar assays)

Poly-D-Lysine Coated Surface

Some assays and procedures require enhanced binding of cells to polystyrene. Corning poly-D-lysine (PDL) microplates are coated with PDL (molecular weight range of 70 to 150 kDa) by a proprietary method. This synthetic polymeric coating creates a uniform net positive charge on the plastic surface which, for some cell types, can enhance cell attachment, growth and differentiation, especially in serum-free and low serum conditions. PDL surfaces often improve attachment and growth of primary neurons, glial cells, neuroblastomas, and a variety of transfected cell lines, including HEK-293. Corning offers poly-D-lysine coated 96 and 384 well microplates.

Standard Tissue Culture Treated Polystyrene Surface

Standard Corning polystyrene cell culture vessels are surface modified using either corona discharge (flasks, dishes and microplates)

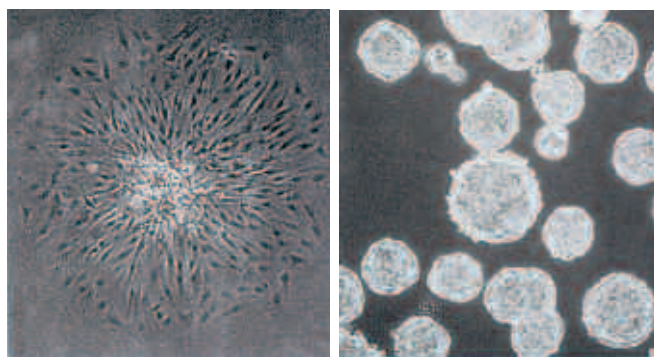


Figure 2. Single cell derived colonies of C6 glioma cells grow as flattened attached colonies in standard tissue culture treated surface (left panel) but form unattached spherical colonies on the ultra low attachment surface (right panel).

or gas-plasma (roller bottles and culture tubes). These processes generate highly energetic oxygen ions which graft onto the surface polystyrene chains (Figure 1) so that the surface becomes hydrophilic and negatively charged when placed in medium. Corning offers the standard tissue culture treated surface on flasks, dishes, multiple well plates, CellSTACK® Culture Chambers, roller bottles and culture tubes.

Untreated Polystyrene Surface

Natural, unmodified polystyrene surfaces are hydrophobic and only bind cells and biomolecules through passive hydrophobic interactions. Corning offers untreated polystyrene culture dishes and microplates for growing cells in stationary suspension or other applications where reduced cell attachment is desired. However, these untreated vessels are sterilized by low dose gamma irradiation, which slightly increases the wettability of the surface. Since some transformed cell lines (CHO-k1, for example) and macrophages will attach and grow on these hydrophobic surfaces, Corning also offers an Ultra-Low Attachment Surface for use in situations where cell attachment must be kept to an absolute minimum.

Characteristics of Corning® Plasticware

	Polystyrene	Polyethylene (High Density)	Polypropylene	Polycarbonate	Nylon	P.T.F.E. (Teflon®)	Polyethylene Terephthalate (PET)
Physical Characteristics							
Basic Properties	Biologically inert, hard, excellent optical qualities	Biologically inert, high chemical resistance toughness	Biologically inert, high chemical resistance, exceptional resistance	Clear, very tough, inert, high temperature transmission	Tough, heat resistant, machinable, high moisture vapor slippery surface	Biologically and chemically inert, high resistant	Biologically inert, hard, tough, excellent optical qualities
Clarity	Clear	Opaque	Translucent	Clear	Opaque	Opaque	Clear
Autoclave Results	Melts	May distort	Withstands several cycles	Withstands one cycle	OK	OK	Melts
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	250°F 70°F
Burning Rate	Slow	Slow	Slow	Self-extinguishing	Self-extinguishing	None	—
Effects of Laboratory Reagents							
Weak Acids	None	None	None	None	None	None	None
Strong Acids	Oxidizing acids attack	Oxidizing acids attack	Oxidizing acids attack	May be attacked	Attacked	None	Oxidizing acids attack
Weak Alkalies	None	None	None	None	None	None	None
Strong Alkalies	None	None	None	Slowly attacked	None	None	Attacked
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	Soluble in aromatic or chlorinated hydrocarbons
Gas Permeability of Thin Wall Products*							
O ₂	Low	High	High	Very low	Very low	—	Very low
N ₂	Very low	Low	Low	Very low	Very low	—	Very low
CO ₂	High	Very high	Very high	Low	—	—	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
Acids										
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
Alcohols										
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
Amines										
Aniline	G	G	P	N	N	R	R	N	R	O
Dimethylformamide	P	G	F	N	N	N	R	N	R	N
Bases										
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
Hydrocarbons										
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*
Halogenated Hydrocarbons										
Chloroform	P	N	P	N	N	R	R	N	R	R
Methylene chloride	P	F	P	N	N	R	R	N	R	N
Ketones										
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.

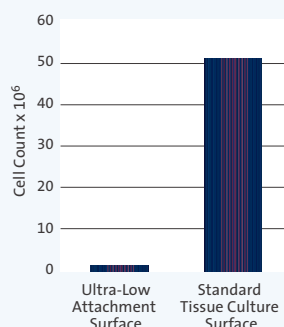
Technical Appendix: Corning® Microplates

Corning Assay Surface Properties and Applications

Corning Surface	Applications	Binding Interaction	Sample Properties	Performance Criteria
FOR BIOCHEMICAL ASSAYS				
NBS™ coated polystyrene surface	- SPA assays - Homogeneous assays	None – Inhibits hydrophobic and ionic interactions	Significantly reduces (<2 ng/cm ²) protein and nucleic acid binding	95% reduction of nonspecific binding of protein compared to untreated polystyrene
Medium Binding (Untreated) modified polystyrene surface	Homogeneous and heterogeneous assays	Hydrophobic	Large biomolecules >20kD with large or abundant hydrophobic regions	96w clear: Well to well CV ≤ 5% 96w black: Well to well CV ≤ 15% (HT) Well to well CV ≤ 3% (HO) 96w white: Well to well CV ≤ 8% (HT) Well to well CV ≤ 5% (HO) 384w clear: Well to well CV ≤ 10% (HT) 384w black and white: Well to well CV ≤ 15% (HT) Well to well CV ≤ 5% (HO)
High Binding modified polystyrene surface	ELISA and other heterogeneous assays	Hydrophobic and ionic (negatively charged)	Improves binding of medium to large biomolecules (>10kD) that are positively charged with or without hydrophobic regions.	96w clear: Well to well CV ≤ 3% 96w black: Well to well CV ≤ 8% 96w white: Well to well CV ≤ 10% 384w clear: Well to well CV ≤ 10% 384w black and white: Well to well CV ≤ 15%
Aminated-modified polystyrene surface	Used with bifunctional crosslinkers (i.e., glutaraldehyde, carbodiimide) to covalently couple to functional groups (primary amines, thiols, and carboxyls) on biomolecules.	Hydrophilic and ionic (positively charged); allows covalent immobilization	Small negatively charged biomolecules OR biomolecules possessing an appropriate functional amine, carboxyl or thiol group.	CV ≤ 5% Percent Covalent Coupling ≥ 95%
DNA-BIND® modified polystyrene surface	- Immobilization of aminated DNA for use in nucleic acid hybridization assays and solid-phase PCR - Immobilization of peptides and other small primary amine containing molecules	Allows covalent immobilization to amine groups via binding to NOS groups	Small to medium biomolecules, especially DNA, possessing an available amine group.	CV ≤ 15%
Sulfhydryl-BIND™ modified polystyrene surface	Assays requiring site-directed orientation of a particular biomolecule, especially antibodies	Allows covalent immobilization via SH moieties on maleimide groups	Biomolecules possessing an accessible sulfhydryl group or reducible disulfide bond.	CV ≤ 15% Activated/NonActivated ≥ 2.0 Activated = reduced disulfide bonds
Carbo-BIND™ modified polystyrene surface	Assays requiring site-directed orientation of a particular biomolecule (oxidized antibodies, carbohydrates and glycosylated proteins) while maintaining enzymatic or immunological activity	Allows covalent immobilization via binding to hydroxide groups	Biomolecules possessing carbohydrate moieties available for periodate activation.	CV ≤ 15% Activated/Non-activated ≥ 3.0 Activated = periodate activation
Universal-BIND™ modified polystyrene surface	- Immobilization of double-stranded DNA - Immobilization of antigens of unknown structure (available functional groups unidentified) - Immobilization of samples containing a mixture of biomolecules, such as cell lysate samples - Immobilization of other nonproteinaceous molecules, such as glycolipids	Allows covalent immobilization via UV cross-linking to abstractable hydrogen	Biomolecules with abstractable hydrogen.	CV ≤ 15% Activated/Non-Activated ≥ 2.0 Activated – by UV
FOR CELL-BASED ASSAYS				
Standard Tissue Culture Surface	Assays using standard attachment dependent cell lines	Hydrophilic and ionic interactions (negatively charged)	Allows cell attachment and binding	≥95% confluency (attachment dependent cell line)
Corning® CellBIND® Surface	- Assays for difficult to attach cells - Help cells stay attached during washing steps	Hydrophilic and ionic interactions (negatively charged)	Enhances cell attachment uniformity and binding to polystyrene	96 Well Plates: CV ≤10%; Wells with cells/wells without cells – 2X signal from MTS assay 384 Well Plates: CV ≤20%; Wells with cells/wells without cells – 2X signal from MTS assay
Poly-D-lysine-Coated Surface	- Assays for difficult to attach cells - Help cells stay attached during washing steps	Hydrophilic and ionic interactions (positively charged)	Enhances cell attachment and binding	96 Well: CV ≤15%; PDL/TCT ≤2.0 serum free HEK cells 384 Well: CV ≤ 20%; PDL/TCT ≥1.5 serum free HEK cells
Ultra-Low Attachment Surface	- Assays where preventing cell attachment is required - Hybridoma production and clonal isolation by limiting dilution	Nonionic hydrogel layer reduces or eliminates ionic and hydrophobic binding	Prevents or reduces cell attachment and binding	≥95% cell attachment inhibition

Corning® Ultra-Low Attachment Microplate

Corning Ultra-Low Attachment Microplate (Cat. No. 3474) has a covalently bonded hydrogel layer to minimize cell attachment, protein absorption, enzyme activation and cellular activation. The surface is non-cytotoxic, biologically inert, and nondegradable.

**Comparison of Cell Attachment in Ultra-Low vs. Standard Tissue Culture Treated Plates**

Vero cells plated at 2.6×10^6 cells per well grown for 4 days at 37°C in a 5% CO₂ environment show a 99% reduction in cellular attachment vs. standard culture treated product.

High Binding Plate Certification of Corning EIA/RIA Microplates

Corning offers 96 well EIA/RIA plates and Stripwell™ microplates manufactured from a special medical grade polystyrene for uniform binding, high optical clarity, and low background absorption.

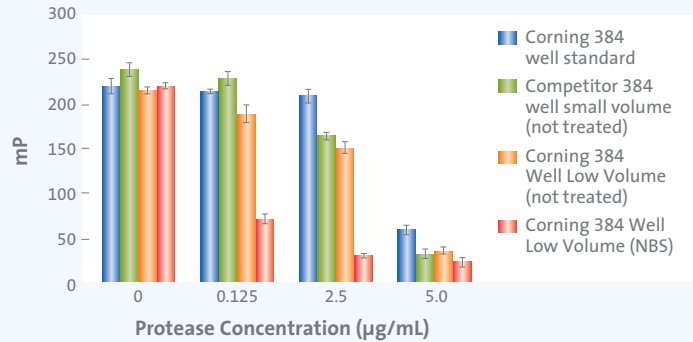
Certification Standards	High Binding	Medium Binding (Not Treated)
Well-to-well coefficient of variation (CV)	≤3%	≤5%
Average high and low wells from the mean	≤8%	≤15%
Background absorbance units from the mean	±0.005	±0.005

Corning high binding plates have a binding capacity of approximately 500 ng of mouse IgG/cm². The nontreated plates have a binding capacity of approximately 250 ng of Mouse IgG/cm². Corning tests its EIA/RIA plates on a lot-to-lot basis and the certification results for each lot are made available upon request by contacting your local Corning Life Sciences office. In addition, five ELISA Technical Bulletins are available at www.corning.com/lifesciences.

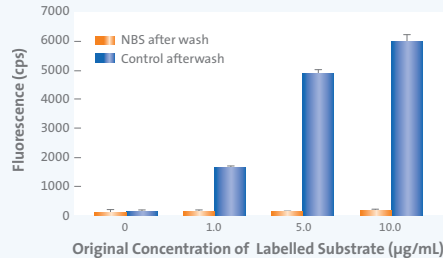
NBS Binding Performance

NBS microplates have a nonionic hydrophilic well surface, and are ideal for minimizing protein binding in homogeneous assays.

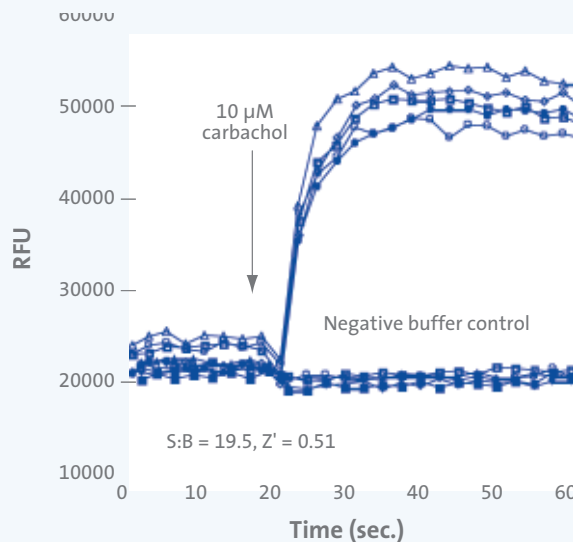
Binding in ng/cm ²	¹²⁵ I-IgG	¹²⁵ I-BSA	¹²⁵ I-Insulin	³² P-oligo DNA	³² P-λ phage DNA
Polystyrene	400	450	310	22	6
Polypropylene	380	440	370	3	<2
NBS on Polystyrene	<2.5	<2.5	5	<2	<2

Benefits of NBS™ on Homogeneous Assays**Fluorescence-based Assay Performance with Corning® NBS™ Low Volume Microplates****Higher Sensitivity for Fluorescence Polarization Assays with 384 Well Corning NBS Low Volume Microplates (Cat. No. 3676)**

Data demonstrates *Streptomyces griseus* protease activity on BODIPY fluorescent labeled (FL) casein substrate. Protease activity is measured as a reduction in millipolarization (mP) units. A significant reduction in fluorescence polarization was observed at the lowest concentration of enzyme in a 10 µL volume.

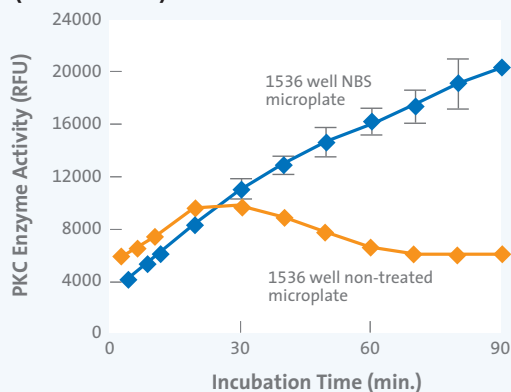
Reduced Nonspecific Protein Binding with Corning NBS Microplates**NBS Surface Significantly Reduces Nonspecific Binding of a BODIPY FL Casein Substrate to Corning Microplates**

Dilutions of BODIPY FL casein in digestion buffer were incubated for 30 min at room temperature in black Corning untreated and NBS microplates (Cat. No. 3654). Control wells contained digestion buffer only. Microplates were washed 3 times with PBS, pH 7.4, and 200 µL/well of digestion buffer alone was added to the wells. Fluorescence intensity was measured.

Miniaturization of Calcium Mobilization Assay in Corning 384 Well Low Volume Black Clear Bottom Tissue Culture Treated Microplate (Cat. No. 3542)

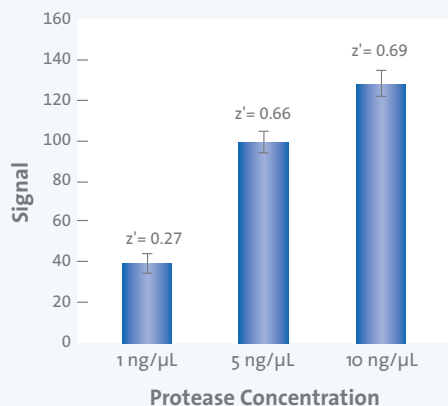
The chromatograms shown here are the rapid increase of calcium signals in Transfected CHO-K1 cells upon the addition of carbachol (n=5 wells). Transfected CHO-K1 cells of M1WT2 (ATCC, CRL-1984) were seeded at 5,000 cells per well in 10 µL medium and then grown in standard CO₂ incubator overnight (37°C). After the addition of 10 µL calcium dye solution per well, the plates were incubated in 37°C for 30 min. After equilibrating to RT for 30 min, plates were loaded to Flexstation reader (Molecular Devices, Inc.). Five µL of 50 µM carbachol solution (final concentration 10 µM) was transferred to induce the response (or 5 µL of plain buffer for the negative controls). The calcium signal was monitored for 60 sec. Assay was performed with Calcium 3 kit (Molecular Devices, Inc.).

