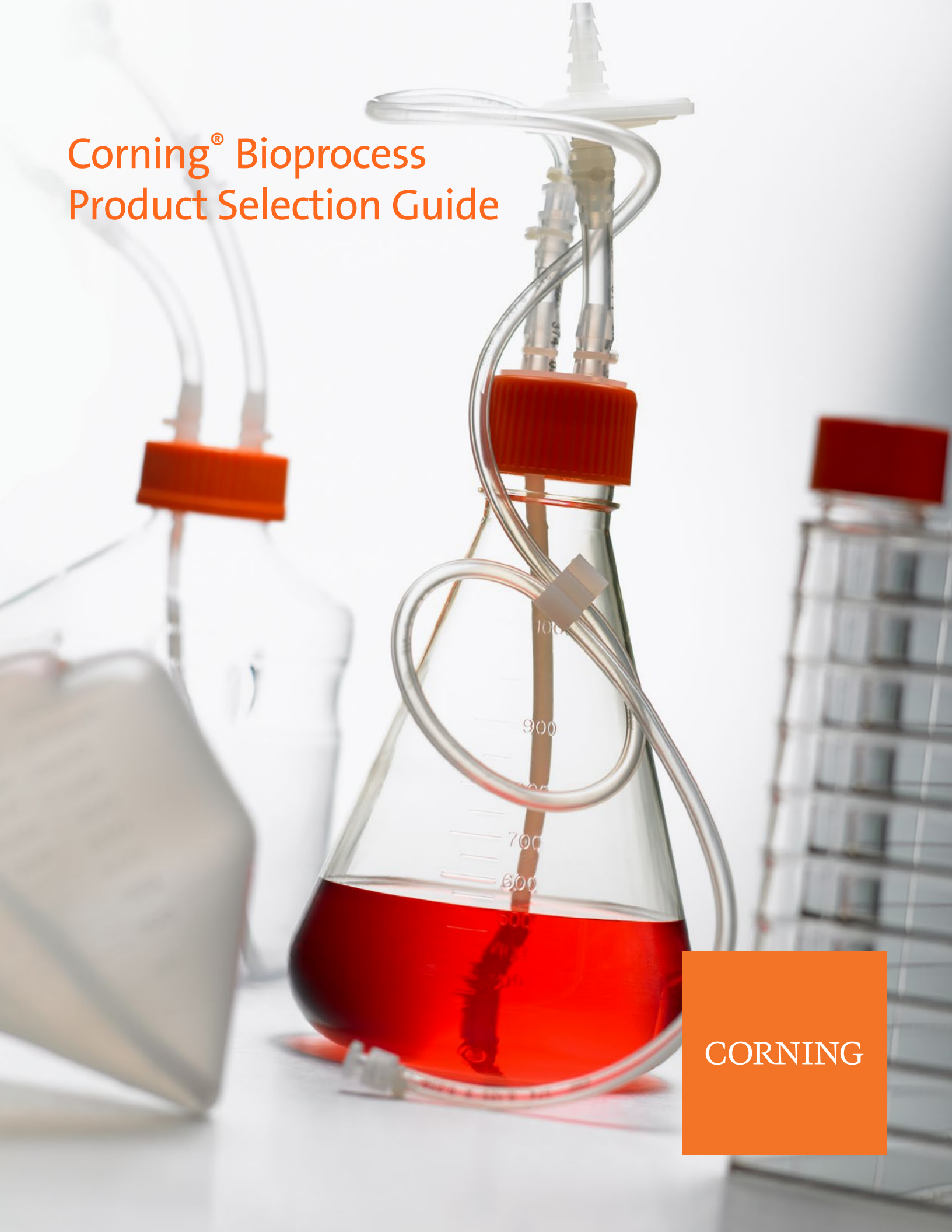


Corning® Bioprocess Product Selection Guide



CORNING



Bioprocess

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Product Ordering Information

For information on Purchasing Options, Terms and Conditions of Sale, Return and Repair Policies, and Warranty/Guarantee Registration, visit our website at www.corning.com/how-to-buy.

Products may not be available in all markets.

Overview

Designed For Performance

Corning Life Sciences offers a full line of cell culture products that are manufactured under strict process controls guaranteeing consistent product performance. In addition, customers can request a Certificate of Quality at www.corning.com/lifesciences.

This certificate details lot-specific information on component materials, sterility testing, and pyrogen testing. Also available are detailed product descriptions and drawings that highlight product dimensions and testing procedures. All are available simply by calling your local Corning Life Sciences office.

Visit www.corning.com/lifesciences/bioprocess for additional product and technical information.

Stackable Cell Culture



Corning® CellSTACK® Culture Chambers

- ▶ 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 tissue culture (TC) treatment, Corning CellBIND® surface for enhanced cell attachment, or Ultra-Low Attachment (ULA) surface for reduced cell attachment on select CellSTACK products.
 - Corning CellBIND surface
 - Great for reducing serum levels
 - Better attachment increases cell yields
 - Ultra-Low Attachment surface
 - Maintains cells in an unattached state
 - Prevents stem cells from attachment-mediated differentiation
 - Reduces binding of attachment and serum proteins to the substrate
- ▶ Greater chamber durability
 - Superior mechanical strength and structural integrity
 - Standard 33 mm vented caps offer larger openings with threaded closures
 - 100% leak-tested prior to shipping
- ▶ Nonpyrogenic
- ▶ Sterility Assurance Level (SAL) of 10⁻⁶
- ▶ Manufactured under cGMP conditions

Corning CellSTACK Culture Chambers

Cat. No.	Description	Surface	Growth Area (cm ²)	Qty/Pk	Pk/Cs
3303	CellSTACK 1-chamber	Ultra-Low Attachment	636	1	8
3330	CellSTACK 1-chamber	Corning CellBIND	636	1	8
3268	CellSTACK 1-chamber	TC-treated	636	1	8
3310	CellSTACK 2-chamber	Corning CellBIND	1,272	1	5
3269	CellSTACK 2-chamber	TC-treated	1,272	1	5
3311	CellSTACK 5-chamber	Corning CellBIND	3,180	1	2
3319	CellSTACK 5-chamber	TC-treated	3,180	1	2
3313	CellSTACK 5-chamber	TC-treated	3,180	1	8
3320	CellSTACK 10-chamber	Corning CellBIND	6,360	1	6
3312	CellSTACK 10-chamber	Corning CellBIND	6,360	1	2
3270	CellSTACK 10-chamber	TC-treated	6,360	1	2
3271	CellSTACK 10-chamber	TC-treated	6,360	1	6
3321	CellSTACK 40-chamber	Corning CellBIND	25,440	1	2
3272	CellSTACK 40-chamber	TC-treated	25,440	1	2



Corning CellSTACK stacking device

Corning® CellSTACK® Accessories

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

Better Filling

Optional filling caps allow direct aseptic transfer of media and cells via pumping or gravity feed. Coupling devices are available with or without integrally sealed, chemically resistant, heat-sealable flexible tubing. Optional filling caps with attached hydrophobic membrane filters provide for gas exchange and faster aseptic venting during liquid transfers. Additional sterile vented or unvented 33 mm replacement caps are also available (see table below).

Better Options

For additional filling and fluid management options for our CellSTACK vessels, consider Corning's suite of closed system solutions. These solutions provide sterile, easy-to-use options that are available as stand-alone manifolds or accessories, or pre-integrated on the CellSTACK vessel. Contact your Corning Bioprocess Specialist for available closed system products or to configure one specifically for your process (see Closed System Solutions for Corning CellSTACK vessels section).

Corning CellSTACK Accessories

Cat. No.	Description	Qty/Pk	Qty/Cs
3331	Corning CellSTACK stacking device, ABS, nonsterile	1	5
3732	Universal cap, polyethylene, 33 mm, with vented overcap, double-bagged, sterile	1	4
3969	Solid cap, polyethylene, 33 mm, sterile	1	6
3968	Vent cap, polyethylene, 33 mm, 0.2 µm membrane, sterile	1	6



Universal cap, vented overcap



Solid cap, not vented



Vented cap

Corning HYPERStack® Cell Culture Vessels

Closed System for High Yield Cell Growth

Corning's High Yield **PER**formance (HYPER) platform – the Corning HYPERStack cell culture vessel – combines the best of two Corning products: the Corning CellSTACK culture chamber and the Corning HYPERFlask® vessel. The utilization of the proprietary gas-permeable film technology provided in the format of the CellSTACK culture chamber allows the HYPERStack vessel to be the most efficient, scalable cell culture vessel for adherent cell culture available today.

- ▶ **More cells** – provides up to 5X the growth surface area of a traditional cell culture vessel of comparable footprint
- ▶ **Closed system** – no open fluid manipulations
- ▶ **Scalable product** – multiple size offerings support scale-up and scale-out
- ▶ **Ergonomic design** – easier manipulation with handling equipment and accessories
- ▶ **Fixed media volume** – 0.2 mL/cm² fills vessel for less volumetric waste

View HYPERStack protocol videos and application notes at www.corning.com/hyperstack.



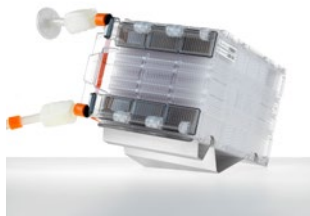
2 Sizes Available

(cm² = surface area)

12-layer = 6,000 cm²

36-layer = 18,000 cm²

Corning® HYPERStack® Vessels and Accessories



Corning HYPERStack Nest accessory (Cat. No. 10047)

Cat. No.	Description	Growth Area (cm ²)	Qty/ Pk	Qty/ Cs
20012	Corning HYPERStack 12-layer cell culture vessel, Corning CellBIND® surface	6,000	1	4
20013	Corning HYPERStack 12-layer cell culture vessel, non-treated surface	6,000	1	4
20037	Corning HYPERStack 36-layer cell culture vessel, non-treated surface	18,000	1	2
20036	Corning HYPERStack 36-layer cell culture vessel, Corning CellBIND surface	18,000	1	2
10047*	Corning HYPERStack Nest accessory		1	1
10042	Disposable tubing set for use with glass bottle, 3/8" ID x 1/2" OD, animal component-free, chemically resistant, heat sealable flexible tubing, 18" in length, sterile		1	2
10043	Disposable tubing set for use with 850 cm ² polystyrene roller bottle, 3/8" ID x 1/2" OD, animal component-free, chemically resistant, heat sealable flexible tubing, 0.2 µm filter, MPC quick connect		1	2
431644	850 cm ² bottle, Easy Grip cap, not treated, polystyrene, sterile		1	40
431518	2L Erlenmeyer flask with dip tube with 0.2 µm vent, male MPC, resistant, heat sealable flexible tubing, 1/4" ID, 3/8" OD		1	3
11501	5L Erlenmeyer flask with dip tube with 0.2 µm filter, male MPC chemically resistant, heat sealable flexible tubing, 1/4" ID, 3/8" OD		1	2
11370	Manifold accessory with 4 connections for Corning HYPERStack vessels		1	2
11380	Manifold accessory with 5 connections for Corning HYPERStack vessels		1	2

*Made to order. Please contact your local Corning Account Representative for more information.
MPC = medical plastic coupler.

Corning Automated Manipulator Rack for Corning CellSTACK® and HYPERStack Cell Culture Vessels



The Corning Automated Manipulator Platform is an effective solution for automating the scale-up of your adherent cell culture process. The automated manipulator platform is designed to save time, reduce cost, and reduce process variability by automating the handling of multiple large stacked vessels during critical fluid handling steps. Optimized for use with Corning CellSTACK and HYPERStack cell culture vessels, the platform consists of a fully programmable manipulator, a manipulator cart, and multiple rack options designed for specific vessel configurations.

