Film Types for Corning® Single-use Containers

Application Note

CORNING

Introduction

Corning® single-use containers are available in multiple formats with eight different types of film. Each film type is selected to provide a high quality, cost effective, flexible container. Depending on the application, Corning can customize the bag's components (e.g., film type, configuration, and connectors) to preserve the physical, chemical, and functional characteristics of the sterile fluids.

As the pharmaceutical industry attempts to replace steel, glass, and hard plastic containers, single-use containers reduce the risk of cross-contamination while reducing cleaning and cleaning validation. The purpose of this report is to demonstrate the suitability of Corning single-use containers for research and product development in biopharmaceutical applications.

We will describe the biocompatibility and other tests used to rigorously assess Corning film types and show detailed physical specifications for each film.

Film types and film layering (containing tie layers, fluid contact layers, as well as outer layers to support use requirements) are classified by their fluid contact layer.

Features and Benefits

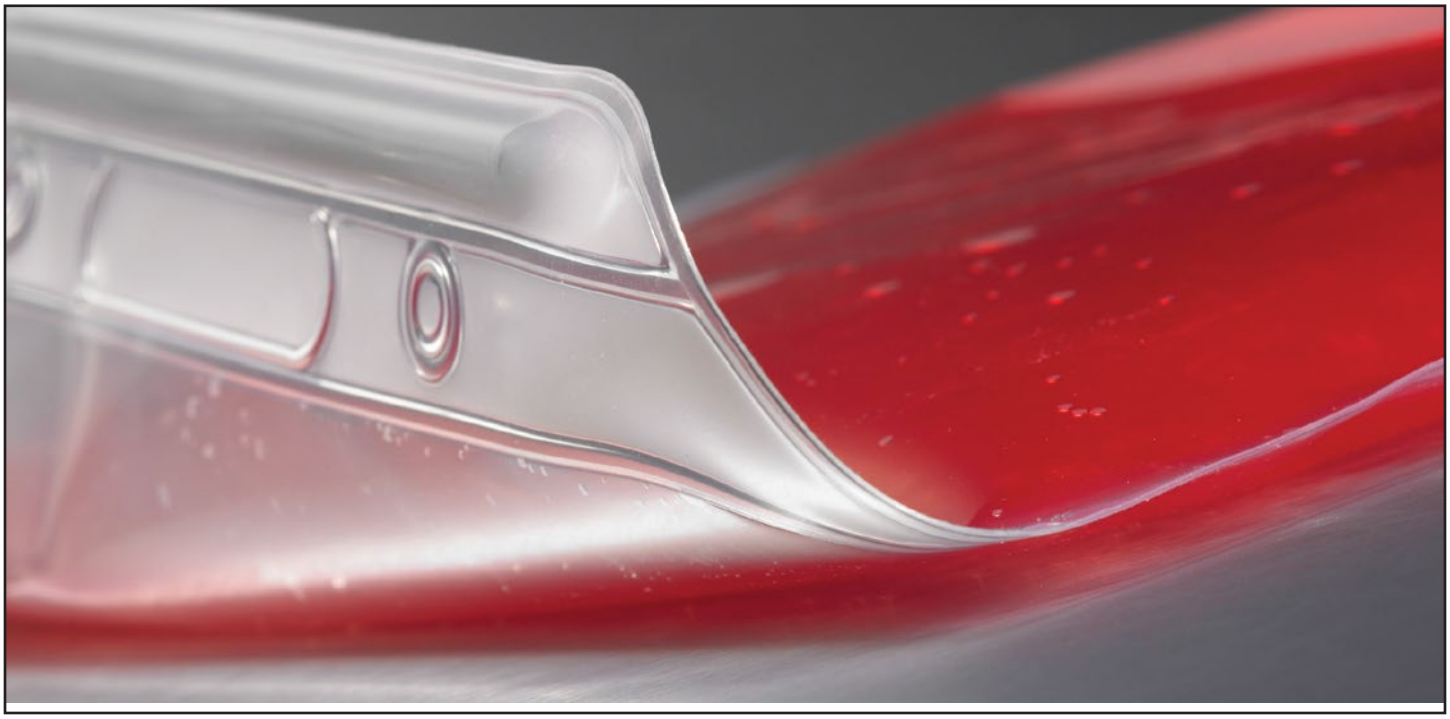
- Raw materials meet USP Class VI requirements
- Gamma irradiated
- Animal-free components
- Gas and moisture barriers minimize transmission of oxygen, carbon dioxide, and water vapor
- Reduces costs associated with washing, sterilization, and SIP/CIP validations
- Reduces the risks associated with cross-contamination

