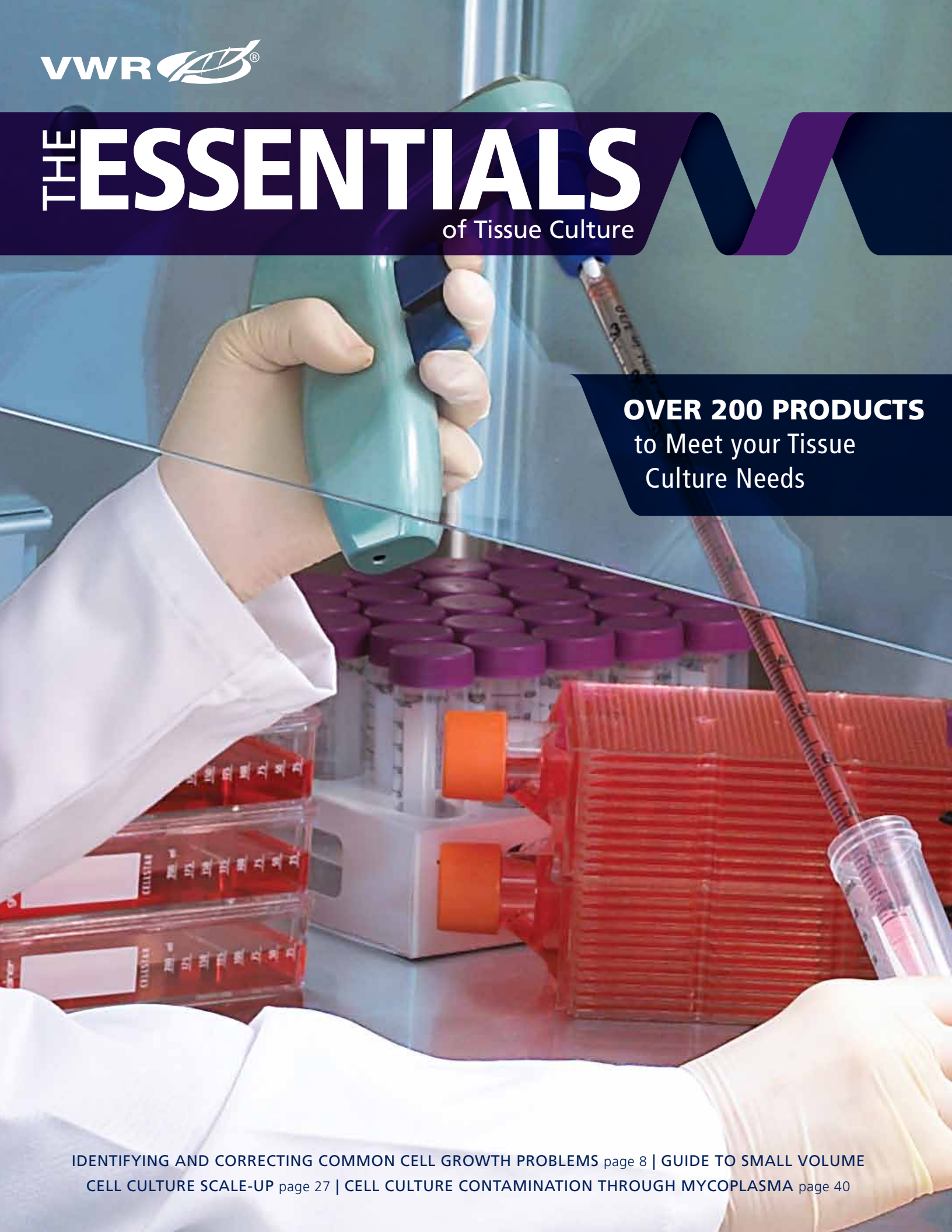
VWR®

THE ESSENTIALS of Tissue Culture



OVER 200 PRODUCTS to Meet your Tissue Culture Needs

VWR offers a comprehensive product selection for all cell culture applications. In this edition of VWR Essentials, we have included the technical expertise of our top suppliers to provide useful tips and know-how to improve and enhance your research results. Whether you're a lab assistant in a university or a Ph.D. researcher in a stem cell research facility, you'll want to keep this guide handy for quick and easy reference.

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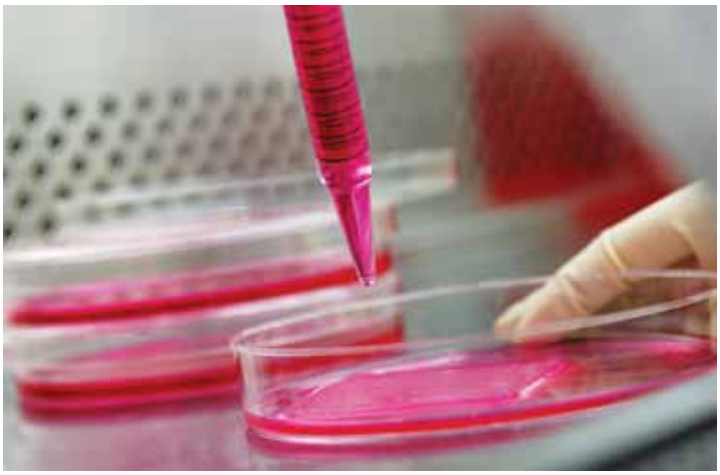
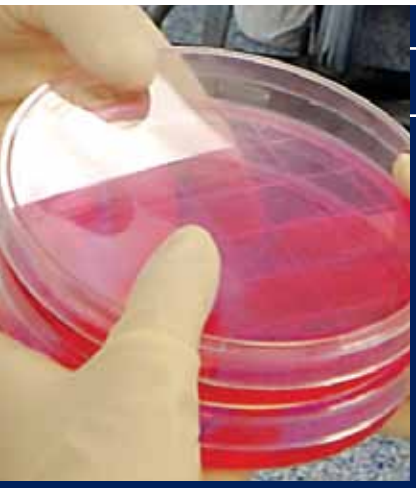


Lonza

BioWhittaker® Classic Cell Culture Media, Lonza

- Formulated according to recommendations from the Tissue Culture Association and manufactured under cGMP regulations
- Powder media are produced with phenol red and without sodium bicarbonate
- Liquid media lots are tested for sterility, pH, osmolality, and cell growth promotion
- If required, products are also tested for endotoxin concentration

Description	Size	Cat. No.	Each
Basal Medium Eagle, Cryoprotective Medium, with 15% DMSO, without L-Glutamine, Use 1:1 with Growth Medium	100mL	**12001-550**	**26.00**
Dulbecco's Modified Eagle's Medium, with 4.5 g/L Glucose and L-Glutamine	500mL	**12001-566**	**16.10**
Dulbecco's Modified Eagle's Medium, with 4.5 g/L Glucose and L-Glutamine	1 L	**12001-568**	**23.70**
Dulbecco's Modified Eagle's Medium, with 4.5 g/L Glucose and L-Glutamine, without Sodium Pyruvate	500mL	**12001-000**	**14.90**
Dulbecco's Modified Eagle's Medium, with 4.5 g/L Glucose, without L-Glutamine and Phenol Red	500mL	**12001-630**	**26.90**
Dulbecco's Modified Eagle's Medium, with 4.5 g/L Glucose, without L-Glutamine, Screened to Support Hybridoma Growth	500mL	**12001-344**	**23.70**
Dulbecco's Modified Eagle's Medium, F-12, 1:1 Mixture, with 3.151 g/L Glucose, 15 mM HEPES, and L-Glutamine	500mL	**12001-600**	**20.90**
Modifed Eagle's Medium (EMEM), with Earle's Balanced Salt Solution and L-Glutamine	500mL	**12001-570**	**14.90**
Modifed Eagle's Medium (EMEM), with Earle's Balanced Salt Solution, L-Glutamine, and Non-Essential Amino Acids, without Calcium	450mL	**12001-514**	**33.00**
Modifed Eagle's Medium (EMEM), with Earle's Balanced Salt Solution and 25 mM HEPES, without L-Glutamine	500mL	**12001-552**	**23.70**
Modifed Eagle's Medium (EMEM), with Earle's Balanced Salt Solution, without L-Glutamine and Phenol Red (Virus Plaquing Medium)	100mL	**12002-016**	**11.90**
Modifed Eagle's Medium (EMEM), Joklik's Formulation for Suspension Cultures	1 L	**12002-002**	**29.90**
NCTC-109 Medium, with Earle's Balanced Salt Solution and L-Glutamine, Screened to Support Hybridoma Growth	100mL	**12001-348**	**34.90**
RPMI 1640, with L-Glutamine	500mL	**12001-590**	**14.70**
RPMI 1643, with 25 mM HEPES and L-Glutamine	500mL	**12001-534**	**20.50**
RPMI 1647, without L-Glutamine	500mL	**12001-558**	**14.60**



FOCUS Information

DETERGENT CAN HELP YOUR CELL CULTURE VIABILITY

Many serum-free applications involve dynamic (agitated) instead of static (not agitated) suspension culture. Agitation can cause shearing forces that will damage a growing cell culture. One way to avoid these shearing forces is to add a detergent to the culture medium. Detergent molecules are hydrocarbon chains that contain a polar end (water-loving, hydrophilic), and a non-polar end (water-repellent, hydrophobic). Also known as surfactants, detergents decrease the surface tension of water and solubilize compounds that are poorly soluble in water. Think of the effect of dish washing detergent on food oils.

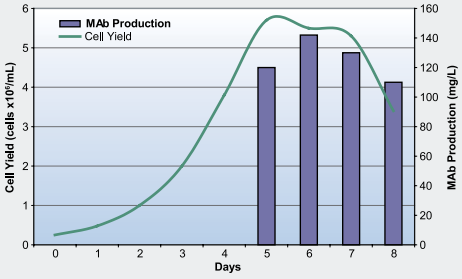
Pluronic® F68 is a non-ionic detergent used in suspension culture media to stabilize the cell membrane from shear forces resulting from agitation. F68 is a non-ionic surfactant that does not denature proteins as ionic surfactants, such as sodium dodecyl sulfate (SDS), do. For your convenience, Lonza includes F68 in most serum-free media intended for dynamic suspension culture. Final concentration of F68 in serum-free media for this application is typically 1.0 gram/liter, or 0.1%.

Thermo Scientific Serum-Free and Chemically Defined Media

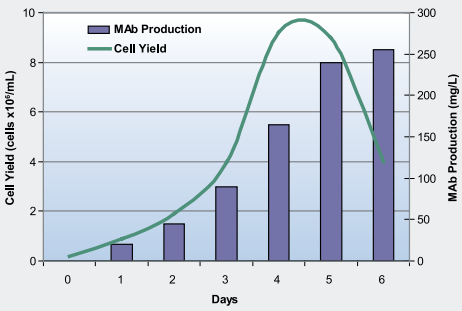
An increasing number of biologically active products, including monoclonal antibodies, recombinant proteins, and viruses for vaccines or gene delivery are produced using animal cell culture. The yield and performance of these biological products corresponds directly to the quality of cell culture reagents used in the manufacturing process. For over 40 years, Thermo Scientific HyClone™ cell culture media, serum, and reagents have been used for cell culture research and bioproduction. Today, our extensive line of serum-free and chemically-defined media products is specifically designed to boost bioproduction yield and quality. Simply put, our mission is to place the best possible products in your hands so you get the most out of your cells.

The high performance of HyClone Serum-Free and Chemically-Defined Media for specific cell culture platforms begins with Thermo Scientific's Metabolic Pathway Design™ technology. Metabolic Pathway Design balances nutrient supply against metabolic waste accumulation, determines the effective dose of nutrients critical to the production of recombinant proteins, and provides complex lipids and phospholipids that facilitate delivery of product through the cell membrane. This approach to media formulation development ensures optimum productivity during both growth and production phases of cell growth by providing a consistent nutrient supply in a form acceptable to cultured cells.

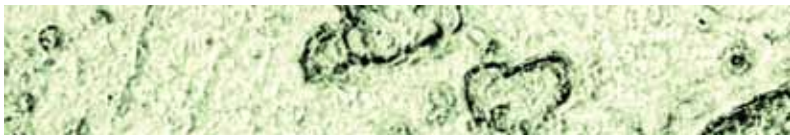
Hyclone Serum-Free and Chemically-Defined media developed through Metabolic Pathway Design provide you with consistent media performance, eliminate the need to pre-screen serum lots, and reduce downstream purification challenges. Additionally, our chemically-defined media are regulatory friendly and simplify regulatory documentation requirements.



Production of MAb using a CHO cell line cultured in HyClone CDM4CHO during a shaker flask culture



Production of MAb using an SP2/0-derived hybridoma cell line cultured in HyClone CDM4MAb



HyClone™ Serum-Free Media, Thermo Scientific

CHO Cell Culture Platform Media

- **CDM4CHO™**: Developed specifically to increase recombinant protein yields in a variety of CHO clones
- **PF-CHO™**: Designed to support the growth of multiple CHO cell clones and the production of a variety of recombinant proteins.
- **SFM4CHO™**: Ideally suited for enhanced stability and growth of various CHO cell lines.
- **SFX-CHO™**: An early generation, protein-containing suspension medium.

Description	Size	Cat. No.	Price
CDM4CHO			
With L-Glutamine	500mL	**82013-292**	Ea./ **34.13**
With L-Glutamine	1 L	**82013-294**	Ea./ **56.64**
Without L-Glutamine	500mL	**82013-298**	Ea./ **34.13**
Without L-Glutamine	1 L	**82013-300**	Ea./ **56.64**
Without L-Glutamine	1 L	**82031-584**	Pk. 6/ **305.86**
PF-CHO			
With Phenol Red	1 L	**16777-362**	Ea./ **45.50**
SFM4CHO			
With L-Glutamine and Sodium Bicarbonate, without Phenol Red	500mL	**82013-384**	Ea./ **31.85**
With L-Glutamine and Sodium Bicarbonate, without Phenol Red	1 L	**82013-386**	Ea./ **51.99**
With L-Glutamine and Sodium Bicarbonate, without Phenol Red	1 L	**82031-578**	Pk. 6/ **264.68**
With Sodium Bicarbonate, without L-Glutamine and Phenol Red	500mL	**82013-378**	Ea./ **31.85**
With Sodium Bicarbonate, without L-Glutamine and Phenol Red	1 L	**82013-380**	Ea./ **51.99**
With Sodium Bicarbonate, without L-Glutamine and Phenol Red	1 L	**82031-576**	Pk. 6/ **264.68**
SFX-CHO			
Basic Formula	1 L	**16777-348**	Ea./ **45.50**

HEK 293 and PER.C6 Cell Culture Platform Media

- **CDM4HEK293™**: Regulatory-friendly media designed to support the growth of HEK 293 culture and promote adenovirus and recombinant protein products in suspension cultures.
- **SFM4HEK293™**: Developed to support the production of adenoviral vectors and recombinant proteins in HEK 293 cultures.
- **SFM4Transfx-293™**: Supports the growth of HEK 293 cultures and promotes transfection in suspension cultures using lipofection or similar methods.
- **CDM4PERMAB™**: Created to increase process yields in the production of human antibodies and recombinant proteins using PERC6® technology.

Description	Size	Cat. No.	Price
CDM4HEK293			
Without L-Glutamine	500mL	**95026-628**	Ea./ **31.85**
Without L-Glutamine	1 L	**95026-630**	Ea./ **52.88**
SFM4HEK293			
With L-Glutamine and Sodium Bicarbonate, without Phenol Red	500mL	**82003-354**	Ea./ **35.09**
With L-Glutamine and Sodium Bicarbonate, without Phenol Red	1 L	**82003-356**	Ea./ **57.18**
With L-Glutamine and Sodium Bicarbonate, without Phenol Red	1 L	**82031-572**	Pk. 6/ **308.77**
SFM4Transfx-293			
Without L-Glutamine	500mL	**95026-634**	Ea./ **38.45**
Without L-Glutamine	1 L	**95026-636**	Ea./ **66.10**
Without L-Glutamine	1 L	**95026-638**	Pk. 6/ **356.94**
CDM4PERMAB			
Without L-Glutamine	500mL	**95059-614**	Ea./ **31.85**
Without L-Glutamine	1 L	**95059-616**	Ea./ **52.88**

Hybridoma and Myeloma Cell Culture Platform Media

- **ADCF™-MAb:** Used to increase antibody yields in engineered hybridoma and myeloma cell lines.
- **CDM4NS0™:** Developed to increase yields of MAbs using a variety of NS0 cell clones without additional cholesterol supplementation.
- **SFM4MAb™:** A low protein formulation optimized for downstream purification using Protein A, Protein G, and other matrices to facilitate antibody recovery.

Description	Size	Cat. No.	Price
ADCF-MAb			
With L-Glutamine and Sodium Bicarbonate, without Phenol Red	500mL	**16777-540**	Ea./ **31.85**
With L-Glutamine and Sodium Bicarbonate, without Phenol Red	1 L	**16777-542**	Ea./ **51.99**
With L-Glutamine and Sodium Bicarbonate, without Phenol Red	1 L	**82031-592**	Pk. 6/ **280.75**
With Sodium Bicarbonate, without L-Glutamine and Phenol Red	500mL	**82013-372**	Ea./ **30.03**
With Sodium Bicarbonate, without L-Glutamine and Phenol Red	1 L	**82013-374**	Ea./ **51.99**
CDM4NS0			
Basic Formula	1L	**82020-018**	Ea./ **70.80**
SFM4MAb			
With L-Glutamine and Sodium Bicarbonate, without Phenol Red	500mL	**14224-312**	Ea./ **29.90**
With L-Glutamine and Sodium Bicarbonate, without Phenol Red	1 L	**14224-300**	Ea./ **48.09**
With L-Glutamine and Sodium Bicarbonate, without Phenol Red	1 L	**82031-568**	Pk. 6/ **259.69**

Insect Cell Culture Media, HiMedia

- Use specialized insect media for recombinant protein expression, propagation of insect viruses, or for studies on control of vector bourne diseases
- Insect culture media offers higher tolerance to osmolality and temperature fluctuations
- Expressed proteins are antigenically, immunologically, and functionally similar to their authentic counterparts
- Easily culture large quantities of posttranslationally modified eukaryotic proteins
- High quality materials ensures lot-to-lot consistency

Description	Cat. No.	Each
1 L Bottles		
D-22 Insect Medium	**95038-644**	**11.60**
Grace's Insect Medium	**95037-608**	**14.39**
IPL-41 Insect Medium	**95038-648**	**11.60**
Mitsuhashi and Maramorosch Insect Medium	**95037-612**	**11.00**
Schneider's Insect Medium	**95037-616**	**14.39**
Shield's and Sang M3 Insect Medium	**95038-640**	**11.60**
TC-100 Insect Medium	**95038-652**	**14.51**
TNM-FH Insect Medium	**95038-656**	**15.91**
5 L Bottles		
D-22 Insect Medium	**95039-060**	**58.07**
Grace's Insect Medium	**95039-036**	**72.61**
IPL-41 Insect Medium	**95039-066**	**58.07**
Mitsuhashi and Maramorosch Insect Medium	**95039-042**	**44.13**
Schneider's Insect Medium	**95039-048**	**72.61**
Shield's and Sang M3 Insect Medium	**95039-054**	**58.07**
TC-100 Insect Medium	**95039-072**	**72.61**
TNM-FH Insect Medium	**95039-078**	**79.86**

Fetal Bovine Sera, PAA Laboratories

- Sera is tested for viruses and microorganisms and receives additional testing according to 9CFR and EP regulations
- GOLD sera is chromatographically purified and fractionated, then the individual components are recombined in a defined composition, eliminating batch-to-batch variation
- GOLD sera also contains no additives from other sera and is characterized by a very low content of IgG antibodies
- ES cell-tested serum supports the growth of undifferentiated ES cells and has low nonspecific stimulation; ideal for morphology studies in stem cells, as well as phosphatase marker expression
- Heat inactivated serum has been heated to inactivate the complement system, antibodies, and other active enzymes
- All sera are sterile, filtered, and packaged in unbreakable, gamma-irradiated PET bottles
- Production facilities comply with cGMP guidelines and are registered with the FDA and EDQM
- Size: 500mL (16oz.)