- ▶ Greatly simplifies CellSTACK and HYPERStack processing by automating filling, equilibration, and harvest
- ▶ Enables consistent and scalable process performance
- ▶ Improves safety by reducing manual manipulations with safeguards include intrusion sensors, fixed guards, and interlocks
- ▶ Intuitive, programmable touch-screen operator panel, full motion control capability, low-maintenance electric motor drive system

Specifications

Dimensions (W x D x H)	62 x 82 x 74 in. (1,580 x 2,080 x 1,880 mm)
Weight	2,205 lbs. (1,000 kg)
Pivot	-2° (right) to 130° (left)
Tilting speed	1° to 60°/second (except for acceleration or deceleration range)
Required power supply	3 phase AC 200-230V, 50/60Hz, 7kVA (AC 380-440V option available)
Mountable vessels	Corning CellSTACK: Three 40-layer vessels Corning CellSTACK: Six 10-layer vessels Corning HYPERStack: Six 36-layer vessels
Installation Environment	Temperature: 0°C to 30°C Humidity: 35% to 85% relative humidity or less (no condensation) Air cleanliness: Grade B recommended Floor: Withstand load of 1000 kg/m ² , no slope recommended
Surface Material	Type 304 stainless steel
System meets applicable FCC, CE, UL and CSA Electrical Safety and EMC standards	

Corning Automated Manipulator

Cat. No.	Description
6650	Corning Automated Manipulator platform, 180-254V, standard power supply
6651	Corning Automated Manipulator platform, 380-440V, standard power supply
6652	Corning Automated Manipulator cart
6653	Corning Automated Manipulator rack for Corning CellSTACK-10, holds six CellSTACK-10 vessels, compatible with Manipulator cart (Cat. No. 6652)
6654	Corning Automated Manipulator rack for Corning CellSTACK-40, holds three CellSTACK-40 vessels, compatible with Manipulator cart (Cat. No. 6652)
6655	Corning Automated Manipulator rack for Corning HYPERStack-36, holds six HYPERStack-36 vessels, compatible with Manipulator cart (Cat. No. 6652)
6656	Attachment for Automated Manipulator cart (Cat. No. 6652). Enables the use of Corning Automated Manipulator carts with Thermo Scientific Nunc™ Cell Factory™ incubators



Corning CellCube 10-, 25-, and 100-layer modules with AseptiQuik® connectors

Corning® CellCube® Systems

The Corning CellCube system provides a fast, simple, and compact method for the mass culture of attachment-dependent cells. CellCube modules are available with either TC-treated or Corning CellBIND® surface for the growth of attachment dependent cells. The CellCube system continually perfuses the cells with fresh medium for increased cell productivity. The CellCube system provides an environment that simulates *in vivo* conditions and reliably distributes nutrients and oxygen with low differential gradients across all cells within the modules.

- ▶ Surface treatment on both sides of the plates doubles the available surface area within the same footprint
- ▶ Encapsulation and endplates made from polycarbonate for strength and long-term reliability
- ▶ Flow control orifice and directors promote even distribution of media
- ▶ Scale-up from 8,500 cm² to 85,000 cm² is linear and uses the same pumps and controller for greater efficiency

Corning CellCube Systems Modules

Cat. No.	Description	Number of Layers	Growth Surface Area (cm ²)	Surface Treatment	Qty/ Pk	Qty/ Cs
3200	CellCube 10-Stack module	10	8,500	TC-treated	1	2
3231	CellCube 10-Stack module with AseptiQuik® connectors	10	8,500	TC-treated	1	2
3304	CellCube 25-Stack module	25	21,250	Corning CellBIND®	1	1
3201	CellCube 25-Stack module	25	21,250	TC-treated	1	1
3232	CellCube 25-Stack module with AseptiQuik® connectors	25	21,250	TC-treated	1	1
3264	CellCube 100-Stack module	100	85,000	TC-treated	1	1
3032	CellCube 100-Stack module	100	85,000	Corning CellBIND®	1	1
3233	CellCube 100-Stack module with AseptiQuik® connectors	100	85,000	TC-treated	1	1

Corning CellCube Accessories

Cat. No.	Description	Qty/ Pk	Qty/ Cs
3136	CellCube single module system with stainless steel stand	1	1
3234	CellCube T-tubing, medium filter, 2 aseptic connectors	1	4
3235	CellCube Double-T manifold, 4 aseptic connectors	1	2
3236	CellCube Cross manifold, 4 aseptic connectors	1	4
3237	CellCube adaptor, aseptic connector to female MPC	1	4
3238	CellCube adaptor, aseptic connector to male MPC	1	4
92341	CellCube production cart	1	1



Corning CellCube production cart

Production Cart Specifications

Dimensions (W x D x H)	43 x 34 x 25 in. (110 x 87 x 64 cm)
Weight (without Corning CellCube module)	130 lbs. (59 kg)
Shipping weight	150 lbs. (68 kg)

Roller Bottles



Ideal for a variety of rolling applications, Corning Roller Bottles are made of USP Class VI Polystyrene. They are single-use, sterile, feature laser-etched graduations, and are available in 490 cm², 850 cm², 1,700 cm² pleated, and 1,750 cm² sizes. Caps are available in solid High Density Polyethylene (HDPE) or vented HDPE with a 0.2 mm microporous PTFE membrane.

- ▶ Treated for optimal cell attachment
- ▶ One piece seamless construction
- ▶ All bottles have printed lot numbers to aid in product traceability
- ▶ Sterility Assurance Level (SAL) 10⁻⁶
- ▶ Nonpyrogenic

Expected Cell Yields and Recommended Medium Volumes

Description	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
1,700 cm ² roller bottle	1,700	1.7 x 10 ⁸	340 - 510
1,750 cm ² roller bottle	1,750	1.75 x 10 ⁸	350 - 525

*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.

Roller Bottle Application Tips

- ▶ Corning recommends 0.2 mL 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, Standard Surface

Cat. No.	Surface	Surface Area (cm ²)	Cap Style	Graduations	Qty/Pk	Qty/Cs
430195	TC-treated	490	Plug seal	No	2	40
430849	TC-treated	850	Easy grip	Yes	2	40
431133	TC-treated	850	Easy grip	Yes	20	20
431198	TC-treated	850	Easy grip vent	Yes	2	40
430851	TC-treated	850	Easy grip	Yes	5	40
431321	TC-treated	850	Easy grip	Yes	22	44
3907	Corning CellBIND®	850	Easy grip	Yes	2	40
431329	Corning CellBIND	850	Easy grip vent	Yes	2	40
431344	Corning CellBIND	850	Easy grip	Yes	22	44
431644	Untreated	850	Easy grip	Yes	1	40
430699	TC-treated	1,750	Easy grip	Yes	10	20

Roller Bottles, Expanded Surface

Ribbed design provides twice the surface area with the same exterior dimensions

Cat. No.	Surface	Surface Area (cm ²)	Cap Style	Graduations	Qty/Pk	Qty/Cs
430852	TC-treated	1,700	Easy grip	Yes	2	40
430853	TC-treated	1,700	Easy grip	Yes	5	40
431135	TC-treated	1,700	Easy grip	Yes	20	20
431191	TC-treated	1,700	Easy grip vent	Yes	20	20
431134	Corning CellBIND	1,700	Easy grip	Yes	20	20

Roller Bottle Caps, Polyethylene

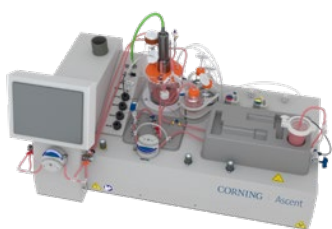
Caps are available separately and are individually wrapped.

Cat. No.	Cap Style	Qty/Pk	Qty/Cs
431132	Easy grip vent cap	1	300



Easy grip vent cap is designed for applications requiring consistent gas exchange

Corning® Ascent® Fixed Bed Reactor Process Development System



The Corning Ascent FBR PD System is designed to enable process development and production scale cell culture capacities for cell and gene therapy workflows. The system is designed to provide viable cell harvest capability that can enable it to be used as seed train and potentially for other applications that require the ability to harvest large quantities of cells, such as regenerative medicine. Three single-use Ascent FBR bioreactor sizes: 1 m², 2.5 m² and 5 m², help in the development of a stable and well-defined manufacturing process.

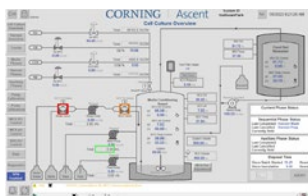
The Corning Ascent FBR PD System is an automated, perfusion bioproduction platform for attachment-dependent cell-based processes. The platform is designed to provide flexibility in protocol development and hands-off operation during use.

The system's consumable set is equipped with disposable sensors for key process parameters (pH, dissolved oxygen, temperature). All fluid-contacting components are pre-assembled, single-use, and irradiated, requiring no autoclaving. The system is designed to be set up and operational in as little as 20 minutes.

Specially treated woven mesh polymer substrate	<ul style="list-style-type: none"> • Uniform fluid flow – efficient nutrient delivery and waste removal • Uniform cell growth – beneficial cell distribution and confluence at transfection • Improves cell health and product yield
FBR designed to harvest viable cells with >90% recovery	<ul style="list-style-type: none"> • Enables its use in other application workflows that require cell recovery for downstream use • Enables the bioreactor to be used for seed train, streamlining vessel-to-vessel cell transfer
Bioreactor scalability	<ul style="list-style-type: none"> • Ascent FBR PD system bioreactors scale from 1 m² to 5 m², helping the development of a stable and well-defined manufacturing process
Separate media condition vessel (MCV)	<ul style="list-style-type: none"> • Provides flexibility in media volume and dilution strategy for transfection reagents prior to addition
Automated control, including disposable sensors that monitor DO, pH, temperature	<ul style="list-style-type: none"> • Reduced labor costs, hands-off operation, reduced risk of human error
Ready to use, irradiated consumables	<ul style="list-style-type: none"> • Minimal set-up required, no autoclaving necessary, no probe calibration required. The minimal setup required can save many hours of valuable time.
Closed system	<ul style="list-style-type: none"> • Can be run outside a laminar flow hood. Aseptic connectors or tube welding allow for easy benchtop aseptic cell sampling of the bioreactor.

The Corning Ascent FBR PD system consists of a system controller with Human-Machine Interface (HMI) touchscreen control display and single-use, irradiated components including a bioreactor, a media conditioning vessel (MCV), and other consumables, such as tubing, connectors, probes, in-line sensors, and bottles.

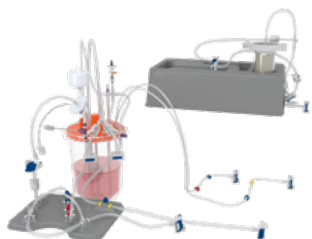
During cell culture, a recirculation pump circulates media from the MCV through the fixed bed bioreactor. A separate pump aids in removing depleted media from the MCV and replacing it with fresh media during media maintenance. Cell culture pH and nutrient levels are monitored and maintained via feed and base pumps while temperature-controlled heated nests keep the MCV and bioreactor at a constant temperature. At harvest, cells are released or lysed in situ from the bioreactor at the user's discretion. The HMI allows the user flexibility to operate the system in manual or automated modes.



The controller is operated using a touchscreen graphic user interface.



Corning Ascent FBR PD Controller



Main Consumables (MCV and BRV) with AseptiQuik® Connectors



Harvest Consumables



Accessory Consumables

The Bioreactor Design

The Corning® Ascent® FBR system's bioreactor features a specially treated and packed polymer mesh that enables uniform, low-shear fluid flow through the bioreactor bed, which promotes evenly distributed cell growth and enhances exposure of cells to nutrients and reagents. This has demonstrated high yields that could result in fewer required runs and significant cost reduction in manufacturing.

The system allows for the removal of the FBR from the controller so it can be moved into a laminar flow hood for sampling. A sanitary twist clamp allows easy access to the segmented sampling mesh located inside the FBR. The 3 sampling mesh disks are divided into 6 segments, each designed for easy removal. Segments may be removed to monitor cell growth within the FBR at various times.

Corning Ascent FBR Pilot and Production systems will be available in multiple surface area sizes, utilizing the same bioreactor technology as the Process Development system to provide scalability from 1 m² to 1,000 m².

Corning® Ascent® FBR PD Controllers

Cat. No.	Description	Qty/Cs
6970	Ascent FBR PD controller, 120V	1
6991	Ascent FBR PD controller, 230V	1
6992	Ascent FBR PD controller, 100V	1

Corning Ascent Bioreactor Consumables

Cat. No.	Description	Qty/Cs
6971	Ascent FBR 1 m ² bioreactor consumable	1
6972	Ascent FBR 2.5 m ² bioreactor consumable	1
6973	Ascent FBR 5 m ² bioreactor consumable	1
6974	Ascent FBR 1 m ² bioreactor consumable with Lynx® connectors	1
6975	Ascent FBR 2.5 m ² bioreactor consumable with Lynx® connectors	1
6976	Ascent FBR 5 m ² bioreactor consumable with Lynx® connectors	1

Corning Ascent Harvest Consumables

Cat. No.	Description	Qty/Cs
6984	Ascent 2L roller bottle with ¼" tubing and AseptiQuik® DC	2
6985	Ascent 3L Erlenmeyer flask with ¼" tubing and AseptiQuik® DC	2
6966	Ascent 5L Erlenmeyer flask with ¼" tubing and AseptiQuik® DC	2
6986	Ascent harvest consumable with 1L wash bottle	1
6987	Ascent harvest consumable with 2L wash bottle	1

Corning Ascent Accessories

Cat. No.	Description	Qty/Cs
6979	Ascent 500 mL centrifuge tube with ¼" tubing and AseptiQuik® G	2
6980	Ascent 500 mL bottle with ¼" tubing and AseptiQuik® G	2
6981	Ascent 500 mL bottle with ⅙" tubing and AseptiQuik® S	4
6982	Ascent 3L Erlenmeyer flask with ¼" tubing and AseptiQuik® G	2
6983	Ascent 5L Erlenmeyer flask with ¼" tubing and AseptiQuik® G	2
6967	Ascent T-adaptor with ¼" tubing and AseptiQuik® S to G	4
6968	Ascent T-adaptor with ¼" tubing and AseptiQuik® G	4
6969	Ascent T-adaptor with ¼" tubing and AseptiQuik® S	4
6993	Ascent Accessory tubing ¼" with AseptiQuik® G	4
6961	Ascent Accessory Tubing ⅜" with AseptiQuik® G	4
6962	Ascent T-connector with ¼" tubing and AseptiQuik® G-DC to G	4
6963	Ascent Cross Connector with ¼" tubing and AseptiQuik® G-DC to G	4
6964	Ascent 1L Bottle with ¼" tubing and AseptiQuik® G	4
6965	Ascent 2L Bottle with ¼" tubing and AseptiQuik® G	2

Erlenmeyer Shaker Flasks



Corning Polycarbonate (PC) and Polyethylene terephthalate glycol-modified (PETG) Erlenmeyer flasks are ideal for all shaker culture applications. These flasks are single-use, sterile, individually packaged, and constructed of USP Class VI PC or PETG. Molded graduations are standard, and the vented threaded caps feature a 0.2 μm hydrophobic membrane to provide continuous gas exchange while ensuring sterility with a liquid-tight seal. Choose the flask that best suits your application and cell line.