Improved Kinase Performance with Corning 1536 Well Solid Black NBS Microplate (Cat. No. 3728)



The fluorescence of the fluorogenic substrate is quenched in this assay. Upon phosphorylation, the quenching mechanism is released, resulting in a significant increase in fluorescence intensity (FI), and therefore, kinase activity can be monitored continuously. The total reaction volume was 8 μ L and contained 20 mM Tris-HCl (pH 7.6), 5 mM $MgCl_2$, 5 mM DTT, 10% Lipid Activator, 6 μ M fluorogenic substrate, 10 μ M ATP and 50 pg/mL PKC-II. Signals were measured by Acquest™ reader (Molecular Devices, Inc.). The PKC assay was developed by Applied Biosystems, Inc.

Performance of Corning 1536 Well 10 μ L Round Well Microplate (Cat. No. 3936)



Fluorescent Polarization Assay on Corning 1536 10 μ L Assay Microplate
10 ng/ μ L, 5 ng/ μ L and 1 ng/ μ L of *Streptomyces griseus* protease were incubated with 2.0 ng/ μ L of BODIPY FL casein substrate in 5 μ L volumes for 10 minutes at room temperature. (Corning 1536 Well 10 μ L black microplate, untreated, Cat. No. 3936).



CRYOPRESERVATION AND LIQUID HANDLING

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External Thread Cryogenic Vials

Cryogenic Vials, Racks and Storage Boxes

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, see page 33.
- ▶ 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

VWR Cat. No.	Corning Cat. No.	Capacity (mL)	Style	Self-Standing	Qty/Pk	Qty/Cs
66021-972	430658	1.2	Conical Bottom	Yes	50	500
66021-974	430659	2.0	Round Bottom	Yes	50	500
66021-976	430661	2.0	Round Bottom	No	50	500
66021-978	430662	4.0	Round Bottom	Yes	50	500
66021-980	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, see page 33.
- ▶ 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

Cryogenic Vial Safety Tip

Appropriate safety equipment (gloves, face shields, biological safety cabinets, hoods, etc.) should always be used to protect personnel when removing vials or ampules from cryogenic storage systems.

Internal Thread Cryogenic Vials Ordering Information

VWR Cat. No.	Corning Cat. No.	Capacity (mL)	Style	Self-Standing	Seal Type	Qty/Pk	Qty/Cs
66021-940	430487	1.2	Conical Bottom	Yes	Washer	50	500
66021-942	430488	2.0	Round Bottom	Yes	Washer	50	500
66021-944	430489	2.0	Round Bottom	No	Washer	50	500
66021-946	430490	4.0	Round Bottom	No	Washer	50	500
66021-948	430491	4.0	Round Bottom	Yes	Washer	50	500
66021-950	430492	5.0	Round Bottom	No	Washer	50	500
66021-970	430656	5.0	Round Bottom	Yes	Washer	50	500
89089-764	431386	2.0	Round Bottom	Yes	Washer	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

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

VWR Cat. No.	Corning Cat. No.	Capacity (mL)	Style	Self-Standing	Qty/Pk	Qty/Cs
66021-920	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

- ▶ Cap 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

VWR Cat. No.	Corning Cat. No.	Description	Qty/Pk	Qty/Cs
66021-964	430499	Assorted colors, polypropylene cap inserts: 100 each of white, blue, red, green, and yellow	50	500
29442-544	2015	White polypropylene cap inserts	50	500
29442-546	2016	Blue polypropylene cap inserts	50	500
29442-548	2017	Red polypropylene cap inserts	50	500
29442-550	2018	Green polypropylene cap inserts	50	500
29442-552	2019	Yellow polypropylene cap inserts	50	500



Cap Inserts

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.

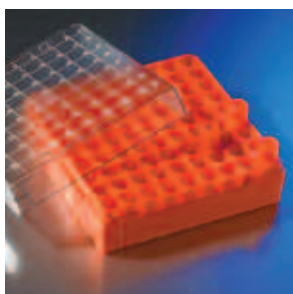
Cryogenic Vial Racks and Storage Boxes Ordering Information

VWR Cat. No.	Corning Cat. No.	Description	Qty/Pk	Qty/Cs
89091-034	430525	Polycarbonate rack and tray, holds 30 vials; self-locking design in ice/water bath	1	1
89091-036	430526	Polycarbonate rack only, holds 30 vials; self-locking design	1	1
22250-112	431131	Reusable orange polypropylene vial rack, holds 50 vials; self-locking design	2	2
89091-030	431119	81 count (9 x 9 array) Cryogenic Box, for 1-2 mL vials	5	10
89091-032	431120	81 count (9 x 9 array) Cryogenic Box, for 4-5 mL vials	5	10
89091-028*	431121*	100 count (10 x 10 array) Cryogenic Box, for 1-2 mL vials	5	10

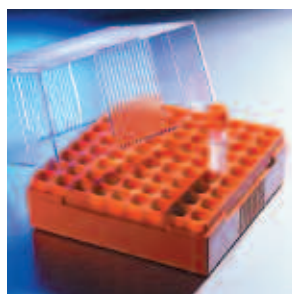
*431121 accepts internally threaded cryogenic vials only.



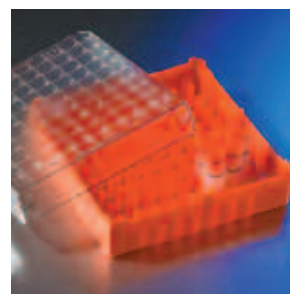
Cryogenic Vial Racks and Tray



431119 Cryogenic Storage Box



431120 Cryogenic Storage Box



431121 Cryogenic Storage Box

Pipets

Stripette® Serological Pipets

- Stripette pipets are sterile, nonpyrogenic, and RNase-/DNase-free.
- Exclusive antidrip tip on 25, 50 and 100 mL sizes assures accurate delivery.
- Color-coded magnifier stripes make volume reading easier.
- Bidirectional graduations provide choice of ascending and descending scales.
- Negative graduations allow additional working volume.
- Four packaging options:
 - Individually wrapped, clear plastic
 - Individually wrapped, paper/plastic
 - Bulk packed for large-scale sterile and nonsterile liquid handling applications
 - Clean room packed; individually wrapped, paper/plastic, triple bagged, SAL 10⁻⁶



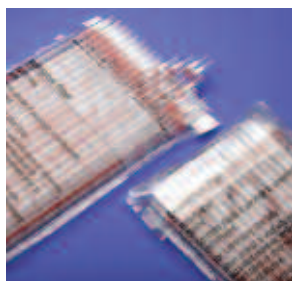
Stripette Serological Pipets



Clear Plastic Wrap



Paper/Plastic Wrap



Bulk Pack



Clean Room Packaging

Stripette Pipets Ordering Information

VWR Cat. No.	Corning Cat. No.	Capacity (mL)	Graduations (mL)	Negative Grads. (mL)	Color Coded Stripe	Qty/Pk	Qty/Cs
Individually Wrapped, Clear Plastic Wrap							
29442-408	4011	1	1/100	0.2	Yellow	100/bag	1,000
29442-410	4012	1	1/100	0.2	Yellow	100/bag	200
29442-418	4021	2	1/100	0.2	Green	100/bag	1,000
29442-422	4051	5	1/10	2.5	Blue	50/bag	200
29442-430	4101	10	1/10	3.0	Orange	50/bag	200
89091-048*	4492*	10	1/10	3.0	Orange	50/bag	200
29442-436	4251	25	2/10	10.0	Red	50/bag	200
29442-440	4501	50	1/2	10.0	Purple	25/bag	100
29442-886	4484	100	1	N/A	Aqua	10/bag	100
Individually Wrapped, Paper/Plastic Wrap							
29443-041	4485	1	1/100	0.2	Yellow	50/bag	1,000
29443-043	4486	2	1/100	0.2	Green	50/bag	1,000
29443-045	4487	5	1/10	2.5	Blue	50/bag	200
29443-047	4488	10	1/10	3.0	Orange	50/bag	200
29443-049	4489	25	2/10	10.0	Red	25/bag	200
29443-051	4490	50	1/2	10.0	Purple	25/bag	100
89091-046	4491	100	1	N/A	Aqua	10/bag	100
Bulk Packed in Bags							
29442-406	4010	1	1/100	0.2	Yellow	50/bag	1,000
29442-416	4020	2	1/100	0.2	Green	50/bag	1,000
29442-420	4050	5	1/10	2.5	Blue	50/bag	500
29442-428	4100	10	1/10	3.0	Orange	50/bag	500
29442-434	4250	25	2/10	10.0	Red	25/bag	200
29442-438	4500	50	1/2	10.0	Purple	25/bag	100
Clean Room Pack, Individually Wrapped, Paper/Plastic, Triple Bagged							
89089-886	7041	1	1/100	0.2	Yellow	50/bag	1,000
89089-890	7042	2	1/100	0.2	Green	50/bag	1,000
89089-894	7045	5	1/10	2.5	Blue	50/bag	200
89089-884	7015	10	1/10	3.0	Orange	50/bag	200
89089-888	7016	25	2/10	10.0	Red	25/bag	200
89089-892	7017	50	1/2	10.0	Purple	25/bag	100
89089-882	7000	100	1	N/A	Aqua	10/bag	100

*Cat. No. 4492 features a wide tip for handling viscous fluids.



Aspirating Pipets

Aspirating Pipets

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

Aspirating Pipets Ordering Information

VWR Cat. No.	Corning Cat. No.	Volume (mL)	Packaging	Qty/Pk	Qty/Cs
89090-256	4975	1	Individually wrapped, bulk packed	50	1,000
29442-462	9186	2	Individually wrapped, clear plastic wrap	100	1,000
29442-460	9099	5	Individually wrapped, clear plastic wrap	50	200
89093-500	9016	2	Individually wrapped, paper/plastic wrap	50	500

Stripettor Pipetting Aid



Stripettor Pipetting Aid

- ▶ Lightweight, adjustable speed control, and designed for use with all serological pipets
- ▶ Nose cones are autoclavable and have a replaceable 0.2 µm hydrophobic sterilizing filter.
- ▶ Operates on a rechargeable 9V nickel hydride 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

VWR Cat. No.	Corning Cat. No.	Product Description	Qty/Cs
29442-508	4910	Stripettor with sterile filter, rechargeable battery and recharger/adaptor	1
29442-510	4911	Grommet replacement (silicone pipet holder)	1
29442-520	4922	0.2 µm hydrophobic replacement filter	4
29442-522	4923	0.2 µm hydrophobic replacement filter	25
29442-516	4914	Recharger/adaptor for 4910	1

Centrifuge Tubes and Racks

15 mL Centrifuge Tubes

- ▶ Corning® 15 mL centrifuge tubes feature black printed graduations and a large white marking spot.
- ▶ Available with your choice of cap styles; the advanced CentriStar™ cap or the original plug seal cap
- ▶ Available in racks or bulk packed in ziplock, resealable sleeves
- ▶ Sterile, certified nonpyrogenic, and RNase-/DNase-free
- ▶ 95 k PA (14 psi) pressure tested – plug seal cap only
- ▶ Foam racks also available separately.

15 mL Centrifuge Tubes Ordering Information

VWR Cat. No.	Corning Cat. No.	Material	Cap Style	Max. RCF	Qty/Pk	Qty/Cs
21008-667	430053	PET	Plug Seal Cap	3,600	25/Sleeve	500
21008-656	430055	PET	Plug Seal Cap	3,600	50/Rack	500
21008-678	430052	PP	Plug Seal Cap	12,000	50/Rack	500
21008-673	430766	PP	Plug Seal Cap	12,000	25/Sleeve	500
21008-670	430790	PP	CentriStar Cap	12,000	50/Rack	500
21008-671	430791	PP	CentriStar Cap	12,000	25/Sleeve	500
89089-644	431355	Foam Centrifuge Tube Rack, 15 mL				20

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



15 mL Centrifuge Tube with CentriStar Cap



50 mL Centrifuge Tube
with CentriStar Cap

50 mL Centrifuge Tubes

- ▶ Corning® 50 mL centrifuge tubes feature black printed graduations and a large white marking spot.
- ▶ Available with your choice of cap styles: the advanced CentriStar™ cap or the original plug seal cap
- ▶ Available in racks or bulk packed in ziplock, resealable sleeves
- ▶ Sterile, certified nonpyrogenic, and RNase-/DNase-free
- ▶ 95 k PA (14 psi) pressure tested
- ▶ Foam racks also available separately

50 mL Centrifuge Tubes Ordering Information

VWR Cat. No.	Corning Cat. No.	Material	Cap Style	Max. RCF	Qty/Pk	Qty/Cs
21008-714	430290	PP	Plug Seal Cap	15,500	25/Rack	500
21008-725	430291	PP	Plug Seal Cap	15,500	25/Sleeve	500
21008-758	430304	PET	Plug Seal Cap	3,600	25/Rack	500
21008-690	430828	PP	CentriStar Cap	15,500	25/Rack	500
21008-736	430829	PP	CentriStar Cap	15,500	25/Sleeve	500
89089-818	4558	PP	CentriStar Cap	15,500	25/Universal Rack*	300
89089-646	4365	Foam Centrifuge Tube Rack, 50 mL			–	20
89089-642	4366	Universal Foam Centrifuge Tube Rack, 15 mL and 50 mL			–	20

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

*Innovative universal rack can hold 50 mL and 15 mL tubes securely, allowing researchers to work with and store both size tubes in the same rack, saving bench and storage space.



Bulk Pack – Ziplock Bag



Universal Rack – holds both 15 mL
and 50 mL tubes



Foam Centrifuge Tube Racks

Self-Standing 50 mL Centrifuge Tubes

- ▶ Corning 50 mL centrifuge tubes feature black printed graduations and a large white marking spot.
- ▶ Available with your choice of flat or the original plug seal cap
- ▶ Tubes are bulk packed in ziplock, resealable sleeves.
- ▶ 95 k PA (14 psi) pressure tested – plug seal cap only
- ▶ Sterile, certified nonpyrogenic, and RNase-/DNase-free

Self-Standing 50 mL Centrifuge Tubes Ordering Information

VWR Cat. No.	Corning Cat. No.	Material	Cap Style	Max. RCF	Qty/Sleeve	Qty/Cs
21008-775	430897	PP	Plug Seal Cap	3,000	25	500
21008-777	430921	PP	Flat Cap	3,000	25	500

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



Self Standing 50 mL
Centrifuge Tube with
Flat Cap

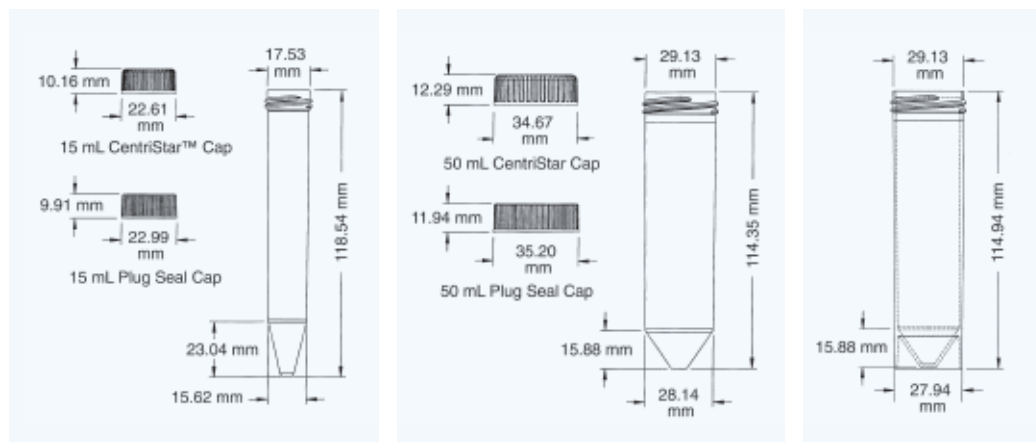


Self Standing 50 mL Centrifuge Tube with CentriStar Cap

CentriStar™ Cap

Corning 15 mL and 50 mL centrifuge tubes are now available with the advanced CentriStar cap. The CentriStar cap has an easy-on/easy-off flat top and offers advanced ergonomics with its wider knurls and roll-over edge design for easier gripping. This design includes a revolutionary plug feature that *minimizes the risk of seepage* when used under recommended conditions.

Dimensions of Corning 15 mL and 50 mL Centrifuge Tube



500 and 250 mL Centrifuge Tubes

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 and Support Cushions Ordering Information

VWR Cat. No.	Corning Cat. No.	Description	Material	Cap Style	Max. RCF	Qty/ Pk	Qty/ Cs
21008-771	430776	250 mL Tube	PP	Plug	6000	6	102
89091-000	431123	500 mL Tube	PP	Plug	6000	6	36
29443-019	431124	500 mL Support Cushion	PEI	n/a	n/a	n/a	6

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



Reusable Glass Beakers

1000 PYREX® Griffin Beaker, Low Form, Double Scale, Graduated

Beaker, with spout, manufactured with uniform wall thickness, offers optimum balance between thermal shock resistance and mechanical strength. For convenience, the 250 through 4000 mL beakers have a double graduated metric scale to indicate approximate content. All sizes have an extra large marking spot. The 10 mL size is not graduated.