Films

EVA, ULDPE Multilayer, Metallocene, Polyolefin/EVA, ULDPE/EVOH, Polyolefin, ULDPE, Polyethylene

Biocompatibility

Our film for single-use products undergoes a range of biocompatibility tests to ensure they are safe for use in manufacturing. USP <88> Class VI tests for *in vivo* reaction to the material, while <87> tests for *in vitro* reactions (toxicity). USP <661> tests for harmful extractables that may affect a process solution. USP <85> tests for the presence of bacterial endotoxins.



Methods Used

USP <88> - Biological Reactivity Test, *In Vivo*, for Class VI

The USP Biological Reactivity Tests, *in vivo*, for Class VI-50°C Plastics are described in the United States Pharmacopoeia and include:

- Injection of extracts of plastic materials
- Implantation of the solid material into animal tissue
- The four extracting media listed in the USP simulate parenteral solutions and body fluids. These include:
  - 0.9% Sodium Chloride for Injection
  - 1-in-20 Solution of Ethanol in Sodium Chloride Injection
  - Polyethylene Glycol 400
  - Vegetable oil (sesame or cottonseed oil)

Samples of gamma-irradiated (at 50 kGy) film and molded connection piece were extracted with these solutions at 50°C ± 2°C for 72 hours ± 2 hours.

Their extracts were then used in the following tests to determine the biological effects:

- **Acute Systemic Injection Tests** – An acute systemic injection test was performed to evaluate the potential of a single injection of an extract to produce systemic toxicity. Extracts in Sodium Chloride Injection and 1-in-20 solution of ethanol in sodium chloride injection were injected intravenously. Cottonseed oil extract and Polyethylene Glycol 400 extracts were injected intraperitoneally.
- **Intracutaneous Tests –** An intracutaneous test was performed to evaluate the potential of a single injection of an extract to produce tissue irritation. All four of the extracts listed above were used for these tests.
- **Implantation Tests –** Implantation tests were performed in order to determine the potential to elicit a reaction at the cellular level.

USP <87> - Biological Reactivity Tests, *In Vitro*

The purpose of this study was to assess toxicity (i.e., the effect of extractable from test material on the test cells) as per USP <87> guidelines (elution method). An extract of the test article, Corning® film gamma-irradiated to 50 kGy was prepared using single strength minimum essential medium supplemented with 5% serum and 2% antibodies (1X MEM). This test extract was placed onto two separate monolayers of L-929 mouse fibroblast cells propagated in 5% CO_2. Two separate monolayers were prepared for the negative control (high density polyethylene) and the positive control (tin-stabilized polyvinylchloride). All monolayers were incubated at 37°C in the presence of 5% CO_2 for 48 hours and were examined microscopically after 48 hours to determine any change in the cell morphology. After 48 hours, both the negative and positive controls performed as anticipated, whereas the 1X MEM test extract showed no evidence of causing cell lysis or toxicity, and, thus, met the requirement of the USP <87> standards.