- ▶ Sterility Assurance Level (SAL) of 10^{-6}
- ▶ RNase-/DNase-free
- ▶ Nonpyrogenic

Erlenmeyer Flasks

Cat. No.	Description	Material	Qty/Cs
431405	125 mL Erlenmeyer flask, vent cap, baffled bottom	PC	50
431404	125 mL Erlenmeyer flask, flat cap, baffled bottom	PC	50
431143	125 mL Erlenmeyer flask, vent cap, plain bottom	PC	50
430421	125 mL Erlenmeyer flask, flat cap, plain bottom	PC	50
431407	250 mL Erlenmeyer flask, vent cap, baffled bottom	PC	50
431406	250 mL Erlenmeyer flask, flat cap, baffled bottom	PC	50
431144	250 mL Erlenmeyer flask, vent cap, plain bottom	PC	50
430183	250 mL Erlenmeyer flask, flat cap, plain bottom	PC	50
431401	500 mL Erlenmeyer flask, vent cap, baffled bottom	PC	25
431408	500 mL Erlenmeyer flask, flat cap, baffled bottom	PC	25
431145	500 mL Erlenmeyer flask, vent cap, plain bottom	PC	25
430422	500 mL Erlenmeyer flask, flat cap, plain bottom	PC	25
431403	1L Erlenmeyer flask, vent cap, baffled bottom	PC	25
431402	1L Erlenmeyer flask, flat cap, baffled bottom	PC	25
431147	1L Erlenmeyer flask, vent cap, plain bottom	PC	25
431146	1L Erlenmeyer flask, flat cap, plain bottom	PC	25
431256	2L Erlenmeyer flask, vent cap, baffled bottom	PC	6
431255	2L Erlenmeyer flask, vent cap, plain bottom	PC	6
431280	2L Erlenmeyer flask, vent cap, plain bottom	PETG	6
431281	2L Erlenmeyer flask, vent cap, baffled bottom	PETG	6
431253	3L Erlenmeyer flask (Fernbach design), vent cap, baffled bottom	PC	4
431252	3L Erlenmeyer flask (Fernbach design), vent cap, plain bottom	PC	4
431282	3L Erlenmeyer flask, vent cap, plain bottom	PETG	4
431283	3L Erlenmeyer flask, vent cap, baffled bottom	PETG	4
431684	5L Erlenmeyer flask (Fernbach design), vent cap, baffled bottom	PC	4
431685	5L Erlenmeyer flask (Fernbach design), vent cap, plain bottom	PC	4
431284	5L Erlenmeyer flask, vent cap, plain bottom	PETG	4
431285	5L Erlenmeyer flask, vent cap, baffled bottom	PETG	4
431686*	5L Erlenmeyer flask (Fernbach design), flat cap, plain bottom	PC	4

*Made to order. Contact a Corning representative for details.

Replacement Erlenmeyer Flask Caps

Corning polypropylene Erlenmeyer flask caps are also available separately. They are sterile, individually packaged, and available for the 500 mL, 1L, 2L, 3L, and 5L flask sizes, and fit both PC and PETG flasks.

Cat. No.	Description	Qty/Cs
431372*	43 mm vent cap for 500 mL and 1L Erlenmeyer flask	50
431339	48 mm vent cap for 2L Erlenmeyer flask	24
431364	48 mm flat cap for 2L Erlenmeyer flask	24
431340	70 mm vent cap for 3L Erlenmeyer flask	24
431363	70 mm flat cap for 3L Erlenmeyer flask	24
431682	100 mm vent cap for 5L Erlenmeyer flask	24

*Made to order. Contact a Corning representative for details.

Shaker Flask Application Tip

Corning recommends starting with a shaking rate of 75 rpm to 125 rpm (orbital shaker). For flasks up to 3L, a medium volume of 30% to 40% of the nominal flask capacity is recommended. For the 5L flasks, a medium volume of 50% to 70% of nominal capacity is recommended.



70 mm vent cap

Mini Bioreactor



The Corning Mini Bioreactor is ideal for high throughput process optimization for suspension cell culture. The product consists of the Corning 50 mL centrifuge tube with a vented cap. This product is used in cell line development, clone selection, media optimization, and recombinant protein development. The tube has a large marking spot to clearly identify tube contents and experimental parameters. Polyethylene cap has 4 vents, and the hydrophobic membrane provides gas exchange.

- Sterility Assurance Level (SAL) of 10^{-6}
- RNase-/DNase-free
- Nonpyrogenic

Cat. No.	Description	Qty/Pk	Qty/Cs
431720	Mini bioreactor, 50 mL with polypropylene vented cap, hydrophobic membrane	25	300

Disposable Spinner Flasks



Disposable spinner flasks
(Cat. Nos. 3152 and 3153)

- The Corning disposable spinner flask system comes ready-to-use with a paddle and integrated magnet, reducing the need for time-consuming assembly, cleaning, or reassembly.
- Molded from virgin polystyrene and sterilized, each spinner flask system assures a clean unit, free of detergent residues and contamination.
- The Corning disposable spinner flask system is ideal for both suspension and microcarrier cell culture applications. Vessels are designed for optimal mixing across the range of vessel sizes. A unique integrated magnet provides smooth, even paddle rotation at required speeds.
- The paddle size and height are optimized for each vessel size. A unique integrated magnet provides smooth, even rotation at required speeds on slow-speed stirrers.

Specifications

Parameter	125 mL (Cat. No. 3152)	500 mL (Cat. No. 3153)	1L (Cat. No. 3561)	3L (Cat. No. 3563)
Vessel height	145 mm	203.2 mm	245 mm	259 mm
Vessel diameter	63.5 mm	87.3 mm	137 mm	188 mm
Vessel width	114.8 mm	139.7 mm	203 mm	256 mm
Sidearm opening (ID)	18.8 mm	38.1 mm	39 mm	39 mm
Sidearm cap diameter (OD)	25 mm (GL 25 threads)	45 mm (GL 45 threads)	54 mm (GL 45 threads)	54 mm (GL 45 threads)
Paddle size (W x H)	39.9 x 50.0 mm	50.3 x 61.0 mm	69 x 215 mm	105 x 227 mm
Maximum drive speed	—	—	150 rpm	150 rpm
Magnet	ALNICO	ALNICO	ALNICO	ALNICO



Disposable spinner flasks
(Cat. Nos. 3561 and 3563)

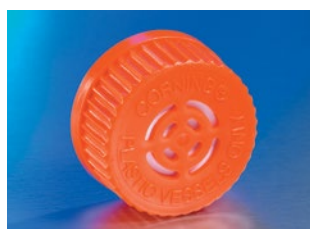
Disposable Spinner Flasks

Cat. No.	Description	Qty/Cs
3152	125 mL disposable spinner flask	12
3153	500 mL disposable spinner flask	12
3578	500 mL disposable spinner flask, vent cap	12
3561	1L disposable spinner flask	6
3580	1L disposable spinner flask, vent cap	6
3563	3L disposable spinner flask	6
3581	3L disposable spinner flask, vent cap	6

Replacement Disposable Spinner Flask Caps

Corning disposable spinner flask replacement caps are available separately. Each are provided sterile and individually doubled-bagged. Caps are available for 500 mL, 1L, and 3L flask sizes.

Cat. No.	Description	Compatible with Cat. No(s).	Qty/Cs
3567	Vent cap, 0.2 µm pore	3153, 3561, 3580, 3563, 3581	4



Microcarriers for Bioprocess Scale-up



Corning Polystyrene microcarriers are designed to simplify your scale-up processes. The microcarriers are sterile, ready-to-use, and available with closed systems packaging for aseptic transfer. Additionally, the microcarriers are available with a variety of surface treatments and coatings to enhance cell attachment, maximizing cell yield and viability.

- ▶ Consistency – USP Class VI polystyrene material provides a reliable platform
- ▶ Performance – Corning microcarriers are offered with a wide variety of surface treatment and coating options to enhance cell performance and yields:
 - Corning untreated surface is available for difficult to detach cell types or where self-coating is required.
 - Corning Synthemax™ II substrate creates a synthetic surface on the microcarriers ideal for stem cell expansion.
 - Corning CellBIND® surface treatment for enhanced cell attachment
 - Collagen Type I coating provides extracellular matrix protein to promote cell attachment and growth.
- ▶ Sterility Assurance Level (SAL) of 10⁻⁶
- ▶ Nonpyrogenic
- ▶ Available as closed system solutions

Specifications

Parameter	Size
Bead size	125 to 212 µm
Density	1.026 ± 0.004 g/cm ³
cm ² /gram	360

Scientific Support

Corning strives to provide the highest scientific support for all our products. Please contact your Corning Account Manager or Bioprocess Specialist for ideas on how to optimize Corning Polystyrene microcarrier culture to meet your scale-up needs.

Vials and Closed System Packaging

Corning Polystyrene microcarriers are available sterile and ready to use in various vial and bottled formats. Corning Polystyrene microcarriers are also available in off-the-shelf and custom closed systems packaging. Tubing, connectors, and materials are customizable based on individual needs through our Closed Systems Solutions process.

Polystyrene Microcarriers

Cat. No.	Description	Size	Qty/Cs
3779	Corning CellBIND surface microcarriers, PS	10 g	1
4620	Corning CellBIND surface microcarriers, PS	100 g	1
4621	Corning CellBIND surface microcarriers, PS	500 g	1
3781	Low concentration Corning Synthemax II microcarriers, PS	10 g	1
4622	Low concentration Corning Synthemax II microcarriers, PS	100 g	1
4623	Low concentration Corning Synthemax II microcarriers, PS	500 g	1
3786	Collagen-coated microcarriers, PS	10 g	1
3772	Untreated microcarriers, PS	10 g	1
4624	Untreated microcarriers, PS	100 g	1
4625	Untreated microcarriers, PS	500 g	1

Aseptic Transfer Caps for Polystyrene Microcarriers

Cat. No.	Description	Tubing	Tubing Length with Connector	Tubing Connection	Qty/Cs
4626	Aseptic transfer cap for 100g bottles – Male Luer lock	Chemically resistant, heat sealable flexible tubing, 1/8" ID, 1/4" OD	30"	Male Luer lock	1
4627	Aseptic transfer cap for 100g bottles – Male MPC	Chemically resistant, heat sealable flexible tubing, 1/4" ID, 3/8" OD	30"	Male MPC	1
4628	Aseptic transfer cap for 500g bottles – Male Luer lock	Chemically resistant, heat sealable flexible tubing, 1/8" ID, 1/4" OD	30"	Male Luer lock	1
4629	Aseptic transfer cap for 500g bottles – Male MPC	Chemically resistant, heat sealable flexible tubing, 1/4" ID, 3/8" OD	30"	Male MPC	1

MPC = medical plastic coupler.



Dissolvable Microcarriers

The research use only Corning Dissolvable Microcarriers are designed to simplify the cell harvest, separation, and concentration processes. All microcarriers arrive pre-coated with either denatured Collagen or Corning Synthemax® II to enhance cell attachment for optimal yield and viability. They are dissolved within 10 to 20 minutes, allowing for the easy collection of cells without the need for microcarrier separation. Corning Dissolvable Microcarriers offer a cell separation that is faster, gentler, and more convenient than that of standard commercially available microcarriers.

These products are ideal for initial testing and research for eventual scale-up into cell therapy workflows, vaccine production, large-volume adherent cell culture scale-up, and cell banking.

- ▶ Dissolvable for easy separation of cells from microcarriers
- ▶ Optical clarity for visualizing cell morphology
- ▶ Irradiated at a minimum of 15.3 kGy
- ▶ Pre-coated for enhanced cell attachment

Dissolvable microcarriers are available in 1g, 5g, and 10g vials and 100g bottles; and with two coating options—denatured Collagen or Corning Synthemax II.

Contact a Corning Specialist for ordering information.

Closed System Solutions

Many of the Corning products you rely on for cell culture are now offered as closed system solutions

Closed cell culture systems help reduce the risk of adventitious contamination during drug development and manufacturing.

Corning closed system solutions arrive sterile and ready to use. They decrease the risk of contamination, reduce the time and expense of sourcing and assembly, and improve productivity.