Origin	Cat. No.	Each
Fetal Bovine Serum, Standard Quality		
Canada	**95042-108**	**188.24**
USA	**95025-534**	**184.25**
USDA Approved	**95025-538**	**168.07**
Fetal Bovine Serum, GOLD		
Canada	**95042-112**	**223.68**
USA	**95025-542**	**233.27**
USDA Approved	**95025-546**	**220.00**
Fetal Bovine Serum, ES Cell-Tested		
Various	**95039-626**	**377.97**
Fetal Bovine Serum, Heat Inactivated		
USA	**95025-550**	**236.22**

cellgro® Animal Sera, Mediatech

- Premium fetal bovine serum is only collected from herds within the U.S.
- USDA-approved fetal bovine serum is derived specifically for USDA-certified facilities located outside of U.S. boundaries
- Donor calf and horse serum is collected from standing herds located within the U.S.
- Animals are tested regularly by a veterinarian and certified to be disease-free
- Chemical constituents within the sera are measured to ensure lot-to-lot consistency
- Size: 500mL (16 oz.)

Description	Cat. No.	Each
USDA-Approved Fetal Bovine Serum, Regular	**45000-734**	**195.00**
USDA-Approved Fetal Bovine Serum, Heat-Inactivated	**45000-736**	**215.00**
Premium Fetal Bovine Serum, Regular	**45001-106**	**258.00**
Premium Fetal Bovine Serum, Heat-Inactivated	**45001-108**	**275.00**
Donor Calf Serum	**45001-060**	**62.00**
Donor Horse Serum	**45001-058**	**62.00**

VWR AND BIO BUSINESS SOLUTIONS®

have partnered to create a life science-specific membership program designed to maximize your purchasing power and streamline your operations. To learn more or receive enrollment information, call the BIO Business Solutions customer service line at **1.800.897.7054** or contact your VWR Sales Representative.

cellgro® Human Sera, Mediatech

- Each donor unit of plasma is tested for the presence of Hepatitis B and C; HIV-1, -1Ag, and -2; and ALT by FDA-approved methods
- All plasma is collected from within the U.S.

Description	Cat. No.	Each
Human AB Serum	**45001-062**	**129.00**

FINDING A SPECIFIC ANTIBODY CAN BE LIKE FINDING YOUR WAY THROUGH A MAZE.

Fortunately, VWR can guide you.

Quickly find the specific antibody you need from VWR's broad antibody product portfolio. VWR carries primary and secondary antibodies that can be used with Western blotting, ELISAs, immunohistochemistry, immunoprecipitation, immunofluoresence, neutralization, and flow cytometry.

At VWR you'll find

- More than 42,000 antibodies
- An expanding supplier base
- Antibodies from multiple species
- Antibodies with multiple conjugations
- Antibodies for all major applications

Visit **www.vwr.com/antibodies** for more information.

BioWhittaker® Buffers and Reagents, Lonza

- Manufactured in accordance with cGMP regulations
- Cell culture tested to assure compatibility
- All trypsin products are manufactured with irradiated trypsin, tested for porcine parvovirus, and screened for mycoplasma
- All water products are WFI grade prepared by ultrafiltration, reverse osmosis, deionization, distillation, and sterile filtration

Description	Concentration	Size	Cat. No.	Each
Dulbecco's Phosphate Buffered Saline	1X, 0.0095 M	500 mL	**12001-664**	**12.70**
Dulbecco's Phosphate Buffered Saline	1X, 0.0095 M	1 L	**12001-666**	**22.70**
Dulbecco's Phosphate Buffered Saline	10X, 0.0095 M	500 mL	**12001-672**	**22.70**
Dulbecco's Phosphate Buffered Saline	10X, 0.0095 M	1 L	**12001-674**	**33.90**
HEPES Buffer, Contains 238.3 g/L in Normal Saline	1 M	100 mL	**12001-708**	**44.30**
HEPES Buffer, Contains 238.3 g/L in Normal Saline	1 M	500 mL	**12001-710**	**226.00**
L-Glutamine, Supplied at 29.3 mg/mL in 0.85% Saline	200 mM	100 mL	**12001-698**	**18.00**
Phosphate Buffered Saline	1X, 0.0067 M	500 mL	**12001-676**	**13.90**
Phosphate Buffered Saline	1X, 0.0067 M	1 L	**12001-678**	**19.00**
Phosphate Buffered Saline	10X, 0.0067 M	1 L	**12001-680**	**20.50**
Trypan Blue, 0.4% Prepared in 0.85% Saline	—	100 mL	**12002-038**	**13.80**
Trypsin-Versene (EDTA) Mixture, Contains 0.5 g/L Trypsin 1:250 and 0.2 g/L Versene (EDTA)	1X	100 mL	**12001-660**	**7.70**
Versene (EDTA), 0.2 g/L Ethylenediaminetetraacetic Acid (0.53 mM) in DPBS	0.02%	100 mL	**12001-704**	**9.60**
Water for Cell Culture	—	500 mL	**12001-356**	**10.00**
Water for Cell Culture	—	1 L	**12001-706**	**13.90**
Water for Cell Culture	—	20 L	**12002-050**	**169.00**

Lonza

Luminescent Cell-Based Assays, Lonza

- Detect as few as ten dead eukaryotic cells per well allowing lower seeding densities and more assays
- No separate mixing or centrifugation steps
- Highly reproducible results
- Samples can be processed and analyzed in <10 minutes in a 96-well plate
- Also compatible with 284-well plates

ToxiLight® Non-Destructive Cytotoxicity BioAssay Kit

- Cytolysis assay kit designed to measure the release of adenylate kinase (AK)
- Allows for kinetic analysis of cell death to be performed on the original cells
- Gives earlier indication of leaky membrane than LDH assays

ViaLight® Cell Proliferation & Cytotoxicity BioAssay Kit

- Incorporates bio-luminescent detection of cellular ATP as a measure of viability
- Most accurate, effective, and direct way to measure the number of living cells in a culture

Description	No. of Tests	Cat. No.	Price
ToxiLight Kit	500	**89125-774**	**209.00**
ToxiLight Kit	1,000	**89125-776**	**370.00**
ViaLight Plus Kit	500	**89125-756**	**190.00**
ViaLight Plus Kit	1,000	**89125-758**	**341.00**
ViaLight Plus Kit	10,000	**89125-760**	**2492.00**
Proliferation and Cytotoxicity Kit ViaLight MDA Plus, Microbial	1,000	**89125-770**	**369.00**
Proliferation and Cytotoxicity Kit ViaLight MDA Plus, Microbial	10,000	**89125-772**	**2559.00**

FOCUS Information

The ToxiLight BioAssay kit exploits the fact that AK is released from cells when they die, removing the need for cell lysis. Repeated samples of supernatant can therefore be taken over time without disrupting the cells themselves.

BD Cell Culture Reagents, BD™

- For additional sizes, contact your VWR Sales Representative

Description	Size	Cat. No.	Each
BD ITS Premix Universal Culture Supplement (20 L Equivalent)	20 mL	47743-624	315.01
BD MITO™+ Serum Extender (5 L Equivalent)	5 mL	47743-630	135.69
BD NuSerum™ Growth Medium Supplement	500 mL	47743-700	138.03
BD NuSerum IV Growth Medium Supplement	500 mL	80089-542	245.38
Bovine Pituitary Extract (BPE)	5 x 15 mg	47743-704	253.66
ECGS, Bovine	15 mg	62405-784	83.77
ECGS, Bovine	100 mg	47743-652	264.29
EGF, Human, Recombinant	100 µg	47743-566	140.39
EGF, Mouse, Natural, Culture Grade	100 µg	62405-786	123.87
bFGF, Human, Recombinant	10 µg	47743-574	175.79
IL-2, Human, Recombinant	10,000 Units	47743-742	153.38
IL-2, Human, Recombinant	50,000 Units	47743-662	493.17
IL-3, Mouse, Recombinant	10 µg	47743-668	358.66
IL-3 Cell Culture Supplement, Mouse	25 mL	47743-646	215.10
IL-4, Human, Recombinant	5 µg	47743-746	205.29
2.5S NGF, Mouse Natural	1 mg	47743-592	1277.74
7S NGF, Mouse Natural	100 µg	47743-594	185.22
TGF-ß, Human, Natural	10 µg	47743-608	1300.29
T-STIM™(IL-2 Supplement) with ConA, Rat	100 mL	47743-642	450.69
VEGF, human recombinant	10 µg	47743-610	454.18

Antibiotics and Antimycotics, Lonza

Description	Size	Cat. No.	Each
Amphotericin B			
250 µg/mL	20 mL	12002-034	22.70
250 µg/mL	100 mL	12002-032	67.90
Gentamicin Sulfate			
10 mg/mL; Screw Cap Vial	10 mL	12001-688	10.80
10 mg/mL; Screw Cap Vial	10 x 10 mL	12001-686	107.00
50 mg/mL; Crimp Top Vial	10 mL	12001-690	37.70
50 mg/mL; Screw Cap Vial	10 mL	12001-684	36.80
50 mg/mL; Screw Cap Vial	10 x 10 mL	12001-682	293.00
Penicillin-Streptomycin Mixtures			
Contains 5000 Units Potassium Penicillin and 5000 µg Streptomycin Sulfate per mL in 0.85% Saline	100 mL	12001-350	13.90
Contains 10,000 Units Potassium Penicillin and 10,000 µg Streptomycin Sulfate per mL in 0.85% Saline	100 mL	12001-692	14.90
Contains 10,000 Units Potassium Penicillin and 10,000 µg Streptomycin Sulfate per mL in 0.85% Saline	500 mL	12001-694	72.00
Contains 25 µg Fungizone, 10,000 Units Potassium Penicillin, and 10,000 µg Streptomycin Sulfate per mL in 0.85% Saline	20 mL	12001-714	13.70
Contains 25 µg Fungizone, 10,000 Units Potassium Penicillin, and 10,000 µg Streptomycin Sulfate per mL in 0.85% Saline	100 mL	12001-712	24.90
Contains 20,000 Units Potassium Penicillin and 20,000 µg Streptomycin Sulfate per mL in 0.85% Saline	500 mL	12001-324	44.90
Contains 25,000 Units Potassium Penicillin and 25,000 µg Streptomycin Sulfate per mL in 0.85% Saline	25 x 4.5 mL	12001-354	204.00
Contains 29.2 mg L-Glutamine, 25,000 Units Potassium Penicillin, and 25,000 µg Streptomycin Sulfate per mL in 0.85% Saline	25 x 4.5 mL	12001-352	173.00

Hyclone® Antibiotics and Selection Agents, Thermo Scientific

- Designed to identify, control, and destroy destructive microorganisms
- A fast and reliable method for combating antimicrobial agents

Description	Size	Cat. No.	Each
Amphotericin B Fungizone	50 mL	82026-728	18.37
G418 Sulfate Solution, 50 mg/mL	20 mL	82026-712	134.15
G418 Sulfate, >90% Purity	5 g	82026-708	384.20
Gentamycin Solution, 50 mg/mL	10 x 10 mL	82026-732	389.41
Pen/Strep Fungizone Solution (100X)	100 mL	82026-730	29.95
Puromycin Dihydrochloride	100 mg	82026-726	273.49

Identifying and Correcting Common Cell Growth Problems

John A. Ryan, Ph.D., Corning Incorporated

The following is an excerpt from the more detailed document of the same name found on the vwr.com literature page.

Introduction

Although very popular among life science researchers, cell culture can be a very difficult tool to work with in the laboratory. Unlike other common laboratory tools such as electrophoresis or chromatography, cell culture makes dynamic, ongoing use of living organisms. These living cultures often respond to our mistakes not only by the erratic behavior common to other laboratory tools, but by dying - the total, irreplaceable destruction of the tool itself.

Because of the complex nature of cell culture, identifying the underlying causes of culture behavior problems is often a difficult, time-consuming task. Erratic culture behavior can take many forms; unusual growth patterns or inconsistent, spotty, and uneven cell attachment are the most common problems. Gradual or abrupt changes in growth rate or unexplainable experimental results are also experienced occasionally. In cell culture, any sudden change is suspect and a potential problem and, therefore, to be avoided.

Surface Treatment Process

The initial and most common suspects for cell culture problems are usually either the culture vessels or the medium being used. Much of the suspicion surrounding plastic cell culture vessels is due to the mystery or lack of understanding concerning the special treatment process used to modify the surface of the plastic. Virgin polystyrene, the resin used to manufacture most cell culture vessels, is hydrophobic in its untreated state. Protein attachment factors do not bind well to this natural surface resulting in poor cell adhesion and growth. Because of this, either a corona discharge or plasma treatment is used under carefully controlled conditions during the manufacturing process to insert oxygen atoms (in the form of carboxyl groups) into the backbone of the polystyrene chain (Ramsey et al, 1984; Amstein and Hartman,1975; Hudis, 1974). This alteration of the plastic polymer (not a peelable coating) results in a hydrophilic surface with a net negative charge that creates a surface suitable for cell attachment and growth. The culture vessels are then sterilized and thoroughly evaluated by quality control tests to insure they received the proper degree of treatment.

Since this modified surface is not visibly different from the untreated surface, there is no easy way, short of growing cells, for customers to check the adequacy of the treatment process. As a result, many customers assume cell attachment and growth problems are caused by mistakes made during manufacturing. It is

MANAGEMENT BY PREVENTION IS THE KEY TO SUCCESSFUL MEDIA PRODUCTION

very important that the plastic culture vessel's status as the suspected cause of the problem be resolved as quickly as possible so the real cause can be identified and eliminated. Usually, the first step is comparing the performance of the suspected vessel against the same product from a different production lot, or against similar products from another manufacturer. If a difference is found or the results are not clear, then it is time to contact the product manufacturer for assistance. Once the vessel is eliminated as the problem's cause, the customer can then continue to look elsewhere for a solution. The following examples will help identify some common problems and causes often incorrectly associated with poor surface treatment of plastic vessels and, where possible, will offer some solutions that can be used to eliminate them.

Problems Related to Technique

The greatest opportunity for cell culture problems occurs during the day-to-day activities of feeding and maintaining the cultures. Culture loss due to contamination is one of the most frequent and more serious of these problems. However, many other problems, while less serious and not as noticeable as contamination, still adversely affect the cultures and experiments. Often, the first sign that something is wrong occurs when the cells are microscopically examined and uneven or unusual patterns of cell attachment or growth are observed. Identifying the problem's cause is the first and usually most difficult step. Sometimes transient growth problems occur and then disappear without ever identifying a cause. Please note that many of these growth problems are not readily observed during routine microscopic observation of live cultures. The occurrence and extent of these problems is best observed when sample cultures are first fixed (2.5% gluteraldehyde or 70% ethanol) and stained (1% crystal violet stain) prior to observation.

Problems Related to Culture Media

Both culture medium and culture vessels are prime suspects whenever mysterious cell growth or attachment problems occur without obvious causes. Unless heavily contaminated, good culture medium is not visibly different in appearance from defective culture medium. The only good way to determine medium quality is to attempt to grow cells with it; this is the basic quality control procedure used by most media manufacturers and the only good method for homemade media as well.

Cell cultures respond to deficient or toxic media in different ways depending upon both the nature and the degree of the problem. These responses can range from minor changes in growth rate or cell attachment to the total destruction of the culture. Determining if the medium is responsible for a problem is relatively easy; simply test the suspected batch against a sample proven effective. Determining why the medium is defective is extremely difficult due to the numerous reagents and complex steps involved. Therefore, time and energy are much better spent preventing media problems than trying to find and fix them later; management by prevention is the key to successful media production.

Vibration-induced concentric ring pattern in a 100mm dish.

Problem Solving Suggestions

Many other problems can and will occur. Below are some recommended steps that can be used to help identify cell culture problems and find their causes:

1. Clearly identify and define the problem. It may require additional testing to repeat or duplicate the problem. It helps to make this a team effort, utilizing everyone in the laboratory whose knowledge or experience might contribute any helpful information.
2. It often helps to break up complex problems into smaller pieces that can be handled and understood more easily.
3. Organize all known facts surrounding the problem. Be specific, look for cause and effect relationships and then discard all facts that clearly do not apply and work with the rest. Don't overlook the obvious. A problem well stated is a problem half solved.
4. Once there is a clear understanding of the problem, begin looking for the cause. Try to avoid the urge to fix problems by changing everything; it may worsen the situation or mask the original problem.
5. Brainstorm and search for all the possible causes. Identify all changes that have occurred in the lab, in the cultures, in media, solutions, etc. that may relate to the problem. Good record keeping is essential for this step. Then select the best possibilities and begin to evaluate if they are actually contributing to the problem. Be creative! This may require some testing and experimentation.
6. Determine and implement the best long-term solution, not only to fix the problem but also to minimize or prevent any chance of a recurrence of the problem. This will take very careful planning.

Media Selection Guide

VWR has gathered some of the biggest names in cell culture media in one place, so you can access the best products available. Products include:

	Antibiotics	Antibodies	Buffers, Buffered Salines, & Reagents	Classical Media	Growth Factors	Sera	Specialty Media	Transfection Reagents
Abgent		✔						
AMRESCO	✔		✔					
Enzo		✔						
BD	✔				✔			
BioLegend		✔						
Diagnostic Biosystems		✔			✔			
EMD	✔	✔	✔		✔			✔
G-Biosciences	✔	✔				✔		
GE Healthcare		✔						
GenScript		✔						
HiMedia				✔			✔	
MP Biomedicals		✔			✔	✔		
KPL		✔						
Lonza	✔		✔	✔		✔	✔	
Mediatech	✔		✔	✔		✔	✔	
PAA					✔	✔		
Polyplus								✔
Rockland		✔						
Thermo Hyclone			✔	✔		✔	✔	
Thermo Pierce		✔						
Trevigen		✔			✔			

Distributor
GE Healthcare

FOCUS Information

Streamline your laboratory operations and improve throughput with the Whatman Klari-Flex bottle top filtration system. Designed for filter sterilization of liquids such as cell culture media, biological fluids and buffers, the Klari-Flex system includes a stable, low-profile pedestal base with a permanent vacuum hose connection. This feature eliminates a time-consuming and inconvenient step in your process — connecting and disconnecting the vacuum to each filter unit. With Klari-Flex, connect the vacuum once to the pedestal base. Each time a new filtration unit is placed on the base, Drop-Connect technology ensures that the vacuum connection is automatic.