Physiochemical Test for Plastics - Chapter <661>

Plastic containers that are intended for packaging medical articles must meet the requirements of Physicochemical testing — plastics found in the current USP. These tests are designed to measure the properties of impurities extracted from plastics when leached with extraction medium over a specified period and temperature. The value of these tests becomes important to ensure the efficacy of product within the container. Irradiated samples (at a dose of 50 kGy) from the Corning single-use containers and the molded connection pieces were extracted at 70°C for 24 hours in purified water and isopropyl alcohol. Samples of the liquids were then tested for the following under USP <661> guidelines:

- **Non-volatile residue (NVR)** — Measures organic/inorganic residues soluble in extraction media
- **Residue on ignition** — Performed when the NVR is greater than 15 milligrams
- **Buffering capacity** — Measures the alkalinity or acidity of the extract
- **Heavy metal content** — Detects the presence of metals such as lead, tin, and zinc

USP <85> - Bacterial Endotoxin Testing

Limulus Amoebocyte Lysate (LAL) testing is done routinely to quantify the presence of bacterial endotoxins on a sample after gamma irradiation.

Shelf Life Studies

Samples of Corning single-use containers with and without exposure to 50 ± 5 kGy gamma irradiation were subjected to a leak test, a tensile strength test on the outer welds, a drop test, and a sterility test on samples as-received and samples after 0, 6, 12, 24, and 36 months equivalent of accelerated aging and 6 months real-time aging. The tests indicated both the functionality and sterility of the bags remained intact after 48 months (dependent upon film type) of accelerated aging and 6 months real-time aging, respectively. The results for longer periods real-time aging will be shared as they become available over time.

Extractables/Leachables Study

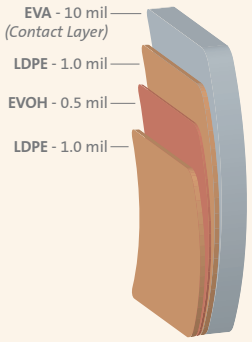
The purpose of this study was to quantify and characterize the components/chemicals that may be extracted/leached out from typical Corning single-use containers when exposed to different solutions and different storage intervals. For more information, please contact Corning.

FILM TYPES

Ethyl Vinyl Acetate (EVA) Film

12.5 mil co-extrusion film—Collection bags.

Composition



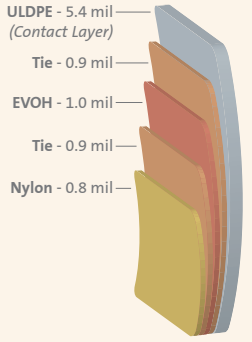
Biocompatibility Tests	Result	Test Protocol
USP intracutaneous reactivity test	Pass	USP <88>
USP acute systemic injection test	Pass	USP <88>
USP intramuscular implantation test	Pass	USP <88>
Toxicity	Nontoxic	USP <87>
Hemolysis	Non-hemolytic	ISO 10993-4
Bacterial endotoxin	<0.015 EU/mL	USP <85>

Physical Properties	Result	Test Protocol
H_2O 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	3100 psi	ASTM D-638
Ultimate elongation	>650%	ASTM D-638
100% modulus	1000 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

Metallocene Film

9.0 mil co-extruded blend of cross-linked polyethylene, EVOH, and Nylon—Collection bags.

Composition



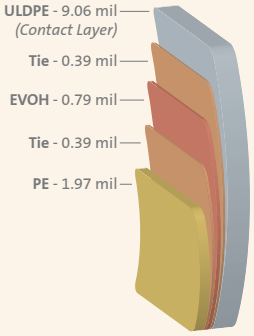
Biocompatibility Tests	Result	Test Protocol
Toxicity	Nontoxic	USP <87>
Bacterial endotoxin	<0.005 EU/mL	USP <85>
Hemolysis	Non-hemolytic	ISO 10993-4
Heavy metals	<1 ppm	ISO 3826-1; USP <661>
Buffering capacity	<1 mL	USP <661>
Non-volatile residue	<1 mg	USP <661>
Residue on ignition	<1 mg	ISO 3826-1; USP <661>
Appearance	Pass	--
Acidity and alkalinity	Pass	--
Absorbance	0.04 units	--
Oxidizable substance	<0.1 mL	--
Transparency	Pass	--