Corning closed systems are:

- ▶ Compliant with USP Class VI
- ▶ Sterility Assurance Level (SAL) of 10^{-6}
- ▶ Animal-free or BSE/TSE compliant
- ▶ Nonpyrogenic

Choose from Two Types of Closed System Solutions

Catalog Product

Standard offerings are available in our catalog including aseptic transfer cap accessories or vessels with pre-attached aseptic accessories.

Configure-to-Order

Corning has a portfolio of over 200 qualified components in our library that can be assembled to meet your specifications.

For more information about Corning's closed system solutions, please refer to our Closed System Solutions brochure (CLS-BP-023).

Designing Your Customized Order is Easy

1. Select your vessel or bag and desired surface treatment
2. Select your components
3. Contact your Corning Account Manager or Bioprocess Specialist

Aseptic Transfer Caps

Aseptic Transfer Caps for Corning® CellSTACK® Culture Chambers



Vent cap with tubing
(Cat. No. 3281)



Fill cap, male MPC, 3/8"
(9.5 mm) ID (Cat. No. 3339)

Cat. No.	Description	Tubing/Cap Inside Diam.	Tubing Length	Tubing Connection	Qty/ Pk	Qty/ Cs
3282	Fill cap with tubing, FLL	1/8"	18"	FLL	1	5
3333	Fill cap with Male MPC	1/4"	28"	Male MPC	1	4
3328	Fill cap with Female MPC	1/4"	N/A	Female MPC	1	4
3334	Fill cap with Male MPC	1/4"	N/A	Male MPC	1	4
3283	Fill cap with tubing and barbed fittings	3/8"	18"	Barbed fitting	1	5
3339	Fill cap with Male MPC	3/8"	N/A	Male MPC	1	4
3329	Fill cap with Female MPC coupling	3/8"	N/A	Female MPC	1	4
11902	Fill cap with tubing and Female MPC	3/8"	28"	Female MPC	1	4
3284	Vent cap with tubing and 37 mm hydrophobic glass laminate 1.0 µm vent filter	1/4"	2 3/4"	N/A	1	4
3281	Vent cap with tubing and 50 mm hydrophobic PVDF 0.2 µm vent filter	3/8"	2 3/4"	N/A	1	5
3324	Two (2) vented over caps and one (1) solid over cap	N/A	N/A	N/A	5	100
11757	Barbed cap with Female MPC	3/8" ID	6"	Female MPC	*	*
11759	Barbed cap with AseptiQuik® G series	3/8" ID	6"	AseptiQuik® G series	*	*
11758	Barbed cap with Female MPC	3/8" ID	24"	Female MPC	*	*
3718	CellSTACK screw cap vent accessory with tubing and 50 mm hydrophobic PVDF 0.2 µm vent filter	3/8"	3"	N/A	1	5
3719	CellSTACK screw cap fill accessory with tubing	3/8"	15"	FLL	1	5
11931	CellSTACK manifold - 4 Luer and 2 MPC connections				1	4

FLL = female Luer lock, MPC = medical plastic coupler, MLL = male Luer lock.

*Products to be launched 2H 2023.

Aseptic Transfer Caps for Corning Erlenmeyer Flasks



Aseptic transfer caps, MLL
(Cat. Nos. 431444, 431446,
and 431448)



Aseptic transfer caps, MPC
(Cat. Nos. 431445, 431447,
and 431449)

Cat. No.	Description	Tubing	Tubing Length with Connector	Tubing Connection	Qty/ Pk	Qty/ Cs
431444	43 mm cap, 1L, dip tube with 0.2 µm vent	Chemically resistant, heat sealable flexible tubing, 1/8" ID, 1/4" OD	36"	MLL	1	5
431445	43 mm cap, 1L, dip tube with 0.2 µm vent	Chemically resistant, heat sealable flexible tubing, 1/4" ID, 3/8" OD	36"	Male MPC	1	5
431446	48 mm cap, 2L, dip tube with 0.2 µm vent	Chemically resistant, heat sealable flexible tubing, 1/8" ID, 1/4" OD	36"	MLL	1	6
431447	48 mm cap, 2L, dip tube with 0.2 µm vent	Chemically resistant, heat sealable flexible tubing, 1/4" ID, 3/8" OD	36"	Male MPC	1	6
431448	70 mm cap, 3L, dip tube with 0.2 µm vent	Chemically resistant, heat sealable flexible tubing, 1/8" ID, 1/4" OD	36"	MLL	1	4
431449	70 mm cap, 3L, dip tube with 0.2 µm vent	Chemically resistant, heat sealable flexible tubing, 1/4" ID, 3/8" OD	36"	Male MPC	1	4
11500	100 mm cap, 5L, dip tube with 0.2 µm vent	Chemically resistant, heat sealable flexible tubing, 1/4" ID, 3/8" OD	36"	Male MPC	1	4

FLL = female Luer lock, MPC = medical plastic coupler, MLL = male Luer lock.

Please contact your local Corning Bioprocess Specialist to discuss individual components.



Aseptic transfer cap, MPC quick connect (Cat. Nos. 3528, 3545, and 3558)



Aseptic transfer cap, MLL quick connect (Cat. Nos. 3565, 3562, and 3564)



Transfer cap for roller bottle (Cat. No. 10043)

Aseptic Transfer Caps for Corning® Disposable Spinner Flasks

Cat. No.	Description	Tubing	Tubing Length with Connector	Tubing Connection	Qty/ Pk	Qty/ Cs
3565	500 mL, 1/8" dip tube with 0.2 µm filter, vent	Chemically resistant, heat sealable flexible tubing, 1/8" ID, 1/4" OD	24"	MLL	1	2
3528	500 mL, 1/4" dip tube with 0.2 µm filter, vent	Chemically resistant, heat sealable flexible tubing, 1/4" ID, 3/8" OD	24"	Male MPC	1	2
3562	1L, 1/8" dip tube with 0.2 µm filter, vent	Chemically resistant, heat sealable flexible tubing, 1/8" ID, 1/4" OD	24"	MLL	1	2
3545	1L, 1/4" dip tube with 0.2 µm filter vent	Chemically resistant, heat sealable flexible tubing, 1/4" ID, 3/8" OD	24"	Male MPC	1	2
3564	3L, 1/8" dip tube with 0.2 µm filter, vent	Chemically resistant, heat sealable flexible tubing, 1/8" ID, 1/4" OD	24"	MLL	1	2
3558	3L, 1/4" dip tube with 0.2 µm filter, vent	Chemically resistant, heat sealable flexible tubing, 1/4" ID, 3/8" OD	24"	Male MPC	1	2

MPC = medical plastic coupler, MLL = male Luer lock.

Aseptic Transfer Caps for Corning Roller Bottles

Cat. No.	Description	Tubing	Tubing Length with Connector	Tubing Connection	Qty/ Pk	Qty/ Cs
10043	Disposable aseptic transfer cap for roller bottle with 0.2 µm filter	Chemically resistant, heat sealable flexible tubing, 3/8" ID, 1/2" OD	8"	Male MPC	1	2

MPC = medical plastic coupler.

Preassembled Closed System Solutions

Preassembled Closed System Solutions for Corning CellSTACK® Culture Chambers

Cat. No.	Description	Tubing	Tubing Length	Qty/ Pk	Qty/ Cs
11760	CellSTACK 2-layer, Female MPC	Chemically resistant, heat sealable flexible tubing, 3/8" ID, 5/8" OD	6"	*	*
11761	CellSTACK 5-layer, Female MPC	Chemically resistant, heat sealable flexible tubing, 3/8" ID, 5/8" OD	6"	*	*
11762	CellSTACK 10-layer, Female MPC	Chemically resistant, heat sealable flexible tubing, 3/8" ID, 5/8" OD	6"	*	*
11763	CellSTACK 2-layer, AseptiQuik® G series	Chemically resistant, heat sealable flexible tubing, 3/8" ID, 5/8" OD	6"	*	*
11764	CellSTACK 5-layer, AseptiQuik® G series	Chemically resistant, heat sealable flexible tubing, 3/8" ID, 5/8" OD	6"	*	*
11765	CellSTACK 10-layer, AseptiQuik® G series	Chemically resistant, heat sealable flexible tubing, 3/8" ID, 5/8" OD	6"	*	*
11766	CellSTACK 2-layer, Female MPC	Chemically resistant, heat sealable flexible tubing, 3/8" ID, 5/8" OD	24"	*	*
11767	CellSTACK 5-layer, Female MPC	Chemically resistant, heat sealable flexible tubing, 3/8" ID, 5/8" OD	24"	*	*
11768	CellSTACK 10-layer, Female MPC	Chemically resistant, heat sealable flexible tubing, 3/8" ID, 5/8" OD	24"	*	*

*Products to be launched 2H 2023.

Please contact your local Corning Bioprocess Specialist to discuss individual components.

Preassembled Closed System Solutions for Corning® Erlenmeyer Flasks
Polycarbonate and plain-bottom



Corning Erlenmeyer flasks for closed systems solutions, MPC (Cat. Nos. 431518 and 431520)



125 mL Corning Erlenmeyer flask with dip tube and 0.2 µm filter, MLL/FLL (Cat. No. 11405)



1L Corning Erlenmeyer flask with dip tube and 0.2 µm filter, MLL/FLL (Cat. No. 11440)



5L Corning Erlenmeyer flask with dip tube and 0.2 µm filter, MPC (Cat. No. 11501)

Cat. No.	Description	Tubing	Tubing Length with Connector	Tubing Connection	Qty/ Pk	Qty/ Cs
11405	125 mL flask with dip tube with 0.2 µm filter, MLL/FLL	Chemically resistant, heat sealable flexible tubing, 1/8" ID, 1/4" OD	36"	MLL	1	6
11410	250 mL flask with dip tube with 0.2 µm filter, MLL/FLL	Chemically resistant, heat sealable flexible tubing, 1/8" ID, 1/4" OD	20"	MLL	1	4
11415	250 mL flask with dip tube with 0.2 µm filter, MLL/FLL	Chemically resistant, heat sealable flexible tubing, 1/8" ID, 1/4" OD	36"	MLL	1	4
11425	500 mL flask with dip tube with 0.2 µm filter, MLL/FLL	Chemically resistant, heat sealable flexible tubing, 1/8" ID, 1/4" OD	36"	MLL	1	2
431510	1L flask with dip tube with 0.2 µm vent, MLL	Chemically resistant, heat sealable flexible tubing, 1/8" ID, 1/4" OD	36"	MLL	1	4
431516	1L flask with dip tube with 0.2 µm vent, MPC	Chemically resistant, heat sealable flexible tubing, 1/4" ID, 3/8" OD	36"	Male MPC	1	4
11440	1L flask with dip tube with 0.2 µm filter, MLL/FLL	Chemically resistant, heat sealable flexible tubing, 1/8" ID, 1/4" OD	36"	MLL	1	4
431512	2L flask with dip tube with 0.2 µm vent, MLL	Chemically resistant, heat sealable flexible tubing, 1/8" ID, 1/4" OD	36"	MLL	1	3
431518	2L flask with dip tube with 0.2 µm vent, MPC	Chemically resistant, heat sealable flexible tubing, 1/4" ID, 3/8" OD	36"	Male MPC	1	3
11460	2L flask with dip tube with 0.2 µm filter, MLL/FLL	Chemically resistant, heat sealable flexible tubing, 1/8" ID, 1/4" OD	20"	MLL	1	2
11465	2L flask with dip tube with 0.2 µm filter, MLL/FLL	Chemically resistant, heat sealable flexible tubing, 1/4" ID, 3/8" OD	36"	MLL	1	2
431514	3L flask with dip tube with 0.2 µm vent, MLL	Chemically resistant, heat sealable flexible tubing, 1/8" ID, 1/4" OD	36"	MLL	1	2
431520	3L flask with dip tube with 0.2 µm vent, MPC	Chemically resistant, heat sealable flexible tubing, 1/4" ID, 3/8" OD	36"	Male MPC	1	2
11495	3L flask with dip tube with 0.2 µm filter, MLL/FLL	Chemically resistant, heat sealable flexible tubing, 1/4" ID, 3/8" OD	36"	MLL	1	2
11501	5L flask with dip tube with 0.2 µm filter, MPC	Chemically resistant, heat sealable flexible tubing, 1/4" ID, 3/8" OD	36"	Male MPC	1	2
11502	5L flask, baffled, with dip tube with 0.2 µm filter, MPC	Chemically resistant, heat sealable flexible tubing, 1/4" ID, 3/8" OD	36"	Male MPC	1	2

MLL = male Luer lock, MPC = medical plastic coupler, FLL = female Luer lock.

Please contact your local Corning Bioprocess Specialist to discuss individual components.