Whatman™ Klari-Flex™ Bottle-Top Filtration System, GE Healthcare

- Permanent vacuum hose connection increases throughput and convenience
- Fast connection of filter to base decreases set-up time
- Ergonomically designed, large bottle cap accommodates labeling information and acts as a handle for safe transport of bottles
- Drop-Connect technology ensures fail-safe unit placement in base and automatic vacuum line connection
- Smaller filter sizes (15 and 50mL units) are now available; contact your VWR Sales Representative for more information

Receiver Capacity, mL	Pore Size, µm	Cat. No.	Pack of
Funnel/Bottle Filtration Units			
250	0.22	**97034-720**	12/ **58.99**
500	0.22	**97034-722**	12/ **91.16**
1000	0.22	**97034-724**	12/ **131.38**
250	0.45	**97034-726**	12/ **58.99**
500	0.45	**97034-728**	12/ **91.16**
1000	0.45	**97034-730**	12/ **131.38**
Funnels Only			
250	0.22	**97034-732**	12/ **47.88**
500	0.22	**97034-734**	12/ **68.85**
1000	0.22	**97034-736**	12/ **110.91**
250	0.45	**97034-738**	12/ **47.88**
500	0.45	**97034-740**	12/ **68.85**
1000	0.45	**97034-742**	12/ **110.91**
Sterile Bottles (Receivers) Only			
250	—	**97034-744**	24/ **47.88**
500	—	**97034-746**	24/ **68.85**
1000	—	**97034-748**	24/ **110.91**
Accessories			
Pedestal Stand	—	**97034-752**	1/ **845.65**
Cradle Ring	—	**97034-750**	1/ **208.52**

Thermo SCIENTIFIC | NALGENE®

Nalgene® MF75™ Vacuum Filter Units, Thermo Scientific

- Ideal for biological and pharmaceutical sterilization requirements
- Choose from either a Supor® machV or standard polyethersulfone membrane
- Supor machV membranes are extremely clean, low-extractable, fast-flowing, and asymmetric for excellent throughput and low protein binding
- Membranes with a 0.1µm pore size protect against mycoplasma contamination
- Filters have side arms fitted with quick-disconnect tubing adapters and graduated upper chambers
- Units are radiation sterilized; certified noncytotoxic and nonpyrogenic

Receiver Capacity, mL	Pore Size, µm	Membrane Dia., mm	Cat. No.	Case of
Complete Units with Supor machV PES Membrane				
115	0.2	50	**73520-980**	72/ **449.15**
150	0.2	50	**73520-982**	12/ **81.46**
250	0.2	50	**73520-988**	12/ **105.48**
500	0.2	75	**73520-984**	12/ **177.78**
500	0.2	90	**73520-990**	12/ **191.43**
1000	0.2	90	**73520-986**	12/ **239.08**
Complete Conical Filter Unit with Supor machV PES Membrane				
50	0.2	50	**82030-938**	12/ **75.09**
Complete Units with Standard PES Membrane				
150	0.1	50	**97014-830**	12/ **79.56**
250	0.1	50	**97014-832**	12/ **103.45**
500	0.1	75	**97014-834**	12/ **173.78**
115	0.45	50	**28199-048**	72/ **427.15**
150	0.45	50	**16211-053**	12/ **81.83**
250	0.45	50	**16211-061**	12/ **107.01**
500	0.45	75	**16211-054**	12/ **177.90**
500	0.45	90	**16211-064**	12/ **201.47**
1000	0.45	90	**16211-056**	12/ **246.41**

Nalgene® MF75™ Bottle-Top Vacuum Filter Units, Thermo Scientific

- Surfactant-free cellulose acetate (SFCA) membrane filters are much cleaner than standard cellulose acetate
- Membranes are designed for use with glass media bottles
- Polystyrene filter design features molded graduation and a support plate that minimized foaming
- Quick-disconnect sidearm accepts 1/4-3/8" tubing
- Units are radiation sterilized
- Units are radiation sterilized; certified noncytotoxic and nonpyrogenic

Capacity, mL	Membrane Diameter, mm	Fits Neck Size, mm	Cat. No.	Case of 12
Membrane with 0.2 µm Pore Size				
150	50	33	**28199-296**	**78.19**
150	50	45	**28199-300**	**78.19**
500	75	33	**28199-303**	**109.54**
500	75	45	**28199-307**	**109.54**
1000	90	33	**28199-312**	**174.90**
1000	90	45	**28199-317**	**174.90**
Membrane with 0.45 µm Pore Size				
150	50	33	**28199-298**	**78.19**
150	50	45	**28199-302**	**78.19**
500	75	33	**28199-305**	**109.54**
500	75	45	**28199-309**	**109.54**

Vacuum Filter/Storage Systems, Corning

- Ideal for tissue culture solution, biological fluids, or other aqueous solutions
- Units feature stable profile reciever bottle with easy-grip sides and angles hose adapter to minimize tipping
- Receiver converts to storage bottle by replacing the filter with a sterile plug seal cap
- Pore size and membrane type are printed on each unit
- Sterilized by gamma radiation; certified nonpyrogenic

Pore Size, µm	Filtration Area, cm^2	Funnel Cap, mL	Cat. No.	Case of 12
Polyethersulfone Membrane				
0.22	13.6	150	**29442-936**	**85.40**
0.22	19.6	250	**28199-764**	**95.54**
0.22	33.2	500	**28199-778**	**157.75**
0.22	54.5	1000	**28199-792**	**234.45**
Cellulose Acetate Membrane				
0.22	13.6	150	**29442-938**	**87.96**
0.22	19.6	250	**28199-774**	**95.41**
0.22	33.2	500	**28199-788**	**162.48**
0.22	54.5	1000	**28199-812**	**240.03**
0.45	13.6	150	**29442-940**	**87.96**
0.45	19.6	250	**28199-776**	**95.48**
0.45	33.2	500	**29552-016**	**162.48**
0.45	54.5	1000	**28199-814**	**240.03**
Cellulose Nitrate Membrane				
0.2	33.2	500	**28199-784**	**161.01**
0.2	54.5	1000	**28199-798**	**237.05**
Nylon Membrane				
0.2	33.2	500	**28199-780**	**171.44**
0.2	54.5	1000	**28199-794**	**252.00**

VWR® Vacuum Filtration Systems

- System incorporates a large membrane area and low center of gravity for fast sample processing
- Polyethersulfone (PES) membrane offers fast liquid flow rates and low protein binding
- Funnel base and cap feature convenient finger tabs
- Sterilized by gamma radiation

Receiver Capacity, mL	Cat. No.	Pack of 12
Systems with 0.2 µm PES Membrane		
150/250	**87006-062**	**107.80**
500	**87006-064**	**137.08**
1000	**87006-066**	**176.26**
Systems with 0.45 µm PES Membrane		
150/250	**87006-068**	**120.33**
500	**87006-070**	**139.82**
1000	**87006-072**	**176.26**

VWR® Syringe Filters

- Ideal for sterile filtration of buffers, tissue culture media or additives, and other biologicals
- Polyethersulfone filters offer high flow rates
- Features male Leur slip and female Leur-lock connections
- Acrylic housing
- Biosafe according to Class VI plastics tests
- ISO 9001 certified
- Diameter: 25mm (1")

Pore Size, µm	Cat. No.	Case of
Cellulose Acetate Membrane Filters		
0.2	**28145-477**	50/ **119.23**
0.2	**28145-475**	100/ **206.36**
0.45	**28145-481**	50/ **118.98**
0.45	**28145-479**	100/ **206.36**
Polyethersulfone Membrane Filters		
0.2	**28145-501**	50/ **125.68**
0.2	**28145-499**	100/ **182.17**
0.45	**28145-505**	50/ **127.61**
0.45	**28145-503**	100/ **184.95**

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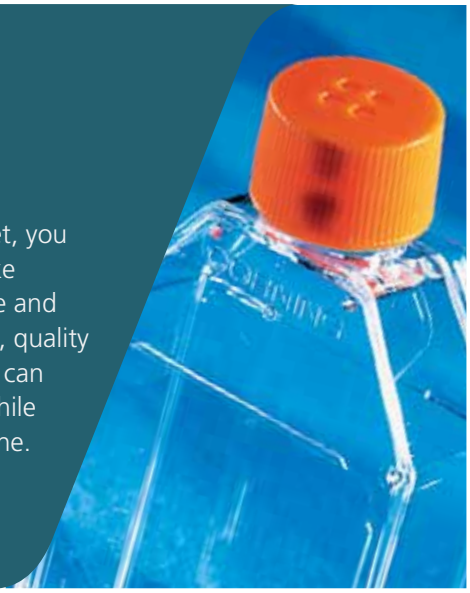
FOCUS Information

In the race to bring new drugs, therapies, and vaccines to market, you rely on innovative tools that make your research more cost-effective and efficient. Corning's leading-edge, quality scale-up and bioprocess product can help you improve productivity while keeping an eye on the bottom line. Their flask and vessel options will help you move quickly from R&D to production.



CORNING

CellBIND® Flasks, Corning

- CellBIND surface treatment incorporates more oxygen into the surface, making the surface more stable
- Surfaces are nonbiological and require no special handling or storage
- Sterilized with gamma irradiation; certified nonpyrogenic

Growth Area, cm²	Neck Style	Cap Type	Cat. No.	Case of
Low Profile Flasks				
100	Canted	Vented	**89089-832**	60/ **341.48**
Standard Flasks				
25	Canted	Vented	**46610-076**	200/ **469.97**
75	Canted	Vented	**46610-078**	100/ **441.59**
150	Canted	Vented	**46610-080**	50/ **363.19**
175	Angled	Phenolic	**22250-136**	50/ **363.03**
175	Angled	Vented	**46610-082**	50/ **377.86**
225	Angled	Vented	**46610-084**	25/ **247.00**
Standard Flasks with Bar Code				
175	Angled	Vented	**22250-134**	84/ **730.02**

Corning® Polystyrene Tissue Culture Flasks

- Treated for optimum cell attachment and growth
- Triangular flasks provide increased stability and better pipet access
- Canted-neck flasks feature a skirt to prevent tipping
- Plug seal caps can be used in open and closed systems
- Vented caps allow efficient gas exchange and minimize contamination
- Lot numbers are printed on the flasks for easy traceability
- Sterilized with gamma irradiation; certified nonpyrogenic

Growth Area, cm²	Neck Style	Cap Type	Packaging	Cat. No.	Case of
Triangular Flasks					
25	Angled	Phenolic	20/Sleeve	**29442-020**	500/ **865.73**
25	Angled	Vented Filter	10/Sleeve	**29442-002**	200/ **428.37**
75	Straight	Phenolic	5/Sleeve	**29442-028**	100/ **387.33**
75	Straight	Vented Filter	5/Sleeve	**29442-008**	100/ **391.79**
Rectangular Flasks					
25	Canted	Plug	20/Sleeve	**29186-002**	500/ **881.84**
25	Canted	Phenolic	20/Sleeve	**29186-024**	500/ **881.84**
25	Canted	Vented Filter	20/Sleeve	**29186-010**	200/ **388.81**
75	Canted	Plug	5/Sleeve	**29186-080**	100/ **364.29**
75	Canted	Phenolic	5/Sleeve	**29186-104**	100/ **364.29**
75	Canted	Vented Filter	5/Sleeve	**29186-105**	100/ **370.54**
100	Canted	Vented Filter	6/Sleeve	**89089-710**	60/ **224.46**
150	Canted	Plug	5/Sleeve	**29186-160**	50/ **306.86**
150	Canted	Phenolic	5/Sleeve	**29186-192**	50/ **306.86**
150	Canted	Vented Filter	5/Sleeve	**29186-106**	50/ **301.42**
175	Angled	Plug	5/Sleeve	**89090-948**	50/ **315.83**
175	Angled	Phenolic	5/Sleeve	**29560-969**	50/ **313.70**
175	Angled	Vented Filter	5/Sleeve	**89090-950**	50/ **311.24**
175	Angled	Vented Filter	7/Sleeve	**10010-366**	84/ **606.24**
225	Angled	Plug	5/Sleeve	**29186-199**	50/ **206.45**
225	Angled	Vented Filter	5/Sleeve	**29560-959**	25/ **208.44**

Treated Cell Culture Flasks, Corning

- Treated for optimum cell attachment and growth
- Lot number is printed on flasks for traceability
- Sterilized with gamma irradiation; certified nonpyrogenic

Growth Area, cm²	Neck Style	Cat. No.	Case of
Phenolic-Style Polyethylene Caps			
162	Straight	**29442-024**	25/ **158.14**
225	Canted	**29442-014**	24/ **202.93**
Vented-Style Polyethylene Caps			
162	Straight	**29442-004**	25/ **156.07**
225	Canted	**29442-000**	24/ **200.00**

Polystyrene Cell Culture Flasks, Corning

- Constructed from optically clear virgin polystyrene
- Untreated flasks are printed with lot numbers for easy traceability
- Feature a canted neck and vented cap
- Sterilized with gamma irradiation; certified nonpyrogenic

Growth Area, cm^2	Cat. No.	Case of
25	**89092-698**	200/ **363.34**
75	**89092-700**	100/ **341.76**
150	**89092-702**	50/ **281.48**
175	**89092-704**	50/ **292.22**

CELLSTAR® Tissue Culture Flasks, Greiner Bio-One

- Canted-neck flasks are manufactured in an asceptic, fully automated facility
- Made from high-quality virgin polystyrene resin for optical clarity
- Adherent flasks are tissue-culture treated
- All 550mL flasks feature a low-profile design; all 650mL flasks feature a high-profile design
- Sterilized by gamma radiation

Volume, mL	Growth Area, cm^2	Cap Type	Cat. No.	Case of
Adherent Flasks				
50	25	Filter	**82051-074**	200/ **304.73**
50	25	Plug	**82051-070**	200/ **270.60**
250	75	Filter	**82050-856**	120/ **372.59**
250	75	Plug	**82050-854**	120/ **339.30**
550	175	Filter	**82050-872**	50/ **271.33**
550	175	Plug	**82050-870**	50/ **226.04**
650	175	Filter	**82050-878**	40/ **214.79**
650	175	Plug	**82050-876**	40/ **203.18**
Suspension Flasks				
50	—	Filter	**82051-078**	200/ **248.66**
50	—	Plug	**82051-076**	200/ **225.60**
250	—	Filter	**82050-860**	120/ **297.89**
250	—	Plug	**82050-858**	120/ **203.27**
550	—	Plug	**82050-874**	50/ **211.60**
650	—	Filter	**82050-882**	40/ **173.99**
650	—	Plug	**82050-880**	40/ **162.64**

RoboFlask™ Cell Culture Vessels, Corning

- For use in manual or automated protocols
- Feature a standard microplate footprint and bar code
- Polystyrene surfaces are treated for tissue culture
- Growth area: 96.2cm^2
- Sterilized with gamma irradiation; certified nonpyrogenic

Neck Style	Cap Type	Packaging	Cat. No.	Case of
Standard Tissue Culture-Treated Vessels				
Straight	Flat	10/Sleeve	**22250-130**	50/ **239.18**
Straight	Flat	20/Sleeve	**22250-126**	100/ **471.13**
Straight	Septum	10/Sleeve	**22250-128**	50/ **239.18**
Straight	Septum	20/Sleeve	**89089-874**	100/ **466.22**
CellBIND®-Treated Vessels				
Short	Septum	20/Sleeve	**89089-852**	100/ **598.16**

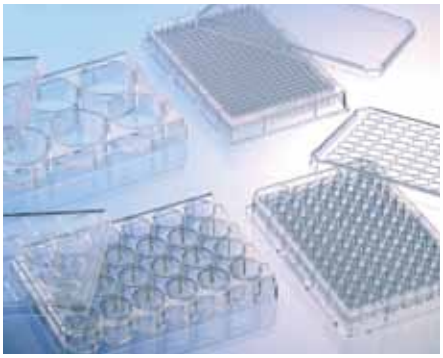
CellBIND® Multiwell Plates, Corning

- Surface treatment improves cell attachment by incorporating more oxygen into the cell culture surface
- CellBIND surfaces are nonbiological and require no special handling or storage
- Plates are made from virgin polystyrene and feature clear, flat bottoms
- Round-bottom wells have individual alphanumeric codes for easy identification
- Supplied with nonreversible lid with condensation rings to reduce contamination
- Sterilized by gamma radiation; certified nonpyrogenic

No. of Wells	Well Volume, mL	Cell Growth Area, cm^2	Cat. No.	Case of 50
6	16.8	9.5	**22250-140**	**160.45**
24	3.4	1.9	**22250-144**	**203.31**

greiner bio-one

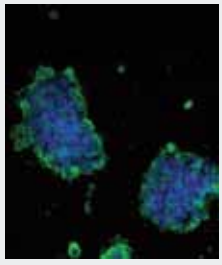
CELLSTAR® Tissue Culture Plates, Greiner Bio-One

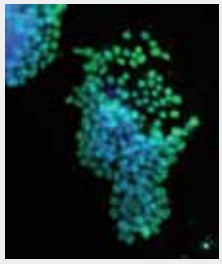


- Chimney well plates reduce the possibility of cross-contamination
- Individual well rims rise above the surface of the plate to aid in sealing by cap mat, thermal sealer, or adhesive sealer
- Excellent heat exchange during incubation is ensured through air circulation spaces between stacked plates
- 384-well plates feature a rounded square well top to minimize wicking, yet provide increased surface area
- Plates feature flat-bottom wells
- DNase-, RNase-, and human-DNA free
- Sterilized by gamma radiation; noncytoxic and nonpyrogenic

No. of Wells	Working Well Volume	Lid Type	Packaging	Cat. No.	Case of
6	2–5 mL	with Condensation Rings	Individually Wrapped	**82050-842**	100/ **221.56**
6	2–5 mL	with Condensation Rings	5/Sleeve, 24 Sleeves/Case	**82050-844**	120/ **259.06**
12	2–4 mL	with Condensation Rings	Individually Wrapped	**82050-930**	100/ **265.64**
12	2–4 mL	with Condensation Rings	5/Sleeve, 24 Sleeves/Case	**82050-928**	120/ **312.44**
24	0.5–1.5 mL	with Condensation Rings	Individually Wrapped	**82050-892**	100/ **277.18**
24	0.5–1.5 mL	with Condensation Rings	5/Sleeve, 24 Sleeves/Case	**82050-894**	120/ **326.33**
48	0.5–1 mL	with Condensation Rings	Individually Wrapped	**82051-004**	100/ **348.91**
48	0.5–1 mL	with Condensation Rings	5/Sleeve, 24 Sleeves/Case	**82051-002**	120/ **411.81**
96	25–340 µL	with Condensation Rings	Individually Wrapped	**82050-771**	100/ **216.83**
96	25–340 µL	with Condensation Rings	10/Sleeve, 16 Sleeves/Case	**82051-596**	160/ **542.84**
96*	25–340 µL	Black, Standard	8/Sleeve, 4 Sleeves/Case	**89135-048**	32/ **246.16**
384	10–130 µL	Clear, Standard	8/Sleeve, 4 Sleeves/Case	**82051-304**	32/ **139.06**
384*	10–130 µL	Black, Standard	8/Sleeve, 4 Sleeves/Case	**82051-282**	32/ **285.76**

*Plates feature µClear® bottoms for clear viewing and minimized autofluorescence.





ES-D3 cell line has been cultivated on Advanced TC™ surface in LIF containing stem cell media. 4 days after seeding expression of the surface marker SSEA-1 (A) and transcription factor Oct-4 (B) has been analyzed using a mouse-anti-SSEA-1 or rabbit-anti-Oct-4 antibody detected by the respective Alexa 488 coupled secondary antibody and a DAPI counter stain.

Improved Surfaces for Different Cell Culture Applications

Classical applications in cell biology such as the cultivation and manipulation of immortalized cells in adherent and suspension culture became standard practice in laboratories around the world.

With the CELLSTAR® product line, Greiner Bio-One offers the ultimate solution for these classical and standard cell culture techniques. Featuring high quality and reliability through the use of virgin ultrapure, non-cytotoxic polymers, CELLSTAR® products are available in a broad spectrum of formats that covers the entire range of applications in cell biology, including the propagation of cells, performance of cell-based assays, and elementary imaging procedures.

An essential requirement for culturing cells in vitro is a surface substrate that provides a basis for firm attachment of anchorage-dependent cells under in vitro culture conditions. Besides physically treated culture vessels, protein-coated culture vessels are widely used in cell culture to increase cell adhesion, differentiation, vitality, and proliferation.