Physical Properties	Result	Test Protocol
H_2O transmission (g/m^2/24 hrs 23°C, 100% RH)	0.455	ASTM F-1249
CO_2 transmission (cm^3/m^2/24 hrs 23°C, 50% RH outside)	<1.0	ASTM F-2476
O_2 transmission rate (cm^3/m^2/24 hrs 23°C, 100% RH inside and 50% RH outside)	0.148	ASTM F-1927
Ultimate tensile strength	3094 psi	ASTM D-638
Elongation	416 (%)	ASTM D-638
Yield strength	1972 psi	--
Seam strength	18 pounds	--
Temperature range	-80°C to 60°C	--
Sterilization	SAL 10^{-6}	--

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.

Composition

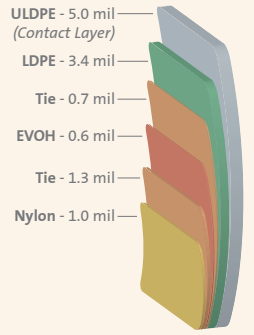


Physical Properties	Result	Test Protocol
Haze (%)	5	ASTM D-1003
Clarity (%)	98	ASTM D-1003
Transmittance (%)	93	ASTM D-1003
Tensile strength at break (Mpa)	14	ASTM D-882
Elongation at break (%)	280	ASTM D-882
Elastic modulus (Mpa)	370	ASTM D-882
Break at cold temperature (°C)	below -45°C	ISO 8570
Density (g/cm^3)	0.9	ASTM D-792
H_2O 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® HYPER*Stack*® vessels, collection bags.

Composition



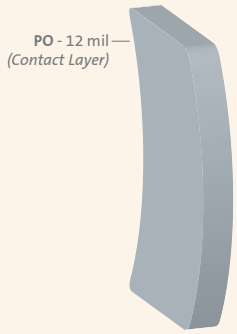
Biocompatibility Tests	Result	Test Protocol
USP intracutaneous reactivity test	Pass	USP <88>
USP acute systemic injection test	Pass	USP <88>
USP intramuscular implantation test	Pass	USP <88>
USP MEM elution method	Nontoxic	USP <87>
Physiochemical test for plastics	Pass	USP <661>

Physical Properties	Result	Test Protocol
H_2O 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	25110 psi	1080%	ASTM D 882-02
	Min Force	**Average Force**	**Max Force**	
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

Composition



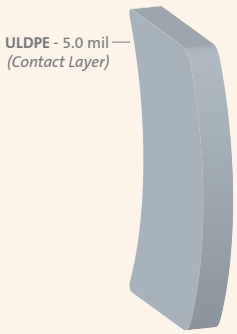
Single-web, 12 mil polyolefin monolayer designed for extremely low temperatures—Cell expansion bags.

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_2O 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	1477	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 (Tg)	-48˚C	DSC
Density (g/cm^3)	0.92	ASTM D792
Low temperature, (remains flexible)	-196˚C	--

Tank Liner Film

Composition



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_2O 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

Glossary of Terms

ASTM — American Society for Testing and Materials

ASTM D638 — Tensile strength tests measure the force required to break a specimen and the extent to which the specimen stretches or elongates to that breaking point. Tensile tests produce a stress-strain diagram, which is used to determine tensile modulus. This test method covers the determination of tensile properties of plastics in the form of thin sheeting and films (less than 1.0 mm (0.04 in.) in thickness). Since the physical properties of many materials (especially thermoplastics) can vary depending on ambient temperature, it is often times appropriate to test materials at temperatures that simulate the intended end use environment. This test method is designed to produce tensile property data for the control and specification of plastic materials. These data are also useful for qualitative characterization and for research and development.