Preassembled Closed System Solutions for Corning® Disposable Spinner Flasks



1L and 3L Disposable spinner flasks, MPC quick connect (Cat. Nos. 3546 and 3559)

Cat. No.	Description	Tubing	Tubing Length with Connector	Tubing Connection	Qty/ Pk	Qty/ Cs
3546	1L with 3545 transfer cap	Chemically resistant, heat sealable flexible tubing, 1/4" ID, 3/8" OD	24"	Male MPC	1	6
3569	1L with 3562 transfer cap	Chemically resistant, heat sealable flexible tubing, 1/8" ID, 1/4" OD	24"	MLL	1	6
3559	3L with 3558 transfer cap	Chemically resistant, heat sealable flexible tubing, 1/4" ID, 3/8" OD	24"	Male MPC	1	4
3579	3L with 3564 transfer cap	Chemically resistant, heat sealable flexible tubing, 1/8" ID, 1/4" OD	24"	MLL	1	4

MPC = medical plastic coupler, MLL = male Luer lock.

Preassembled Closed System Solutions for Corning Centrifuge Tubes



50 mL centrifuge tubes with MLL dip tube and 0.2 µm filter (Cat. Nos. 11705 and 11706)



500 mL centrifuge tube with MLL dip tube and 0.2 µm filter (Cat. No. 11750)

Cat. No.	Description	Tubing	Tubing Length with Filter	Tubing Length with Connector	Tubing Connection	Qty/ Pk	Qty/ Cs
11705	50 mL centrifuge tube with dip tube and 0.2 µm filter with MLL/FLL end	Chemically resistant, heat sealable flexible tubing, 1/8" ID, 1/4" OD	4"	18"	MLL	1	2
11706	50 mL centrifuge tube and 0.2 µm filter with MLL/FLL end	Chemically resistant, heat sealable flexible tubing, 1/8" ID, 1/4" OD	4"	18"	MLL	1	2
11750	500 mL centrifuge tube with dip tube and 0.2 µm filter with MLL/FLL end	Chemically resistant, heat sealable flexible tubing, 1/8" ID, 1/4" OD and 1/4" ID, 3/8" OD	6"	20"	MLL	1	2
11755	500 mL centrifuge tube with dip tube and 0.2 µm filter with MPC	Chemically resistant, heat sealable flexible tubing, 1/8" ID, 1/4" OD and 1/4" ID, 3/8" OD	6"	20"	MPC	1	2

MLL = male Luer lock, FLL = female Luer lock.

Please contact your local Corning Bioprocess Specialist to discuss individual components.

Preassembled Closed System Solutions for Corning® Polystyrene Storage Bottles



150 mL Easy Grip storage bottle with dip tube and filter, MLL (Cat. No. 11650)



150 mL Easy Grip storage bottle with dip tube and filter, MPC (Cat. No. 11651)



500 mL Easy Grip storage bottle with dip tube and filter, MLL (Cat. No. 11665)



500 mL Easy Grip storage bottle with dip tube and filter, MPC (Cat. No. 11666)

Cat. No.	Description	Tubing	Tubing Length with Filter	Tubing Length with Connector	Length of the Dip Tube	Tubing Connection	Qty/ Pk	Qty/ Cs
11650	150 mL Easy Grip polystyrene storage bottles with dip tube, with 0.2 µm filter, MLL/FLL	Chemically resistant, heat sealable flexible tubing, 1/8" ID, 1/4" OD and 1/4" ID, 3/8" OD	6"	24"	4.25"	MLL	1	8
11651	150 mL Easy Grip polystyrene storage bottles with dip tube, with 0.2 µm PTFE filter	Chemically resistant, heat sealable flexible tubing, 1/4" ID, 3/8" OD	4"	20"	4.25"	Male MPC	1	8
11655	250 mL Easy Grip polystyrene storage bottles with dip tube, with 0.2 µm filter, MLL/FLL	Chemically resistant, heat sealable flexible tubing, 1/8" ID, 1/4" OD and 1/4" ID, 3/8" OD	6"	24"	5"	MLL	1	6
11656	250 mL Easy Grip polystyrene storage bottles with dip tube, with 0.2 µm PTFE filter	Chemically resistant, heat sealable flexible tubing, 1/4" ID, 3/8" OD	4"	20"	5"	Male MPC	1	6
11665	500 mL Easy Grip polystyrene storage bottles with dip tube, with 0.2 µm filter, MLL/FLL	Chemically resistant, heat sealable flexible tubing, 1/8" ID, 1/4" OD and 1/4" ID, 3/8" OD	6"	24"	5.5"	MLL	1	4
11666	500 mL Easy Grip polystyrene storage bottles with dip tube, with 0.2 µm PTFE filter	Chemically resistant, heat sealable flexible tubing, 1/4" ID, 3/8" OD	4"	20"	5.5"	Male MPC	1	4
11680	1,000 mL Easy Grip polystyrene storage bottles with dip tube, with 0.2 µm filter, MLL/FLL	Chemically resistant, heat sealable flexible tubing, 1/8" ID, 1/4" OD and 1/4" ID, 3/8" OD	6"	24"	7"	MLL	1	4
11681	1,000 mL Easy Grip polystyrene storage bottles with dip tube, with 0.2 µm PTFE filter	Chemically resistant, heat sealable flexible tubing, 1/4" ID, 3/8" OD	4"	20"	7"	Male MPC	1	4

MPC = medical plastic coupler, MLL = male Luer lock, FLL = female Luer lock, PTFE = polytetrafluoroethylene.

Please contact your local Corning Bioprocess Specialist to discuss individual components.

Single-use Bioproduction Bags

Corning single-use bioproduction bags are designed to be practical and cost-effective alternatives to rigid-walled containers. They are fabricated to match your specific application with a variety of sizes and tubing/connector configurations. These containment and delivery systems preserve the physical, chemical, and functional characteristics of sterile and process fluids. All components can be customized to match your requirements



- ▶ High quality barrier films
- ▶ Sterile
- ▶ Gas and moisture barriers to minimize transmission of oxygen, carbon dioxide, and water vapor
- ▶ Universal connection systems
- ▶ Reduces costs associated with washing, sterilization, and SIP/CIP validations
- ▶ Reduces the risks associated with cross-contamination
- ▶ Minimal setup time
- ▶ Wide variety of standard configurations
- ▶ Easily integrated in automated systems

Industry Recognized Manufacturing Standards

- ▶ cGMP – is manufactured under a quality system that conforms to the current ISO 13485 and Quality System Regulation (21 CFR 820)
- ▶ Complete documentation and traceability
- ▶ Animal-free manufacturing process

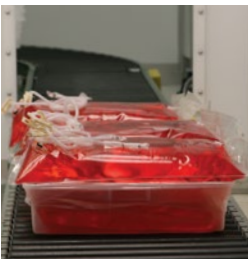


Custom Configuration Options

- ▶ 50 mL to 500L sizes
- ▶ 2D and 3D configurations (pillow and gusseted)
- ▶ Hanging designs
- ▶ Manifold systems
- ▶ Custom tubing and filter assemblies
- ▶ Cryopreservation bags
- ▶ Single-use bags for Corning HYPERStack® vessels

Applications

- ▶ Bioreactor and fermentation
- ▶ Media storage and delivery
- ▶ Seed/culture/harvest/recovery
- ▶ Separation
- ▶ Downstream processing
- ▶ Filtration
- ▶ Storage of high purity water
- ▶ Waste containment



Custom Fabrication and Assembly Services

Corning offers extensive custom design services for single-use technologies.



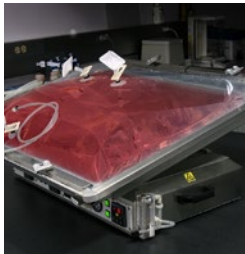
Film Materials

- ▶ Ethyl vinyl acetate (EVA)
- ▶ Ultra-low density polyethylene (ULDPE)
- ▶ ULDPE/Ethylene Vinyl Alcohol (EVOH)
- ▶ Polyethylene (PE)
- ▶ Polyolefin (PO)



Fittings

- ▶ Luer locks
- ▶ CPC connectors
- ▶ Sanitary fitting
- ▶ Hose barbs
- ▶ Spike components
- ▶ Steam-in-place (SIP) connectors



Tubing

- ▶ Chemically resistant, heat sealable flexible tubing
- ▶ Platinum or peroxide cured silicone
- ▶ PVC

Configuration

- ▶ Custom sizes
- ▶ Bottom ports
- ▶ 2D and 3D options
- ▶ Dip tube
- ▶ Recirculation tube

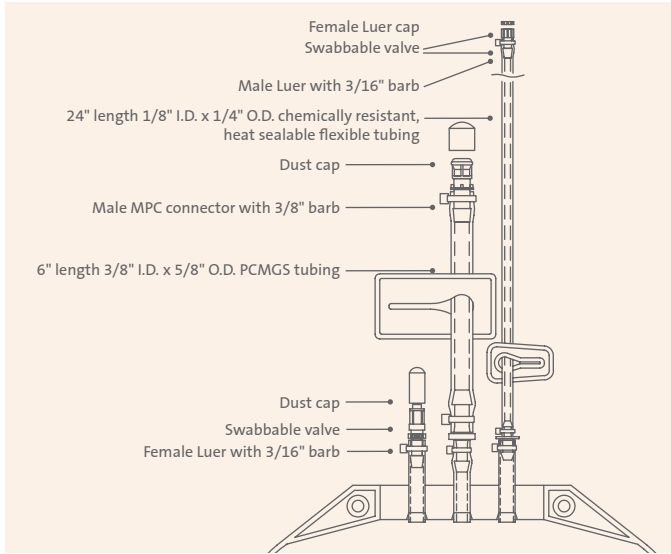


Bag Types Available

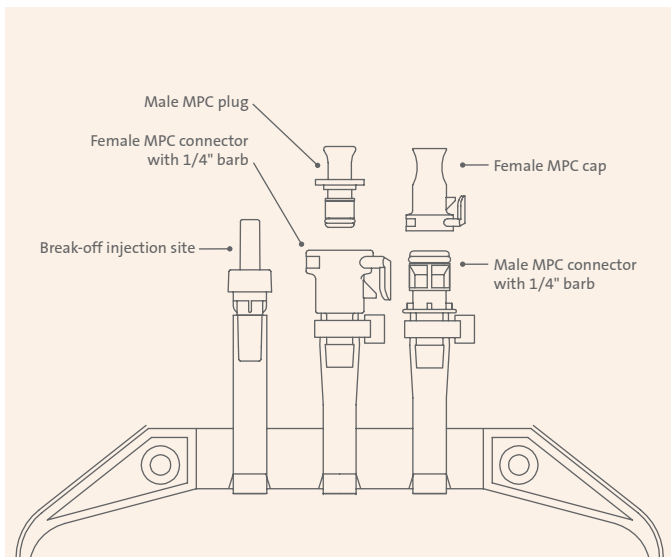
- ▶ Multi-purpose bioproduction bags
- ▶ Tank liners
- ▶ Cryopreservation bags
- ▶ Cell expansion bags
- ▶ Bags for Corning® HYPERStack® vessels
- ▶ Rocker cell culture bags

Multi-purpose Bioproduction bags

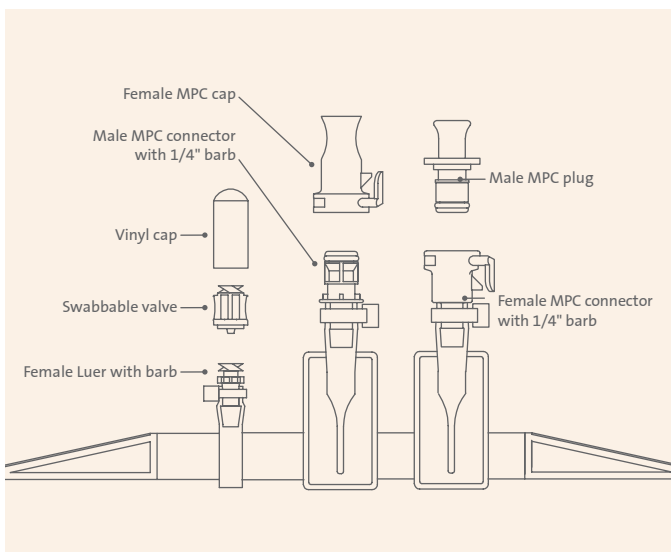
Corning's bioproduction bags are available in 2D hanging configurations with multiple bag volumes and connector configurations.