1000 PYREX Griffin Beaker, Low Form, Double Scale, Graduated – Ordering Information

VWR Cat. No.	Corning Cat. No.	Capacity (mL)	Graduation Range (mL)	Approx. O.D. x Height (mm)	Graduation Interval (mL)	Qty/ Pk	Qty/ Cs
13912-069	1000-10	10	—	25 x 32	—	12	48
13912-091	1000-20	20	5-15	32 x 40	5	12	48
13912-127	1000-30	30	5-25	35 x 53	10	12	48
13912-149	1000-50	50	10-40	42 x 56	10	12	48
13912-160	1000-100	100	20-80	50 x 72	10	12	48
13912-182	1000-150	150	20-140	57 x 86	10	12	48
13912-207	1000-250	250	25-200	68 x 90	25	12	48
13912-229	1000-400	400	25-325	77 x 110	25	12	48
13912-240	1000-600	600	50-500	90 x 124	50	6	36
13912-262	1000-800	800	50-750	98 x 135	50	6	24
13912-284	1000-1L	1000	50-1000	108 x 158	50	6	24
13912-309	1000-1XL	1500	200-1400	121 x 166	100	4	16
13912-320	1000-2L	2000	200-1800	131 x 193	100	4	8
89090-522	1000-3L	3000	250-2500	146 x 216	125	1	6
89090-524	1000-4L	4000	500-3500	160 x 250	250	1	6
89090-542*	1000-PACK*	Assortment Pack				5	1 set

*A convenience pack containing one each of the most popular sizes of 1000 beaker. Designed for the low volume user, a case contains one each of five sizes; 50 mL, 100 mL, 250 mL, 600 mL and 1L. Packaged in a partitioned carton for safe transit and storage.

Reference: ASTM E-960.

1003 PYREX Griffin Beaker, Heavy Duty, Graduated

Heavy duty beakers specifically designed to offer the best mechanical strength under harsh conditions, such as mechanized washing operations. For convenience, the 250 through 4000 mL beakers have a double graduated metric scale to indicate their approximate content. All sizes have an extra large marking spot.

1003 PYREX Griffin Beaker, Heavy Duty, Graduated – Ordering Information

VWR Cat. No.	Corning Cat. No.	Capacity (mL)	Graduation Range (mL)	Approx. O.D. x Height (mm)	Graduation Interval (mL)	Qty/ Pk	Qty/ Cs
13912-502	1003-150	150	20-140	57 x 86	20	12	48
13912-524	1003-250	250	25-200	68 x 90	25	12	48
13912-546	1003-400	400	25-325	77 x 110	25	12	48
13912-568	1003-600	600	50-500	90 x 124	50	6	36
13912-604	1003-1L	1000	50-1000	108 x 156	50	6	24
89090-526	1003-2L	2000	200-1800	131 x 180	200	4	8
89090-528	1003-4L	4000	500-3500	160 x 250	250	1	4

Reference: ASTM E-960.

Reusable Glass Bottles

1220 PYREX® Aspirator Bottle, Outlet for Tubing

A range of bottles featuring a tubular sidearm outlet to facilitate attachment of flexible tubing. Useful as a delivery/storage container for solutions.

1220 PYREX Aspirator Bottle, Outlet for Tubing – Ordering Information

VWR Cat. No.	Corning Cat. No.	Capacity (mL)	Rubber Stopper No.	Approx. O.D. of Outlet (mm)	Approx. Diam. x Height (mm)	Qty/ Pk	Qty/ Cs
16331-370	1220-2X	9500	12	13	187 x 476	—	1
16331-372	1220-3X	13250	12	13	238 x 445	—	1
16335-100	1220-5	19000	12	13	292 x 508	—	1





61220 PYREXPLUS® Aspirator Bottle, Protective Coating,* Outlet for Tubing

Bottle has a protective PVC coating for longer product life and safety. Protective coating helps prevent glass from shattering and reduces spills. Autoclavable (121°C) and resistant to thermal shock. Bottle features a tubular sidearm outlet for attachment of flexible tubing. The tubulation is not coated to allow easy connection of standard size tubing.

61220 PYREXPLUS Aspirator Bottle, Protective Coating, Outlet for Tubing – Ordering Information

VWR Cat. No.	Corning Cat. No.	Capacity (mL)	Rubber Stopper No.	Approx. O.D. of Outlet (mm)	Approx. Diam. x Height (mm)	Qty/ Pk	Qty/ Cs
16331-392	61220-4L	4000	10	12.5	165 x 298	—	1
16331-395	61220-3X	13250	12	12.5	238 x 445	—	1

Do not place over direct heat or flame. Do not heat above 121°C moist heat or 110°; dry heat.

*Covered by U.S. Patent #4940613.

1395 PYREX® Media Storage Bottle, Screw Cap

Heavy duty bottle which can be used for storage as well as mixing and sampling. Includes linerless, one-piece autoclavable polypropylene plug seal cap with drip free pouring rings. Optional red PBT caps and red ETFE pouring rings are available for dry heat sterilization (180°C). Glass bead indicates full capacity line on 100 mL through 2 liter size. Bottles have permanent white enamel graduations and marking spots. Color-coded polypropylene caps in a choice of orange, green, purple, red, and light gray are available.

1395 PYREX Media Storage Bottle Ordering Information

VWR Cat. No.	Corning Cat. No.	Description	Capacity (mL)	Approx. Thread Finish	Grad. Diameter x Height (mm)	Grad. Range (mL)	Interval (mL)	Qty/ Cs
16157-071	1395-25	Storage Bottle	25	GL25	36.5 x 70	10-25	5	10
16157-068	1395-50	Storage Bottle	50	GL32	46 x 88	20-50	10	10
16157-103	1395-100	Storage Bottle	100	GL45	56 x 100	40-80	20	10
16157-136	1395-250	Storage Bottle	250	GL45	70 x 138	50-200	50	10
16157-169	1395-500	Storage Bottle	500	GL45	86 x 176	100-400	100	10
16157-191	1395-1L	Storage Bottle	1000	GL45	101 x 225	100-900	100	10
16157-227	1395-2L	Storage Bottle	2000	GL45	136 x 262	400-1800	200	10
16157-250	1395-5L	Storage Bottle	5000	GL45	186 x 335	500-4500	500	1
16157-282	1395-10L	Storage Bottle	10000	GL45	234 x 410	2000-9000	1000	1
89089-690	1395-32HTC	Red Cap, High Temp	—	GL32	—	—	—	10

PYREX Storage Bottle Screw Caps Ordering Information

VWR Cat. No.	Corning Cat. No.	Description	Thread Finish	Qty/Cs
16157-409	1395-45LTC	Orange Cap	GL45	20
16157-431	1395-45LTR	Clear Ring	GL45	50
16157-497	1395-45HTR	Red Ring, High Temp	GL45	50
16157-340	1395-45LTC1	Purple Cap	GL45	20
16157-362	1395-45LTC2	Light Gray Cap	GL45	20
16157-384	1395-45LTC3	Green Cap	GL45	20
16157-412	1395-45LTMC	Gray Membrane Cap	GL45	10
11310-692	1395-25HTSC	Cap, Open Top, PBT, High Temp	GL25	10
11310-690	1395-32HTSC	Cap, Open Top, PBT, High Temp	GL32	10
11310-688	1395-45HTSC	Cap, Open Top, PBT, High Temp	GL45	10
11310-696	1395-32SS	Septa, Silicone	GL32	10
11310-694	1395-45SS	Septa, Silicone	GL45	10
11310-702	1395-32TS	Septa, PTFE Faced Silicone	GL32	10
11310-700	1395-45TS	Septa, PTFE Faced Silicone	GL45	10
89089-662	1397-80LTC	Orange Wide Mouth Cap	GLS80	20

Caution: Bottles larger than 2L should NOT be used with bottle top filter units, or in other applications involving vacuum pressure, as breakage may occur. DO NOT have caps tightened immediately after autoclaving as the vacuum resulting from cooling can cause breakage. A pouring ring is not included on 25 mL size. A vented cap is NOT recommended for use on the 5L and 10L 1395 bottle.





51395 PYREX® Low Actinic Bottle, Media, Storage, Graduated, Screw Cap

Heavy duty bottle of low actinic glass for use when storing/transporting light sensitive materials. Includes a linerless, one-piece, autoclavable, orange polypropylene, plug-seal cap with drip-free pouring rings. Glass bead indicates full capacity line. Permanent white enamel graduations and marking spots. Thread size: GL45. Neck I.D.: 29 mm I.D.

51395 PYREX Low Actinic Bottle, Media, Storage, Graduated, Screw Cap – Ordering Information

VWR Cat. No.	Corning Cat. No.	Capacity (mL)	Diameter x Height (mm)	Approx. Grad. Range (mL)	Grad. Interval (mL)	Qty/ Cs
16157-067	51395-100	100	56 x 100	40-80	20	4
16157-065	51395-250	250	70 x 138	50-200	50	4
16157-063	51395-500	500	86 x 176	100-400	100	4
16157-061	51395-1L	1000	101 x 225	100-900	100	4
89090-098	51395-2L	2000	136 x 262	400-1800	200	10
89090-104	51395-5L	5000	186 x 335	500-4500	500	1
80080-920	51395-10L	10000	234 x 410	2000-9000	1000	1

Replacement caps and pouring rings are available under Cat. No. 1395 series.

1396 PYREX Media Storage Bottle, Screw Cap, Graduated, Square

Manufactured from PYREX borosilicate glass for chemical and thermal resistance. Square bottles are easier to handle, require less space (13-20%) on the shelf or in the autoclave and are ideal for mixing, sampling and storage. Features include white enamel graduations, large marking spot and a glass ridge molded into the bottle to indicate full capacity. Includes linerless, one-piece, autoclavable, orange, polypropylene plug seal cap with drip-free pouring ring. A wide range of optional caps are available under the catalog series 1395.

1396 PYREX Media Storage Bottle, Screw Cap, Graduated, Square – Ordering Information

VWR Cat. No.	Corning Cat. No.	Description	Capac. (mL)	Thread Finish	Approx. Dimensions Width x Hgt. (mm)	Grad. Range (mL)	Grad. Interval (mL)	Qty/ Cs
11310-680*	1396-100*	Square Storage Bottle	100	GL32	50 x 105	40-80	20	10
11310-682*	1396-250*	Square Storage Bottle	250	GL45	64 x 138	50-200	50	10
11310-684*	1396-500*	Square Storage Bottle	500	GL45	78 x 176	100-400	100	10
11310-686*	1396-1L*	Square Storage Bottle	1000	GL45	94 x 217	100-900	100	10
11310-696	1395-32SS	Septa, Silicone	—	GL32	—	—	—	10
11310-694	1395-45SS	Septa, Silicone	—	GL45	—	—	—	10
11310-702	1395-32TS	Septa, PTFE Faced Silicone	—	GL32	—	—	—	10
11310-700	1395-45TS	Septa, PTFE Faced Silicone	—	GL45	—	—	—	10

*Do NOT have caps tightened immediately after autoclaving as the vacuum resulting from cooling can cause breakage. Not applicable for vacuum use.

1397 PYREX Round Wide Mouth Media Storage Bottle with GLS 80 Screw Cap

These PYREX wide mouth bottles are designed for heavy duty storage as well as mixing and sampling. The extra-wide mouth (69 mm inner diameter) gives easier access for pouring and removing pastes, powders and larger items. They include a linerless, one-piece autoclavable orange polypropylene plug seal GLS80-threaded cap with a drip-free pouring ring. The neck opening is 5 times larger than on GL45-threaded bottles and is much easier to add or remove powders and to clean.

1397 PYREX Round Wide Mouth Media Storage Bottle with GLS 80 Screw Cap Ordering Information

VWR Cat. No.	Corning Cat. No.	Capacity (mL)	Thread Size	Approx. Diameter x Height (mm)	Grad. Range (mL)	Grad. Interval (mL)	Qty/ Cs
89090-062	1397-500	500	GLS80	101 x 148	100-500	100	10
89090-054	1397-1L	1000	GLS80	101 x 218	100-1000	100	10
89090-060	1397-2L	2000	GLS80	136 x 248	400-2000	200	10

1585 PYREX® Serum Bottle

Designed especially for handling and storing sterile culture media and sera where stability of the glass is of prime importance. Also suitable for storing distilled water and standard solutions. Will withstand hot air (dry) or steam (wet) sterilization. Necks are tooled to increase mechanical strength and for uniform stopper fit.

1585 PYREX Serum Bottle Ordering Information

VWR Cat. No.	Corning Cat. No.	Capacity (mL)	Rubber Stopper No.	Approx. Diam. x Height (mm)	Qty/Cs
89091-390	1585-4L	4000	8	165 x 278	8
89091-534	1585-9L	9000	8	203 x 408	4

1595 PYREX Solution Bottle

These bottles are designed for storage of solutions and are ideal for media preparation. The 9.5 liter (2.5 gallon) and 13.25 liter (3.5 gallon) sizes are in a conventional bottle shape. The 19 liter (5 gallon) and 45.5 liter (12 gallon) sizes are similar in design to a carboy. The 19 liter size is weight controlled to 15 lbs. maximum for ease of handling. The necks are tooled to increase mechanical strength and for uniform stopper fit.

1595 PYREX Solution Bottle Ordering Information

VWR Cat. No.	Corning Cat. No.	Capacity (mL)	Rubber Stopper No.	Approx. Diam. x Height (mm)	Qty/Cs
89091-528	1595-2X	9500	12	187 x 470	4
89091-148	1595-3X	13250	12	238 x 445	4
16145-068	1595-5	19000	12	292 x 508	1
16145-080	1595-12	45500	12	406 x 584	1

1596 PYREX Solution Bottle, Graduated, Carboy

With double scale (liters and gallons) black enamel graduations. Graduated in 500 mL increments.

1596 PYREX Solution Bottle, Graduated, Carboy – Ordering Information

VWR Cat. No.	Corning Cat. No.	Capacity (mL)	Rubber Stopper No.	Approx. Diam. x Height (mm)	Qty/Cs
89091-530	1596-9L	9500	12	187 x 476	4
89091-150	1596-13L	13250	12	238 x 438	4
16145-161	1596-19L	19000	12	292 x 508	1

61596 PYREXPLUS® Solution Bottle, Protective Coating,* Graduated, Carboy

Bottle features a protective PVC coating for longer product life and safety. Protective coating helps prevent glass from shattering and reduces spills. Autoclavable (121°C) and resistant to thermal shock. Designed for storage of solutions, ideal for media preparation. The 9L and 13L sizes are in conventional bottle shape. The 19L size is similar in design to a carboy. Necks are tooled to increase mechanical strength and for uniform stopper fit. Graduated in 500 mL increments with black enamel.

61596 PYREXPLUS Solution Bottle, Protective Coating, Graduated, Carboy – Ordering Information

VWR Cat. No.	Corning Cat. No.	Capacity (mL)	Rubber Stopper No.	Approx. Diam. x Height (mm)	Qty/Pk	Qty/Cs
89091-698	61596-9L	9500	12	187 x 476	—	1
16145-164	61596-13L	13250	12	238 x 438	—	1
16145-166	61596-19L	19000	12	292 x 508	—	1

Do not place over direct heat or flame. Do not heat above 121°C moist heat or 110°C dry heat.

*Covered by U.S. Patent #4940613.

Reusable Glass Cylinders

3022 PYREX® Single Metric Scale Graduated Cylinder, TC

Calibrated “to contain,” with white enamel graduations. The 100 mL capacity is in accordance with ASTM E-133 and E-1272 and is used in ASTM tests D-86, D-216 and D-447. The 10 mL size has a funnel top. Bumper guards are supplied with 25 mL thru 2000 mL sizes inclusive.

3022 PYREX Single Metric Scale Graduated Cylinder, TC – Ordering Information

VWR Cat. No.	Corning Cat. No.	Capacity (mL)	Grad. Interval (mL)	ASTM Tol. (± mL)	Approx. O.D. x Height (mm)	Qty/ Pk	Qty/ Cs
89090-556	3022-10	10	0.1	0.2	13 x 178	2	24
89090-564	3022-25	25	0.2	0.3	18 x 192	1	18
89090-594	3022-50	50	1.0	0.5	24 x 225	1	18
89090-552	3022-100	100	1.0	1.0	29 x 254	1	12
89090-560	3022-250	250	2.0	2.0	39 x 340	1	12
89090-568	3022-500	500	5.0	4.0	50 x 392	1	8
24710-205	3022-1L	1000	10.0	6.0	64 x 465	1	1
24710-227	3022-2L	2000	20.0	12.0	83 x 520	1	1

3024 PYREX Single Metric Scale Graduated Cylinder, TD

Calibrated “to deliver,” with white enamel graduations. Bumper guards are supplied on 25 mL through 4000 mL sizes.

3024 PYREX Single Metric Scale Graduated Cylinder, TD – Ordering Information

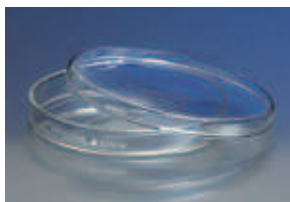
VWR Cat. No.	Corning Cat. No.	Capacity (mL)	Grad. Interval (mL)	ASTM Tol. ± (mL)	Approx. O.D. x Height (mm)	Qty/ Pk	Qty/ Cs
89090-574*	3024-5*	5	0.1	0.1	12 x 117	2	12
89090-558*	3024-10*	10	0.1	0.2	13 x 177	2	24
89090-566	3024-25	25	0.2	0.3	18 x 192	1	18
89090-572	3024-50	50	1.0	0.5	24 x 225	1	18
89090-554	3024-100	100	1.0	1.0	29 x 254	1	12
89090-562	3024-250	250	2.0	2.0	39 x 340	1	12
89090-570	3024-500	500	5.0	4.0	50 x 390	1	8
24709-771	3024-1L	1000	10.0	6.0	64 x 465	1	1
24709-782	3024-2L	2000	20.0	12.0	83 x 520	1	1
32645-066	3024-4L	4000	50.0	29.0	110 x 585	—	1
77777-014**	3024-PACK**						Assortment Pack

*Funnel top.