Two types of proteins/polypeptides are used to coat polystyrene surfaces for this purpose.

- Extracellular matrix proteins – like Collagen Type I, Fibronectin, and Laminin – mediate specific binding of the cell to the protein.
- Fibronectin and Laminin exhibit a binding sequence – the R-G-D (Arg-Gly-Asp) motif – known to bind to the integrin receptor of the cell. This heterodimeric cell surface adhesion receptor not only regulates binding between cell and substrate, it also triggers signaling pathways that direct cellular processes such as proliferation, survival, differentiation, and migration.

Greiner Bio-One offers coated surfaces with natural proteins and synthetic polypeptides – like Collagen Type I, Fibronectin, Laminin, and Poly-Lysine for the cultivation of specific cell lines and various experimental procedures.

Poly-D-Lysine, a synthetically produced biomolecule, belongs to the non-specific adhesion-promoting polypeptides. Poly-Lysine enhances the attachment of cells by generating a positive charge on the surface and is frequently used to promote cell adhesion.

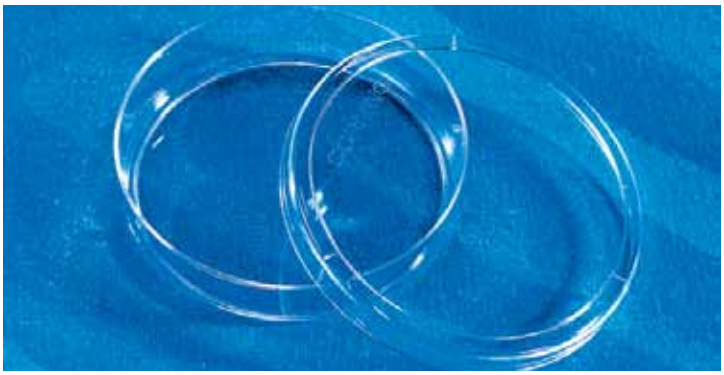
The applications in Poly-Lysine-coated culture vessels include the integration of washing steps in an experimental setup, the cultivation of cells under serum-free or serum-reduced conditions, or the transfection of cells. It has been proven that Poly-D-Lysine (PDL)-coated surfaces provide beneficial advantages when culturing neuronal cell lines with respect to both viability and proliferation.

For the cultivation of fastidious cells or cells cultivated under restricted growth conditions, Greiner Bio-One also offers the Advanced TC™ polymer modification. Based on an innovative physical treatment, the cell culture surface is modified to positively influence cellular features and functions and improve cell adherence for optimal growth conditions. Even embryonic stem cell cultivation can be completed without any risk of cross-contamination and pathogen spreading caused by feeder cells or biological coatings. In addition to the positive effects during general cell propagation, Advanced TC™ also supports neuronal differentiation and long term cultivation.

CELLSTAR® Tissue Culture Dishes, Greiner Bio-One

- Polystyrene plates are treated for optimal cell attachment and proliferation
- Vented for uniform gas exchange
- Nonpyrogenic, RNase-, and DNase-free

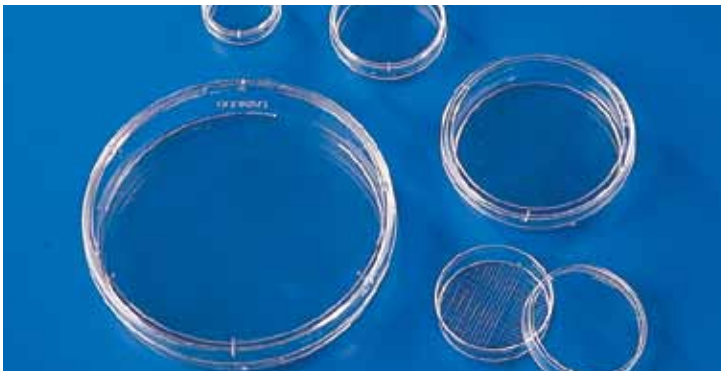
Dia. x H, mm	Growth Area, cm²	Cat. No.	Case of
35 x 10	8.7	**82050-538**	740/ **380.03**
60 x 15	21	**82050-546**	600/ **341.61**
94 x 16	58	**82050-580**	480/ **520.66**
100 x 20	58	**82050-916**	360/ **430.41**
145 x 20	145	**82050-598**	120/ **273.46**



CellBIND® Culture Dishes, Corning

- CellBIND surface treatment improves cell attachment by incorporating more oxygen into the cell culture surface
- Surfaces are nonbiological and require no special handling or storage
- Petri-style, disposable polystyrene dish features vents to allow consistent gas exchange
- Stacking beads assist in handling
- Sterilized by gamma radiation; certified nonpyrogenic

Dia. x H, mm	Growth Area, cm²	Growth Surface, mm	Cat. No.	Case of 40
100 x 20	55	83.8	**89089-840**	**72.06**



Corning™ Tissue Culture Dishes

- Specially treated for optimal growth of anchorage dependent cells
- Vents are designed for consistent gas exchange in open culture procedures
- Disposable polystyrene dishes are sterilized by gamma radiation
- Certified nonpyrogenic

Dia. x H, mm	Growth Area, cm²	Growth Surface, mm	Packaging	Cat. No.	Case of
Round Dishes					
35 x 10	8	33.9	20/Sleeve	**25382-348**	500/ **302.39**
60 x 15	21	51.4	20/Sleeve	**25382-392**	500/ **449.06**
60 x 15	21	51.4	10/Sleeve	**25382-381**	500/ **352.31**
100 x 20	55	80.5	20/Sleeve	**25382-428**	500/ **755.98**
100 x 20	55	80.5	10/Sleeve	**25382-439**	480/ **724.23**
150 x 25	148	138.7	5/Sleeve	**25382-442**	60/ **177.44**
Square Dishes					
245 x 25	500	224	4/Sleeve	**29186-489**	16/ **318.71**

FOCUS Information

The Nunclon™ Δ polystyrene surface is certified for monolayer formation with two different cell lines and a primary cell culture. Cloning efficiency is performed with a specially selected cell line that has a high sensitivity to the presence of any toxic compounds.

Thermo SCIENTIFIC | nunc™

Nunclon™ Δ Dishes, Thermo Scientific

- High optical clarity dishes effectively support adherent cell lines for research and industry
- Top and bottom stacking rings provide easy handling
- Sterile

Dimensions, mm	Growth Area, cm²	Bottom I.D., mm	Dishes/ Sleeve	Cat. No.	Case of
Vented Dishes, with Grid					
35 dia. x 10L	8.8	35	20	**62407-124**	500/ **370.45**
60 dia. x 15L	21.5	52	10	**25382-336**	400/ **354.29**
Vented Dishes, without Grid					
35 dia. x 10L	8.8	33	10	**25382-334**	500/ **314.93**
60 dia. x 15L	20.5	51	10	**25382-330**	400/ **285.66**
100 dia. x 15L	56.7	136	10	**25382-328**	450/ **664.18**
100 dia. x 20L	56.7	86	10	**62407-132**	480/ **721.66**
140 dia. x 20L	145	136	10	**25382-335**	80/ **248.31**
Standard Unvented Dishes					
35 dia. x 10L	8.8	33	10	**25382-331**	500/ **313.92**
60 dia. x 15L	18.1	48	10	**25382-332**	400/ **284.65**
245W x 245L x 25H	500	—	4	**25382-327**	16/ **337.15**

Nunclon™ Δ MicroWell™ Terasaki-Style Plates, Thermo Scientific

- Treated for enhanced cell attachment
- Conical-shaped wells hold 8µL and allow for full sample recovery
- Tight-fitting lids reduce evaporation and allow stable stacking
- Sterilized by gamma irradiation

No. of Wells	Cat. No.	Case of 150
60	**62409-106**	**339.74**
72	**62409-105**	**316.54**

Nunclon™ Δ Rectangular Dishes, Thermo Scientific

- Useful in all areas of cell culture, including scale-up and cloning
- Ideal for compartmentalizing cell culture assays
- Include lids
- Feature ANSI standard dimensions for instrument compatibility
- Sterile

Description	Total Well Volume, mL	Working Well Volume, mL	Cat. No.	Case of 100
4-Well Dish	28	12	**73521-422**	**459.57**
8-Well Dish	14	6	**73521-426**	**483.80**

Nunclon™ Δ MicroWell™ Plates, Thermo Scientific

- Ideal for cell culture, cloning, viral titration, and cell fusion
- Treated surface ensures optimum cell growth and attachment
- 96-well plates fit standard automated handling equipment
- Raised well rims reduce cross-contamination
- White plates provide maximum reflection and minimum autofluorescence
- Black plates provide minimum background and back light scatter in fluorescence assays
- Sterilized by gamma irradiation

Plate Color	Packaging	Cat. No.	Case of
Round-Bottom Well Plates with Lids			
Clear	1/Sleeve	**25382-329**	50/ **235.34**
Flat-Bottom Well Plates with Lids			
Clear	1/Sleeve	**25382-342**	50/ **236.35**
Clear	10/Sleeve	**21993-954**	160/ **652.49**
Black	1/Sleeve	**43300-444**	50/ **242.41**
Black	10/Sleeve	**43300-446**	160/ **720.15**
White	1/Sleeve	**43300-430**	50/ **242.41**
White	10/Sleeve	**46000-328**	160/ **720.15**
Round-Bottom Well Plates without Lids			
Clear	1/Sleeve	**25382-340**	50/ **163.62**
Flat-Bottom Well Plates without Lids			
Clear	1/Sleeve	**25382-341**	50/ **190.90**
Clear	10/Sleeve	**21993-952**	180/ **587.84**

Nunclon™ Δ MultiDishes, Thermo Scientific

- Flat-bottom wells are treated with Nunclon Δ surface treatment for optimal cell attachment and growth
- Rings in the lids reduce evaporation and condensation
- Writing areas on lids and dishes and individual alphanumeric markings allow easy identification of samples
- Sterile, noncytotoxic, and nonpyrogenic

No. of Wells	Well Area, cm²	Working Volume, mL	External Dimensions, mm	Packaging	Cat. No.	Case of
4	1.9	0.4–1.0	66 x 66	4/Sleeve	**62407-068**	120/ **290.71**
6	9.6	2.0–5.0	128 x 86	1/Sleeve	**73520-906**	75/ **210.97**
6	9.6	2.0–5.0	128 x 86	5/Sleeve	**73520-836**	85/ **232.16**
12	3.5	0.7–1.8	128 x 86	1/Sleeve	**62407-332**	75/ **238.22**
24	1.9	0.4–1.0	128 x 86	1/Sleeve	**73521-004**	75/ **264.46**
24	1.9	0.4–1.0	128 x 86	5/Sleeve	**73521-006**	85/ **292.72**
48	1.1	0.3–0.6	128 x 86	1/Sleeve	**62407-338**	75/ **316.95**
48	1.1	0.3–0.6	128 x 86	5/Sleeve	**73521-008**	85/ **348.25**

FOCUS Information

Synthemax surface is a unique synthetic coating on tissue culture-treated cell culture ware. The surface chemistry is designed to mimic a cell's natural environment. The coating is a peptide acrylate (see Figure 1) that creates a uniform active surface for stem cell attachment, growth, and differentiation, especially in a chemically defined media. Cells grown on the Synthemax surface display stable double times and excellent viability.

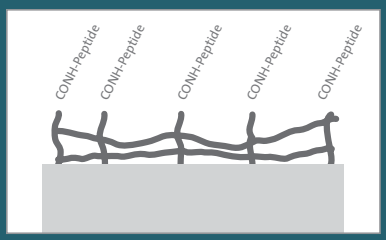


Figure 1: Peptide Acrylate Surface

CORNING

Corning® Synthemax™-R Surface

Sythemax Surface Characteristics

- Synthetic, xeno-free substrate
- Ready-to-use, no preparation required
- Manufacturing process ensure lot-to-lot consistency
- Sterilized by gamma radiation to (SAL) 10^{-3}

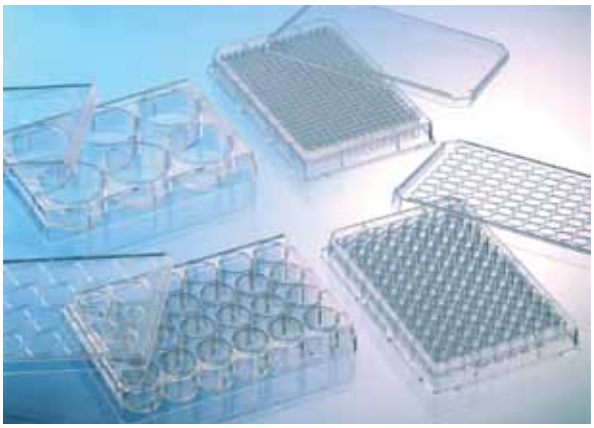
Description	Cat. No.	Case of
6-Well Plate	**89166-460**	2/ **55.02**
6-Well Plate	**89166-462**	12/ **325.16**
75 cm² Flask with Canted Neck and Vent Cap	**89168-660**	2/ **72.03**
75 cm² Flask with Canted Neck and Vent Cap	**89168-662**	12/ **430.21**

Corning® Osteo Assay Surface Plates

- Surface is a unique 3-D structure that mimics in vivo bone
- Inorganic surface is capable of supporting the functional properties of osteogenic cells
- Use for direct assessment of osteoclast and osteoblast functional activity
- Allows for co-culture of osteoblast/osteoclasts with other cell lines
- Sterilized with gamma irradiation; certified nonpyrogenic

Description	Cat. No.	Case of
1 x 8 Stripwell® Microplate with Lid*	**89184-614**	2/ **345.60**
24-Well Plate	**89126-756**	4/ **341.67**
96-Well Plate with Bar Code	**89126-758**	4/**1025.00**

*12 Strips/Holder



CELLCOAT® Protein Coated Flasks, Greiner Bio-One

- Coated with extra-cellular matrix proteins (ECM) or synthetic peptides that stimulates the cell's natural environment
- Flasks feature a canted neck, plug seal, "Best Before" date, and a lot number on each pack
- 650mL flasks feature a high profile design
- Certified nonpyrogenic and DNase- and RNase-free
- Sterile

Volume, mL	Growth Area, cm²	Cat. No.	Case of
Poly-D-Lysine Coating			
250	75	**82050-862**	50/ **428.76**
Collagen Type 1 Coating			
250	75	**82050-864**	50/ **410.11**
650	175	**82050-886**	40/ **644.09**

CELLCOAT® Tissue Culture Plates, Greiner Bio-One

- Poly-D-Lysine coating enhances the attachment of cells by generating a positive charge on the plate surface
- Surface is ideal for culturing neuronal cell lines or cell transfection
- Plates feature a "Best Before" date and lot number
- Footprint conforms to ANSI/SBS 1-2004 standard
- Clear plates are supplied with lids

No. of Wells	Working Well Volume	Lid Color	Packaging	Cat. No.	Case of
6	2–5 mL	Transparent	5/Sleeve, 10 Sleeves/Case	**82050-850**	50/ **381.06**
24	0.5–1.5 mL	Transparent	5/Sleeve, 10 Sleeves/Case	**82050-906**	50/ **410.38**
96	30–340 µL	Black	5/Sleeve, 4 Sleeves/Case	**82050-806**	20/ **290.00**
384	10–130 µL	Black	5/Sleeve, 4 Sleeves/Case	**82051-358**	20/ **417.16**

BD BioCoat™ Cultureware, BD Biosciences

The Right Surface for Every Cell

With more than 50 years of research heritage, BD Biosciences - Discovery Labware is the leading provider of cell culture surfaces, including BD BioCoat™ proven to facilitate, accelerate, and enhance discovery.

- Offers improved cell attachment and an increased proliferation rate of transfected mammalian cells, primary cells, and stem cells
- Tested negative for bacteria and fungi
- Quality assurance tested for lot-to-lot consistency
- Stable for six months from date of shipment when stored at room temperature
- Collagen Type I is good with endothelial cell, epithelial cells, hepatocytes, and tumor cells
- Collagen Type IV promotes the growth of endothelial, epithelial, muscle, and nerve cells
- Fibronectin promotes cell attachment through integrin binding and improves survival of primary cells
- Laminin is used to culture and maintain differentiated functions in neuroblastoma and breast cancer cells
- Poly-lysine promotes firm attachment of transfected and primary cells

Description	Cat. No.	Case of
Collagen Type I Cultureware		
60 mm Dish	**62405-615**	20/ **66.24**
100 mm Dish	**62405-617**	10/ **65.05**
6-Well Plate	**62405-601**	5/ **59.10**
12-Well Plate	**62405-603**	5/ **61.23**
24-Well Plate	**62405-607**	5/ **61.23**
48-Well Plate	**62405-609**	5/ **96.83**
96-Well Plate	**62405-611**	5/ **60.60**
Collagen Type IV Cultureware		
60 mm Dish	**62405-644**	20/ **146.11**
100 mm Dish	**62405-646**	10/ **155.48**
6-Well Plate	**62405-636**	5/ **148.46**
24-Well Plate	**62405-638**	5/ **150.78**
96-Well Plate	**62405-640**	5/ **155.48**
Fibronectin Cultureware		
60 mm Dish	**62405-674**	20/ **130.91**
100 mm Dish	**62405-676**	10/ **143.77**
6-Well Plate	**62405-662**	5/ **135.60**
12-Well Plate	**62405-664**	5/ **137.94**
24-Well Plate	**62405-666**	5/ **139.10**
48-Well Plate	**62405-668**	5/ **141.42**
96-Well Plate	**62405-670**	5/ **143.77**
Laminin Cultureware		
60 mm Dish	**62405-706**	20/ **148.46**
100 mm Dish	**62405-708**	10/ **157.81**
6-Well Plate	**62405-694**	5/ **151.97**
12-Well Plate	**62405-696**	5/ **153.15**
24-Well Plate	**62405-698**	5/ **154.31**
48-Well Plate	**62405-700**	5/ **156.64**
96-Well Plate	**62405-702**	5/ **157.81**
Poly-D-Lysine Cultureware		
60 mm Dish	**62406-042**	20/ **66.24**
100 mm Dish	**62406-048**	10/ **65.04**
6-Well Plate	**62405-747**	5/ **59.10**
12-Well Plate	**62406-026**	5/ **61.17**
24-Well Plate	**62405-749**	5/ **61.17**
48-Well Plate	**62406-718**	5/ **98.11**
96-Well Plate	**62405-027**	5/ **60.56**
Poly-L-Lysine Cultureware		
60 mm Dish	**62406-268**	20/ **72.04**
6-Well Plate	**62406-280**	5/ **55.63**
96-Well Plate	**62406-276**	5/ **65.56**

FOCUS Information

Extracellular Matrix (ECM) proteins provide a range of diverse options that allow you to mimic in vivo environments and maximize cellular activity. BD™ ECM proteins are highly purified and defined so that you can grow your cells under more defined serum-reduced or serum-free conditions.

For additional BioCoat cultureware products, contact your VWR Sales Representative.