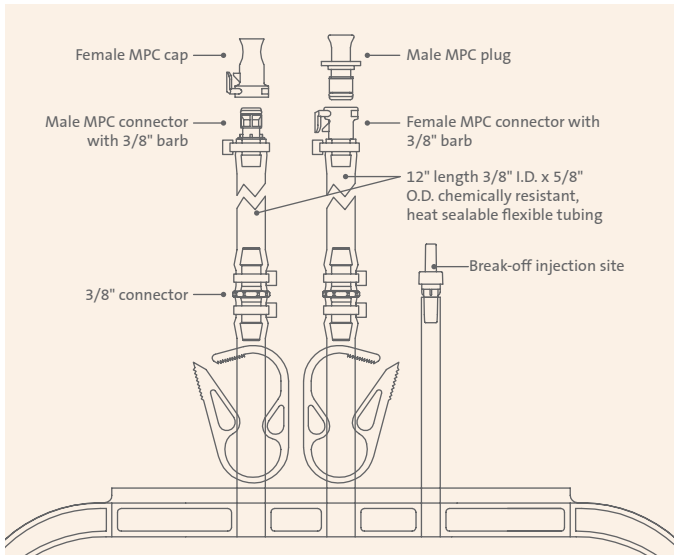
Cat. No.	Film Type	Size	Qty/Pk
91-200-01	EVA	1L	1
91-200-02	EVA	2L	1
91-200-05	EVA	5L	1
91-200-10	EVA	10L	1
91-200-20	EVA	20L	1



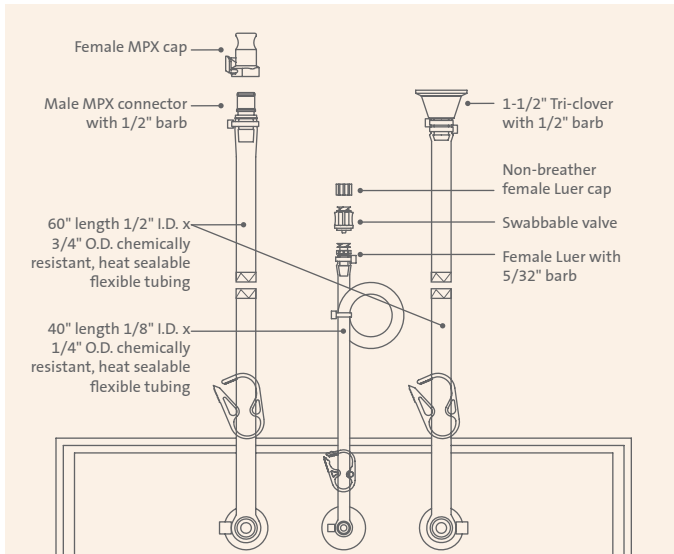
Cat. No.	Film Type	Size	Qty/Pk
91-200-41	EVA	500 mL	1
91-200-42	EVA	1L	1



Cat. No.	Film Type	Size	Qty/Pk
91-200-36	EVA	10L	1
91-200-39	EVA	20L	1



Cat. No.	Film Type	Size	Qty/Pk
91-200-43	EVA	5L	1
91-200-45	EVA	10L	1
91-200-47	EVA	20L	1
91-200-48	EVA	50L	1



Cat. No.	Film Type	Size	Qty/Pk
91-200-82	ULDPE	100L	1
91-200-83	ULDPE	200L	1

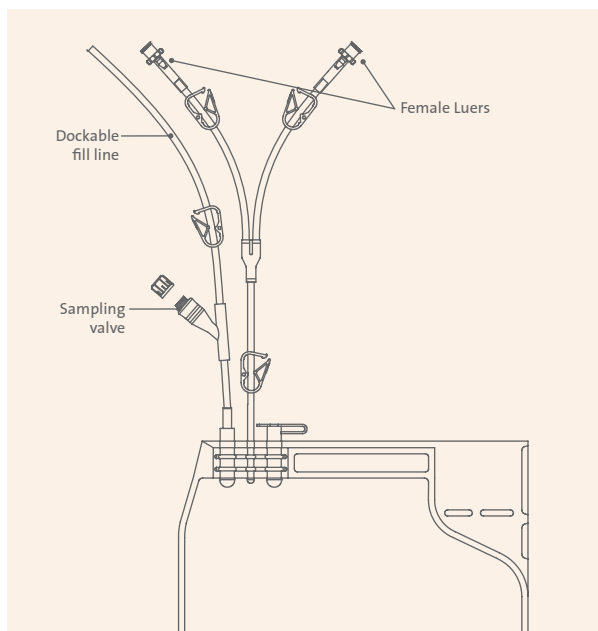
Cell Expansion Bags

Cell expansion bags are intended for the expansion and culture of non-adherent cells. The bags are made from single-web polyolefin, gas permeable film. The integrated tubing allows for functionally closed system filling, feeding, and sampling.

- ▶ Cell expansion observed with multiple cell models
- ▶ Gas permeable film
- ▶ Reusable sampling valve for in-process testing
- ▶ Tubing for sterile weld connections
- ▶ Scalable, user friendly design

Biocompatibility Tests	Result	Test Protocol
USP Class VI	Pass	USP <88>
Toxicity	Nontoxic	USP <87>
Heavy metals	<2 ppm	ISO 3826-1
Buffering capacity	1.22 mL	USP <661>
Non-volatile residue	8.6 mg	USP <661>
Residue on ignition (polyolefins)	<1 mg	ISO 3826-1
Acidity and alkalinity	Pass	ISO 3826-1
Oxidizable constituents	<1.5 mL	ISO 3826-1
Absorbance	<0.2 abs unit	ISO 3826-1
Reducing substances	0.34 mL	EP 3.1.14
Local effects after implantation	Pass	ISO 10993-6
Irritation and delayed-type sensitivity	Pass	ISO 10993-10
Systemic toxicity	Pass	ISO 10993-11

Physical Properties	Result	Test Protocol
O ₂ transmission (cm ³ /100 in ² /24 hrs) at (25°C; 0% RH)	153	ASTM D-3985
CO ₂ transmission (cm ³ /100 in ² /24 hrs) at (25°C; 0% RH)	1183	MOCON Test Method
Moisture vapor transmission (g/100 in ² /24 hrs)	0.94	ASTM D-1249
Transmittance (%)	83	ASTM D-1003
Tensile strength (psi)	3,400/3,700	ASTM D-638
Elastic modulus (E)	540/480	ASTM D-638



Cat. No.	Size	Fill Volume	Qty/Pk
91-200-84	500 mL	190 mL	1
91-200-85	1L	381 mL	1
91-200-86	3 L	633 mL	1
91-200-87	5L	1,252 mL	1

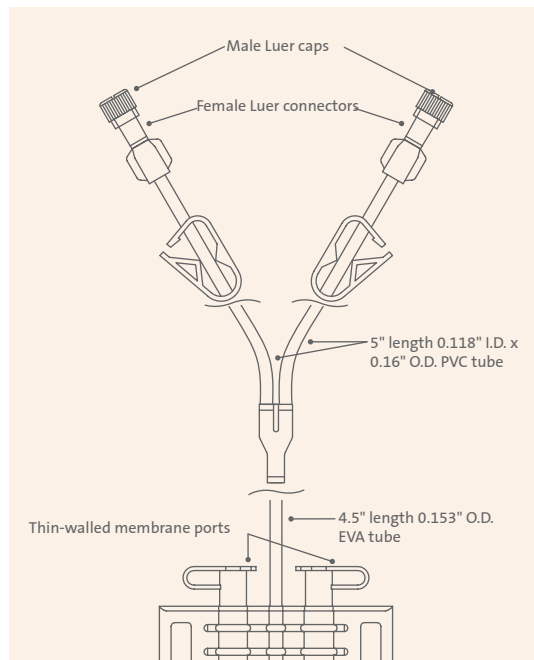
Cryopreservation Bags

Cryopreservation bags are designed for storage, preservation, and transfer of cells.

- ▶ Unique bag film material remains flexible at low temperatures (-196°C).
- ▶ Proprietary membrane port design offers thinner walls for increased flexibility and attached cap minimizes membrane exposure during freezing.
- ▶ Industry standard label pocket design offers ease-of-use and traceability in labeling.
- ▶ Polyolefin film – Proprietary EVA blend specifically selected for its low temperature properties while maintaining flexibility and clarity when filled with liquid.
- ▶ Membrane port – The attached cap snaps into place to protect the contents and minimizes membrane exposure during use.
- ▶ Label pocket – Supports use of computer-generated labels; product information can be viewed quickly by simply opening the freezing cassette
- ▶ Integral fill tube – The unique manufacturing method used to secure the fill tube to the container body eliminates the need for PVC interfaces with the liquid nitrogen storage section of the container.
- ▶ Interface/Connectors – Compatible with sterile connection technology and smart seal technology (Sebra® Model 1100 tube welder); fits in a variety of freezing cassette systems.

The physical integrity of the containers were evaluated for their ability to withstand temperature variations experienced during routine storage of hematopoietic progenitor cell products. All containers passed the physical integrity tests performed, which included initial pressure, leak, microbial challenge, and dye immersion tests.

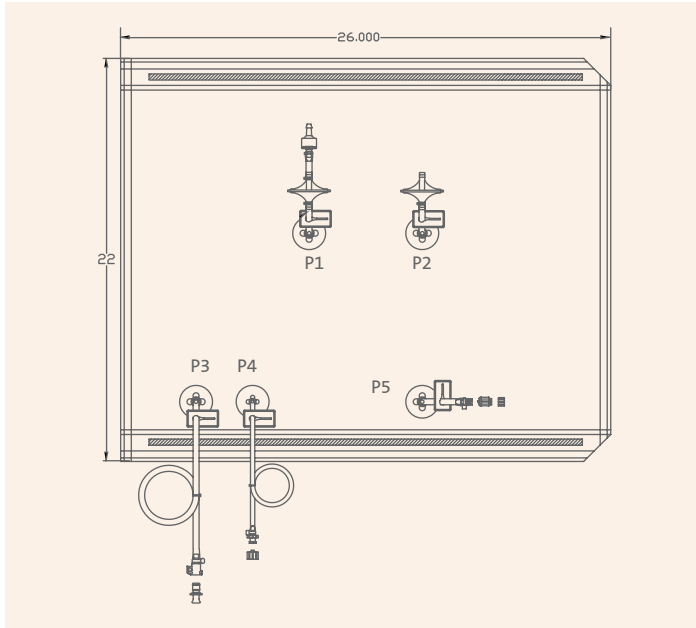
Cell quality was assessed on our cryogenic storage containers using diluted HPC with 10% DMSO. All containers met the acceptance requirement for MNC and CD34+ cell recovery of ≥70% relative to cell counts of the sample prior to cryopreservation. The average MNC and CD34+ cell recoveries were 81% and 84%, respectively. All containers met ≥1 CFU acceptance criteria with an average of 78% recovery.



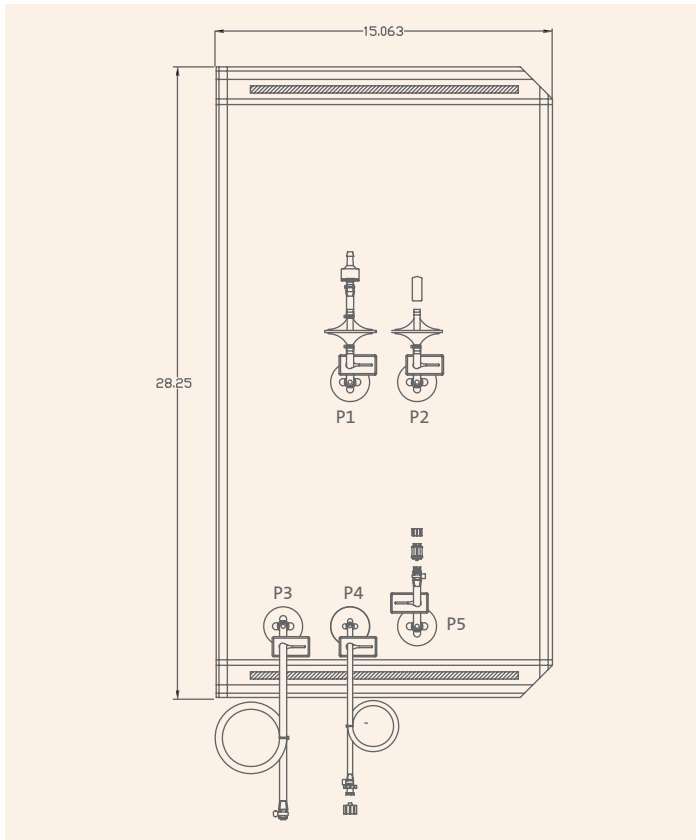
Cat. No.	Size	Fill Volume	Qty/Pk
91-200-88	50 mL	10 - 20 mL	1
91-200-89	250 mL	30 - 70 mL	1
91-200-90	500 mL	55 - 100 mL	1
91-200-91	750 mL	80 - 190 mL	1

Rocker Cell Culture Bags

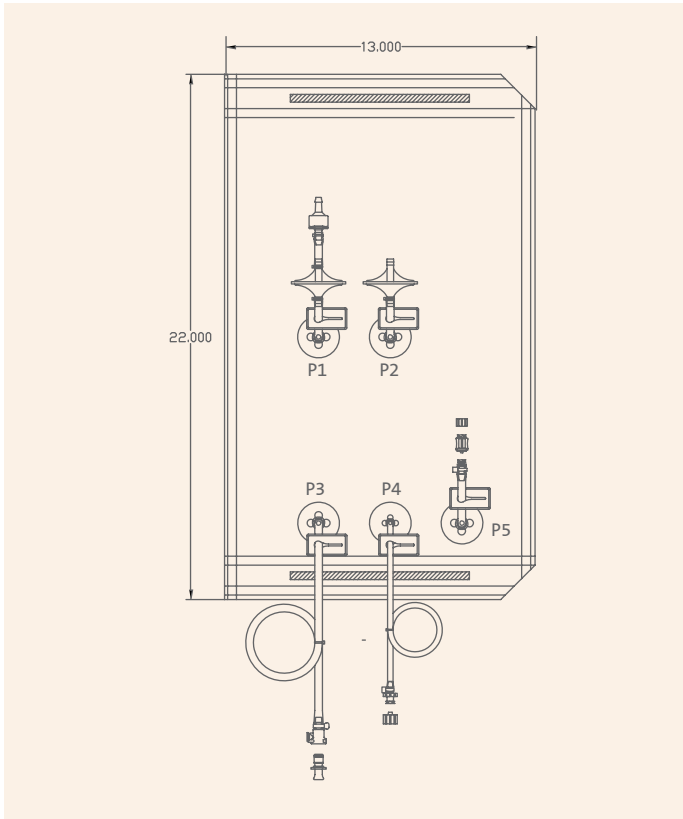
Rocker cell culture bags are designed for use with commercial rocking-motion bioreactor chambers. They feature ethylene vinyl alcohol (EVOH)/ultra-low density polyethylene (ULDPE) 9101 film and stability bars on each side. These sterile, single-use cell culture bags are ideal for applications from basic research to large-scale biopharmaceutical manufacturing.