**The assortment pack includes one each of the 10 mL, 25 mL, 50 mL, 100 mL and 250 mL sizes.

Reusable Glass Dishes

3160 PYREX® Culture Dish, Petri



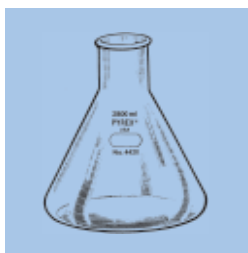
These flat, clear dishes will withstand repeated sterilization (wet or dry). The edges are beaded to provide greater mechanical strength. The bead also provides a means to equally space the side walls of the bottom and cover, thereby reducing the capillary action of condensed moisture on the sides. They are not affected chemically or thermally by any of the methods commonly employed in laboratories where sterilization is a major factor in routine or in specialized work. The covered dish is not airtight. The tops are marked in blue enamel and the bottoms in white enamel to make sorting easier. Bottoms also have a triangular, enamel reference point for serial dilutions.

3160 PYREX Culture Dish, Petri – Ordering Information

VWR Cat. No.	Corning Cat. No.	Description	Size (mm)	Approx. Diam. x Height (mm)	Qty/ Pk	Qty/ Cs
25354-025	3160-60	Complete	60 x 15	58 x 15	12	72
25354-047	3160-100	Complete	100 x 10	98 x 10	12	72
25354-069	3160-101	Complete	100 x 15	98 x 15	12	72
25354-080	3160-102	Complete	100 x 20	98 x 20	12	72
25354-105	3160-150	Complete	150 x 15	148 x 15	12	24
25354-127	3160-152	Complete	150 x 20	148 x 20	12	24
77777-036	3160-60CO	Cover Only	60 x 15	58 x 15	–	12
77777-022	3160-100CO	Cover Only	100 x 10	98 x 10	–	12
77777-026	3160-101CO	Cover Only	100 x 15	98 x 15	–	12
77777-030	3160-102CO	Cover Only	100 x 20	98 x 20	–	12
33500-294	3160-150CO	Cover Only	150 x 15	148 x 15	–	12
33500-296	3160-152CO	Cover Only	150 x 20	148 x 20	–	12
89091-518	3160-60BO	Bottom Only	60 x 15	58 x 15	–	12
25356-042	3160-100BO	Bottom Only	100 x 10	98 x 10	–	12
77777-024	3160-101BO	Bottom Only	100 x 15	98 x 15	–	12
77777-028	3160-102BO	Bottom Only	100 x 20	98 x 20	–	12
33500-292	3160-150BO	Bottom Only	150 x 15	148 x 15	–	12
77777-032	3160-152BO	Bottom Only	150 x 20	148 x 20	–	12
89091-532	3163-100	Quadrant Dish	100 x 20	95 x 22	6	72

Reusable Glass Flasks

4420 PYREX Fernbach Culture Flask



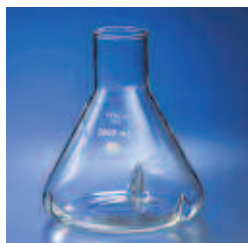
This wide mouth flask is designed for culturing organisms requiring a large surface area to volume ratio. It can also be used in serum production.

4420 PYREX Fernbach Culture Flask Ordering Information

VWR Cat. No.	Corning Cat. No.	Capacity (mL)	Approx. Rubber Stopper No.	Approx. O.D. x Height (mm)	Qty/Cs
89091-278	4420-2XL	2800	13-14	205 x 230	6

Reference: *Industrial and Engineering Chemistry*, Vol. 21, No. 12, p. 1198. Note: Do not use this flask on a heat source smaller than the base of the flask. Uneven heating of the flask could cause breakage.

4423 PYREX Fernbach Culture Flask, Baffled, Beaded Neck



This wide-mouth flask is designed for culturing organisms requiring a large surface area to volume ratio. Triple baffled on the bottom outside edges to achieve maximal oxygen transfer to culture medium. Beaded neck is 63 mm I.D. and accepts cotton plugs or rubber stoppers.

4423 PYREX Fernbach Culture Flask, Baffled – Ordering Information

VWR Cat. No.	Corning Cat. No.	Capacity (mL)	Description	Rubber Stopper No.	Dimensions O.D. x Height (mm)	Qty/Cs
22877-168	4423-2XL	2800	Culture Flask	13	200 x 230	3

Do not place on a direct heat source.



4425 PYREX® Fernback Culture Flask, Baffled, with Screw Cap

This wide mouth flask is designed for culturing organisms requiring a large surface area to volume ratio. Triple baffled on the bottom outside edges to achieve maximal oxygen transfer to culture medium. Supplied with GL45 orange polypropylene cap.

4425 PYREX Fernback Culture Flask, Baffled – Ordering Information

VWR Cat. No.	Corning Cat. No.	Description	Capacity (mL)	Dimensions O.D. x Height (mm)	Qty/Cs
22877-170	4425-2XL	Culture	2800	200 x 230	3

Note: For replacement caps, see Cat. No. 1395-45LTC.

Caution: Do not place on a direct heat source.



4442 PYREX Culture Flask, Long Neck

The long neck culture flask is basically an Erlenmeyer flask to which a long straight, rimless neck of heavy tubing has been added. The longer necks reduce the amount of splashed solution reaching the closure. It is ideal for shaker cultures.

4442 PYREX Culture Flask, Long Neck – Ordering Information

VWR Cat. No.	Corning Cat. No.	Description	Approx. O.D. x Height (mm)	Approx. Neck O.D. (mm)	Qty/ Pk	Qty/ Cs
89091-452	4442-50	Flask 50 mL	50 x 105	18	6	24
89090-644	4442-125	Flask 125 mL	66 x 122	25	6	24
89090-782	4442-250	Flask 250 mL	81 x 138	38	6	24
29174-150	4442-500	Flask 500 mL	101 x 181	38	–	1
29174-152	4442-1L	Flask 1000 mL	129 x 216	38	–	1
60856-138*	26794-25*	Closure, Orange	–	25	50	100
60856-140*	26795-25*	Closure, Natural	–	25	50	100
60856-145**	26796-38**	Closure, Orange	–	38	50	100
60856-147**	26797-38**	Closure, Natural	–	38	50	100

*Closure fits 125 mL size.

**Closure fits 250, 500, 1L, 2L.



4444 PYREX Baffled Shaker Flask

Delong style, with three baffle indents designed to provide greater agitation of solutions to improve oxygen or gas transfer when used with rotary or reciprocating shakers. Long neck reduces splashing and is designed for two-position polypropylene closures.

4444 PYREX Baffled Shaker Flask Ordering Information

VWR Cat. No.	Corning Cat. No.	Description	Neck O.D. (mm)	Approx. O.D. x Height (mm)	Qty/ Pk	Qty/ Cs
32645-026	4444-125	Flask, 125 mL	25	70 x 140	–	6
32645-024	4444-250	Flask, 250 mL	38	85 x 155	–	6
32645-022	4444-500	Flask, 500 mL	38	100 x 200	–	6
32645-020	4444-1L	Flask, 1000 mL	38	130 x 240	–	6
32645-016	4444-2L	Flask, 2000 mL	38	160 x 282	–	1
32645-064	4444-4L	Flask, 4000 mL	38	210 x 350	–	1
60856-138	26794-25	Closure, Orange	25	–	50	100
60856-140	26795-25	Closure, Natural	25	–	50	100
60856-145	26796-38	Closure, Orange	38	–	50	100
60856-147	26797-38	Closure, Natural	38	–	50	100

4446 PYREX® Shaker Flask, Extra-Deep Baffles

Delong style neck, with three extra-deep baffles, to enhance gas transfer when used with rotary or reciprocating shakers. Long neck reduces splashing and is designed for two-position polypropylene closures. Closures are sold separately.

4446 PYREX Shaker Flask, Extra-Deep Baffles – Ordering Information

VWR Cat. No.	Corning Cat. No.	Description	Approx. O.D. x Height (mm)	Approx. Neck O.D. (mm)	Qty/ Cs
22877-262	4446-50	Flask 50 mL	51 x 106	18	12
32645-062	4446-125	Flask 125 mL	67 x 140	25	12
22877-266	4446-250	Flask 250 mL	82 x 147	38	12
22877-268	4446-300	Flask 300 mL	89 x 155	38	12
22877-270	4446-500	Flask 500 mL	101 x 200	38	12
22877-272	4446-1L	Flask 1000 mL	129 x 240	38	6
22877-274	4446-2L	Flask 2000 mL	160 x 282	38	3
22877-276	4446-3L	Flask 3000 mL	185 x 327	38	2
22877-278	4446-4L	Flask 4000 mL	206 x 350	38	2

4460 PYREX Trypsinizing Flask, Beaded Neck, Baffled

Flasks are used for converting homogenous tissue samples into cell suspensions by digestion of connective proteins. Heavy beaded neck accepts cotton plugs. Four extra-deep baffles enhance vigorous agitation.

4460 PYREX Trypsinizing Flask, Beaded Neck, Baffled – Ordering Information

VWR Cat. No.	Corning Cat. No.	Description	Approx O.D. x Height (mm)	Height of Baffles (mm)	Qty/ Cs
22877-174	4460-50	Flask, 35 mL	51 x 77	30	3
22877-176	4460-125	Flask, 75 mL	67 x 102	50	3
22877-178	4460-250	Flask, 50 mL	82 x 130	70	3
22877-180	4460-500	Flask, 300 mL	101 x 167	95	3
22877-182	4460-1L	Flask, 700 mL	129 x 204	105	2
22877-184	4460-2L	Flask, 1500 mL	160 x 290	125	2

4980 PYREX Erlenmeyer Flask, Narrow Mouth, Heavy Duty Rim, Graduated

Approximate graduations are in durable white enamel. An extra large marking space is also provided. Heavy, durable top tooling.

4980 PYREX Erlenmeyer Flask, Narrow Mouth, Heavy Duty Rim, Graduated – Ordering Information

VWR Cat. No.	Corning Cat. No.	Capacity (mL)	Rubber Stopper No.	Grad. Range (mL)	Grad. Interval (mL)	Approx. O.D. x Height (mm)	Qty/ Pk	Qty/ Cs
89091-116	4980-10	10	00	5-10	5	31 x 50	–	12
29136-026	4980-25	25	0	10-25	5	41 x 65	12	48
29136-037	4980-50	50	1	20-50	10	51 x 78	12	48
29136-048	4980-125	125	5	50-125	25	67 x 114	12	48
29136-060	4980-250	250	6	50-200	25	82 x 132	12	48
89090-894	4980-300	300	6	100-300	25	89 x 144	12	48
89091-420	4980-500	500	7	100-500	50	101 x 176	6	36
29136-106	4980-1L	1000	9	250-1000	50	129 x 216	6	24
29136-108	4980-1XL	1500	9	400-1500	100	149 x 244	–	1
89090-858	4980-2L	2000	10	600-1800	200	160 x 268	1	8
89090-738	4980-4L	4000	10	1000-4000	500	206 x 360	1	4
89090-942	4980-6L	6000	10	1500-6000	500	241 x 410	1	4

*A convenience pack containing one each of the most popular sizes of Cat. No. 4980 flask. Designed for the low volume user, a case contains one each of five sizes; 50 mL, 125 mL, 250 mL, 500 mL, and 1L. Packaged in a partitioned carton for safe transit and storage.



4985 PYREX® Erlenmeyer Flask, Screw Cap, Graduated

These Erlenmeyer flasks with phenolic screw caps are ideal for culturing, mixing and storing media. Impact resistant caps are equipped with cemented-in, inert white rubber liners which are resistant to steam sterilization. Flasks are graduated and include marking space.

4985 PYREX Erlenmeyer Flask, Screw Cap, Graduated – Ordering Information

VWR Cat. No.	Corning Cat. No.	Capacity (mL)	G.P.I. Thread Finish	Grad. Range (mL)	Grad. Interval (mL)	Approx. O.D. x Height (mm)	Qty/ Pk	Qty/ Cs
89090-922	4985-50	50	24-410	20-50	10	50 x 78	12	24
89090-648	4985-125	125	24-410	50-125	25	68 x 105	12	24
89090-786	4985-250	250	38-430M	50-200	25	81 x 135	6	24
89090-874	4985-500	500	38-430M	100-500	50	102 x 186	6	24
89090-870	4985-1L	1000	38-430M	250-1000	50	128 x 218	6	12

For cap only, see Cat. No. 9999.



4995 PYREX Erlenmeyer Flask, Wide-Mouth, Screw Cap, Graduated

Features a convenient single size plug-seal cap. Wide, 29 mm neck opening makes it easy to use larger volume serological pipets. Ideal product for all media prep and storage needs. Can be used as vented culture flask when optional membrane cap is used.

4995 PYREX Erlenmeyer Flask, Wide-Mouth, Screw Cap, Graduated – Ordering Information

VWR Cat. No.	Corning Cat. No.	Approx. O.D. x Description	Height (mm)	Qty/Cs
32645-054	4995-250	Flask	81 x 140	6
32645-052	4995-500	Flask	102 x 185	6
32645-048	4995-1L	Flask, 1000 mL	128 x 225	6
32645-046	4995-2L	Flask, 2000 mL	160 x 268	1
32645-044	4995-4L	Flask, 4000 mL	206 x 335	1
32645-038	4995-6L	Flask, 6000 mL	235 x 395	1

For replacement caps, O-Rings or Vented Membrane Cap, see Cat. No. 1395.



5340 PYREX Filtering Flask, Heavy Wall, Tubulation, Graduated

These flasks, with tubulation, are blown in special molds, in shapes designed to give maximum mechanical strength. For convenience, the flasks are graduated to show approximate capacity. The neck finish affords an excellent fit for rubber stoppers. Tubulation O.D. on sizes up to 1000 mL is 10mm. Tubulation O.D. for 2000 mL and 4000 mL is 12.5 mm.

5340 PYREX Filtering Flask, Heavy Wall, Tubulation, Graduated – Ordering Information

VWR Cat. No.	Corning Cat. No.	Capacity (mL)	Grad. Range (mL)	Grad. Interval (mL)	Rubber Stopper No.	Approx. O.D. x Height (mm)	Qty/ Pk	Qty/ Cs
89090-856	5340-250	250	75-250	25	6	84 x 146	6	18
89090-760	5340-500	500	150-500	50	7	106 x 184	6	18
89090-868	5340-1L	1000	300-1000	50	8	137 x 238	6	12
89090-856	5340-2L	2000	600-1800	200	9	168 x 292	1	12
89090-736	5340-4L	4000	1500-3500	500	12	198 x 356	1	6



5640 PYREX® Volumetric Flask, Class A, PYREX Standard Taper Stopper

The strength of these flasks has been increased appreciably through machine-blown bodies to which are sealed heavy-tubing necks tooled for standard taper glass stoppers. The graduation line is sharp and permanent and large white block letters make the inscription easy to read. The 1 mL and 2 mL sizes are test tube shaped. Sizes 3L thru 6L have pennyhead standard taper glass stoppers.

5640 PYREX Volumetric Flask, Class A, PYREX Standard Taper Stopper – Ordering Information

VWR Cat. No.	Corning Cat. No.	Description	Capacity (± mL)	Tol. (mL)	Approx. O.D. x Height (mm)	Stopper No.	Qty/ Pk	Qty/ Cs
89091-218	5640-1	Complete	1	0.01	9 x 79	8	–	12
89091-300	5640-2	Complete	2	0.015	9 x 114	8	–	12
89091-480	5640-5	Complete	5	0.02	26 x 91	8	–	12
89091-102	5640-10	Complete	10	0.02	28 x 99	9	–	12
89090-818	5640-25	Complete	25	0.03	40 x 121	9	6	12
89090-912	5640-50	Complete	50	0.05	51 x 151	9	6	12
89090-606	5640-100	Complete	100	0.08	60 x 181	13	6	12
89090-680	5640-200	Complete	200	0.10	74 x 214	13	6	12
89090-770	5640-250	Complete	250	0.12	78 x 252	16	6	12
89090-752	5640-500	Complete	500	0.20	100 x 287	19	6	12
89090-714	5640-1L	Complete	1000	0.30	125 x 342	22	1	6
89090-848	5640-2L	Complete	2000	0.50	158 x 388	27	1	4
26307-462	5640-3L	Complete	3000	1.0	180 x 440	32	–	1
26307-464	5640-4L	Complete	4000	1.0	205 x 480	38	–	1
26307-466	5640-5L	Complete	5000	1.5	225 x 510	38	–	1
26307-468	5640-6L	Complete	6000	2.0	230 x 550	38	–	1
89091-094	5640-10FO	Flask only	10	–	–	–	–	12
29619-915	5640-25FO	Flask only	25	–	–	–	–	1
29619-926	5640-50FO	Flask only	50	–	–	–	–	1
89091-062	5640-100FO	Flask only	100	–	–	–	–	12
29619-948	5640-200FO	Flask only	200	–	–	–	–	1
29619-959	5640-250FO	Flask only	250	–	–	–	–	1
89091-402	5640-500FO	Flask only	500	–	–	–	–	1
29619-970	5640-1LFO	Flask only	1000	–	–	–	–	1

For stopper only on sizes 1 mL thru 2L, see Cat. No. 7650; for sizes 3L thru 6L, see Cat. No. 7660.