CORNING

Ultra-Low Attachment Surface from Corning

The Ultra-Low Attachment Surface is Useful for:

- Growing primary cultures of tumor or normal cells as unattached spheroids
- Studying activation and inactivation mechanisms of lymphocytes, monocytes, macrophages, and other phagocytic cells
- Selectively culturing tumor or transformed cells as unattached colonies
- Culturing cells, tissue, or organ fragments in a stationary suspended, unattached state
- A substitute for soft agar assays
- Tissue engineering of easily harvested cell sheets and constructs using magnetic nanoparticles or liposomes
- Promoting embryoid body formation (see Figure 1)
- Growing colonies with defined margins
- Harvesting individual colonies quickly and easily

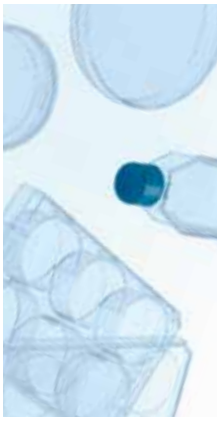
Description	Cat. No.	Case of
6-Well Flat-Bottom Plate	**29443-030**	24/ **295.42**
24-Well Flat-Bottom Plate	**29443-032**	24/ **306.75**
96-Well Flat-Bottom Plate	**29443-034**	24/ **358.07**
96-Well Round-Bottom Plate	**89089-826**	24/ **402.54**
25 cm² Flask with Canted Neck and Vent Cap	**89089-876**	24/ **319.15**
75 cm² Flask with Canted Neck and Vent Cap	**89089-878**	24/ **446.95**
60 mm Culture Dish	**33500-730**	20/ **224.60**
100 mm Culture Dish	**33500-732**	20/ **274.62**

FOCUS Information

Since proteins and other biomolecules passively adsorb to polystyrene surfaces through either hydrophobic or ionic interactions, researchers at Corning set out to create a surface that naturally inhibits these interactions. The result was a covalently-bound hydrogel layer that inhibits cell attachment. The surface is very stable, noncytotoxic, biologically inert, and nondegradable.

Figure 1: Corning Ultra-Low Attachment Surface inhibits differentiation and promotes tight well-defined embryoid body formation in murine ES cell grown in methylcellulose medium for 3 days

Advanced TC™ Tissue Culture Plates, Greiner Bio-One



- Use for the cultivation of fastidious and sensitive cells
- Unique chemical modification of plastic material increases primary and long-term adhesion of cell cultures
- Enhanced cell attachment and higher proliferation rates offer increased cell yield
- Allows for improved assay consistency
- Store at room temperature for up to two years
- Sterilized by gamma radiation

No. of Wells	Lid Color	Packaging	Cat. No.	Case of
6	Transparent	Individually Wrapped	**89131-688**	100/ **313.02**
12	Transparent	Individually Wrapped	**89136-864**	100/ **353.40**
24	Transparent	Individually Wrapped	**89131-690**	100/ **383.70**
48	Transparent	Individually Wrapped	**89136-866**	100/ **424.09**
96	Transparent	Individually Wrapped	**89131-692**	100/ **504.86**
96*	Black	8/Sleeve, 4 Sleeves/Case	**89131-694**	32/ **302.92**

*Plate features µClear® bottoms for clear viewing and minimized autofluorescence.

Costar® Center Well Culture Dish, Corning

- Designed in consultation with embryologists and researchers for IVF procedures
- Center well has a 20mm dia. and holds 3mL of medium for oocyte culture and insemination
- Outer well holds 10mL of medium for humidification
- Treated for optimal cell attachment
- Sterilized by gamma radiation; certified nonpyrogenic

Dia. x H, mm	Growth Area, cm²	Cat. No.	Case of 500
60 x 15	3.14	**29442-026**	**1326.35**

CELLCOAT® Protein-Coated Petri Dishes, Greiner Bio-One

- Dishes are coated with extracellular matrix proteins or synthetic polypeptides
- Coatings provide scaffolding that participates directly and indirectly in cell growth regulation and differentiation
- A reliable alternative for application involving sensitive cells
- Feature a "Best Before" date and lot number
- Certified nonpyrogenic and DNase- and RNase-free

W x H, mm	Growth Area, cm²	Cat. No.	Case of
Collagen Type I-Coated Dishes			
60 x 15	21	**82050-558**	100/ **271.05**
100 x 20	58	**82050-924**	40/ **196.12**
Laminin-Coated Dishes			
60 x 15	21	**82050-550**	20/ **156.06**
100 x 20	58	**82050-920**	10/ **207.39**
Poly-D-Lysine-Coated Dishes			
60 x 15	21	**82050-556**	100/ **316.22**
100 x 20	58	**82050-922**	40/ **196.12**
Poly-L-Lysine-Coated Dishes			
60 x 15	21	**82050-554**	100/ **248.46**

BD BioCoat™ Matrigel™ Matrix Cultureware, BD Biosciences

- BD Matrigel is rich in ECM proteins, especially collagen IV, entactin, heparin sulfate proteoglycans, and laminin
- Protein source is Engelbreth-Holm-Swarm mouse tumor
- Offers lot-to-lot consistency and reliable performance
- Tested for bacteria and fungi
- Stable for ≥3 months from the date of shipment when stored frozen

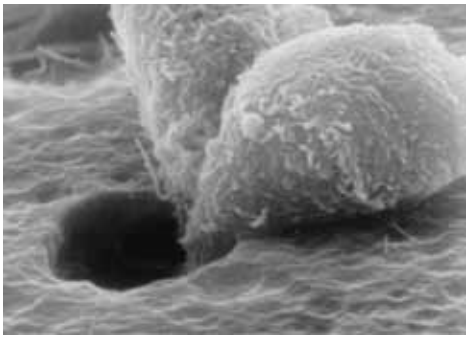
Description	Cat. No.	Case of
Culture Dishes		
35 mm	**62405-732**	8/ **329.65**
Thin Layer Culture Dishes		
35 mm	**62405-138**	20/ **153.13**
60 mm	**62405-140**	20/ **157.81**
100 mm	**62405-142**	10/ **173.02**
Multiwell Plates		
6-Well Plate	**62405-724**	2/ **339.01**
12-Well Plate	**62405-726**	2/ **349.53**
24-Well Plate	**62405-728**	2/ **361.21**
48-Well Plate	**62405-730**	2/ **369.44**
Thin Layer Multiwell Plates		
6-Well Plate	**62405-101**	5/ **162.49**
24-Well Plate	**62405-103**	5/ **165.99**
96-Well Plate	**62405-105**	5/ **173.02**
Multiwell Plates for Hepatocytes		
6-Well Plate	**62405-144**	5/ **385.77**

BD Matrigel™ Basement Membrane Matrix, BD Biosciences

Trusted Provider of Reconstituted Basement Membranes Since 1985

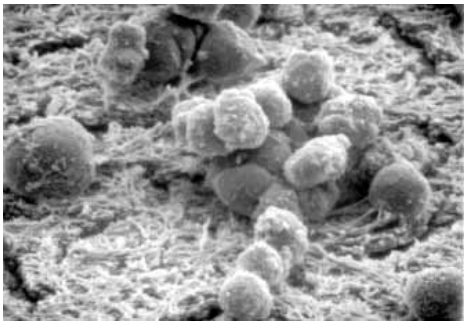
- Provides the substrate necessary for the study of angiogenesis and the propagation of human tumor cells
- Certified LDEV-free
- Growth factor reduced (GFR) is best for applications where a highly defined basement membrane preparation is desired
- High concentration (HC) is ideal for in vivo applications where high protein concentration augments tumor growth
- Phenol-red free (PRF) is recommended for assays that require color detection
- hESC-qualified matrix has been qualified as mTeSR™-1 compatible and is an effective feeder-free surface for human stem cell maintenance

Description	Size, mL	Cat. No.	Each
BD Matrigel Matrix	5	**47743-706**	**189.81**
BD Matrigel Matrix	10	**47743-715**	**294.66**
BD Matrigel Matrix	5 x 10	**47743-710**	**1270.22**
GFR Matrix	5	**47743-718**	**224.27**
GFR Matrix	10	**47743-720**	**354.35**
GFR & HC Matrix	10	**80094-330**	**512.34**
GFR & PRF Matrix	10	**47743-722**	**376.95**
hESC-Qualified Matrix	5	**47743-678**	**200.40**
HC Matrix	10	**47747-220**	**477.83**
HC & PRF Matrix	10	**80094-328**	**512.34**
PRF Matrix	10	**47743-716**	**358.36**



Invasion Assays

BD Matrigel matrix provides a biologically active basement membrane model for in vitro invasion assays. Image shows a scanning electron micrograph of two human fibrosarcoma cells that have digested the BD Matrigel matrix and are migrating through the 8µm pore of the PET membrane.



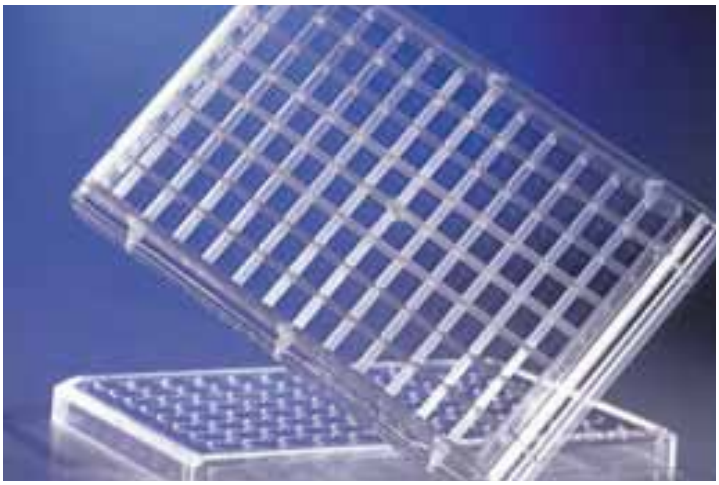
Metabolism/ Toxicology Studies

BD Matrigel matrix has been used to successfully construct in vitro models of liver cells for drug toxicity studies. Note the typical appearance of the clusters of spherical hepatocytes cultured on BD Matrigel matrix.

HTS Transwell®-24 Permeable Supports System, Corning

- Provide an excellent substrate for adherent cell attachment, growth, and differentiation
- Tissue-culture treated membrane has a 6.5mm dia. and 0.4µm pore size
- Open culture reservoirs provide a common outer well, making it easier to change media while feeding cells
- Individually wrapped supports also include two sterile, individually wrapped open culture reservoirs
- Sterilized by gamma radiation

Packaging	Cat. No.	Case of
Supports with Polycarbonate Membrane		
Individually Wrapped	**29445-098**	2/ **205.99**
Bulk Packed	**29445-100**	12/ **1139.88**
Supports with Polyester Membrane		
Individually Wrapped	**46610-178**	2/ **211.79**
Bulk Packed	**66025-540**	12/ **1171.97**
Accessories		
Open Culture Reservoir	**29445-096**	48/ **164.96**



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

- Ideal for ADMET screening, drug transport, and other assays
- Large apical and basolateral access ports allow efficient media sampling and facilitate automated or manual access
- The reservoir plate allows for simultaneous feeding of 96 wells and is supplied with a removable media stabilizer to reduce the risk of spills
- Complete systems come with the 96-well plate packaged with a single-well reservoir plate, a 96-well receiver plate, and two lids
- Support plates only come with the 96-well insert plate, a 96-well receiver plate, and one lid
- Sterilized by gamma radiation

Membrane Pore Size, µm	Membrane Material	Cat. No.	Case of
Support Systems			
0.4	PC	**89089-924**	5/ **1390.49**
1	PET	**89089-928**	5/ **1390.49**
Support Plates			
3	PC	**89089-932**	8/ **667.43**
5	PC	**89089-936**	8/ **667.43**
8	PET	**89089-938**	2/ **163.56**
Accessories			
Receiver Plate with Lid	—	**89089-944**	10/ **150.19**
Reservoir Plate with Lid	—	**89089-946**	10/ **108.16**

Transwell Dish Inserts, Corning

- Polycarbonate inserts are for use in epithelial and endothelial cell culture, transport, migration/invasion, co-culture, and microbial pathogenesis studies
- Provide independent access to both the apical and basolateral sides of the cell monolayer
- Diameter: 75mm (3"); well area: 44cm^2
- Sterile

Pore Size, µm	Cat. No.	Case of 12
0.4	**29442-114**	**378.78**
3.0	**29442-116**	**378.78**

Snapwell™ Inserts, Corning

- Tissue-culture treated inserts are designed for use with diffusion chambers
- Polycarbonate membrane is supported by a detachable ring and is housed in a two-piece polystyrene assembly
- Supplied preloaded into 6-well plates

Density, cm^2	Pore Size, µm	Cat. No.	Case of 24
108	0.4	**29442-160**	**179.82**

Transwell® Plate Inserts, Corning

- Designed for use in epithelial and endothelial cell culture applications
- Provide independent access to both apical and basolateral plasma membranes
- Microporous membrane inserts are available in polyester, polycarbonate, and PTFE collagen formats
- Once stained, they allow excellent cell visibility with phase contrast microscopy
- Supplied preloaded into multiwell plates

No. of Wells	Well Area, cm^2	Insert Size, mm	Pore Size, µm	Cat. No.	Case of
Polyester Tissue Culture-Treated Inserts					
6	4.7	24	0.4	**29442-074**	24/ **123.11**
6	4.7	24	3	**29442-076**	24/ **123.11**
12	1	12	0.4	**29442-078**	48/ **222.53**
12	1	12	3	**29442-080**	48/ **222.53**
24	0.3	6.5	0.4	**29442-082**	48/ **208.34**
24	0.3	6.5	3	**29442-084**	48/ **208.34**
Polycarbonate Tissue Culture-Treated Inserts					
6	4.5	24	0.4	**29442-104**	24/ **120.75**
6	4.5	24	3	**29442-108**	24/ **123.11**
6	4.5	24	8	**29442-130**	24/ **123.11**
12	1.1	12	0.4	**29442-086**	48/ **224.90**
12	1.1	12	3	**29442-088**	48/ **224.90**
24	0.3	6.5	0.4	**29442-106**	48/ **208.34**
24	0.3	6.5	3	**29442-110**	48/ **208.34**
24	0.3	6.5	5	**29442-118**	48/ **208.34**
24	0.3	6.5	8	**29442-120**	48/ **208.34**
Polytetrafluoroethylene Collagen-Coated Inserts					
6	4.7	24	0.4	**29442-125**	24/ **300.33**
12	1	12	0.4	**29442-092**	24/ **274.81**
24	0.3	6.5	0.4	**29442-129**	24/ **261.23**

Expanded Surface Roller Bottles, Corning

- Ribbed design provides twice the surface area of traditional 850cm^2 bottles
- Two lengthwise windows provide a clear view for microscopy and facilitate drainage
- Bottles are treated for optimal cell attachment
- Supplied with high-density easy grip caps
- Sterilized by gamma radiation; certified nonpyrogenic

Packaging	Cat. No.	Case of 40
2 Bottles/Bag	**62404-446**	**605.35**

Roller Bottles, Corning

- Treated for optimal cell attachment
- 850cm^2 bottles feature printed graduations
- 1750cm^2 bottles feature molded-in graduations
- Supplied with high-density easy grip caps
- Sterilized by gamma radiation; certified nonpyrogenic

Culture Area, cm^2	Cap Type	Packaging	Cat. No.	Case of
490	Plug Seal	2 Bottles/Sleeve	**62404-370**	40/ **258.19**
850	Easy Grip	2 Bottles/Sleeve	**62404-442**	40/**355.22**
850	Easy Grip	5 Bottles/Sleeve	**62404-444**	40/**369.29**
850	Easy Grip	Bulk Pack	**21008-660**	20/ **174.98**
850	Easy Grip, Vent	2 Bottles/Sleeve	**25382-462**	40/ **426.27**
1750	Easy Grip	10 Bottles/Sleeve	**62404-440**	20/ **412.45**

DO YOU NEED A CUSTOMIZED MEDIA PREPARATION SOLUTION?

For a number of years, **VWR**CATALYST team members have been performing various types of media prep and sample testing. Today, we have the people, processes, and technology to offer a customized solution for virtually any media prep or sampling problem. Call **1.888.793.2300** or visit **www.vwrsp.com/vwrcatalyst** for more information.

CellBIND® Roller Bottles, Corning

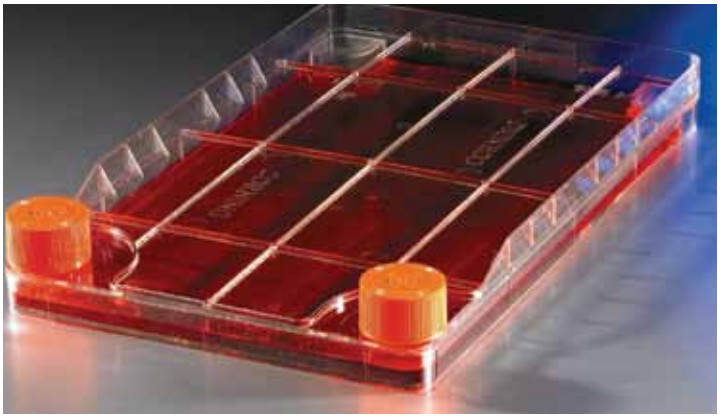
- Surface treatment improves cell attachment by incorporating more oxygen into the cell culture surface
- CellBIND surfaces are nonbiological and require no special handling or storage
- One-piece seamless construction features a wide mouth and printed graduations
- Polystyrene bottles come with high-density polyethylene caps
- Provide 850cm² of culture area
- Sterilized by gamma radiation; certified nonpyrogenic

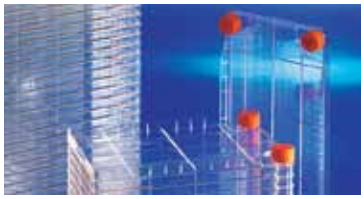
Packaging	Cat. No.	Case of
2 Bottles/Bag	**33500-694**	40/ **846.89**
22 Bottles/Bag	**89089-838**	44/ **731.10**

CELLMASTER™ Roller Bottles, Greiner Bio-One

- Polystyrene bottles offer stability and optical clarity and feature treated surfaces for improved cell adhesion
- Polyethylene terephthalate (PET) bottles provide increased flexibility, sturdiness, and resistance to cracking for use in either automatic or manual procedures
- Two-phase blow-molding procedure creates seamless construction
- Features lot number and best before dates on the label
- Standard seal cap sits flush with rim of bottle to prevent significant gas exchange
- Vented filter cap guarantees tightly closed, contamination-free cultivation
- Single use bottles offer 850cm² culture area
- Sterilized by gamma irradiation; noncytotoxic and nonpyrogenic
- USP Class VI certified; DNase-, RNase-, and human-DNA free

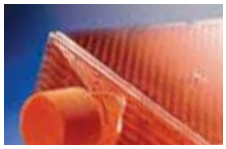
Bottle Material	Packaging	Cat. No.	Case of
Standard Seal Cap			
PET	30 Bottles/Bag	**89049-110**	30/ **230.12**
Polystyrene	2 Bottles/Bag	**82051-012**	24/ **187.12**
Polystyrene	24 Bottles/Bag	**82051-008**	48/ **374.24**
Vented Filter Cap			
Polystyrene	2 Bottles/Bag	**82051-010**	24/ **216.64**
Polystyrene	24 Bottles/Bag	**82051-006**	48/ **433.93**





CORNING

HYPERFlask® Cell Culture Vessels, Corning



- High-yield flasks utilize a multilayered, gas-permeable growing surface for efficient gas exchange
- 10X higher yields increase productivity and reduce processing time
- Ten interconnected polystyrene surfaces provide 1720cm² growth area with an air gap between each layer
- CellBIND® surface treatment is on every gas permeable layer to improve cell attachment and growth
- Feature straight neck, flat-top cap, and bar code
- HYPERFlask M vessels are designed for manual use and feature an ergonomic cap
- Sterilized with gamma irradiation; certified nonpyrogenic

Packaging	Cat. No.	Case of
HYPERFlask Vessels		
Double Bagged	**89089-848**	24/ **2182.70**
HYPERFlask M Vessels		
Individually Wrapped	**89125-584**	4/ **414.57**
Double Bagged	**89125-582**	4/ **414.57**
Double Bagged	**89125-586**	24/ **2487.35**

CellSTACK® Culture Chambers, Corning

- Feature USP Class VI polystyrene construction for excellent optical clarity and mechanical strength
- Two 26mm dia. filling ports allow direct access to the chamber bottom, for greater flexibility in filling and emptying by pouring, pipetting, or tubing
- Self-venting 33mm threaded caps feature 0.2µm pore membranes sealed directly to the caps for efficient gas exchange without the risk of contamination

Growth Area, cm²	No. of Chambers	Cat. No.	Case of
Standard CellSTACK Culture Chambers			
636	1	**33500-818**	8/ **442.58**
1272	2	**33500-820**	5/ **338.25**
3180	5	**66025-656**	2/ **319.16**
3180	5	**22250-152**	8/ **1216.40**
6360	10	**33500-822**	2/ **479.95**
6360	10	**33500-824**	8/ **1411.64**
25440	40	**16001-330**	2/ **1860.65**
CellSTACK Culture Chambers with CellBIND® Surface			
636	1	**66025-624**	8/ **506.64**
1272	2	**66025-618**	5/ **387.20**
3180	5	**66025-628**	2/ **507.55**
6360	10	**89178-350**	2/ **745.49**
6360	10	**66025-620**	6/ **2258.22**
25440	40	**66025-622**	2/ **2664.73**
CellSTACK Culture Chambers with Ultra-Low Attachment Surface			
636	1	**89089-960**	8/ **1183.26**

LIFE SCIENCE RESEARCHERS ARE CONSTANTLY BEING CHALLENGED TO PRODUCE MORE CELLS

Growing More Cells: A Simple Guide to Small Volume Cell Culture Scale-Up

John A. Ryan, Ph.D., Corning Incorporated

The following is an excerpt from the more detailed document of the same name found on the vwr.com literature page.