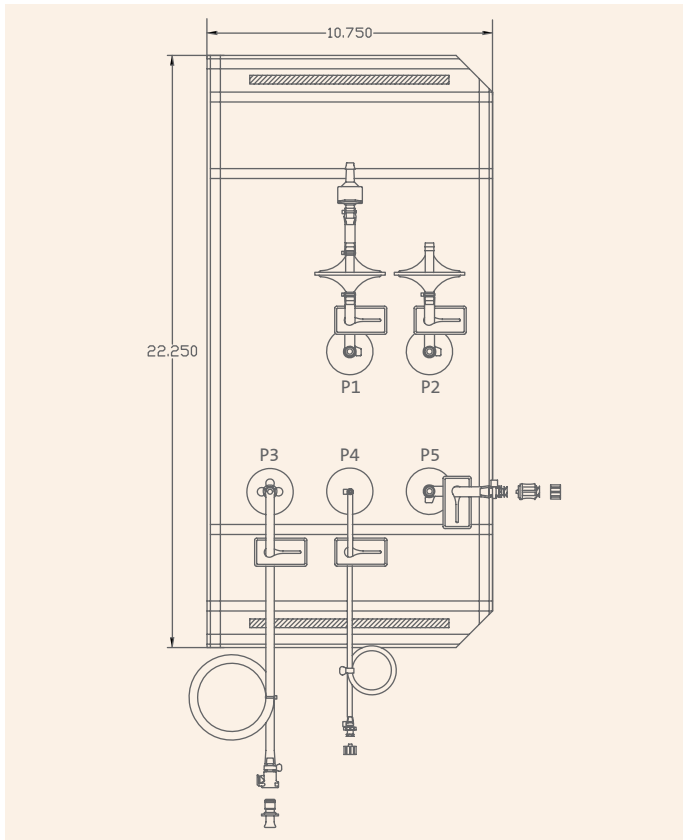
Cat. No.	Size	Qty/Pk
91-200-78	20L	1
P1	Check valve with 1/4" barb PVDF 8004022 filter 2" length 3/16" ID x 3/8" OD PCMGS tube	
P2	PVDF 8004022 filter 2" length 3/16" ID x 3/8" OD PCMGS tube	
P3	Female MPC connector with 1/4" barb Male MPC plug 40" length 1/4" ID x 7/16" OD chemically resistant, heat sealable flexible tube	
P4	Female Luer with 1/4" barb Male Luer plug 40" length 1/8" ID x 1/4" OD chemically resistant, heat sealable flexible tube	
P5	Female Luer with 1/4" barb Swabbable valve Male Luer plug without stem	



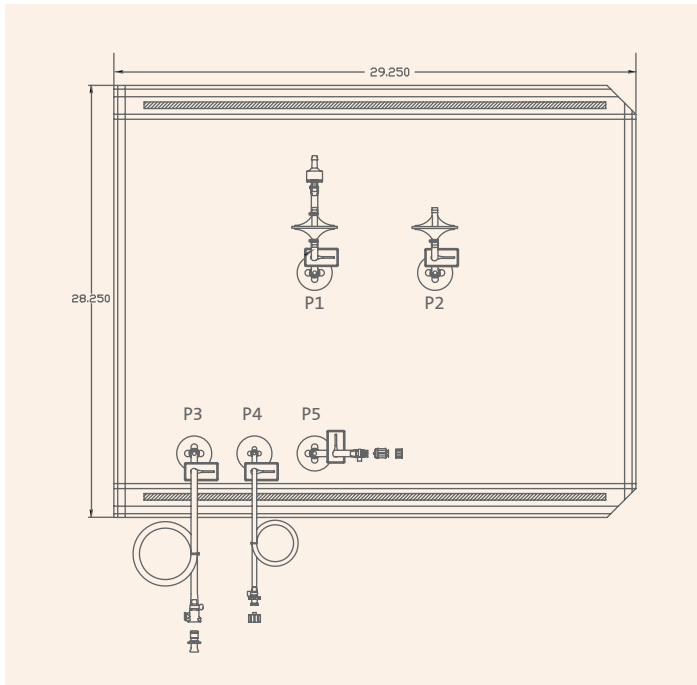
Cat. No.	Size	Qty/Pk
91-200-92	22L	1
P1	Check valve with 1/4" barb PVDF 8004022 filter 2" length 3/16" ID x 3/8" OD PCMGS tube	
P2	PVDF 8004022 filter 2" length 3/16" ID x 3/8" OD PCMGS tube	
P3	Plug with 1/4" barb 48" length 1/4" ID x 7/16" OD chemically resistant, heat sealable flexible tube	
P4	Female Luer with 1/4" barb Male Luer plug 48" length 1/8" ID x 1/4" OD chemically resistant, heat sealable flexible tube	
P5	Female Luer with 1/4" barb Swabbable valve Male Luer plug without stem	



Cat. No.	Size	Qty/Pk
91-200-79	10L	1
P1	Check valve with 1/4" barb PVDF 8004022 filter 2" length 3/16" ID x 3/8" OD PCMGS tube	
P2	PVDF 8004022 filter 2" length 3/16" ID x 3/8" OD PCMGS tube	
P3	Female MPC connector with 1/4" barb and plug 40" length 1/4" ID x 7/16" OD chemically resistant, heat sealable flexible tube	
P4	Female Luer with 1/4" barb and plug 40" length 1/8" ID x 1/4" OD chemically resistant, heat sealable flexible tube	
P5	Female Luer with 1/4" barb Swabbable valve Male Luer plug without stem	



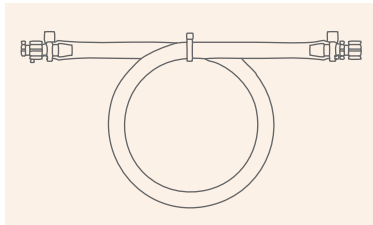
Cat. No.	Size	Qty/Pk
91-200-80	2L	1
P1	Check valve with 1/4" barb PVDF 8004022 filter 2" length 3/16" ID x 3/8" OD PCMGS tube	
P2	PVDF 8004022 filter 2" length 3/16" ID x 3/8" OD PCMGS tube	
P3	Female MPC connector with 1/4" barb Male MPC plug 40" length 1/4" ID x 7/16" OD chemically resistant, heat sealable flexible tube	
P4	Female Luer with 1/4" barb Male Luer plug 40" length 1/8" ID x 1/4" OD chemically resistant, heat sealable flexible tube	
P5	Female Luer with 1/4" barb Swabbable valve Male Luer plug without stem	



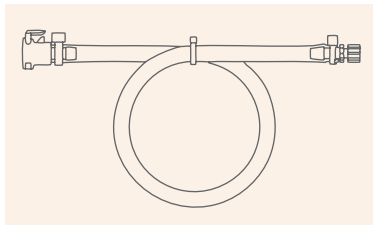
Cat. No.	Size	Qty/Pk
91-200-81	50L	1
Check valve with 1/4" barb P1 PVDF 8004022 filter 2" length 3/16" ID x 3/8" OD PCMGS tube		
P2 PVDF 8004022 filter 2" length 3/16" ID x 3/8" OD PCMGS tube		
Female MPC connector with 1/4" barb P3 Male MPC plug 40" length 1/4" ID x 7/16" OD chemically resistant, heat sealable flexible tubing		
Female Luer with 1/4" barb P4 Male Luer plug 40" length 1/8" ID x 1/4" OD chemically resistant, heat sealable flexible tubing		
Female Luer with 1/4" barb P5 Swabbable valve Male Luer plug without stem		

Tubing Sets

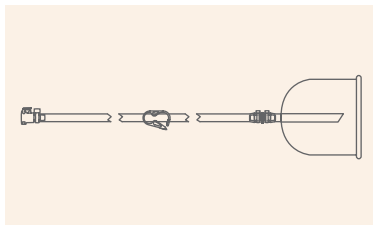
Optional tubing sets are available in combination with all single-use bag options.



Cat. No.	Description	Qty/Pk
91-700-00	36" length 1/4" ID clear, chemically resistant, heat sealable, flexible tubing Male Luer and female Luer cap Female Luer and male Luer cap	1



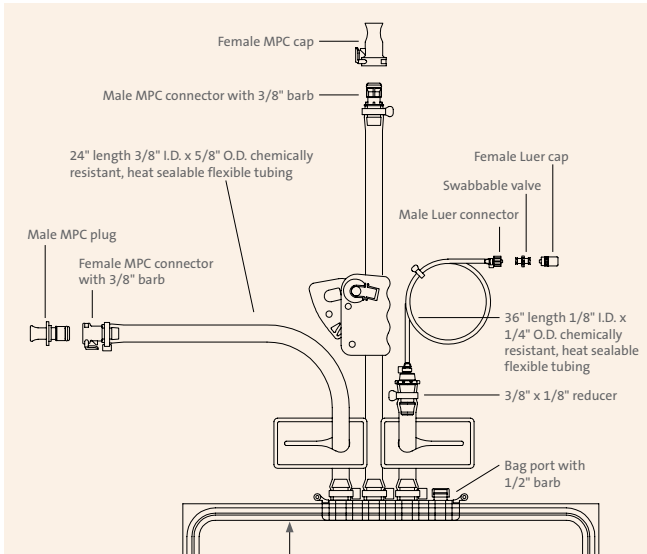
Cat. No.	Description	Qty/Pk
91-700-04	36" length 1/4" ID clear, chemically resistant, heat sealable, flexible tubing Female MPC connector Female Luer and male Luer cap	1



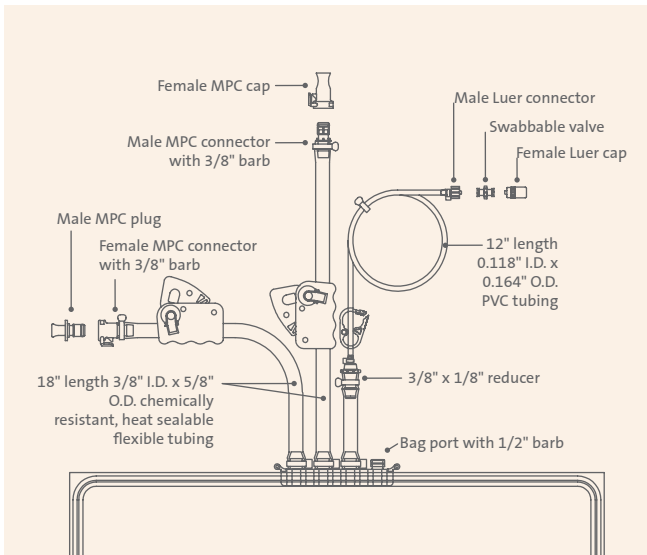
Cat. No.	Description	Qty/Pk
91-700-12	24" length 1/4" ID clear, chemically resistant, heat sealable, flexible tubing Female MPC connector with 1/4" barb Pinch clamp Filling bell	1

Single-use Bags for Corning® HYPERStack® Vessels

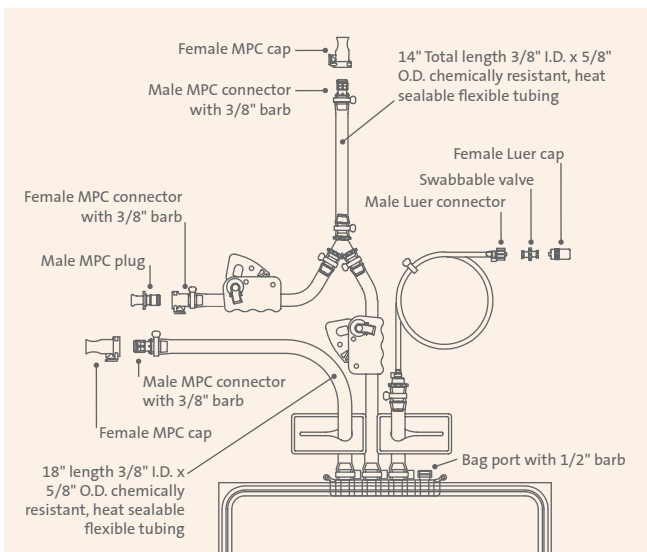
These single-use bags can be connected to tubing by tube welding or by using the pre-assembled multipurpose connectors. They can be used to add media, trypsin, or quenching substrates to culture cells in an entirely closed environment.