Reusable Glass Pipets

7085 PYREX Reusable Glass Serological Pipet, Color-Coded, Colored Markings

These pipets are color coded by size for easy identification and sorting. Colored graduations are enameled onto the glass. These “to deliver” pipets must be blown out to obtain total rated capacity.

7085 PYREX Reusable Glass Serological Pipet, Color-Coded, Colored Markings – Ordering Information

VWR Cat. No.	Corning Cat. No.	Capacity (mL)	Tolerance (± mL)	Grad. Interval (mL)	Approx. O.D. x Length (mm)	Qty/ Pk	Qty/ Cs
53204-279	7085-1X	0.1	.005	.01	7 x 300	6	12
53204-315	7085-1	1.0	.02	.1	7 x 350	6	12
53204-337	7085-1C	1.0	.02	.01	7 x 350	6	12
53204-359	7085-2	2.0	.02	.1	7 x 350	6	12
53204-370	7085-2C	2.0	.02	.01	7 x 350	6	12
89090-934	7085-5	5.0	.04	.1	8 x 350	6	12
53204-417	7085-10	10.0	.06	.1	10 x 350	–	12

Do not pipet by mouth. We suggest using a mechanical pipetting device.

Reference: ASTM E-1044.



Reusable Glass Tissue Grinders

7722 PYREX® Tissue Grinder, Dounce, 2 Glass Pestles

Supplied with two pestles to ensure dissociation of cells into fine particles with minimal damage to cell nuclei. Use the large clearance pestle for initial reduction of soft tissue. Complete the homogenization with the small clearance pestle. Particularly useful in enzyme studies where heat build-up must be avoided.

7722 PYREX Tissue Grinder, Dounce, 2 Glass Pestles – Ordering Information

VWR Cat. No.	Corning Cat. No.	Approx. Description	Body O.D. x Capacity (mL)	Height (mm)	Qty/Cs
22877-280	7722-7	Tissue Grinder	7	15 x 117	1
22877-282	7722-15	Tissue Grinder	15	20 x 145	1
22877-284	7722-40	Tissue Grinder	40	27 x 210	1

7724 PYREX Tissue Grinder, Glass Pestle

Designed to handle both initial grinding and final homogenization in the same sequence of operations. The lower conical section is intended primarily for the initial grinding. To assist in this work the clearance between mortar and pestle can be adjusted at will by raising or lowering the pestle. The upper cylindrical section is for the final homogenization.

7724 PYREX Tissue Grinder, Glass Pestle – Ordering Information

VWR Cat. No.	Corning Cat. No.	Description	Approx. Capacity (mL)	Body O.D. x Height	Pestle O.D. x Height (mm)	Qty/Cs
26307-606	7724-1	Tissue Grinder	1	19 x 83	7 x 155	1
22877-300	7724-3	Tissue Grinder	3	13 x 125	6 x 208	1
26307-608	7724-5	Tissue Grinder	5	25 x 150	11 x 225	1
22877-302	7724-15	Tissue Grinder	15	20 x 175	10 x 267	1
22877-304	7724-30	Tissue Grinder	30	27 x 220	10 x 305	1
22877-306	7724-50	Tissue Grinder	50	32 x 225	16 x 345	1

7724T PYREX Tissue Grinder, PTFE Pestle with Steel Shaft

Recommended for soft tissues found in the liver and brain. Designed to handle both initial grinding and final homogenization in the same sequence of operations. Mortar is unground and the pestle contact surface is PTFE, threaded onto a stainless steel shaft.

7724T PYREX Tissue Grinder, PTFE Pestle with Steel Shaft – Ordering Information

VWR Cat. No.	Corning Cat. No.	Description	Approx. Capacity (mL)	Body O.D. x Height (mm)	Qty/Cs
22877-240	7724T-1	Tissue Grinder	1	13 x 110	1
22877-242	7724T-3	Tissue Grinder	3	13 x 130	1
22877-244	7724T-5	Tissue Grinder	5	19 x 150	1
22877-246	7724T-15	Tissue Grinder	15	25 x 175	1
22877-248	7724T-30	Tissue Grinder	30	27 x 215	1
22877-250	7724T-50	Tissue Grinder	50	32 x 225	1

7725 PYREX Tissue Grinder, Glass Pestle

These tissue grinders (homogenizers) are used in preparing small samples for pathological and biochemical studies. Designed to be motor-driven. Use a friction clutch to eliminate damage to the pestle from pieces of connective tissue or muscle. The clearance between the ground tube and pestle is approximately 0.15 mm. The parts are ground to a medium grind to insure adequate abrasive qualities, yet deliver a fine homogenous sample.

7725 PYREX Tissue Grinder, Glass Pestle – Ordering Information

VWR Cat. No.	Corning Cat. No.	Description	Working Capacity (mL)	Approx. O.D. x Body Length (mm)	Qty/Pk	Qty/Cs
89091-362	7725-13	Complete	3	16 x 100	1	4
89091-536	7725-16	Complete	9	18 x 150	1	4
89091-190	7725-19	Complete	16	21 x 150	1	4
62400-278	7725-25	Complete	50	27 x 200	—	—

Caution: If used with a motor-driven device, the attachment must contain some form of friction release clutch to prevent damage to the apparatus. The user should wear a protective glove of sufficient thickness to prevent injury in the event of failure of the glass components.



7725T PYREX® Tissue Grinder, Potter-Elvehjem, Teflon® Pestle

Homogenization occurs as the sample and buffer are forced through the cylindrical portion of the mortar as the pestle is rotated downward. Mortar is unground and pestle contact surface is PTFE, threaded onto a stainless steel shaft.

7725T PYREX Tissue Grinder, Potter-Elvehjem, Teflon® Pestle – Ordering Information

VWR Cat. No.	Corning Cat. No.	Description	Approx. Capacity (mL)	Body O.D. x Height (mm)	Qty/Cs
22877-292	7725T-5X	Tissue Grinder	0.5	9 x 50	1
22877-288	7725T-1	Tissue Grinder	1	9 x 65	1
22877-290	7725T-3	Tissue Grinder	3	16 x 70	1
89090-068	7725T-5	Tissue Grinder	5	16 x 95	1
22877-294	7725T-8	Tissue Grinder	8	16 x 110	1
22877-296	7725T-17	Tissue Grinder	17	21 x 150	1
22877-298	7725T-45	Tissue Grinder	45	27 x 180	1

7726 PYREX Ten Broeck, Homogenizer

These 40 mL capacity PYREX homogenizers are designed for grinding small samples for pathological and biochemical work. The catch basin bulb has a 55 mm outer diameter. Made in accordance with Federal Specification DD-T-363a. It may be used manually but is adaptable for use with a slow speed stirrer by means of a rubber stopper and a connecting rod.

7726 PYREX Ten Broeck, Homogenizer – Ordering Information

VWR Cat. No.	Corning Cat. No.	Description	Size	Mortar Tube O.D. x Length (mm)	Pestle O.D. x Length (mm)	Ground Zone Length (mm)	Approx. Total Length (mm)	Qty/Cs
62400-020	7726-L	Complete	L	26 x 210	20 x 335	130	340	1

Caution: If used with a motor-driven device, the attachment must contain some form of friction release clutch to prevent damage to the apparatus. The user should wear a protective glove of sufficient thickness to prevent injury in the event of failure of the glass components.

7727 PYREX Ten Broeck, Homogenizer, Pour Spout

These grinders are designed for use in hand grinding small samples for pathological or biochemical studies. It may also be motor driven at low speed if some form of friction release is provided. The mortar tubes and pestles are ground to be interchangeable. Clearance between the two parts is approximately 0.15 mm. The medium grind provides the required abrasive action to deliver well homogenized samples. Made in accordance with Federal Specification NNN-T-360B.

7727 PYREX Ten Broeck, Homogenizer, Pour Spout – Ordering Information

VWR Cat. No.	Corning Cat. No.	Description	Size (mL)	Mortar Tube O.D. x Length (mm)	Pestle O.D. x Length (mm)	Bulb O.D. (mm)	Ground Zone Length (mm)	Pestle Opening Stopper No.	Approx. Total Length (mm)	Qty/ Pk	Qty/ Cs
89090-892	7727-2	Complete	2	16 x 100	10.5 x 165	20	60	00	170	1	4
89090-474	7727-7	Complete	7	18 x 130	12.6 x 195	25	80	00	200	1	4
89090-664	7727-15	Complete	15	21 x 150	15.8 x 235	35	90	1	240	1	4
89090-380	7727-40	Complete	40	27 x 210	22.1 x 335	50	130	3	340	1	2

Caution: If used with a motor-driven device, the attachment must contain some form of friction release clutch to prevent damage to the apparatus. The user should wear a protective glove of sufficient thickness to prevent injury in the event of failure of the glass components.

Reusable Glass Centrifuge Tubes

8142 PYREX Centrifuge Tube, Conical, Heavy Duty, Screw Cap, Graduated

Constructed of heavy wall glass for greater mechanical strength. Graduations are with durable white enamel. The 10 mL size is graduated upward from tip in 0.1 mL divisions. The 40 mL size is graduated in 0.5 mL divisions to 10 mL, and from 10 to 40 in 1 mL divisions. Tubes are fitted with a phenolic screw cap.

8142 PYREX Centrifuge Tube, Conical, Heavy Duty, Screw Cap, Graduated – Ordering Information

VWR Cat. No.	Corning Cat. No.	Capacity (mL)	Approx. O.D. x Length (mm)	GPI Thread Finish	Qty/Cs
21059-043	8142-10	10	17 x 118	15-415	1
21059-067	8142-40	40	28 x 147	24-400	1

For phenolic cap, see Cat. No. 9999.





8422 PYREX® Centrifuge Tube, Heavy Duty, Round Bottom, Screw Cap

These tubes are useful for the handling of sputum specimens. Digestion, shaking, neutralizing and centrifuging can be performed in one container. They are also useful for other clinical and microbiological tests. Screw caps resist the effects of temperature and steam. The 50 mL tube has a black phenolic cap with a glued-in, white rubber liner. The 100 mL tube has a white polypropylene cap with a Teflon® liner.

8422 PYREX Centrifuge Tube, Heavy Duty, Round Bottom, Screw Cap – Ordering Information

VWR Cat. No.	Corning Cat. No.	Capacity (mL)	Approx. O.D. x Length (mm)	GPI Thread Finish	Qty/Cs
89091-460	8422-50	50.0	29 x 122	24-410	12
21023-403	8422-100	100.0	43 x 139	38-400	1

For phenolic cap for 50 mL tube, see Cat. No. 9999.

9820 PYREX Culture Tube, Rimless

Rimless for greater convenience in plugging and rack storage. Walls and bottoms are of uniform thickness. Ends are fire-polished. The 6, 22 and 25 mm O.D. tubes do not have marking spots.

9820 PYREX Culture Tube, Rimless – Ordering Information

VWR Cat. No.	Corning Cat. No.	Capacity (mL)	Approx. O.D. x Length (mm)	Qty/Pk	Qty/Cs
60820-068	9820-6	0.5	6 x 50	72	720
60820-080	9820-10	3.0	10 x 75	72	720
60820-104*	9820-12*	5.0	12 x 75	72	720
60820-126**	9820-13**	9.0	13 x 100	72	720
60820-181	9820-16	11.0	16 x 100	72	576
60820-206	9820-16X	15.0	16 x 125	72	576
60820-228	9820-16XX	20.0	16 x 150	72	576
60820-240	9820-18	27.0	18 x 150	72	576
60820-261	9820-20	34.0	20 x 150	72	576
60820-265	9820-22	50.0	22 x 175	72	432
60820-320	9820-25	55.0	25 x 150	72	288
60820-321	9820-25X	70.0	25 x 200	48	192

*Kahn tubes.

** Wasserman tube.

9825 PYREX Culture Tube, Screw Cap

Furnished with deep-form phenolic caps to facilitate handling and sealing after autoclaving. Caps are fabricated from a special formula resistant to the effects of temperature and steam in autoclaving. Caps are provided with a glued-in, white rubber liner. The white enamel marking spot gives an excellent surface for pencil notations. Pencil marks are easily erased.

9825 PYREX Culture Tube, Screw Cap – Ordering Information

VWR Cat. No.	Corning Cat. No.	Approx. Capacity (mL)	Approx. O.D. x Length (mm)	G.P.I. Thread Finish	Qty/Pk	Qty/Cs
60827-023	9825-13	9.0	13 x 100	13-415	144	288
60827-045	9825-16	11.0	16 x 100	15-415	144	288
60827-067	9825-16X	15.0	16 x 125	15-415	144	288
60827-089	9825-16XX	20.0	16 x 150	15-415	144	288
60827-125	9825-20	25.0	20 x 125	18-415	96	192
60827-147	9825-20X	34.0	20 x 150	18-415	96	192
89091-462	9825-22	50.0	22 x 175	18-415	48	192
89090-930	9825-25	55.0	25 x 150	24-410	48	144
60827-207	9825-38	170.0	38 x 200	38-430M	12	48

For phenolic caps, see Cat. No. 9999.

Digital Hot Plates, Stirrers, and Stirring Hot Plates



The new Corning® digital hot plates and stirrers are made with the same durability and quality Corning has been putting into Pyroceram® top products since 1964. Digital displays are only available on 5" x 7" and 10" x 10" models. All models include Pyroceram top and a two year warranty.

- ▶ **Twin display stirring hot plate** – Truly affordable unit shows both temperature and stirring speed on separate digital displays to ensure accuracy time and time again.
- ▶ **Precise liquid temperatures and stirring speeds** – Temperature accuracy within $\pm 2^{\circ}\text{C}$ and stirring speeds at $\pm 5\%$ of the speed setting you choose
- ▶ **Digital displays** – Indicate when set temperature and stirring speeds are reached. Facilitate repeatability of standard operating procedures.
- ▶ **Safety indicators** – Power button and hot top indicators warn if unit is plugged in or is too hot to touch. Products have been independently tested and evaluated for compliance to product safety standards.
- ▶ **Angled front panel and large knobs** – Minimizes damage from spills and puts controls right at your fingertips

Digital Hot Plates, Stirrers and Stirring Hot Plates Ordering Information

Digital Hot Plates

VWR Cat. No.	Corning Cat. No.	Model Number	Voltage	Temperature Range	Top Plate Size
89090-206	6795-400D	PC-400D	120V/60Hz	5-550°C	5" x 7" (12.7 x 17.8 cm)
89090-188	6795-600D	PC-600D	120V/60Hz	5-550°C	10" x 10" (25.4 x 25.4 cm)

Digital Stirrers

VWR Cat. No.	Corning Cat. No.	Model Number	Voltage	Stir Range	Top Plate Size
89090-244	6795-410D	PC-410D	120V/60Hz	60-1150 RPM	5" x 7" (12.7 x 17.8 cm)
89090-238	6795-610D	PC-610D	120V/60Hz	60-1150 RPM	10" x 10" (25.4 x 25.4 cm)

Digital Stirring Hot Plates

VWR Cat. No.	Corning Cat. No.	Model Number	Voltage	Temperature/ Stir Range	Top Plate Size
89090-216	6795-420D	PC-420D	120V/60Hz	5-550°C/ 60-1150RPM	5" x 7" (12.7 x 17.8 cm)
89090-198	6795-620D	PC-620D	120V/60Hz	5-550°C/ 60-1150RPM	10" x 10" (25.4 x 25.4 cm)

Analog Hot Plates, Stirrers and Stirring Hot Plates Ordering Information

Analog Hot Plate

Micro-chemistry size. Hot top indicator light.

VWR Cat. No.	Corning Cat. No.	Model	Power	Top Plate Size	Temp. Range	Weight	Dimensions (H x W x D)
89090-982	6795-200	PC-200	120V/60Hz/ 253W/2.1A	4" x 5"	77-1022°F (25-550°C)	4 lbs. (1.8 kg.)	4.4" x 5.8" x 7.3"

Analog Stirrer

Micro-chemistry size.

VWR Cat. No.	Corning Cat. No.	Model	Power	Top Plate Size	Stir Range	Weight	Dimensions (H x W x D)
89090-988	6795-210	PC-210	120V/60Hz/ 33W/0.3A	4" x 5"	60-1100 RPM	4.5 lbs. (2.0 kg.)	4.4" x 5.8" x 7.3"

Analog Stirring Hot Plate

Micro-chemistry size. Hot top indicator light.