Introduction

We need more cells… Researchers are constantly being challenged to produce more cells for cell-based experiments and assays, or for producing recombinant proteins, antibodies and viral vectors. Researchers must choose from a sometimes confusing variety of cell culture vessels, systems and methods to meet their needs for larger quantities of cells. This Corning guide is designed to help researchers select the vessels and methods that can best meet all of their needs for growing more cells or producing more cell products. It will focus on basic systems suitable for producing at least 1 x 10^9 cells (approximately one gram).

Selecting the Best System

The key to selecting the best system for your needs is to thoroughly understand and evaluate these five key areas:

Attachment requirements

- Cell or product yields desired
- Equipment and space requirements
- Labor requirements and availability
- Investment in technology and expertise to operate (ease of use)

Once each of these four areas have been thoroughly evaluated and understood, selecting the system that best meets your needs will be much easier.

Figure 1: Attachment-dependent cells can also be grown in spinner flasks on microcarrier beads.

Matching the Culture System with the Attachment Requirements of the Cells

The first and most important step is to determine the attachment requirements of your cells.

Some cell lines are attachment-dependent, that is, they can only grow when attached to a suitable substrate such as a flask or roller bottle. Many other cell lines, frequently designated as transformed cell lines, are able to grow either attached to a substrate or floating unattached in suspension; they are attachment-independent.

In general, if the cells allow it, it is always easier to grow large amounts of animal cells in suspension culture than in attached culture. Some cell lines used to produce genetically engineered proteins will also have higher yields when grown in suspension culture. If cells are attachment-dependent, it may be possible to adapt them to grow in suspension. However, even if the cells can be adapted to grow in suspension, they may not maintain the same characteristics or produce the same amount of products that they did when grown attached (Iyer et al.; 1999). It may also be necessary to screen the cultures after adaptation to select for high producers or the desired cell characteristics.

For short term projects, it may not be worth the effort to attempt to adapt attachment dependent cells to grow in suspension. For longer term or ongoing projects, it is usually worth the effort to attempt to adapt cultures to grow in suspension.

Advantages of growing cells in attached culture systems:

- Easier to feed but harder to subculture
- Easier to view cultures to check status
- Avoids physical stresses on cells caused by stirring or shaking which may lead to higher yields

Advantages of growing cells in suspension culture systems:

- Easier to sample but harder to feed
- Most economical for large amounts of cells
- Less labor intensive
- May provide better gas exchange than static monolayer systems
- Less space needed because cells grow in three dimensions versus two in monolayer culture

Another alternative for growing attachment-dependent cells in suspension is to use microcarriers in modified spinner flasks (Figure 1). Microcarriers are small (100 to 300µm) sterile glass or polymeric beads to which the cells attach and grow while the beads are kept in suspension by the rotation of the paddle. Microcarriers do not work well with all cell types and have their own unique problems and requirements. They are beyond the scope of this guide; please refer to references (McLimans; 1979, Freshney; 2000) for information on using microcarriers.

Thermo SCIENTIFIC | nunc™

Nunclon® Δ Cell Factories, Thermo Scientific

- Maximize growing area while reducing the risk of contamination
- Feature a common vent and fill ports
- Openings connecting the chambers cause media to fill evenly for consistent growth condition
- Starter kit includes an HDPE connector, Tyvek® cell factory caps, sealing caps, tubing, clamp, and bacterial air vent

Growth Area, cm^2	No. of Chambers	Cat. No.	Case of
632	1	**62407-098**	8/ **470.67**
1264	2	**62407-099**	5/ **363.61**
6320	10	**62407-100**	2/ **456.53**
6320	10	**62407-106**	6/ **1372.63**

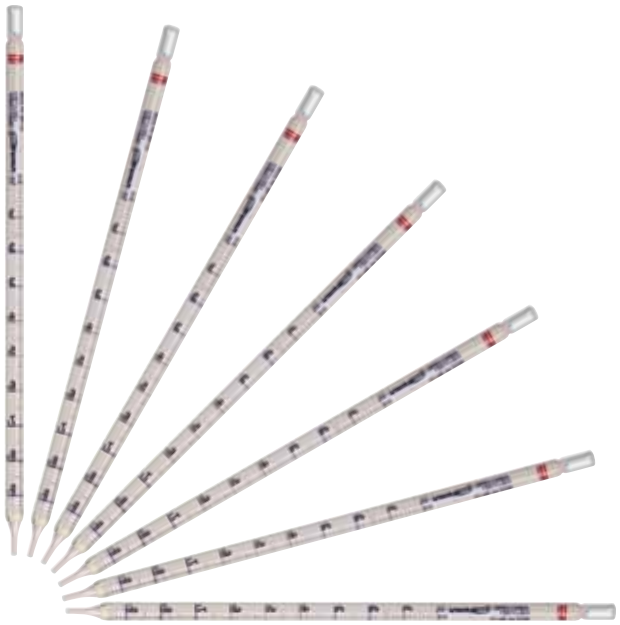
FOCUS Information

Most often, cells are seeded in a 1-chamber or 2-chamber Cell Factory as a control. Cells grown in these smaller Cell Factories can be viewed under a microscope. For larger Cell Factories, the first few layers can be viewed using inverted stereo microscopes with a powerful light source on the view side that has been adjusted to the height of the Cell Factory.

VWR® Disposable Serological Pipets, Glass

- Feature a uniform pulled tip and negative graduations
- Calibrated to deliver to the tip
- Manufactured from borosilicate glass in compliance with ASTM Specification E438, Type I, Class B requirements
- Bulk pack pipets are sealed in plastic bags and overpacked in dispensing packs
- Individually wrapped pipets are plugged, sterile, packaged in color-coded wraps, and overpacked in dispening packs for laboratory benches
- Multi-pack pipets are plugged and sterile and come in color-coded bags of 25 pipets (1mL and 2mL sizes) or 10 pipets (5mL and 10mL sizes)

Capacity, mL	Graduations, mL	Subdivisions, mL	Tolerance, ± mL	Cat. No.	Case of
Bulk Pack Pipets					
1	0.2	0.01	0.02	**93000-702**	1000/ **341.73**
2	0.2	0.01	0.04	**93000-742**	500/ **192.27**
5	1	0.1	0.15	**93000-704**	500/ **289.05**
10	2	0.1	0.30	**93000-706**	500/ **317.79**
Individually Wrapped Pipets					
1	0.2	0.01	0.02	**93000-692**	1000/ **427.03**
2	0.2	0.01	0.04	**93000-694**	500/ **249.65**
5	1	0.1	0.15	**93000-696**	500/ **342.67**
10	2	0.1	0.30	**93000-698**	500/ **365.40**
Multi-Pack Pipets					
1	0.2	0.1	0.02	**93000-672**	1000/ **395.26**
2	0.2	0.01	0.04	**93000-676**	500/ **197.23**
5	1	0.1	0.15	**93000-678**	500/ **287.47**
10	2	0.1	0.30	**93000-680**	500/ **329.88**



DID YOU KNOW that VWR also offers a pipet controller? Contact your VWR Sales Representative for more information.

HIRSCHMANN

pipetus® Pipetting Device, Hirschmann

- Fast, safe, and precise, with five speeds to match your ideal pipetting rate
- Ergonomic, lightweight (240g) pipettor has color LCD panel
- Performs up to 50 hours before batteries need to be recharged
- Pump aspirates 50mL in less than seven seconds
- Rechargeable cadmium-free nickel-metal hydride (NiMH) batteries are included
- CE marked

Volume Range	Cat. No.	Each
0.1–200 mL	**83007-692**	**385.95**

VWR® Disposable Serological Pipets, Polystyrene

- For sterile serological and tissue culture applications
- Calibrated to deliver
- Feature black ascending and descending negative graduations
- Accuracy is at ±2% at full volume
- All plastic polyethylene packaged pipets allow for aseptic removal
- Paper/plastic packaging is designed to reduce static cling
- Choose bulk packaging for high volume liquid handling applications

Capacity, mL	Subdivisions, mL	Color Code	Cat. No.	Case of
Individually Wrapped in All-Plastic Polyethylene				
1	0.01	Yellow	**89130-882**	1000/ **278.28**
2	0.01	Green	**89130-884**	1000/ **360.40**
5	0.1	Blue	**89130-886**	200/ **101.31**
10	0.1	Orange	**89130-888**	200/ **101.74**
25	0.2	Red	**89130-890**	200/ **250.55**
Individually Wrapped in Paper/Plastic				
1	0.01	Yellow	**89130-892**	1000/ **265.98**
2	0.01	Green	**89130-894**	500/ **168.27**
5	0.1	Blue	**89130-896**	200/ **90.75**
10	0.1	Orange	**89130-898**	200/ **98.08**
25	0.25	Red	**89130-900**	200/ **212.81**
50	1	Purple	**89130-902**	100/ **231.64**
Bulk Packed in Resealable Polyethylene Bags of 50				
1	0.01	Yellow	**89130-904**	1000/ **252.87**
2	0.01	Green	**89130-906**	500/ **164.12**
5	0.1	Blue	**89130-908**	500/ **199.97**
10	0.1	Orange	**89130-910**	500/ **229.88**
10 (Wide Tip)	0.1	Orange	**89130-916**	500/ **266.97**
Bulk Packed in Resealable Polyethylene Bags of 25				
25 (Wide Tip)	0.25	Red	**89130-912**	200/ **212.99**
Bulk Packed in Resealable Polyethylene Bags of 20				
50	0.5	Purple	**89130-914**	100/ **239.26**

VWR® Ultra High-Performance Pipettors

- Soft-plunger system ensures light aspiration and dispensing forces
- Levered ejection mechanism is designed to provide smooth and gentle tip ejection
- Volume adjustment wheel can be locked to prevent accidental volume changes
- Four-digit micrometer allows for fine control over volume adjustment
- Multi-channel pipettors include a self calibration tool for in lab calibration when used with a balance

Volume Range, µL	Accuracy, %	Precision, %	Cat. No.	Each
Single-Channel Pipettors				
0.1–2.0	±12.0–1.5	≤6.0–0.7	**89130-552**	**315.42**
0.5–10	±4.0–0.5	≤2.8–0.4	**89130-554**	**315.42**
2–20	±3.0–0.8	≤1.5–0.3	**89130-556**	**309.87**
5–50	±3.0–0.8	≤2.0–0.4	**89130-558**	**309.87**
10–100	±1.6–0.8	≤0.8–0.2	**89130-560**	**309.87**
20–200	±1.2–0.6	≤0.6–0.2	**89130-562**	**309.87**
100–1000	±0.9–0.6	≤0.4–0.15	**89130-566**	**309.87**
8-Channel Pipettors				
1–10	±8.0–2.0	≤6.0–1.2	**89134-744**	**666.10**
5–50	±4.0–1.6	≤2.8–0.6	**89134-746**	**666.10**
20–200	±3.0–1.0	≤1.5–0.6	**89134-748**	**666.10**
50–300	±1.6–1.0	≤1.5–0.6	**89134-750**	**666.10**
12-Channel Pipettors				
1–10	±8.0–2.0	≤6.0–1.2	**89134-752**	**802.14**
5–50	±4.0–1.6	≤2.8–0.6	**89134-754**	**802.14**
20–200	±3.0–1.0	≤1.5–0.6	**89134-756**	**802.14**
50–300	±1.6–1.0	≤1.5–0.6	**89134-758**	**802.14**

PIPETTING ACADEMY™

A Convenient Way to Teach Ergonomics in the Lab and Reduce Injuries

Pipetting is heavy work. No less than 44% of lab professionals suffer from injuries caused by prolonged overuse, pressure, force, or awkward and static postures associated with pipetting.

Over 300 hours of pipetting per year (1.5 hours per day) causes exposure to Repetitive Strain Injury (RSI), a soft tissue disorder affecting muscles, tendons, ligaments, and nerves.

The Biohit Pipetting Academy is your resource for better safety in the lab. The academy offers onsite training as well as a website featuring videos that will guide you through the essentials of laboratory ergonomics.

Take advantage of all the academy has to offer. Register for more information today at **www.vwrsp.com/biohit**

VWR® Signature™ ZapSlik Low Adhesion Filter Pipet Tips

- Modified polypropylene surface limits the adhesion of cells, rDNA, and other viscous materials
- Filter is made of a polyethylene that does not have any cellulose gum or toluene to contaminate samples
- Pore size is 10µm to block even the smallest radionucleotides
- Certified free of DNase, RNase, protease, and human DNA; certified non-pyrogenic
- Sterile; autoclavable

Size, µL	Packaging	Cat. No.	Case of 10 Packs
Standard Length Tips			
10	96 Tips/Rack, 12 Racks/Pack, 10 Packs/Case	**89174-520**	**1596.07**
20	96 Tips/Rack, 10 Racks/Pack, 10 Packs/Case	**89174-524**	**1276.69**
200	96 Tips/Rack, 10 Racks/Pack, 10 Packs/Case	**89174-526**	**1276.69**
300	96 Tips/Rack, 10 Racks/Pack, 10 Packs/Case	**89174-528**	**1276.69**
1000	96 Tips/Rack, 6 Racks/Pack, 10 Packs/Case	**89174-530**	**724.51**
Extended Length Tips			
10	96 Tips/Rack, 12 Racks/Pack, 10 Packs/Case	**89174-522**	**1276.69**

Robotic Tips, Biotix

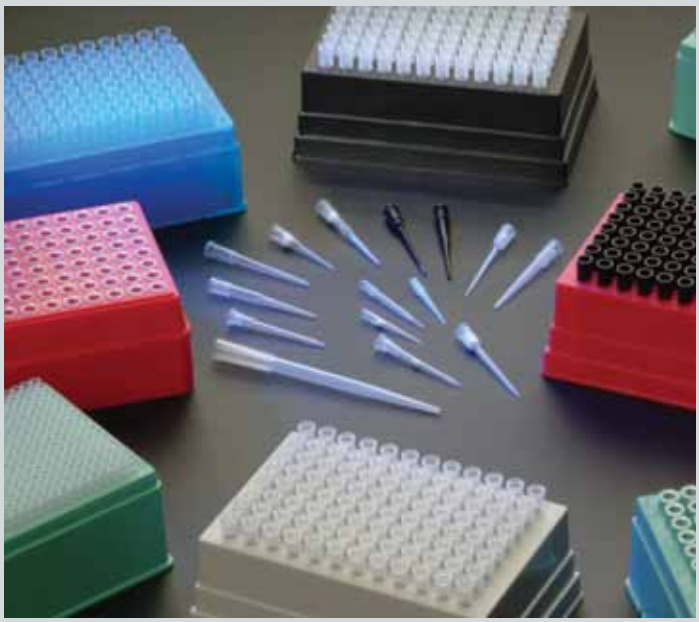
- Manufactured to the highest engineering standards for robotic systems
- Standard tip definitions bundled in the robotic software program allows problem-free use
- Delta Filter™ changes color when contacted by liquids or aerosols
- All tips are packed with 384 tips/rack; 10 racks/pack; 5 packs/case
- Sterile

Description	Volume, µL	Tip Length, mm	Cat. No.	Case of 5
Standard Robotic Tips				
Agilent™ Velocity 11® VPrep®/Bravo Robotic Tip	30	25.83	**89129-582**	**2709.35**
Beckman® Biomek® AP384 P30 Robotic Tip	30	33.15	**89108-096**	**2868.80**
Robotic Tips with Delta Filter				
Beckman® Biomek® AP384 P30 Robotic Tip	30	33.15	**89129-576**	**4476.97**
Beckman® Biomek® AP384 P30 Robotic Tip	50	43.15	**89129-578**	**3950.00**

NEW!

Axygen Now Has QIAGEN® Biorobot QIAgility™ and OnCor Tips!

Axygen provides a comprehensive line of robotic tips for Qiagen automation systems. Our in-house engineering/tooling department has tremendous expertise in designing/creating molds that produce consistent, high-quality products. Our automated production process and our experienced personnel ensure all products are free from contamination.