ASTM D2240 — This test method is based on the penetration of a specific type of indentor when forced into the material under specified conditions. The indentation hardness is inversely related to the penetration and is dependent on the elastic modulus and viscoelastic behavior of the material. This test method covers twelve types of rubber hardness measurement devices known as durometers. The procedure for determining indentation hardness of substances classified as thermoplastic elastomers, vulcanized (thermoset) rubber, elastomeric materials, cellular materials, gel-like materials, and some plastics is also described.

ASTM D792 — These test methods describe the determination of the specific gravity (relative density) and density of solid plastics in forms such as sheets, rods, tubes, or molded items. The specific gravity or density of a solid is a property that is conveniently measured to identify a material, to follow physical changes in a sample, to indicate degree of uniformity among different sampling units or specimens, or to indicate the average density of a large item.

ASTM D790 — These test methods cover the determination of flexural properties of unreinforced and reinforced plastics, including high-modulus composites and electrical insulating materials in the form of rectangular bars molded directly or cut from sheets, plates, or molded shapes. These test methods are generally applicable to both rigid and semi- rigid materials. Flexural properties as determined by these test methods are especially useful for quality control and specification purposes.

ASTM D1238 — This test method covers the determination of the rate of extrusion of molten thermoplastic resins using an extrusion plastometer. After a specified preheating time, resin is extruded through a die with a specified length and orifice diameter under prescribed conditions of temperature, load, and piston position in the barrel. This test method is particularly useful for quality control tests on thermoplastics.

ASTM D1646 — These test methods cover procedures for measuring a property called Mooney viscosity. Mooney viscosity is defined as the shearing torque resisting rotation of a cylindrical metal disk (or rotor) embedded in rubber within a cylindrical cavity.

ASTM D3985 — This test method covers a procedure for determination of the steady-state rate of transmission of oxygen gas through plastics in the form of film, sheeting, laminates, coextrusions, or plastic-coated papers or fabrics. It provides for the determination of (1) oxygen gas transmission rate (OTR), (2) the permeance of the film to oxygen gas (PO_2), and (3) oxygen permeability coefficient ($P'O_2$) in the case of homogeneous materials. The OTR is an important determinant of the packaging protection afforded by barrier materials. It is not, however, the sole determinant, and additional tests, based on experience, must be used to correlate packaging performance with OTR.

ASTM F2476 — This test method covers a procedure for determination of the steady-state rate of transmission of carbon dioxide gas through plastics in the form of film, sheeting, laminates, coextrusions, or plastic-coated papers or fabrics. It provides for the determination of carbon dioxide gas transmission rate (CO_2TR). Carbon dioxide gas transmission rate (CO_2TR) is an important determinant of the packaging protection afforded by barrier materials. It is not, however, the sole determinant, and additional tests must be used to correlate packaging performance with CO_2TR.

ASTM F1249 — This test method covers a procedure for determining the rate of water vapor transmission through flexible barrier materials. The method is applicable to sheets and films up to 3 mm (0.1 in.) in thickness, consisting of single or multilayer synthetic or natural polymers and foils, including coated materials. It provides for the determination of (1) water vapor transmission rate (WVTR), (2) the permeance of the film to water vapor, and (3) for homogeneous materials, water vapor permeability coefficient. The purpose of this test method is to obtain reliable values for the WVTR of plastic film and sheeting. WVTR is an important property of packaging materials and can be directly related to shelf life and packaged product stability.

ASTM F1980 — This test method is a guide which provides information for developing accelerated aging protocols to rapidly determine the effects, if any, due to the passage of time on the sterile integrity of the sterile barrier system, as defined in ANSI/AAMI/ISO 11607-1:2006 and the physical properties of their component packaging materials. Information obtained may be used to support expiration date claims for medical device sterile barrier systems.