VWR Cat. No.	Corning Cat. No.	Model	Power	Top Plate Size	Stir Range	Temp. Range	Weight	Dimensions (L x W x D)
89090-994	6795-220	PC-220	120V/60Hz/ 283W/2.4A	4" x 5"	60-1100 RPM	77-1022°F (25-550°C)	5.0 lbs. (2.3 kg.)	4.4" x 5.8" x 7.3"



Technical Appendix: Cryopreservation and Liquid Handling

Characteristics of Corning® Plasticware

	Polystyrene	Polyethylene (High Density)	Polypropylene	Polycarbonate	Nylon	P.T.F.E. (Teflon®)	Polyethylene Terephthalate (PET)
Physical Characteristics							
Basic Properties	Biologically inert, hard, excellent optical qualities	Biologically inert, high chemical resistance toughness	Biologically inert, high chemical resistance, exceptional resistance	Clear, very tough, inert, high temperature transmission	Tough, heat resistant, machinable, high moisture vapor slippery surface	Biologically and chemically inert, high resistant	Biologically inert, hard, tough, excellent optical qualities
Clarity	Clear	Opaque	Translucent	Clear	Opaque	Opaque	Clear
Autoclave Results	Melts	May distort	Withstands several cycles	Withstands one cycle	OK	OK	Melts
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	250°F 70°F
Burning Rate	Slow	Slow	Slow	Self-extinguishing	Self-extinguishing	None	—
Effects of Laboratory Reagents							
Weak Acids	None	None	None	None	None	None	None
Strong Acids	Oxidizing acids attack	Oxidizing acids attack	Oxidizing acids attack	May be attacked	Attacked	None	Oxidizing acids attack
Weak Alkalies	None	None	None	None	None	None	None
Strong Alkalies	None	None	None	Slowly attacked	None	None	Attacked
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	Soluble in aromatic or chlorinated hydrocarbons
Gas Permeability of Thin Wall Products*							
O ₂	Low	High	High	Very low	Very low	—	Very low
N ₂	Very low	Low	Low	Very low	Very low	—	Very low
CO ₂	High	Very high	Very high	Low	—	—	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
Acids										
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
Alcohols										
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
Amines										
Aniline	G	G	P	N	N	R	R	N	R	O
Dimethylformamide	P	G	F	N	N	N	R	N	R	N
Bases										
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
Hydrocarbons										
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*
Halogenated Hydrocarbons										
Chloroform	P	N	P	N	N	R	R	N	R	R
Methylene chloride	P	F	P	N	N	R	R	N	R	N
Ketones										
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 56) 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	New Polyethylene Terephthalate
Recommended Working Temp*	0-40°	0-40°
Heat Distortion Point	121°	70°
Flexibility	Moderate	Rigid
Transparency	Clear	Clear
Maximum RCF:		
15 mL Tube	12,000 x g	3,600 x g
50 mL Tube	15,500 x g	3,600 x g
250 mL Tube	—	—
500 mL Tube	—	—

*At room temperature for 24 hours.

Chemical Resistance of Disposable Plastic Centrifuge Tubes*

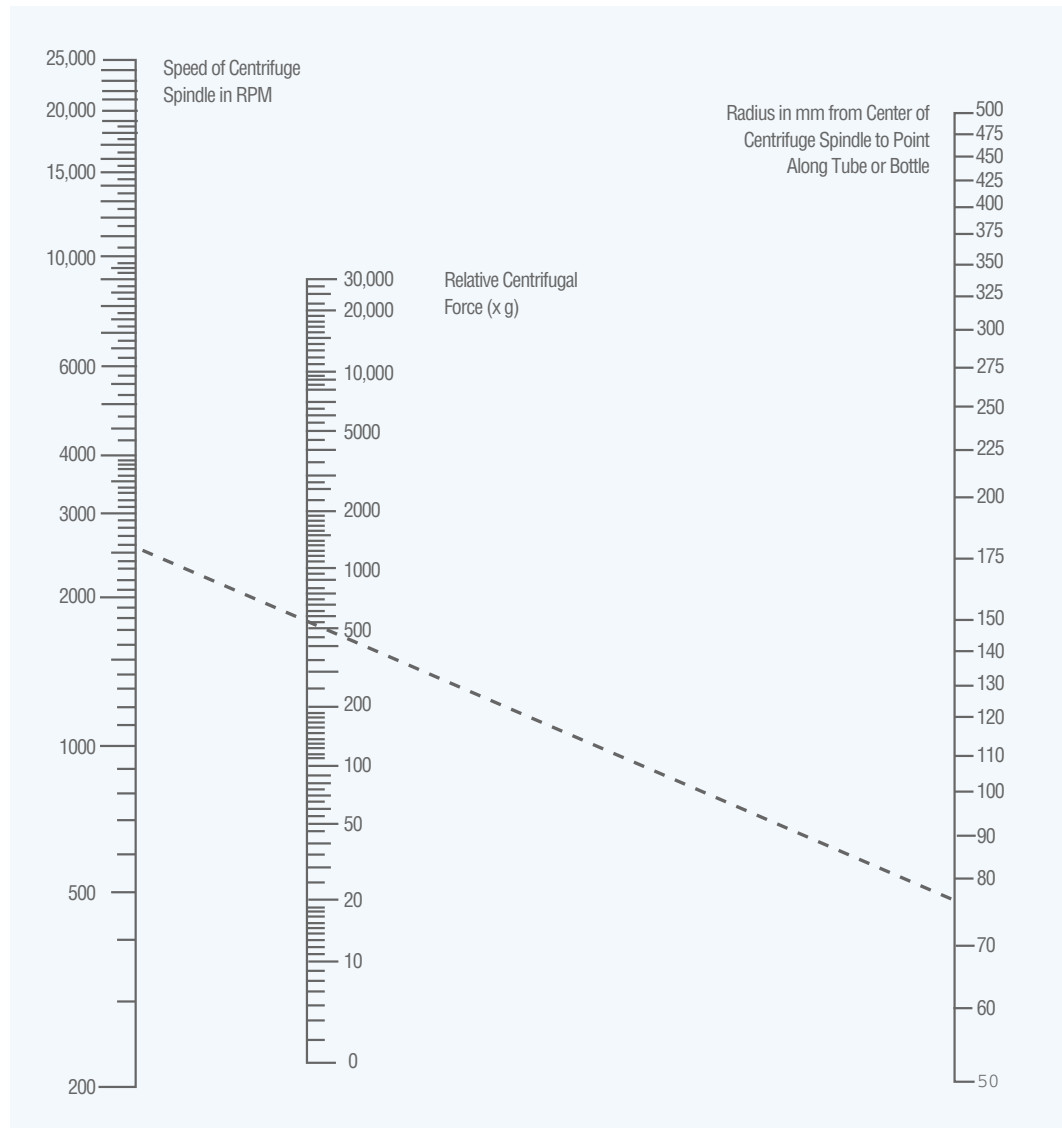
Chemical Class	Polyethylene Terephthalate	Polypropylene	Polyethylene Caps
Acids (weak)	1	1	1
Acids	3	1	1
Alcohols	1	1	1
Aldehydes	3 ^a	2 ^a	1
Bases	3	1	1
Esters	2	2	2
Hydrocarbons:			
Aliphatic	1	2	3
Aromatic	3	3 ^b	3
Halogenated	3	3	3
Ketones	2	2 ^c	2

*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



MEDIA/BUFFER PREPARATION/FILTRATION

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Syringe Filters



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; Teflon (PTFE) – chemical resistance; regenerated cellulose (RC) – best choice for DMSO compatibility; Nylon (NY) – hydrophilic, surfactant-free and lowest extractable.
- ▶ 100% integrity tested, certified nonpyrogenic and noncytotoxic, manufactured in accordance with ISO 9002 standards

Syringe Filters Ordering Information

VWR Cat. No.	Corning Cat. No.	Diameter (mm)	Pore Size (μm)	Membrane Material	Housing Material	Sterile	Inlet/Outlet	Packaging	Qty/Cs
28200-024	431212	4	0.2	RC	PP	Yes	LL/LS	Ind	50
28200-018	431215	15	0.2	RC	PP	Yes	LL/LS	Ind	50
28200-014	431218	28	0.2	SFCA-PF	AC	Yes	LL/LS	Ind	50
28200-016	431219	28	0.2	SFCA	AC	Yes	LL/LS	Ind	50
28200-026	431220	28	0.45	SFCA	AC	Yes	LL/LS	Ind	50
28200-028	431221	28	0.8	SFCA	AC	Yes	LL/LS	Ind	50
28200-030	431222	25	0.2	RC	PP	Yes	LL/LS	Ind	50
28200-034	431224	25	0.2	NY	PP	Yes	LL/LS	Ind	50
28200-036	431225	25	0.45	NY	PP	Yes	LL/LS	Ind	50
28200-040*	431227*	50	0.2	PTFE	PP	Yes	HB/HB	Ind	12
28200-042	431229	28	0.2	PES	AC	Yes	LL/LS	Ind	50
28200-046	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



Spin-X Centrifuge Tube Filters

- ▶ Costar® 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 (Relative Centrifugal Force [x g]) is 16,000

Spin-X Centrifuge Tube Filters Ordering Information

VWR Cat. No.	Corning Cat. No.	Membrane Material	Working Volume (μL)	Pore Size (μm)	Sterile	Tube Size (mL)	Qty/Cs
29442-752	8160	CA	500	0.22	Yes	2.0	96
29442-754	8161	CA	500	0.22	No	2.0	100
29442-756	8162	CA	500	0.45	Yes	2.0	96
29442-758	8163	CA	500	0.45	No	2.0	100
29442-760	8169	NY	500	0.22	No	2.0	200
29442-762	8170	NY	500	0.45	No	2.0	200

CA = Cellulose Acetate, NY = Nylon.

Vacuum Filters

150 mL Tube Top Vacuum Filters

- 42 mm square membrane
- Minimizes unnecessary transfers by filtering directly into 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, certified nonpyrogenic

150 mL Tube Top Vacuum Filters Ordering Information

VWR Cat. No.	Corning Cat. No.	Membrane	Funnel Size/Tube Size (mL)	Pore Size (µm)	Qty/Cs
28680-121	430314	CA	150/50	0.45	12
28680-120	430320	CA	150/50	0.22	12

CA = Cellulose Acetate.

Vacuum Filter Systems

- Four sizes: 150 mL, 250 mL, 500 mL and 1L
- 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 61.

Vacuum Filter Systems Ordering Information

VWR Cat. No.	Corning Cat. No.	Membrane	Funnel/Bottle Volume (mL)	Pore Size (µm)	Color-Coded Adapter	Qty/Cs
150 mL Capacity, 42 mm Square Membrane						
29442-936	431153	PES	150/150	0.22	Orange	12
29442-938	431154	CA	150/150	0.22	Orange	12
29442-940	431155	CA	150/150	0.45	Orange	12
250 mL Capacity, 49.5 mm Square Membrane						
28199-770	430756	CN	250/250	0.22	Orange	12
28199-774	430767	CA	250/250	0.22	Orange	12
28199-776	430768	CA	250/250	0.45	Orange	12
28199-766	430771	NY	250/250	0.2	Orange	12
28199-764	431096	PES	250/250	0.22	Orange	12
500 mL Capacity, 63 mm Square Membrane						
28199-784	430758	CN	500/500	0.22	Orange	12
28199-788	430769	CA	500/500	0.22	Orange	12
29552-016	430770	CA	500/500	0.45	Orange	12
28199-780	430773	NY	500/500	0.2	Orange	12
28199-778	431097	PES	500/500	0.22	Orange	12
1,000 mL Capacity, 79 mm Square Membrane						
28199-798	430186	CN	1,000/1,000	0.22	Orange	12
28199-794	430515	NY	1,000/1,000	0.2	Orange	12
28199-814	430516	CA	1,000/1,000	0.45	Orange	12
28199-812	430517	CA	1,000/1,000	0.22	Orange	12
28199-792	431098	PES	1,000/1,000	0.22	Orange	12
28199-816**	431205**	CA	500*/1,000	0.22	Orange	12
28199-818**	431206**	CA	500*/1,000	0.45	Orange	12

*Available 2010.

**500 mL Funnel with 63 mm membrane.

PES = Polyethersulfone, CA = Cellulose Acetate, CN = Cellulose Nitrate, NY = Nylon.



Tube Top Vacuum Filter



Vacuum Filter Systems



Bottle Top Vacuum Filters

Bottle Top Vacuum Filters

- Individually packaged, sterile and certified nonpyrogenic
- Adaptors are color coded by membrane type.
- 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).

Bottle Top Vacuum Filters Ordering Information

VWR Cat. No.	Corning Cat. No.	Membrane	Volume (mL)	Neck Size (mm)	Pore Size (µm)	Color-Coded Adapter	Qty/Cs
150 mL Capacity, 42 mm Square Membrane							
28199-985	430624	CA	150	33	0.22	Orange	48
28199-987	430625	CA	150	33	0.45	Orange	48
28199-989	430626	CA	150	45	0.22	Orange	48
28199-991	430627	CA	150	45	0.45	Orange	48
29442-950	431160	PES	150	33	0.22	Orange	48
29442-952	431161	PES	150	45	0.22	Orange	48
500 mL Capacity, 63 mm Square Membrane							
29442-980	430049	NY	500	45	0.2	Orange	12
28199-972	430512	CA	500	33	0.45	Orange	12
29552-012	430513	CA	500	45	0.22	Orange	12
28199-976	430514	CA	500	45	0.45	Orange	12
28199-970	430521	CA	500	33	0.22	Orange	12
29186-210	431117	PES	500	33	0.22	Orange	12
29186-212	431118	PES	500	45	0.22	Orange	12
1,000 mL Capacity, 79 mm Square Membrane							
28199-730	430015	CA	1,000	45	0.22	Orange	12
29442-978	431174	PES	1,000	45	0.22	Orange	12

PES = Polyethersulfone, CA = Cellulose Acetate, CN = Cellulose Nitrate, NY = Nylon.

Corning Glass Fiber Prefilters

For use with vacuum filter systems or bottle top vacuum filters.

Corning Glass Fiber Prefilters Ordering Information

VWR Cat. No.	Corning Cat. No.	Shape	Filter Funnel (mL)	Qty/Cs
97039-894	431410	43 mm Square	150	100
97039-896	431411	49.5 mm Square	250	100
97039-898	431412	63 mm Square	500	100
97039-900	431413	79 mm Square	1000	100

Storage Bottles

Polystyrene 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 (see page 59).
- ▶ Sterile, certified nonpyrogenic

Corning Easy Grip Style Storage Bottles Ordering Information

VWR Cat. No.	Corning Cat. No.	Volume (mL)	Neck Size (mm)	Qty/Pk	Qty/Cs
29443-026	431175	150	45	2	24
28199-758	430281	250	45	2	24
28199-760	430282	500	45	2	24
28199-762	430518	1,000	45	2	24

Costar® Traditional Style Storage Bottles Ordering Information

VWR Cat. No.	Corning Cat. No.	Volume (mL)	Neck Size (mm)	Qty/Pk	Qty/Cs
29442-870	8388	125	45	1	24
29442-874	8390	250	45	1	12
29442-878	8393	500	45	1	12
29442-882	8396	1,000	45	1	12

Corning Square Polycarbonate Storage Bottles



Corning square polycarbonate storage bottles are easier to handle, require less space (13 to 20%) on the shelf or in the autoclave and are ideal for mixing, sampling and storage.

- ▶ Strong polycarbonate bottles are more break-resistant than other glass or plastic bottles.
- ▶ Screened white enamel graduations are easier to see than molded graduations.
- ▶ Sterilized by gamma radiation
- ▶ Large white marking spot for easier identification
- ▶ Bottles can be autoclaved once at 121°C and 15 psi. Repeated autoclaving weakens polycarbonate and is not recommended.
- ▶ Optional reusable caps with silicone septa (Corning Cat. Nos. 1395-45HTSC, 1395-45SS, 1395-45TS) for syringe sampling or introduction of reagents are available for these caps.
- ▶ Store down to -80°C
- ▶ Not for vacuum filtration use

Corning Square Polycarbonate Storage Bottles Ordering Information

VWR Cat. No.	Corning Cat. No.	Capacity (mL)	Shape	Bottle Material	Neck Diam. (mm)	Qty/Bag	Qty/Cs
89089-722	431430	150	Square	Polycarbonate	45	1	24
89089-762	431431	250	Square	Polycarbonate	45	1	24
89089-816	431432	500	Square	Polycarbonate	45	1	24
89089-756	431433	1000	Square	Polycarbonate	45	1	24

Technical Appendix: Selecting the Best Corning® Syringe or Vacuum 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 Corning 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 Corning 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 sold separately.
- ▶ 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 information from Tables 2 and 3 will help you choose the best Corning membranes for your applications:

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



Cellulose acetate (CA) membranes have a very low binding affinity for most protein binding, such as filtering culture media containing sera. However, both cellulose acetate and cellulose nitrate membranes are naturally hydrophobic and contain 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.

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.

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.

Table 1. Selecting the Pore Size

Application	Pore Size (µm)	Membrane Availability*
Removing Mycoplasma from Solutions	0.1	Only PES
Sterilization of Aqueous Solutions	0.20 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
Course Particle Removal	0.8	SFCA

*PES = polyethersulfone

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 pre-wetted 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) is used in some of the Corning syringe filter housings. This plastic should only be used in filtering non-aggressive aqueous solutions and biological fluids. Refer to Table 3 for more chemical compatibility information.

Polypropylene (PP) is used in 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.

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

Chemical Compatibility of Corning Filters

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 2. Characteristics of Corning Filter Membranes of Corning Filter Membranes

Membrane Material	Polyethersulfone	Cellulose Acetate	Nylon	Cellulose Nitrate	Regenerated Cellulose	Teflon (PTCFC)
Flow rates for Medium with 10% Serum	Best	Very good	Poor	Good	Not applicable	Not applicable
Wetting Agents	No	Yes	No, naturally hydrophilic	Yes	Yes	Does not wet
Protein Binding	Very low	Very Low	Low to Moderate	Very high	Low	Not applicable
DNA Binding	Very low	Very low	Very high	High	Low	Not applicable
Chemical Resistance	Low	Low	Moderate to high	Low	Very high	Very high

Table 3. Chemical Resistance of Filter Membranes and Housing Materials*

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	Membrane Material						Housing Material			
	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	2	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

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



Filter Systems with Bottles



Bottle Top Filters



Centrifuge Tube Top Filters

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 design, 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.