Cat. No.	Description	Film Type	Size	Qty/Pk
91-200-75	Trypsin bag	ULDPE	5L	1



Cat. No.	Description	Film Type	Size	Qty/Pk
91-200-77	Media bag	ULDPE	20L	1



Cat. No.	Description	Film Type	Size	Qty/Pk
91-200-76	Quench bag	ULDPE	5L	1

Tank Liners

Corning's portfolio of sterile tank liners are designed to fit cylindrical tanks. Tank liners are manufactured with ultra-low density polyethylene (ULDPE) and are available in a range of sizes.

- ▶ Sterile, individually packaged
- ▶ Animal-free components
- ▶ Reduce costs associated with the cleaning and validation of tanks
- ▶ Reduce labor costs and increase turnaround time
- ▶ Reduce the risks associated with cross-contamination
- ▶ Help extend the life of reusable tanks, resulting in lower capital expenditures
- ▶ Wide variety of sizes

Gusseted Tank Liners (3D)

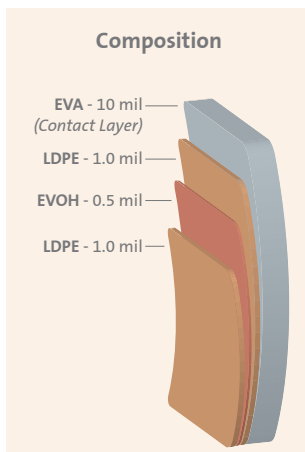
Cat. No.	Max. Volume	Diameter	Approx. Depth	Qty/Pk
91-300-15	50L	13"	27"	1
91-300-25	100L	18"	30"	1
91-300-35	200L	22"	36"	1

Non-gusseted Tank Liners (2D)

Cat. No.	Max. Volume	Diameter	Approx. Depth	Qty/Pk
91-300-20	130L	18"	30"	1
91-300-30	200L	22.5"	36"	1
91-300-80	1090L	42"	49"	1

Ethyl Vinyl Acetate (EVA) Film

12.5 mil co-extrusion film — Collection bags.

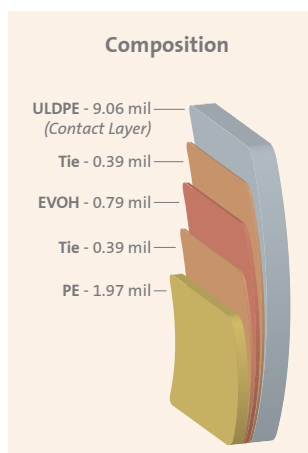


Biocompatibility Tests	Result	Test Protocol
USP intracutaneous reactivity test	Pass	USP <88>
USP acute systemic injection test	Pass	USP <88>
USP intramuscular implantation test	Pass	USP <88>
Toxicity	Nontoxic	USP <87>
Hemolysis	Non-hemolytic	ISO 10993-4
Bacterial endotoxin	<0.015 EU/mL	USP <85>

Physical Properties	Result	Test Protocol
H ₂ O transmission (g/100 in ² /24 hrs)	0.011	ASTM F-1249
CO ₂ transmission (cm ³ /100 in ² /24 hrs)	0.58	MOCON Test Method
O ₂ transmission (cm ³ /100 in ² /24 hrs)	0.28	ASTM F-3985
Ultimate tensile	3,100 psi	ASTM D-638
Ultimate elongation	>650%	ASTM D-638
100% modulus	1,000 psi	ASTM D-638
Tear strength	550 lbs/in.	ASTM D-1004
Low pressure brittleness	>-75°F	ASTM D-1290
Puncture resistance	22.4 lbs.	FTMS 101 B

Ultra-Low Density Polyethylene (ULDPE)/Ethylene Vinyl Alcohol (EVOH) Film

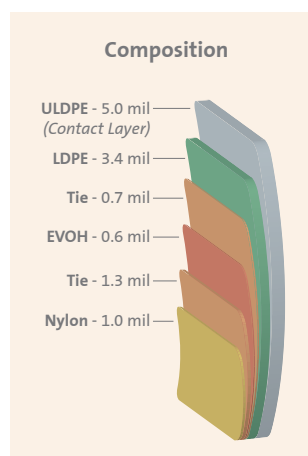
Single-ply multilayer structure with inert PE fluid contact layer.
Film is animal-free—Rocker cell culture bags.



Physical Properties	Result	Test Protocol
Haze (%)	5	ASTM D-1003
Clarity (%)	98	ASTM D-1003
Transmittance (%)	93	ASTM D-1003
Tensile strength at break (Mpa)	14	ASTM D-882
Elongation at break (%)	280	ASTM D-882
Elastic modulus (Mpa)	370	ASTM D-882
Break at cold temperature (°C)	below -45°C	ISO 8570
Density (g/cm ³)	0.9	ASTM D-792
H ₂ O transmission rate g/m ² /24 hrs	0.4 (23°C)	ASTM F-1249
O ₂ permeability cm ³ /m ² /24 hrs	0.1 (23°C, 0% RH)	ASTM D-3985
CO ₂ permeability cm ³ /m ² /24 hrs	<0.2 (23°C, 0% RH)	MOCON Permatran C-IV

Ultra-Low Density Polyethylene (ULDPE) Film

Fluid contact layer is 5.0 mil, ultra-low density polyethylene. Outer film is 5-layer, 7 mil co-extrusion film—Bags for Corning® HYPERStack® vessels, collection bags.



Biocompatibility Tests	Result	Test Protocol
USP intracutaneous reactivity test	Pass	USP <88>
USP acute systemic injection test	Pass	USP <88>
USP intramuscular implantation test	Pass	USP <88>
USP MEM elution method	Nontoxic	USP <87>
Physiochemical test for plastics	Pass	USP <661>

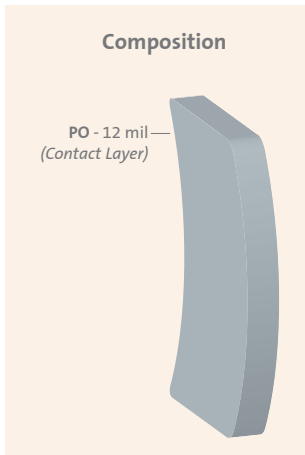
Physical Properties	Result	Test Protocol
H ₂ O transmission (g/100 in ² /24 hrs.)	0.017	ASTM F-1249
CO ₂ transmission (cm ³ /100 in ² /24 hrs.)	0.129	ASTM F-2476
O ₂ transmission (cm ³ /100 in ² /24 hrs.)	0.043	ASTM F-1927

	Average Force	Average MOE	Average Elongation	Test Protocol
Tensile strength	32.73 lbs.	25,110 psi	1,080%	ASTM D 882-02

	Min. Force	Average Force	Max. Force	Test Protocol
Tear resistance	6.77 lbs.	7.21 lbs.	7.74 lbs.	ASTM D1004-07
Puncture resistance	16.42 lbs.	18.61 lbs.	19.51 lbs.	FTMS 101C

Polyolefin (PO) Film

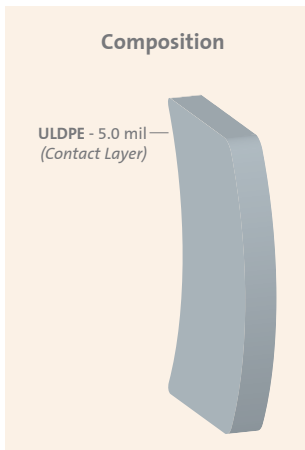
Single-web, 12 mil polyolefin monolayer designed for extremely low temperatures—Cell expansion bags.



Biocompatibility Tests	Result	Test Protocol
USP Class VI	Pass	USP <88>
Toxicity	Nontoxic	USP <87>
Hemolysis	Non-hemolytic	ISO 10993-4
Heavy metals	Pass	ISO 3826-1; USP <661>
Buffering capacity	Pass	USP <661>
Non-volatile residue	Pass	USP <661>
Residue on ignition	Pass	ISO 3826-1; USP <661>
Local effects after implantation	Pass	ISO 10993-6
Irritation and delayed-type sensitivity	Pass	ISO 10993-10
Systemic toxicity	Pass	ISO 10993-11
Bacterial endotoxin	<20 EU/device	USP <85>

Physical Properties	Result	Test Protocol
H ₂ O transmission g/100 in ² /24 hrs at 25°C	1.1	ASTM F1249
CO ₂ transmission cm ³ /100 in ² /24 hrs at 25°C, 0% RH	1,477	ASTM F2476
O ₂ transmission cm ³ /100 in ² /24 hrs at 25°C, 0% RH	180	ASTM D3985
Tensile strength (Mpa)	17	ASTM D882
Elongation at break, MD/TD (%)	560/700	ASTM D882
Elastic modulus (Mpa)	17	ASTM D882
Break at cold temperature (°C)	Below -80°C	ISO 8570
Glass transition temperature (T _g)	-48°C	DSC
Density (g/cm ³)	0.92	ASTM D792
Low temperature, (remains flexible)	-196°C	--

Tank Liner Film



Biocompatibility Tests	Result	Test Protocol
USP intracutaneous reactivity	Pass	USP <88>
USP acute systemic injection	Pass	USP <88>
USP intramuscular implantation	Pass	USP <88>
Toxicity	Nontoxic	USP <87>
Physiochemical test for plastics	Pass	USP <661>

Physical Properties	Result	Test Protocol
H ₂ O transmission (g/100 in ² /24 hrs)	0.017	ASTM F-1249
CO ₂ transmission (cm ³ /100 in ² /24 hrs)	0.129	ASTM F-2476
O ₂ transmission (cm ³ /100 in ² /24 hrs)	0.043	ASTM F-1927

	Average MOE	Average Elongation	Test Protocol
Tensile strength	5756 psi	710%	ASTM D 882
	Average Force		
Impact strength	2.52 lbs	7.74 lbs.	ASTM D 1709

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91-200-48	22	3304	5	6651	5	11655	18	431280	9
91-200-75	28	3310	2	6652	5	11656	18	431281	9
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91-200-77	28	3312	2	6654	5	11666	18	431283	9
91-200-78	25	3313	2	6655	5	11680	18	431284	9
91-200-79	26	3319	2	6656	5	11681	18	431285	9
91-200-80	26	3320	2	6961	8	11705	17	431321	6
91-200-81	27	3321	2	6962	8	11706	17	431329	6
91-200-82	22	3324	14	6963	8	11750	17	431339	9
91-200-83	22	3328	14	6964	8	11755	17	431340	9
91-200-84	23	3329	14	6965	8	11757	14	431344	6
91-200-85	23	3330	2	6966	8	11758	14	431363	9
91-200-86	23	3331	3	6967	8	11759	14	431364	9
91-200-87	23	3333	14	6968	8	11760	15	431372	9
91-200-88	24	3334	14	6969	8	11761	15	431401	9
91-200-89	24	3339	14	6970	8	11762	15	431402	9
91-200-90	24	3528	15	6971	8	11763	15	431403	9
91-200-91	24	3545	15	6972	8	11764	15	431404	9
91-200-92	25	3546	17	6973	8	11765	15	431405	9
91-300-15	29	3558	15	6970	8	11766	15	431406	9
91-300-20	29	3559	17	6974	8	11767	15	431407	9
91-300-25	29	3561	10	6975	8	11768	15	431408	9
91-300-30	29	3562	15	6976	8	11902	14	431444	14
91-300-35	29	3563	10	6979	8	11931	14	431445	14
91-300-80	29	3564	15	6980	8	20012	4	431446	14
91-700-00	27	3565	15	6981	8	20013	4	431447	14
91-700-04	27	3567	10	6982	8	20036	4	431448	14
91-700-12	27	3569	17	6983	8	20037	4	431449	14
3032	5	3578	10	6984	8	92341	5	431510	16
3136	5	3579	17	6985	8	430183	9	431512	16
3152	10	3580	10	6986	8	430195	6	431514	16
3153	10	3581	10	6987	8	430421	9	431516	16
3200	5	3718	14	6991	8	430422	9	431518	4, 16
3201	5	3719	14	6992	8	430699	6	431520	16
3231	5	3732	3	6993	8	430849	6	431644	4, 6
3232	5	3772	11	10042	4	430851	6	431682	9
3233	5	3779	11	10043	4, 15	430852	6	431684	9
3234	5	3781	11	10047	4	430853	6	431685	9
3235	5	3786	11	11370	4	431132	6	431686	9
3236	5	3907	6	11380	4	431133	6	431720	10
3237	5	3968	3	11405	16	431134	6		

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