ASTM F1929 — Harmful contaminants may enter a disposable container through leaks. These leaks are frequently found at seals between bag seals of the same or dissimilar materials. Leaks may also result from a pinhole in the packaging material. This test method defines materials and procedures that will detect and locate a leak in package edge seals formed between a transparent material and a porous sheet material. A dye penetrant solution is applied locally to the seal edge to be tested for leaks. After contact with the dye penetrant for a specified time, the package is visually inspected for dye penetration.

ASTM D543 — These tests cover the evaluation of all plastic materials for resistance to chemical reagents. These tests include provisions for reporting changes in weight, dimensions, appearance, and strength properties. Standard reagents are specified to establish results on a comparable basis. Provisions are made for various exposure times, stress conditions, and exposure to reagents at elevated temperatures. The choice of types and concentrations of reagents, duration of immersion or stress, or both, temperature of the test, and properties to be reported is necessarily arbitrary. The tests provide a basis for standardization and serves as a guide to investigators wishing to compare the relative resistance of various plastics to typical chemical reagents.

DSC — This test method covers the assignment of the glass transition temperatures (Tg) of materials using differential scanning calorimetry. Differential scanning calorimetry provides a rapid test method for determining changes in specific heat capacity in a homogeneous material or domain. The glass transition is manifested as a step change in specific heat capacity. For amorphous and semi-crystalline materials the determination of the glass transition temperature may lead to important information about their thermal history, processing conditions, stability of phases, and progress of chemical reactions. This test method is useful for research, quality control, and specification acceptance.

USP — United States Pharmacopoeia

USP <88> — These tests are a set of in-vivo screening tests to characterize the basic biocompatibility of the plastic under investigation. Six classes of plastics are defined, based on responses to a series of in-vivo tests for which extracts, materials and routes of administration are specified. The following three *in vivo* tests make up the test set:

- **Acute Systemic Toxicity Test** — *In-vivo* systemic tests evaluate the impairment or activation of a system – rather than the impairment of individual cells or organs. In acute systemic toxicity tests, the test material (extract) is tested for systemic toxic effects as a result of a single, acute exposure.
- **Irritation Test-Intracutaneous Injection Test** — The irritation tests are *in vivo* screening tests to evaluate the potential of test materials or their extracts to cause irritation on the exposed part of the body. This test for intracutaneous irritation is performed to assess inflammatory reactions after applications of extracts of the test article.
- **Implantation Test** — Implant studies evaluate the local pathological effects on living tissue, at both the gross and microscopic level of a test article that is surgically implanted into an appropriate implant site. The implantation evaluates local effects of implanted test articles on living tissue.

USP <87> — The tests are designed to determine the biological reactivity of mammalian cell cultures following contact with the elastomeric plastics and other polymeric materials with direct or indirect patient contact or of specific extracts prepared from the materials under test. The tests include the Agar Diffusion Test, the Direct Contact Test, and the Elution Test. The decision as to which type of test or the number of tests to be performed to assess the potential biological response of a specific samples or extract depends upon the material, the final product, and its intended use.

USP <661> — These tests are used to define the packaging properties that will maintain the highest level of product quality. Tests performed under USP 24 <661 — Polyethylene> characterize high density and low density polyethylene containers. This includes analysis of the container's resistance to light and a determination of heavy metals and extractables. The following physical tests are performed:

- **Multiple Internal Reflectance** — This test is performed to ensure that the material of the container falls within the range of HDPE or LDPE as specified in the test.
- **Thermal Analysis** — This standard determines endotherms and exotherms temperatures. These temperatures should fall within the ranges specified by the standard.
- **Light Transmission** — These tests are intended to provide protection from light as specified by the standard.
- **Water Vapor Permeation** — These tests are intended to provide protection from moisture permeation as specified by the standard. Water vapor permeation tests are performed using aluminum foil for sealing the open end of the bottle if it is used with a closure.
- **Heavy Metals** — Under these tests, containers must meet the requirements for heavy metals under Physicochemical Tests — Plastics.
- **Nonvolatile Residue** — Under these tests the container must meet the requirements for nonvolatile residue under Physicochemical Tests — Plastics, and also has test procedures for Polyethylene Terephthalate (PET) and Polyethylene Terephthalate G (PETG).