Corning offers three basic filter types: positive pressure-driven syringe and disc filters and vacuum-driven filters. The vacuum-driven filters offer several different designs and styles in both reusable and disposable plastic products.

Disposable Plastic Vacuum Filters

These sterile filters are available in three styles: complete filter/storage systems, bottle top filters, and centrifuge tube top filters. Angled hose connector simplifies vacuum line attachment.

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. Filters are available with cellulose acetate, cellulose nitrate, nylon, or polyethersulfone membranes.

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 or plastic 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 glass Storage Bottles with GL 45 threads. See Safety Precautions section (below) for recommendations on using these products with glass bottles. Filters are available with cellulose acetate, nylon, or polyethersulfone membranes.

150 mL centrifuge tube top filters feature a 150 mL polystyrene filter funnel with an 18 cm² cellulose acetate membrane attached to a 50 mL polypropylene centrifuge tube to minimize unnecessary transfers by filtering directly into centrifuge tube. Filters are available with cellulose acetate, membranes.

Table 4. Typical Expected Throughput Volumes

Filter Design and Dimensions	Effective Filter Area (cm ²)	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 micron membrane. Solutions containing sera or other proteinaceous materials will be at the lower end of the range. Use of prefilters may extend the throughput 50-100% above the values shown.



4, 15, 25 to 28 mm Syringe Filters 50 mm Syringe Filters

Disposable Syringe/Disc Filters

The smaller **Corning® syringe 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 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.

Safety Precautions

Corning filter units are intended for use by persons knowledgeable in safe laboratory practices. Safety is one of the most critical concerns of any lab. Because of variations in conditions, Corning cannot guarantee any glassware or plasticware against breakage under vacuum or pressure. Failure can result from surface damage, improper pressure or temperature, or use with incompatible

chemicals. Adequate precautions should always be taken to protect personnel doing such work. To help improve lab safety, Corning has compiled these common sense suggestions concerning the safe use of filtration products:

- ▶ Use of vacuum-driven filters on glass or plastic bottles may cause personal injury if they implode during use. Eye protection is strongly recommended whenever glass or plastic vessels are used under partial vacuum negative pressure to guard against these injuries. Only bottles specifically designed for these applications should be used.
- ▶ Never use the 45 mm threaded bottle top filters on PYREX® or PYREXPLUS® Storage Bottles larger than 2 liter capacity or that are square. Use of bottle top filters with PYREXPLUS Storage Bottles (with plastic safety coatings) is highly recommended for vacuum filtration. Never use the 33 mm threaded bottle top filters on standard glass media bottles that are larger than 500 mL or on bottles that are not cylindrical.
- ▶ Never use plastic roller bottles as substitute receiver bottles for vacuum filtration.
- ▶ Do not use a bottle for vacuum applications if it is not designed to withstand a vacuum; if the bottle is scratched, chipped or cracked; if the bottle is clamped in such a way as to induce stress; or if the bottle is being hand held.
- ▶ Care must be taken when using syringe filters with small syringes (5 mL or less) as the pressures generated may exceed the 75 psi limit, causing a possible membrane or housing failure. Loss of valuable contents and personal injury may result. If clogging causes slower flow rates, we recommend that you replace filters rather than increase the pressure.

References

1. Brock, T.S. *Membrane Filtration: A User's Guide and Reference Manual*. Science Tech, Inc. Madison, WI, 1983, 381 pp.
2. Lukaszewicz, R.C. and Fisher, R. *Mechanisms of Membrane Filtration for Particulate and Microbial Retention in Critical Applications*. Pharmaceutical Technology, Vol. 5: June 1981.
3. Walsh, R.L. and Coles, M.E. *Binding of IgG and Other Proteins to Microfilters*. Clinical Chemistry 26(3):496-498, 1981.

Table 5. Corning Filter Designs

Design	Sterile	Filter Diameters (mm)	Available Membrane Materials	Pore Sizes (µm)	Special Features
Syringe Filters	Some	4, 15, 25, 26, 28	RC, PES, SFCA, NY and PTFE	0.2, 0.45	Ideal for small volume pressure filtration
Disc Filters	Yes	50	PTFE	0.2	Ideal for filtering solvents and gases
Vacuum Filter Storage Systems**	Yes	42, 49.5, 63, 79	PES, CA, CN and Nylon	0.2, 0.22 and 0.45	Easy grip bottles for storing filtrate
Bottle Top Vacuum Filters**	Yes	42, 63, 79	PES, CA and Nylon	0.2, 0.22 and 0.45	2 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
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.

**Membrane design is square.

PES = Polyethersulfone, CA = Cellulose Acetate, CN = Cellulose Nitrate.



SUSPENSION CELL CULTIVATION

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Plastic Erlenmeyer Flasks

Corning® Erlenmeyer Flasks

Corning baffled and plain Erlenmeyer and Fernbach culture flasks are ideal for shaker culture applications and storage. Like all Corning flasks, the Erlenmeyer flasks are certified nonpyrogenic and sterile.

- Polycarbonate construction: USP Class VI material provides excellent optical clarity and mechanical strength
- Sizes range from 125 mL to 3L
- Baffled or plain bottom options in every size
- Molded-in graduations for accuracy
- Vent cap option for continuous gas exchange while ensuring sterility and preventing leakage
- Individually packaged and radiation sterilized for ease of use
- All flasks have the highest Sterility Assurance Level (SAL) of 10^{-6}
- Certified nonpyrogenic



Sizes range from 125 mL to 3L for plain and baffled Erlenmeyer flasks



Unique baffled design with a molded-in "1/3 Fill" line for convenience on all baffled Erlenmeyer flasks.

Corning Polycarbonate Erlenmeyer Flasks and Caps Ordering Information

VWR Cat. No.	Corning Cat. No.	Description	Sterile	Qty/Cs
Baffled Bottom Erlenmeyer Flasks				
89089-718	431405	Erlenmeyer Flask, Baffled, 125 mL, Vent Cap	Yes	50
89089-716	431404	Erlenmeyer Flask, Baffled, 125 mL, Plug Seal Cap	Yes	50
89089-760	431407	Erlenmeyer Flask, Baffled, 250 mL, Vent Cap	Yes	50
89089-758	431406	Erlenmeyer Flask, Baffled, 250 mL, Plug Seal Cap	Yes	50
89089-812	431401	Erlenmeyer Flask, Baffled, 500 mL, Vent Cap	Yes	25
89089-810	431408	Erlenmeyer Flask, Baffled, 500 mL, Plug Seal Cap	Yes	25
89089-752	431403	Erlenmeyer Flask, Baffled, 1L, Vent Cap	Yes	25
89089-750	431402	Erlenmeyer Flask, Baffled, 1L, Plug Seal Cap	Yes	25
17777-102	431256	Erlenmeyer Flask, Baffled, 2L, Vent Cap	Yes	6
17777-104	431253	Fernbach Culture Flask, Baffled, 3L, Vent Cap	Yes	4
Plain Bottom Erlenmeyer Flasks				
29445-060	431143	Erlenmeyer Flask, 125 mL, Vent Cap	Yes	50
29152-146	430421	Erlenmeyer Flask, 125 mL, Plug Seal Cap	Yes	50
29445-056	431144	Erlenmeyer Flask, 250 mL, Vent Cap	Yes	50
29152-168	430183	Erlenmeyer Flask, 250 mL, Plug Seal Cap	Yes	50
29445-058	431145	Erlenmeyer Flask, 500 mL, Vent Cap	Yes	25
29152-180	430422	Erlenmeyer Flask, 500 mL, Plug Seal Cap	Yes	25
29445-064	431147	Erlenmeyer Flask, 1L, Vent Cap	Yes	25
29445-062	431146	Erlenmeyer Flask, 1L, Plug Seal Cap	Yes	25
17777-106	431255	Erlenmeyer Flask, 2L, Vent Cap	Yes	6
17777-100	431252	Fernbach Culture Flask, 3L, Vent Cap	Yes	4

Shaker Flask Application Tip

Corning recommends starting with a shaking rate of 75-125 RPM (orbital shaker) and a medium volume of 30 to 40% of the nominal flask capacity.

**431363** Flat Cap**431340** Vent Cap

Aseptic Transfer Caps, MLL



Aseptic Transfer Caps, MPC

Replacement Erlenmeyer Flask Caps

Corning Polypropylene Erlenmeyer Flask Caps are also available separately. They are sterile, individually packaged and available for the 500 mL and 1L*, 2L and 3L flask sizes.

Replacement Erlenmeyer Flask Caps Ordering Information

VWR Cat. No.	Corning Cat. No.	Description	Sterile	Qty/Cs
89089-808	431339	48 mm Vent Cap, 2L Erlenmeyer Flask	Yes	24
89089-658	431364	48 mm Flat Cap, 2L Erlenmeyer Flask	Yes	24
89089-820	431340	70 mm Vent Cap, 3L Erlenmeyer Flask	Yes	24
89089-660	431363	70 mm Flat Cap, 3L Erlenmeyer Flask	Yes	24

Aseptic Transfer Caps

Corning Erlenmeyer Flask Aseptic Transfer Caps are available separately. They are sterile and arrive individually doubled bagged. They are available for the 1L, 2L and 3L flask sizes. The transfer caps have two ports. One port ends in a 0.2 µm Acro® 50 mm disk and the other port is C-Flex Tubing ending in either a male luer lock or a male polycarbonate quick connect. The Driptube reaches all the way to the bottom of the flask for easy aseptic transfer of your liquid handling processes.

Aseptic Transfer Caps Ordering Information

VWR Cat. No.	Corning Cat. No.	Description	Sterile	Qty/Cs
89089-898	431444	43 mm Cap, 1L, Driptube with 0.2 µm Vent, MLL	Yes	5
89089-896	431445	43 mm Cap, 1L, Driptube with 0.2 µm Vent, MPC	Yes	5
89089-902	431446	48 mm Cap, 2L, Driptube with 0.2 µm Vent, MLL	Yes	6
89089-900	431447	48 mm Cap, 2L, Driptube with 0.2 µm Vent, MPC	Yes	6
89089-906	431448	70 mm Cap, 3L, Driptube with 0.2 µm Vent, MLL	Yes	4
89089-904	431449	70 mm Cap, 3L, Driptube with 0.2 µm Vent, MPC	Yes	4

Plastic Spinner Flasks

Corning® Disposable Spinner Flasks



3152 and 3153
Disposable Spinner Flasks



3561 and 3563
Disposable Spinner Flasks

- ▶ The Corning disposable spinner flask system comes ready-to-use with paddle and integrated magnet, eliminating the need for time-consuming assembly or cleaning and reassembly
- ▶ Molded from virgin polystyrene and gamma-irradiated, each spinner flask system assures a clean sterile unit. No more concerns with detergent residues or contamination
- ▶ Made of ISO 10993 compliant polystyrene, the vessel is comparable to conventional glass spinner flasks for growth of suspension cell lines and any attachment-dependent cultures using microcarrier beads. The 1L and 3L impellers are made of ISO 10993 compliant polypropylene.
- ▶ The paddle size and height is optimized for each vessel size. A unique integrated magnet provides smooth, even rotation at required speeds on slow-speed stirrers. Heat build-up in the vessel is reduced by means of a specially designed flange that raises the vessel off the stir-plate surface for the 125 mL and 500 mL flasks only.

Corning Disposable Spinner Flasks Ordering Information

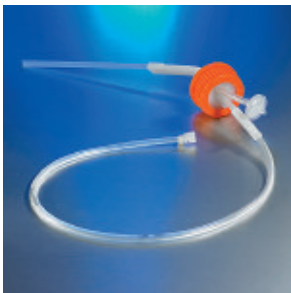
VWR Cat. No.	Corning Cat. No.	Description	Capacity (mL)	Center Neck (mm)	Sidearm Neck (mm)	Qty/Cs
89089-720	3152	Disposable Spinner Flask	125	70	25	12
89089-814	3153	Disposable Spinner Flask	500	100	45	12
89089-754	3561	Disposable Spinner Flask	1000	-	45	6
	3580	Disposable Spinner Flask, Vent	1000	-	45	6
89089-804	3563	Disposable Spinner Flask	3000	-	45	4
	3581	Disposable Spinner Flask, Vent	3000	-	45	4

Replacement Caps and Aseptic Transfer Caps Ordering Information

VWR Cat. No.	Corning Cat. No.	Description	Capacity (mL)	Sidearm Neck (mm)	Qty/Cs
89089-914	3567	Vent Cap, 0.2 µm Vent	500, 1000, 3000	45	4
89089-912	3565	Side Arm Aseptic Transfer Cap, DipTube w/ 0.2 µm Vent, MLL	500	45	2
89089-908	3562	Side Arm Aseptic Transfer Cap, DipTube w/ 0.2 µm Vent, MLL	1000	45	2
89089-910	3564	Side Arm Aseptic Transfer Cap, DipTube w/ 0.2 µm Vent, MLL	3000	45	2



1L and 3L Disposable Spinner
Flasks with Accessories



3565, 3562 and 3564
Aseptic Transfer Cap



3567 Vent Cap



4500-1L and 4500-250
Spinner Flasks



ProCulture Spinner Flasks

Reusable Glass Spinner Flasks

ProCulture® Glass Spinner Flask with Angled Sidearms

- ▶ Baffles enhance aeration and agitation of contents of the flask.
- ▶ Unique impeller design ensures optimal stirring.
- ▶ Sidearm designs permit easy access of 25 and 50 mL pipettes
- ▶ Visit www.corning.com/lifesciences to view additional Corning® spinner flask accessories

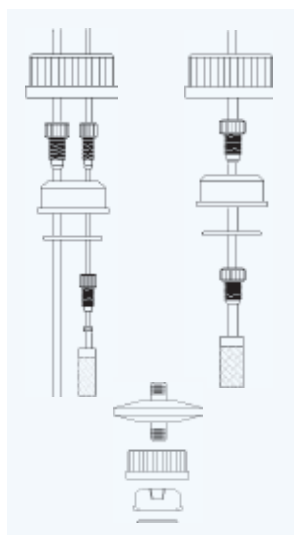
ProCulture Spinner Flasks with Angled Sidearms Ordering Information

VWR Cat. No.	Corning Cat. No.	Description	Capacity	Center Neck (mm)	Sidearm Neck (mm)	Qty/Cs
22877-072	4500-125	Spinner	125 mL	70	32	1
22877-074	4500-250	Spinner	250 mL	70	32	1
22877-076	4500-500	Spinner	500 mL	100	45	1
22877-078	4500-1L	Spinner	1L	100	45	1
22877-080	4500-3L	Spinner	3L	100	45	1
22877-082	4500-6L	Spinner	6L	100	45	1
22877-084	4500-8L	Spinner	8L	100	45	1
22877-086	4500-15L	Spinner	15L	100	45	1
22877-088	4500-36L	Spinner	36L	100	45	1
22877-090	4502-3L	Spinner	3L	120	45	1
22877-092	4502-6L	Spinner	6L	120	45	1
22877-094	4502-8L	Spinner	8L	120	45	1
22877-096	4502-15L	Spinner	15L	120	45	1
22877-098	4502-36L	Spinner	36L	120	45	1
22877-100	4504-3L	Spinner	3L	140	45	1
22877-102	4504-6L	Spinner	6L	140	45	1
22877-104	4504-8L	Spinner	8L	140	45	1
22877-106	4504-15L	Spinner	15L	140	45	1
22877-108	4504-36L	Spinner	36L	140	45	1

Retrofit Kits are available for converting older Corning ProCulture Spinner Flasks to fit newer dual-bearing impellers.