Tips are also available for the following automation platforms:

- **BECKMAN COULTER®**
  - Biomek® FX, Biomek® NX and Multimek™
  - Biomek® 3000
  - Biomek® NX with SPAN-8 liquid level sensing head
  - Biomek® 1000 & Biomek® 2000
  - SAGIAN Multipette
- **AGILENT / VELOCITY 11® VPrep® and Bravo**
- **TECAN®**
  - Genesis Freedom®, Freedom Evo® and Miniprep with LiHa
  - TeMo & Aquarius
- **CORBETT CAS-1200™ with LLT and X-tractor Gene**
- **PERKINELMER®**
  - Janus®, Evolution P3, MiniTrak and PlateTrak®
  - Janus®MultiProbe
- **CORBETT CAS-4200™**
- **ZYMARK®/CALIPER**
  - RapidPlate®, SciClone® and Zephyr®
- **BIOTEK® Precision™ and Precision™ xs**
- **AURORA BIOMED Versa®**
- **DYNAMIC DEVICES Oasis LM**
- **HAMILTON® Microlab® STAR, STARlet and STARplus**
- **WELLPRO**

Genuine AXYGEN® Quality

CORNING

VWR® symphony™ Incubating Orbital Shaker

- Variable speed microprocessor control provides consistent and uniform mixing action with the ability to restart and display last set-point
- Precise temperature control is maintained by a PID controller
- Accu-drive™ shaking system continuously monitors shaking speed, even under changing loads and will automatically reduce rpm during unbalanced conditions
- Audible and visual signals will activate if the system detects a tray obstruction or overload
- Polycarbonate lid allows viewing of samples without disturbing internal temperatures and an automatic shutoff circuit will stop the platform movement when the lid is opened
- A caution symbol will illuminate when the air temperature inside the shaker reaches 40°C (104°F) and will remain lit until the chamber cools
- Refrigeration model will cool the air inside the unit down to -15°C (5°F)
- Electrical: 120V, 50/60 Hz
- Five year warranty on drive system and motor

Description	Cat. No.	Each
Model 5000I Incubating Orbital Shaker	**97009-890**	**7432.55**
Model 5000I/R Incubating/Refrigerating Orbital Shaker	**97009-894**	**9298.38**

VWR® Incubating Orbital Shaker

- Features variable speed microprocessor control for consistent, uniform mixing action
- Easy-to-use, spill-resistant touchpad controls adjust temperature in 1°C increments
- Opti-flow forced ventilation system uses twin induction fans and air deflectors to deliver exceptional temperature uniformity and stability
- Accu-drive™ shaking system continuously monitors shaking speed, even under changing loads and will automatically reduce rpm during unbalanced conditions
- Triple eccentric drive with brushless motor is designed for continuous duty and heavy loads
- RS-232 serial port provides two-way communication for data logging and unit control
- Electrical: 120V, 50/60 Hz
- CSA certified and CE marked
- Five year warranty on drive system and motor

Description	Cat. No.	Each
Incubating Orbital Shaker	**12620-946**	**4866.28**

C Series Air-Jacketed CO_2 Incubators, Binder

- Overnight hot air sterilization cycle operates at 180°C (356°F)
- Weldless, deep-drawn inner chamber features an integrated shelf support system with three perforated, stainless steel shelves
- Tightly closing inner glass door and seamless, jointless design prevent the accumulation of particulate matter
- Features a drift-free IR sensor for absolute CO_2 management
- Safety features include an automatic diagnostic system and zero-potential alarm contact
- Incubator door is lockable and available with a right- or left-hinge opening
- Available stand-alone or stacked
- UL listed
- Electrical: 115V, 50/60Hz, 1200W

Description	Cat. No.	Each
Stand-Alone Single Incubator		
Right-Hinged Door	**97000-602**	**7090.00**
Left-Hinged Door	**97000-604**	**7090.00**
Stacked Single Incubator		
Right-Hinged Door	**97000-610**	**13,980.00**
Left-Hinged Door	**97000-612**	**12,956.45**

CB150 Air-Jacketed CO_2 Incubators, Binder

- Features the APT.Line™ air jacket system for temperature accuracy and reproducible results
- Permadry™ system keeps chamber walls and door dry at a maximum humidity of 98%
- Overnight hot air sterilization cycle operates at 180°C (356°F)
- Seamless, jointless design prevents the accumulation of particulate matter
- Optional intelligent fail-safe function ensures continuous monitoring of the CO_2 concentration
- Vibration-free stacking frames are designed on castors with stop brake and wedge equipment
- UL listed
- Electrical: 115V, 50/60Hz, 1400W

Description	Cat. No.	Each
Stainless Steel Interior	**80200-008**	**9693.78**
Divided Door	**80200-024**	**10,340.36**
O_2 Control	**80200-016**	**13,055.22**
O_2 Control and Divided Door	**80200-032**	**13,702.81**

CARON
Opening Doors for Scientists

FOCUS Information

Caron's Oasis Benchtop CO_2 Incubator incorporates innovative and proven technologies to bring you an ultra stable, stackable incubator designed for cell and tissue cultures. The new CO_2 incubator is 6 cu. ft. and features a high grade, stainless steel interior. Numerous optional accessories are available to customize this incubator to your application. Contact your VWR Sales Representative for more informaton.

Oasis™ Benchtop IR CO_2 Incubator, Caron

- Tri-zone temperature control utilizes individual heaters located on the outside of every interior wall to ensure highly uniform and rapidly recovering temperature
- CO_2 is recovered quickly after door openings and is accurately controlled by an infrared (IR) sensor
- Stainless steel interior with coved corners and ISOCIDE antimicrobial powder coated exterior work together to prevent contamination
- Maintenance-free decon cycle rapidly cleans the unit overnight with the push of a button

Description	Cat. No.	Each
Oasis CO_2 Incubator	**97052-136**	**7248.41**

GelJacket™ Benchtop CO_2 Incubator, Caron

- Will sustain temperature after door openings and during power outages longer than any incubator on the market
- Compartmentalized gel is lightweight and features a volumetric heat capacity 40X greater than water
- CO_2 is quickly recovered and is accurately controlled by an IR sensor
- gVapor™ sensor delivers precise, controlled humidity on an as needed basis
- Automatic decon cycle rapidly cleans the unit overnight
- The refrigerated model will accommodate heat-generating equipment, such as shakers and stirrers

Description	Cat. No.	Each
GelJacket Incubator	**89173-386**	**13,995.00**
Refrigerated GelJacket Incubator	**89173-392**	**15,995.00**

FOCUS Information

Caron's 10 cu. ft. GelJacket Benchtop CO_2 Incubator is the most innovative technological advancement for cell culture incubators in decades. GelJacket has high-energy thermal absorbing gel located in every incubator wall. This design has advantages far surpassing any other CO_2 incubator.

VWR® symphony™ Water-Jacketed CO_2 Incubators

- Cultures are protected by a non-corrosive stainless steel chamber, insulated triple-wall cabinet construction, and a jacket of temperature-conditioned water
- Internal shelves and supports are easily installed and removed
- Guarantees protection from unwanted heat loss, even in the event of a power outage
- Creates cleanroom Class 100 conditions, preserving the aseptic culturing environment
- Available with thermal conductivity (TC) or infrared (IR) sensor-based CO_2 control

Sensor	Cat. No.	Each
Single-Unit Incubator		
TC	**98000-358**	**6580.27**
IR	**98000-360**	**7896.34**
TC with HEPA Filter	**97025-836**	**7002.71**
IR with HEPA Filter	**97025-838**	**8216.58**
Dual-Stacked Incubator		
TC	**98000-000**	**13,160.55**
IR	**98000-002**	**15,885.19**
TC with HEPA Filter	**97025-840**	**13,995.13**
IR with HEPA Filter	**97025-842**	**15,274.06**

VWR® symphony™ Air-Jacketed CO_2 Incubator, Model 1.4A

- Excellent for space-constrained working environments
- Radiant wall heating provides accurate, uniform temperatures and optimal recovery
- Simple, three-button touchpad allows quick access to all functions
- High-visibility digital readouts simplify operation and monitoring
- Seamless stainless steel interior chamber features coved corners, making it easy-to-clean
- Unit uses a microprocessor-based, automatic thermal conductivity (TC) CO_2 control

Description	Cat. No.	Each
Model 1.4A CO_2 Incubator	98000-356	4656.34

VWR® symphony™ Air-Jacketed CO_2 Incubators

- Advanced, air-jacketed temperature control technology ensures an optimal and stable growing environment
- Unique panless humidity water reservoir protects cultures from drying out, improving recovery characteristics and cell growth
- Internal shelves and supports are easily installed and removed without tools
- Easy-to-use interface panel features separate large LED displays for temperature and CO_2 parameters
- Touch-sensitive membrane controls provide the status of incubator functions
- Convenient, dual-stacked configurations are available on some models
- Units use thermal conductivity (TC) sensor-based CO_2 control
- The moist heat, high temperature decontamination cycles offer total decontamination without removing the sensors, fittings, or shelves

Description	Cat. No.	Each
Model 5.3A		
Single-Unit Incubator	98000-364	5602.00
Single-Unit Incubator with High-Temperature Decontamination	98000-362	6023.43
Dual-Stacked Incubator	98000-380	11,193.72
Dual-Stacked Incubator with High-Temperature Decontamination	98000-378	11,810.46
Model 8.5A		
Single-Unit Incubator	98000-372	8963.20
Single-Unit Incubator with High-Temperature Decontamination	98000-370	9960.24

Protecting your laboratory environment
LABCONCO®

Purifier® Logic® Class II Biosafety Cabinets, Labconco®

- Electronically commuted motor (ECM) consumes 60% less energy and provides more power with cooler and quieter operation
- Constant Airflow Profile technology precisely controls airflow without the need for sensors
- LCD information center with touchpad control keeps users aware of current cabinet conditions, while allowing manual use of the menu
- Touchpad control permits manual activation of blower, light, timer, audible alarm mute, and menu selection
- The Smart-Start™ system allows the user to program start up/shut down operations
- Night-Smart™ system idles the blower at 30% when the sash is closed to help maintain a clean, particulate-free environment
- Supply and exhaust HEPA filters are 99.99% efficient

Sash Opening, cm (in.)	Service Fixture(s)	Exhaust Volume, cfm	Cat. No.	Each
Type A2 Models with 0.9 m (3′) Nominal Width				
20.3 (8)*	1	203–223	97000-852	8465.00
25.4 (10)*	1	253–279	97000-860	8465.00
Type A2 Models with 1.2 m (4′) Nominal Width				
20.3 (8)*	1	269–296	97000-854	9560.00
25.4 (10)*	1	339–370	97000-862	9560.00
Type A2 Models with 1.5 m (5′) Nominal Width				
20.3 (8)*	1	336–370	97000-856	11,050.00
25.4 (10)*	1	420–462	97000-864	11,050.00
Type A2 Models with 1.8 m (6′) Nominal Width				
20.3 (8)*	2	403–443	97000-858	12,100.00
25.4 (10)*	2	503–554	97000-866	12,100.00
Type B2 Models with 1.2 m (4′) Nominal Width				
20.3 (8)	1	743–771	97000-834	13,840.00
Type B2 Models with 1.8 m (6′) Nominal Width				
20.3 (8)	2	1111–1151	97000-838	16,115.00

*REDISHIP.

Purifier® Vertical Clean Benches, Labconco®

- Ideal for applications requiring a particulate-free work area
- Variable speed blowers feature solid-state speed to maintain proper air velocities
- The HEPA filter removes 99.99% of all particulates greater than 0.3µm
- An aerodynamic airfoil allows filtered air to sweep the work surface, promoting ISO Class 5 (FED-STD-209E Class 100/M3.5) conditions

Description	Cat. No.	Etach
Vertical Clean Bench	89000-138	5100.00

Accessories for Purifier® HEPA-Filtered Enclosures, Labconco®

Description	Exterior Dimensions, W x D x H, cm (in.)	Cat. No.	Each
Telescoping Base Stand with Casters for 0.9 m (3′) Models	91.4 x 73.7 x 69.9–85.1 (36 x 29 x 27½–33½)	82003-570	825.00
Telescoping Base Stand with Casters for 1.2 m (4′) Models	121.9 x 73.7 x 69.9–85.1 (48 x 29 x 27½–33½)	82003-572	860.00
Solid Epoxy Dished Work Surface for 0.9 m (3′) Models	91.4 x 73.7 x 2.5 (36 x 29 x 1)	82018-190	640.00
Solid Epoxy Dished Work Surface for 1.2 m (4′) Models	121.9 x 73.7 x 2.5 (48 x 29 x 1)	82018-192	790.00

Enclosures and Biosafety Cabinets

The majority of steps conducted in tissue culture are done inside an enclosure that provides HEPA-filtered air (a sterile work area), to prevent contamination of the cell lines.

The types of cells you are working with will determine the appropriate enclosure and level of protection needed for culturing techniques. Cells, such as plant tissue and non-hazardous mammalian cells, may be handled in a still air enclosure. This non-ventilated enclosure provides a quiet work area with relatively little air movement for minimal disruption and contamination. Additional protection from contamination is achieved by using a horizontal or vertical clean bench. These enclosures bathe the work area in HEPA-filtered sterile air, but provide no protection to the researcher.

When working with bacteria, viruses, and potentially harmful mammalian cell lines, a Class II biological safety cabinet provides protection for the product, as well as the worker and the lab environment. Class II, Type A2 cabinets provide HEPA-filtered vertical airflow to provide a sterile work environment. In addition, they capture and filter the air, recirculate some air within the cabinet, and exhaust the remainder to the room. The Class II cabinet may be preferred when preparing dry powder media, since it captures the particulates in the air stream without introducing them into the room. The Class II biological safety cabinet may be exhausted to the outside using a canopy connection. This will prevent build-up of odors inside the cabinet and the laboratory.

Work that includes the use of volatile solvents, radionucleotides, or other hazardous gaseous chemical agents requires a Class II Type B2 "Total Exhaust" biological safety cabinet. These cabinets do not trap gaseous material in the HEPA filters, since recirculation of these contaminants inside the cabinet could lead to high concentrations or loss of containment. Unless ducted to the outside, these substances would then be introduced into the laboratory, creating a potential hazard for lab workers. For example, when working on neural cell lines and treating those cells with a neurotoxin, the biosafety cabinet should be ducted to the outside to protect the user from potential exposure to those toxins.

For product recommendations and suggestions, please contact your VWR Sales Representative.

MAINTAINING CABINET FUNCTIONALITY

A biosafety cabinet should be maintained regularly to ensure proper function at all times. Whenever the cabinet will be in use, it should be turned on for at least five minutes to properly purge the cabinet. The inside should be wiped down with a 70% ethanol (or other appropriate decontamination) solution before beginning work. Likewise, everything being placed inside the cabinet that has been exposed to the ambient room air should also be wiped down.

When the work inside has been completed, the cabinet should be left to purge for at least five minutes and all surfaces inside wiped down with a decontamination solution once all materials have been removed. On a monthly basis the exterior of the cabinet should be wiped down with a damp cloth.

Over time as the HEPA filter loads, the reading on the cabinet's differential pressure gauge will increase. There should be no major change in the reading between uses or during use. The cabinet should be recertified on an annual basis by a qualified certification technician to check filter condition and airflow. The UV lamp should be replaced annually if the cabinet or enclosure is so equipped.

ESCO
WORLD CLASS. WORLDWIDE.

FOCUS Information

IN YOUR WORLD, YOUR BIOLOGICAL SAFETY CABINET SHOULD BE YOUR FORTRESS

When it comes to safety and protection, Esco biological safety cabinets deliver. Every Esco cabinet is a triumph of engineering – from the ground up and inside out. With their durable antimicrobial-coated heavy gauge sheet metal shells, ULPA filters that are ten times more efficient than the industry average, and a certification program second to none in the industry; Esco cabinets perform, protecting laboratory personnel day in and day out.

Biological Safety Cabinet, Esco

Certified in More Countries — Esco Lab Culture

- The safety solution for life science laboratories is available in 3, 4, 5, and 6 foot models
- Contact your VWR Sales Representative for more ordering options

Description	Cat. No.	Each
4′ Biological Safety Cabinet	**97015-936**	**8943.52**
4′ Telescoping Stand with Leveling Feet	**97004-480**	**809.88**

Z Series Coulter Counter® Cell and Particle Counters, Beckman Coulter®

- Allow for variable, user-specified cell size settings
- Capable of analyzing virtually all cell types and species variations
- Use the Coulter Principle (Electrical Sensing Zone Method) of counting and sizing cells, ensuring accuracy, speed, versatility, and reproducibility in all applications
- The Z1™ Single Threshold model is ideal for obtaining rapid total cell counts on cell lines containing uniformly sized cells
- The Z1 Dual Threshold model is ideal when cell numbers between a selected size range are required
- The Z2™ Dual Threshold model provides accurate population size distribution data
- Incorporate an oil displacement pump which delivers a high degree of accuracy and precision, eliminating the need for mercury
- Certified to ISO 90001 by NSAI Quality Assurance

Description	Cat. No.	Each
Z1 Single Threshold Coulter Counter	**BK6605698**	**14,500.00**
Z1 Dual Threshold Coulter Counter	**BK6605699**	**18,900.00**
Z2 Coulter Counter	**BK6605700**	**21,000.00**

VWR® Hand Tally Counter

- Easy-to-use four-digit unit counts up to 9999
- Protective window seals out dust, dirt, and humidity
- Features a hinged finger loop for a sure grip

Dia. x W, cm (in.)	Weight, g (oz.)	Cat. No.	Each
4.5 x 3 (1 3/4x1 1/8)	85 (3)	**23609-102**	**31.20**

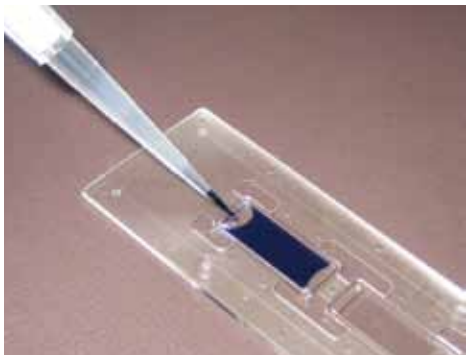
ORFLO®

ORFLO® Moxi Z: A Revolution In Cell Counting

Moxi Z is the only automated cell counter that combines the Coulter Principle typically used in high-end cell counters with an exclusive thin-film sensor technology to allow particle sizing and counting for the broadest size range (2–34µm). It also features the Moxi Viability Index (MVI), which provides an assessment of living cells by measuring the electrical differential between living and dead cells.

- Precise, repeatable measurements in just eight seconds and easy walk-away operation
- Accurate, repeatable high-resolution compared to any other cell counter

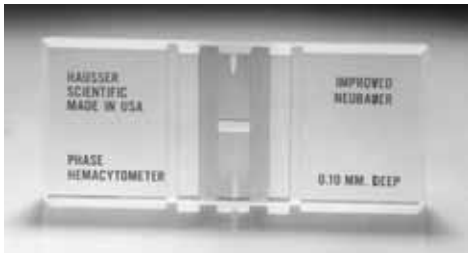
Description	Cat. No.	Each
MOXI Z Mini Automated Cell Counter Kit	**97065-500**	**2246.25**
Accessories		
Cassette Dispenser	**97065-504**	**39.60**
Cassettes, Type M (2 tests/cassette, 25 cassettes/pack)	**97065-502**	**61.25**
Calibration Cassette	**97065-510**	**55.60**
Calibration CheckBead Kit	**97065-508**	**71.60**
Orflo Diluent	**97065-512**	**7.60**



INCYTO C-Chip™ Disposable Hemacytometers, SKC

- Offer repeatable, reliable measurements and analysis
- Unique design eliminates the use of coverslips, allowing for exact volume control and reduces risk of exposure
- Increases efficiency by eliminating the need for washing or autoclaving components
- Biocompatible and optically transparent
- Dimensions: 75L x 25Wmm
- Thickness: 1mm

Chamber Depth, µm	Chamber Volume, µL	Grid Type	Cat. No.	Pack of 20
100	10	Burker Turk	**82030-482**	**58.58**
100	10	Neubauer Improved	**82030-470**	**58.58**
200	20	Fuchs Rosenthal	**82030-474**	**58.58**



Phase Hemacytometer, Hausser Scientific

- Used with a phase microscope for accurately counting red and white blood cells, platelets, dust/yeast clusters, and specimens in spinal and other body fluids
- Triple dividing lines clearly show which cells lie within the counting area
- A "V" cut in the plateau makes filling easy and reduces the possibility of overflow into the moat
- Each plateau features enhanced Neubauer rulings 0.1mm below the cover glass

Description	Cat. No.	Each
Phase Hemacytometer	**15170-263**	**238.07**

Motic®
More Than Microscopy

NEW

AE2000 Model Inverted Microscope, Motic

- Binocular model tilts to 30°-60°/Trinocular tilts to 20°-80° and features 360° swiveling
- Widefield eyepieces N-WF10X/20mm with diopter adjustment on both eyepieces
- Side facing quadruple nosepiece
- CCIS® plan achromat objectives PL4X, LWD PL40X
- CCIS plan achromat phase objectives PL Ph10X, LWD PL Ph20X
- ELWD condenser N.A. 0.30
- Phase slider with PH1, BF, and PH2, phase centering telescope
- Plain stage with metal and glass stage inserts
- Halogen illumination 6V/30W with intensity control and sleeping mode