USP <85> — This test evaluates the amount of bacterial endotoxins in the sample product using kinetic LAL. This test is used to detect or quantify bacterial endotoxins that may be present in or on the test article. It uses Limulus Amebocyte Lysate (LAL) obtained from the aqueous extracts of circulating amebocytes of horseshoe crab (Umulus polyphemus or Tachypleus tridentatus) which has been prepared and characterized for use as an LAL Reagent.

ISO — International Organization for Standardization

ISO 10993-4 — Biological evaluation of medical devices – Part 4: Tests for interactions with blood. Specifies test methods for evaluating a materials interaction with blood, based on the intended use and duration of contact as defined in ISO 10993-1.

ISO 8570 — This specifies a method for assessing the brittleness of plastic film and sheeting at low temperature. This method characterizes a finished product of given thickness and texture but not its raw-material composition.

Ordering Information

Collection Bags

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
91-200-36	EVA	10L	1
91-200-39	EVA	20L	1
91-200-41	EVA	500 mL	1
91-200-42	EVA	1L	1
91-200-43	EVA	5L	1
91-200-45	EVA	10L	1
91-200-47	EVA	20L	1
91-200-48	EVA	50L	1
91-200-82	ULDPE multilayer	100L	1
91-200-83	ULDPE multilayer	200L	1
91-002-MX	Metallocene	10L	1
91-001-MB	Metallocene	25L	1
91-100-30	Metallocene	50L	1
91-100-35	Metallocene	100L	1

Cell Expansion Bags

91-200-84	Polyolefin	500 mL	1
91-200-85	Polyolefin	1L	1
91-200-86	Polyolefin	3L	1
91-200-87	Polyolefin	5L	1

Cryopreservation Bags

Cat. No.	Film Type	Size	Qty/Pk
91-200-88	Polyolefin/EVA	50 mL	1
91-200-89	Polyolefin/EVA	250 mL	1
91-200-90	Polyolefin/EVA	500 mL	1
91-200-91	Polyolefin/EVA	750 mL	1

Rocker Cell Culture Bags

91-200-80	ULDPE/EVOH	2L	1
91-200-79	ULDPE/EVOH	10L	1
91-200-78	ULDPE/EVOH	20L	1
91-200-92	ULDPE/EVOH	22L	1
91-200-81	ULDPE/EVOH	50L	1

Single-use Bags for Corning® HYPER*Stack*® Vessels

Cat. No.	Description	Film Type	Size	Qty/Pk
91-200-75	Trypsin bag	ULDPE multilayer	5L	1
91-200-76	Quench bag	ULDPE multilayer	5L	1
91-200-77	Media bag	ULDPE multilayer	20L	1

Tank Liners

Cat. No.	Description	Film Type	Size	Qty/Pk
91-300-15	Gusseted tank liner	ULDPE	50L	1
91-300-25	Gusseted tank liner	ULDPE	100L	1
91-300-35	Gusseted tank liner	ULDPE	200L	1
91-300-20	Non-gusseted tank liner	ULDPE	130L	1
91-300-30	Non-gusseted tank liner	ULDPE	200L	1
91-300-80	Non-gusseted tank liner	ULDPE	1090L	1

For more specific information on claims, visit the Certificates page at **www.corning.com/lifesciences**.

Warranty/Disclaimer: Unless otherwise specified, all products are for research use only. Not intended for use in diagnostic or therapeutic procedures. Not for use in humans. Corning Life Sciences makes no claims regarding the performance of these products for clinical or diagnostic applications.

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