ProCulture Spinner Flasks with Vertical Sidearms Ordering Information

VWR Cat. No.	Corning Cat. No.	Capacity	Center Neck (mm)	Number of Vertical Sidearms	Sidearm Neck (mm)	Qty/Cs
22877-128	4510-8L	8L	100	4	45	1
22877-130	4510-15L	15L	100	4	45	1
22877-132	4510-36L	36L	100	6	45	1
22877-134	4512-8L	8L	120	4	45	1
22877-136	4512-15L	15L	120	4	45	1
22877-138	4512-36L	36L	120	6	45	1
22877-140	4514-15L	15L	140	4	45	1
22877-142	4514-36L	36L	140	6	45	1



Vertical Sidearm Fittings,
Gas Delivery and Venting

Gas Handling Fittings, Vertical Sidearm Flasks

- Used to provide gases into larger spinner flasks with vertical sidearms
- Fittings are comprised of a PET insert with a Viton® O-Ring and a polypropylene sealing cap
- Gas filters are PTFE, 0.2 µm porosity
- The 316 stainless steel tubes are held in place by Noryl® nuts with integrated ferrules
- The fittings are completely autoclavable

Gas Handling Fittings, Vertical Sidearm Flasks – Ordering Information

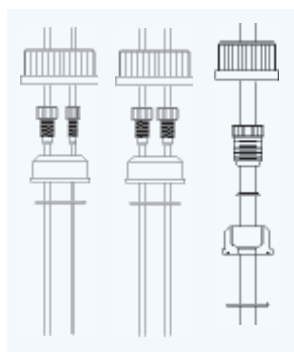
VWR Cat. No.	Corning Cat. No.	Description	Dimension	Qty/Cs
22877-044	4519-100	Sidearm fitting, gas delivery	1/8" Inlet	1
22877-046	4519-102	Sidearm fitting, gas delivery	1/4" Inlet	1
22877-048	4519-104	Sidearm fitting, delivery and vent	1/8" and 1/4"	1
22877-050	4519-106	Sidearm fitting, vent cap, 0.2 µm	50 mm filter	1
89090-014	4519-177	Sidearm fitting, vent cap, 0.2 µm, sanitary	50 mm filter	1

Media Handling Fittings, Vertical Sidearm Flasks

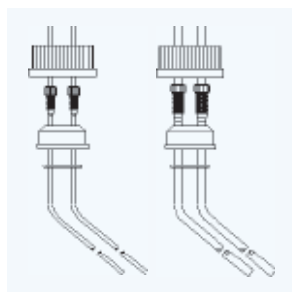
- Used to introduce medium aseptically into large spinner flasks with vertical sidearms
- Fittings are comprised of a PET insert with a Viton O-Ring and a polypropylene sealing cap
- Gas filters are PTFE, 0.2 µm porosity
- The 316 stainless steel tubes are held in place by Noryl nuts with integrated ferrules
- The fittings are completely autoclavable

Media Handling Fittings, Vertical Sidearm Flasks – Ordering Information

VWR Cat. No.	Corning Cat. No.	Description	Fits Flask Size	Tubing O.D. (inches)	Qty/ Cs
22877-054	4519-112	Sidearm fitting, dual, media handling	8L, 15L	1/8"	1
22877-118	4519-114	Sidearm fitting, dual, media handling	36L	1/8"	1
22877-056	4519-116	Sidearm fitting, dual, media handling	8L, 15L	1/4"	1
22877-120	4519-118	Sidearm fitting, dual, media handling	36L	1/4"	1
22877-054	4519-120	Sidearm fitting, combo, media handling	8L, 15L	1/8", 1/4"	1
22877-146	4519-122	Sidearm fitting, combo, media handling	36L	1/8", 1/4"	1
22877-060	4519-124	Sidearm fitting, single, media handling	8L, 15L	1/2"	1
22877-148	4519-126	Sidearm fitting, single, media handling	36L	1/2"	1
89090-016	4519-176	Sidearm fitting, dual, media handling, EPDM	8L, 15L	1/4"	1



Vertical Sidearm Fittings,
Media Handling



Dual Angled Sidearm Fittings

Gas or Media Handling Fittings, Angled Sidearm Flasks, Dual Style

- Dual angled sidearm fittings can be used for aseptically transferring medium into or out of angled sidearm spinner flasks or for sparging the medium with gases
- Fittings are comprised of a PET insert with a Viton O-ring and a polypropylene sealing cap
- Two 316 stainless steel tubes which extend to the bottom of the flask, are held in place by Noryl nuts with integrated ferrules
- The fittings are completely autoclavable

Gas or Media Handling Fittings, Angled Sidearm Flasks, Dual Style – Ordering Information

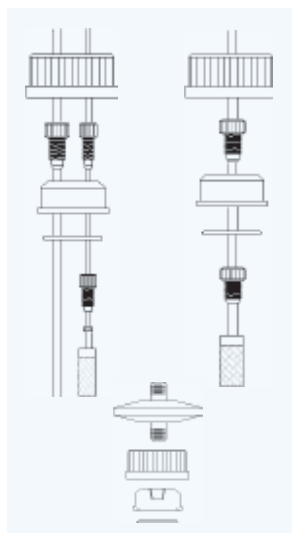
VWR Cat. No.	Corning Cat. No.	Description	Flask Size	Tubing O.D. (inches)	Qty/Cs
89089-998	4519-150	SA fitting, Dual	1L	1/8"	1
89090-000	4519-151	SA fitting, Dual	3L	1/8"	1
89090-002	4519-152	SA fitting, Dual	6L	1/8"	1
89090-004	4519-153	SA fitting, Dual	8L	1/8"	1
89090-964	4519-173	SA fitting, Dual	1L	1/8", 1/4"	1
89089-968	4519-121	SA fitting, Dual	8L	1/8", 1/4"	1
89089-966	4519-174	Sidearm fitting, Dual	500 mL	1/8" angled to 125 mL level, 1/4"	1
89089-982	4519-154	Sidearm fitting, Dual	1L	1/4"	1
89089-984	4519-155	Sidearm fitting, Dual	3L	1/4"	1
89089-986	4519-156	Sidearm fitting, Dual	6L	1/4"	1
89089-988	4519-157	Sidearm fitting, Dual	8L	1/4"	1
89089-980	4519-170	Sidearm fitting, Dual	15L	1/4"	1

Gas or Media Handling Fittings, Angled Sidearm Flasks, Combination Style

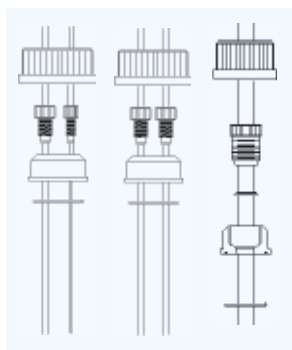
- Used to aseptically transfer medium, sparge the cell culture medium directly or add gases to the head space above the cell culture medium
- Fittings are comprised of a PET insert with a Viton® O-ring and a polypropylene sealing cap.
- One or two 316 stainless steel tubes extend to the bottom of the flask; the other is a shorter 6" length.
- Both tubes are held in place by Noryl® nuts with integrated ferrules.
- The fittings are completely autoclavable.

Gas or Media Handling Fittings, Angled Sidearm Flasks, Combination Style – Ordering Information

VWR Cat. No.	Corning Cat. No.	Description	Flask Size	Tubing O.D. (inches)	Qty/Case
89089-990	4519-158	Sidearm fitting, combination	1L	1/8"	1
89089-992	4519-159	Sidearm fitting, combination	3L	1/8"	1
89089-994	4519-160	Sidearm fitting, combination	6L	1/8"	1
89089-996	4519-161	Sidearm fitting, combination	8L	1/8"	1
89089-972	4519-162	Sidearm fitting, combination	1L	1/4"	1
89089-974	4519-163	Sidearm fitting, combination	3L	1/4"	1
89089-976	4519-164	Sidearm fitting, combination	6L	1/4"	1
89089-970	4519-165	Sidearm fitting, combination	8L	1/4"	1
89089-978	4519-171	Sidearm fitting, combination	15L	1/4"	1
89090-006	4519-166	Sidearm fitting, combination, triple	1L	1/8"	1
89090-008	4519-167	Sidearm fitting, combination, triple	3L	1/8"	1
89090-012	4519-168	Sidearm fitting, combination, triple	6L	1/8"	1
89090-010	4519-169	Sidearm fitting, combination, triple	8L	1/8"	1



Vertical Sidearm Fittings, Gas Delivery and Venting

Vertical Sidearm Fittings,
Media Handling

Fittings for Insertion Probes, Vertical Sidearm Flasks

- Used to secure pH, O₂, or temperature sensors in large spinner flasks with vertical sidearms
- Fittings are comprised of a PET insert with a Viton O-ring and a polypropylene sealing cap
- The 316 sensors are held in place by Noryl nuts with integrated ferrules
- The fittings are completely autoclavable

Fittings for Insertion Probes, Vertical Sidearm Flasks – Ordering Information

VWR Cat. No.	Corning Cat. No.	Description	Sensor O.D. (mm)	Qty/Cs
22877-052	4519-108	Sidearm fitting, sensor, O ₂ probes	12	1
22877-062	4519-128	Sidearm fitting, sensor, temperature probes	12	1
22877-144	4519-110	Sidearm fitting, sensor, pH probes	12	1
89089-962	4519-172	Sidearm fitting, sensor, pH or O ₂	18	1

Impeller Assembly for Magnetically-Driven Bioreactor

Stainless steel impeller shaft with modified impeller blade for use with probes to create a small bioreactor.

Impeller Assembly for Magnetically-Driven Bioreactor – Ordering Information

VWR Cat. No.	Corning Cat. No.	Description	Qty/Cs
89090-178	402648	Impeller assembly, stainless steel, dual bearing, modified for probes, 3L	1
89089-954	401392	Impeller assembly, stainless steel, dual bearing, modified for probes, 8L	1
89089-948	401661	Impeller assembly, stainless steel, dual bearing, modified for probes, 15L	1



Impeller Assembly

Cap Assembly for Magnetically-Driven Bioreactor

Cap assembly for small bioreactor with various fitting arrangements.

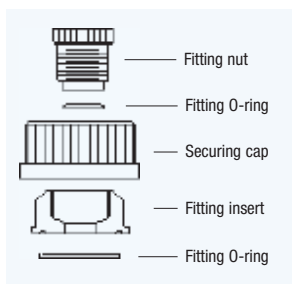
Cap Assembly for Magnetically-Driven Bioreactor – Ordering Information

VWR Cat. No.	Corning Cat. No.	Description	Qty/Cs
89089-674	402579	Cap Assembly, 120 mm, Glass Filled PBT, 3 (3/8"), 1 (1/4") fittings	1
89089-670	402576	Cap Assembly, 120 mm, Glass Filled PBT, 2 (12 mm), 2 (1/4") fittings	1
89089-672	402577	Cap Assembly, 120 mm, Glass Filled PBT, 2 (12 mm), 2 (1/4"), 1 (3/8") fittings	1

Spare Parts for Sidearm Fittings

Securing Caps Ordering Information

VWR Cat. No.	Corning Cat. No.	Description	Qty/Cs
16157-330	1395-32LTC	Cap, solid, 32 mm, orange	1
16157-409	1395-45LTC	Cap, solid, 45 mm, orange	1
16157-431	1395-45LTR	Drip ring, 45 mm, clear	1
16157-412	1395-45LTM	Cap, vented, securing, 45 mm, .22 PTFE, grey	10





Direct Drive Motor

Direct Drive Motors

- ▶ High torque, low rpm stirrer designed to maintain constant low speed
- ▶ Gearhead stirrer delivers 14.5 in-lbs of torque
- ▶ Maximum speed is 350 rpm
- ▶ Weight of motor is 9 lbs (4.1 kg)
- ▶ Available with 120 VAC 60Hz or 230 VAC 50Hz

Direct Drive Motors Ordering Information

VWR Cat. No.	Corning Cat. No.	Description	Qty/Cs
89090-230	400640	120VAC, 60 Hz Motor	1
89090-232	402645	230VAC, 50 Hz Motor	1



Direct Drive Shaft/Cap Assembly

Direct Drive Shaft/Cap Assemblies

- ▶ For 8L, 15L, or 36L paddle assemblies
- ▶ Used on all series 4510 and 4512 Spinner flasks

Direct Drive Shaft/Cap Assemblies Ordering Information

VWR Cat. No.	Corning Cat. No.	Description	Qty/Cs
89089-676	402614	For 100 mm Neck Flasks	1
89089-664	400649	For 120 mm Neck Flasks	1



Direct Drive Paddle Assembly

Direct Drive Paddle Assemblies

- ▶ For series 4510, 4512, and 4514 Spinner flasks when coupled to a direct drive motor
- ▶ Paddle assemblies will couple to 100 mm and 120 mm cap assemblies

Direct Drive Paddle Assemblies Ordering Information

VWR Cat. No.	Corning Cat. No.	Description	Qty/Cs
22877-110	4515-8L	Paddle assembly only for 8L flask	1
22877-112	4515-15L	Paddle assembly only for 15L flask	1
22877-114	4515-36L	Paddle assembly only for 36L flask	1



PROTEIN CONCENTRATION AND PURIFICATION

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New!

Corning® Spin-X® UF Concentrators

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

Features and Benefits

- ▶ The patented vertical membrane design and thin channel filtration chamber (U.S. Patent No. 5,647,990), minimizes membrane fouling and provides fast, high speed concentrating, even with particle laden solutions.
 - ▶ Integrated dead stop design eliminates risk of spinning to dryness; no respinning necessary
 - ▶ Choice of three sizes for greater flexibility:
 - Spin-X UF 500 for samples up to 500 μ L
 - Spin-X UF 6 for samples up to 6 mL
 - Spin-X UF 20 for samples up to 20 mL, 14 mL if using fixed angle rotors
 - ▶ 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 1/2 to 1/3 smaller than the protein to be concentrated.
 - ▶ The MWCO and graduations are printed right 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.

Corning Spin-X UF Applications

- ▶ Concentration, desalting of proteins, enzymes, monoclonal antibodies, immunoglobulins
- ▶ Removal of labeled amino acids and nucleotides
- ▶ HPLC sample preparation
- ▶ Deproteinization of samples
- ▶ Recovery of biomolecules from cell culture supernatants, lysates
- ▶ Concentrating virus from cell culture supernatants

A size to fit all your concentrating needs



Spin-X UF 500



Spin-X UF 6



Spin-X UF 20

Corning® Spin-X® UF Concentrator Ordering Information


VWR Cat. No.	Corning Cat. No.	Description	Capacity	Membrane	Pack Size
<i>Spin-X UF 500</i>					
97027-888	431477	Spin-X UF 500	500 µL	5,000 MWCO	25
97027-890	431478	Spin-X UF 500	500 µL	10,000 MWCO	25
97027-892	431479	Spin-X UF 500	500 µL	30,000 MWCO	25
97027-894	431480	Spin-X UF 500	500 µL	50,000 MWCO	25
97027-896	431481	Spin-X UF 500	500 µL	100,000 MWCO	25
<i>Spin-X UF 6</i>					
97027-898	431482	Spin-X UF 6	6 mL	5,000 MWCO	25
97027-900	431483	Spin-X UF 6	6 mL	10,000 MWCO	25
97027-902	431484	Spin-X UF 6	6 mL	30,000 MWCO	25
97027-904	431485	Spin-X UF 6	6 mL	50,000 MWCO	25
97027-906	431486	Spin-X UF 6	6 mL	100,000 MWCO	25
<i>Spin-X UF 20</i>					
97027-908	431487	Spin-X UF 20	20 mL	5,000 MWCO	12
97027-910	431488	Spin-X UF 20	20 mL	10,000 MWCO	12
97027-912	431489	Spin-X UF 20	20 mL	30,000 MWCO	12
97027-914	431490	Spin-X UF 20	20 mL	50,000 MWCO	12
97027-916	431491	Spin-X UF 20	20 mL	100,000 MWCO	12

Technical Appendix: Selecting the Best Corning® Spin-X® UF Concentrator for Your Application

Introduction

Corning 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 1). 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. Microsolutes are 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 2 and 3 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 patented vertical membrane design and thin channel filtration chamber (U.S. Patent No. 5,647,990) 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 have been developed to 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%.

The Spin-X UF 6 features twin vertical membranes for unparalleled filtration speeds and 100x plus concentrations. Remaining volume



Table 1. 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

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 have been developed to 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. 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.

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 Corning® 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 2) and membrane cut-off (Table 3) is selected, Corning 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 4). 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/cm². This can increase to 20 to 100 µg/cm² 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.

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.

Table 2. Technical Properties of Corning Spin-X UF Concentrators

Concentrator	Spin-X UF 500	Spin-X UF 6	Spin-X UF 20
Concentrator Capacity			
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°
Dimensions			
Total Length	50 mm	122 mm	116 mm
Width	11 mm	17 mm	30 mm
Active membrane area	0.5 cm ²	2.5 cm ²	6.0 cm ²
Membrane hold up volume	<5 µL	<10 µL	<20 µL
Dead stop volume*	5 µL	30 µL	50 µL
Materials of Construction			
Body	Polycarbonate	Polycarbonate	Polycarbonate
Filtrate vessel	Polypropylene	Polycarbonate	Polycarbonate
Concentrator cap	Polycarbonate	Polypropylene	Polypropylene
Membrane	Polyethersulfone	Polyethersulfone	Polyethersulfone

*Dead stop volume as designed in molding tool. This volume may vary depending on sample, sample concentration, operation temperature and centrifuge rotor.

Table 3. 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 4. 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.
BSA 1.0 mg/mL (66,000 MW)										
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%
IgG 0.25 mg/mL (160,000 MW)										
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%

Prerinsing

Membranes fitted to Corning® 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 prerinsed 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 5).
- 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.
- Pretreat the device overnight with a passivation solution, such as 5% SDS, Tween 20, or Triton X in distilled water. Then, rinse thoroughly before use.

Chemical Compatibility

Corning Spin-X UF concentrators are designed for use with biological fluids and aqueous solutions. For chemical compatibility details, refer to Table 6.

Table 5. Maximum Recommended Centrifugal Force

Concentrator	Spin-X UF 500	Spin-X UF 6	Spin-X UF 20
Maximum Spin Force – Swing Bucket			
5,000 to 50,000 MWCO PES	Do not use	4,000 xg	5,000 xg
>100,000 MWCO PES	Do not use	4,000 xg	3,000 xg
Maximum Spin Force – Fixed Angle			
5,000 to 50,000 MWCO PES	15,000 xg	10,000 xg	8,000 xg
>100,000 MWCO PES	15,000 xg	6,000 xg	6,000 xg

Table 6. Chemical Compatibility*

(2 hr 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 (8 M)	1

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

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3296	6	3450	15	3712	11	4492	34	430196	6
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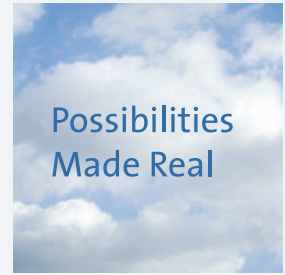
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