Description	Cat. No.	Each
Model AE2000, Binocular Microscope	**89168-388**	**2135.00**
Model AE2000, Trinocular Microscope	**89168-390**	**2535.00**

AE30/31 Model Inverted Microscopes, Motic

- Binocular/Trinocular model tilts to 20°-80°
- Widefield eyepieces WFPL10X/22mm with diopter adjustment on both eyepieces
- Side facing quintuple nosepiece
- CCIS® Plan Achromat objectives PL4X
- CCIS Plan Achromat Phase objectives PL Ph10X, LWD PL Ph20X, LWD PL Ph40X
- ELWD condenser N.A. 0.30
- Phase slider with PH1, BF, and PH3, phase centering telescope
- Plain stage with metal and glass stage inserts
- Koehler halogen illumination 6V/30W with intensity control

Description	Cat. No.	Each
Model AE30, Binocular Microscope	**97021-914**	**3210.31**
Model AE31, Trinocular Microscope	**97021-916**	**3631.33**
XBE-EP1 Fluorescence Package	**97021-918**	**4104.98**

Moticam Pro CCD Cameras, Motic

- Cameras features the Sony ICX range of sensors for sustained quality readouts
- **Features are as follows:**
  - A – Color Camera
  - B – Peltier-Cooled Color Camera
  - C – Monochrome Camera
  - D – Peltier-Cooled Monochrome Camera
- Peltier-cooled sensors can be cooled down to 10°C below ambient temperature and are ideal for fluorescence microscopy
- Choose from the model that best your needs
  - 205 – A budget high speed camera
  - 252 – An intermediate resolution camera
  - 282 – A high resolution camera
  - 285 – A high speed and high resolution camera
- Special imaging packages are available; contact your VWR Sales Representative for more information

Model No.	Cat. No.	Each
205A	**89130-160**	**2684.03**
205B	**89130-162**	**3315.56**
205C	**89130-164**	**2684.03**
205D	**89130-166**	**3315.56**
252A	**89130-152**	**2926.11**
252B	**89130-154**	**3557.65**
282A	**89130-156**	**4273.40**
282B	**89130-158**	**4904.93**
285A	**89130-168**	**4273.40**
285B	**89130-170**	**4904.93**
285C	**89130-172**	**4273.40**
285D	**89130-174**	**4904.93**

VWR VistaVision™ Inverted Microscopes

- Highly versatile due to the unique swing-out condenser and long working distance
- Large stage surface improves specimen access
- All-metal base prohibits vibration and offers superior stability
- **Includes six LWD objectives:** three brightfield planachromatic (10x, 25x, and 40x magnification) and three phase contrast planachromatic (10x, 25x, and 40x magnification)
- Standard components ensure crisp, high-quality images in either brightfield or phase contrast mode
- Image analysis software offers powerful functions for image or movie capturing, adjusting, operating, and measuring
- Fluorescent microscope is supplied with four fluorescence filter sets, one each of blue, green, violet, and ultraviolet

Description	Cat. No.	Each
Standard Inverted Microscope	**82026-630**	**4529.38**
Fluorescent Inverted Microscope	**97010-036**	**12,398.88**

VWR CAN HELP YOU SELECT THE RIGHT PRODUCT FOR YOUR APPLICATION

The VWR Technical Product Support team consists of experienced scientists with backgrounds in your area of research. They can provide technical product specifications and help you compare different products, so you can choose the right product every time. For assistance email us at **TechnicalProductSupportNA@vwr.com** or call us at **1.888.897.5463**.

Cell Culture Contamination Through Mycoplasma

While bacterial and fungal infections of cell cultures are relatively easy to detect, prevent and treat, a contamination with mycoplasma represents a much bigger problem in terms of incidence, detectability, prevention, eradication and its effects on the final product. It has been estimated that between 5 to 35% of cell cultures in current use are infected with mycoplasma.

Contamination with mycoplasma can occur in various stations throughout the process. So it is important that contamination and impurity analyses are being performed during processing as well as upon the final product.

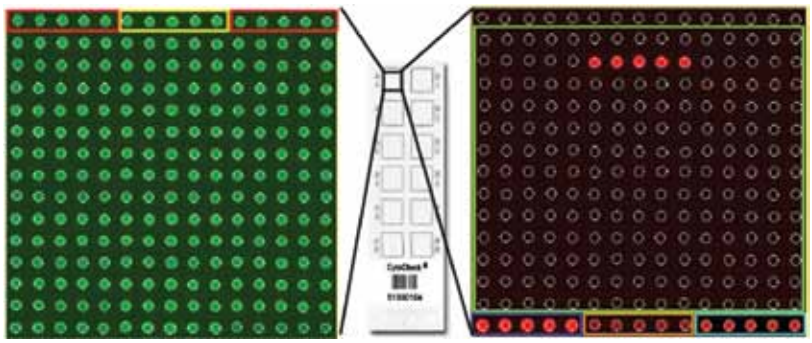
Potential sources of contamination include culture medium components such as serum or trypsin as well as contamination from the laboratory personnel themselves.

Greiner Bio-One developed a specific test kit for rapid detection of mycoplasma. This system was designed to meet the guidelines for PCR based mycoplasma detection assays as stated in the European Pharmacopoeia in July 2007.

The methodology used for our mycoplasma detection assay is based on microarray technology, which was optimized to allow streamlined simultaneous analysis of multiple parameters, achieves an accurate result interpretation. Because the array design includes a set of integrated DNA universal probes that hybridize to a highly conserved region of the mycoplasma genome, it is possible to detect the presence of all mollecute species. In addition to universal detection capability, the system incorporates species-specific DNA probes to perform identification of 41 different mycoplasma species, including the genera Acholeplasma, Ureaplasma and Spiroplasma.

A significant advantage of CytoInspect™ is that it does not require Multiplex PCR reactions to differentiate between the 41 mycoplasma species. Instead, species identification is achieved through hybridization of fluorescence-labeled PCR amplicons of the 16s-23s intergenic spacer region to highly species-specific DNA probes within the array. This is critical, as mycoplasma species identification is essential to trace the entry point or source of contamination.

An integrated control system enables monitoring of not only sample quality, but also performance of the test procedure as a whole. This type of check verification is fundamental for troubleshooting purposes as well as exclusion of both false positive and negative results.



CytoInspect™ DNA Chip, scanned at wavelengths of 532nm (DNA probes fluorescence labeled with Cy3 — green signals) and 635nm (DNA probes fluorescence labeled with Cy5 — red signals), displaying positive results for the On-Chip Control System and specific Mycoplasma probes.

greiner bio-one

CytoInspect™ Mycoplasma Detection Test Kits, Greiner Bio-One

Microarray test kits detect mycoplasma contamination in cell cultures and other biological materials. Kits include a universal probe test, as well as species-specific probes to identify virtually all reported contaminations using PCR detection. Each DNA probe is spotted five times to ensure assay robustness. On-chip control systems with Cy3- and Cy5-labeling allow for exact quality determination. Comprehensive assays are completed in under five hours from sample collection to evaluation. Highly specific and sensitive probes eliminate virtually all false-positive and false-negative test results. Validated in accordance with European Pharmocopoeia (Ph. Eur. 2.6.21) guidelines. Detection limit of <10 CFU/mL complies with biologics production requirements.

- Detection of all Mollicutes with a universal probe
- Identification of 40 mycoplasma species at species level
- Comprehensive on-chip-controls and automated data analysis
- Software designed according to legal requirements of the FDA (21 CFR part 11)
- High specificity and sensitivity

Description	Cat. No.	Each
CytoInspect Kit, 10 Arrays	**89085-680**	**5125.75**
CytoInspect Kit, 60 Arrays	**89085-682**	**30,754.50**
CheckScanner Microarray Scanner	**89085-684**	**41,981.07**
Additional CheckReport Software License	**89085-686**	**9141.09**

VWR® Disposable Tissue Grinders

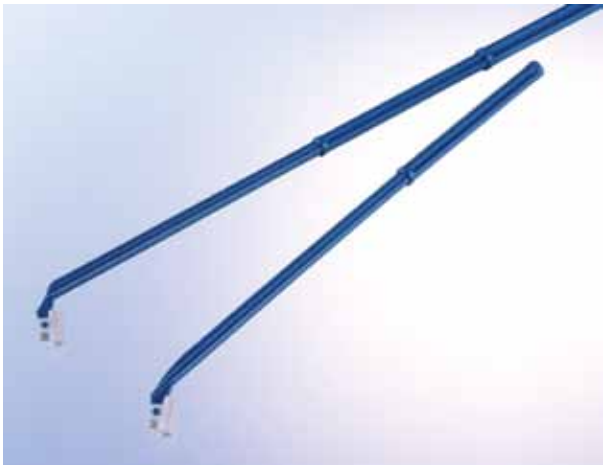
- Safe and easy to use
- Patented closed system has the ability to grind specimen in a sealed container, helping to prevent contact with the sample
- Molded abrasive surface does not leave any sediment to obstruct examination of the sample
- Extra cap and I.D. label are provided for storage, transport, and added safety
- Fully assembled and gamma sterilized

Capacity, mL	Style	Cat. No.	Case of 10
15	Conical	**47732-446**	**110.48**
35	Freestanding	**47732-448**	**101.92**
50	Conical	**47732-450**	**102.65**

Dounce Tissue Grinders, Wheaton

- Designed for fine particle size reduction without damage to cell nuclei
- For small cells such as *E. coli*, proteins, serum, and malignant tissues
- Made of low extractable borosilicate glass
- Mortar has large reservoir and pouring lip
- Large clearance pestle is used for initial sample reduction; narrow clearance pestle forms the final homogenate
- Loose pestle clearance: 0.0889–0.127mm (0.0035–0.0050")
- Tight pestle clearance: 0.0254–0.0762mm (0.0010–0.0030")

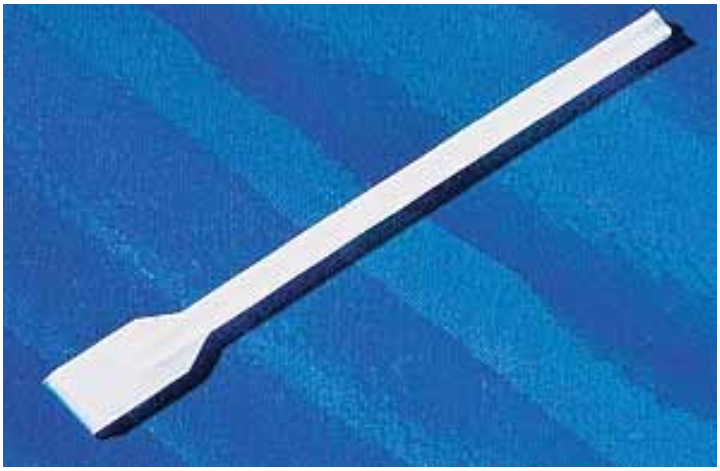
Capacity, mL	Chamber Dimensions, D x L, mm	Cat. No.	Case of 2
1	110 x 48	**62400-595**	**162.62**
7	130 x 82	**62400-620**	**177.89**
15	150 x 82	**62400-642**	**204.47**
40	250 x 130	**62400-664**	**254.54**



Cell Scrapers, Greiner Bio-One

- Designed for mechanical harvesting of cells in place of chemical treatment methods
- Pivoting head/blade design minimizes cell damage while ensuring even contact with growth surface
- Scraper width: 18mm
- Individually wrapped
- Sterilized by gamma radiation; certified nonpyrogenic

Size	Handle Length, cm (in.)	Cat. No.	Case of 100
Small	25 (9 7/8)	**82050-468**	**158.12**
Large	40 (15 3/4)	**82050-470**	**180.70**



Cell Lifter and Scrapers, Corning

- Lifter features a wide beveled edge for use in cell culture dishes
- Scraper features an angled swiveled blade for easy access to growth surfaces of flasks and dishes
- Individually wrapped
- Certified nonpyrogenic

Description	Blade Length, cm (in.)	Handle Length, cm (in.)	Cat. No.	Case of 100
Cell Lifter	1.9 (3/4)	18 (7)	**29442-200**	**168.11**
Cell Scraper	1.8 (3/4)	25 (9 7/8)	**29442-202**	**251.24**
Cell Scraper	3.0 (1 3/16)	40 (15 3/4)	**29442-204**	**283.78**

VWR Signature™ Digital Vortex Mixer

- Ideal for applications that require repeatable performance of speed and time
- Microprocessor feedback control maintains set speed from 500–3000rpm
- Timer displays elapsed time or user-defined time limit and shuts off unit when the time reaches zero
- Can be operated in touch mode or in continuous mode
- UL and C-UL listed; CE marked

Description	Cat. No.	Each
Digital Vortex Mixer	**14005-824**	**448.57**

VWR Signature™ Pulsing Vortex Mixer

- Designed for glass bead procedures and complete cell disruption
- Unique pulsing action reduces heat generation whle producing excellent grinding action
- Comes with a micro-tube holder with a built-in cup head allowing the unit to be used as a standard vortex mixer during "touch" mode
- The digital interface features independent LED displays for both speed and time
- UL and C-UL listed; CE marked

Description	Cat. No.	Each
Pulsing Vortex Mixer	**12620-862**	**611.53**

VWR® Advanced Heavy-Duty Vortex Mixer

- A heavy-duty design and efficient motor permit continuous duty operation
- Unit can handle accessory components over the entire speed range
- Select from "touch" mode or "on" mode
- Microprocessor control maintains the set speed for strong, consistent mixing action
- CSA approved; CE marked

Description	Cat. No.	Each
Heavy-Duty Vortex Mixer	**97043-564**	**864.08**

Accessories for VWR® and VWR Signature™ Vortex Mixers

- Microtube and microplate holder kit (**12620-874**) includes a microtube holder (**12620-876**) for forty-eight 0.25–2.0mL microcentrifuge tubes, a microplate holder (**12620-878**) for a 96- or 384-well plate or deep well block, and an insert retainer (**58816-132**)
- Tube holder kit (**58816-130**) consists of an insert retainer (**58816-132**) for securing vessels and tube holders, two vessel harnesses (**58816-136**) for flasks and bottles, one 9–13mm tube holder (**58816-138**) for 5mL culture tubes, one 14–19mm tube holder (**58816-140**) for 15mL centrifuge tubes, and one 20–25mm tube holder (**58816-142**) for 50mL centrifuge tubes
- Single tube holder (**12620-898**) mounts on the top of the vortex mixers for hands-free mixing of 15–50mL centrifuge tubes
- Tube holders (except **12620-898**) require insert retainer **58816-132**

Description	Cat. No.	Price
Kits		
Microtube and Microplate Holder Kit	**12620-874**	Ea./ **82.65**
Tube Holder Kit	**58816-130**	Ea./ **158.58**
Holders		
Microplate Holder	**12620-878**	Pk. 2/ **47.88**
Microtube Holder	**12620-876**	Pk. 2/ **48.75**
Single Tube Holder	**12620-898**	Ea./ **133.07**
Tube Holder for 5 mL Centrifuge Tubes	**58816-138**	Pk. 2/ **22.93**
Tube Holder for 15 mL Centrifuge Tubes	**58816-140**	Pk. 2/ **22.93**
Tube Holder for 50 mL Centrifuge Tubes	**58816-142**	Pk. 2/ **22.93**
Accessories		
Insert Retainer	**58816-132**	Ea./ **105.15**
Vessel Harness	**58816-136**	Pk. 2/ **6.97**

More Solutions for Cell & Tissue Processing

Allegra Family of Centrifuge Systems, Beckman Coulter

- Convenient packages include everything you need to get up-and-running quickly
- Enhance laboratory safety with our BioCertified* swinging-bucket rotors**
- Powerful refrigeration systems
- Designed with the end-user in mind

Allegra X-15R

Premium Swinging Bucket Performance

Maximize sample capacity and performance with the X-15 Series Benchtop Centrifuge system. The Allegra X-15 system can process up to twenty-eight 50mL or fifty-six 15mL conical tubes per cycle and helps you complete your runs faster with industry-leading maximum Swinging Bucket RCF of 5,250 x *g*.

- Exclusive ARIES Smart Balance Rotor automatically detects AND corrects up to 50 grams of imbalance, allowing you to "eye balance" your samples with confidence
- Cell Culture Package includes Allegra X-15R Series Instrument, ARIES Smart Balance 3-liter 4 x 750mL Swinging-bucket Rotor or Standard 4 x 750mL Rotor, 2 x 50mL Conical Tube Adapters, and 2 x 15mL Conical Tube Adapters

Description	Cat. No.
X-15R Cell Culture Package with Standard Rotor	**BKA46448***
X-15R Cell Culture Package with ARIES Rotor	**BKA30124***

*For pricing and special savings, contact your VWR Sales Representative

NEW

Allegra X-30 Series

Performance and Versatility with a Small Footprint

Achieve high performance and versatility without sacrificing valuable bench space with the X-30 Series Benchtop Centrifuge System. The Allegra X-30 system can process up to twelve 50mL or twenty 15mL conical tubes per cycle.

- Highest speed and *g*-force in its class with a fixed-angle microtube or microplate rotor
- Compact design measures only 18" wide—up to 35% narrower than comparable refrigerated instruments
- Cell Culture Package includes Allegra X-30 Series Instrument, SX4400 Swinging-bucket Rotor, Adapters for 50mL Conical Tubes (2 sets of 2), and Adapters for 15mL Conical Tubes (2 sets of 2)

Description	Cat. No.
X-30 Cell Culture Package	**BKB08536***
X-30R Refrigerated Cell Culture Package	**BKB08540***

*For pricing and special savings, contact your VWR Sales Representative

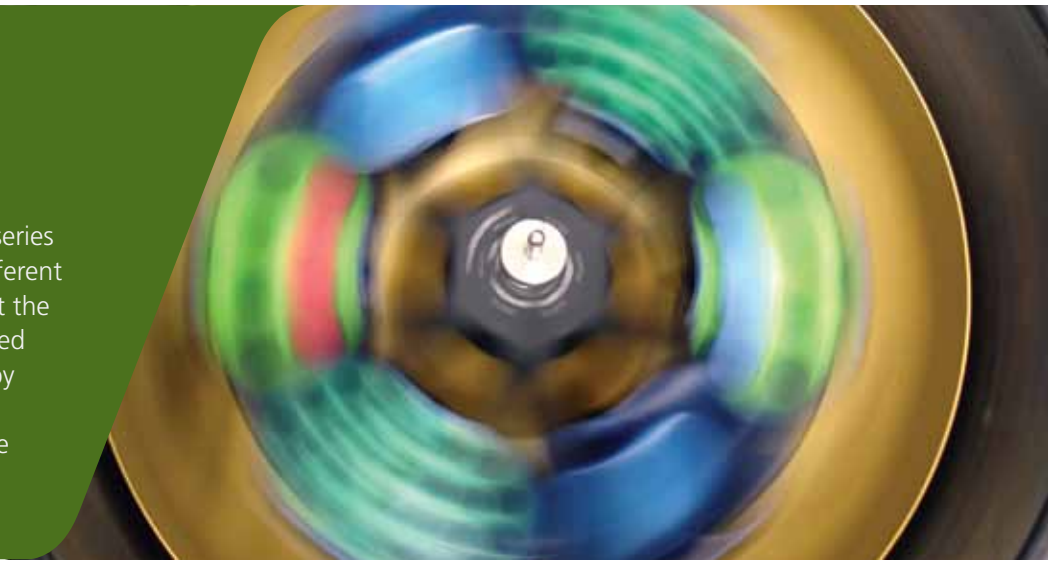
Optional BioSafe† bucket covers or high capacity adapters are also available; contact your VWR Sales Representative for more information.

BECKMAN COULTER

* BioCertified is a term used to describe our products which have been tested and validated to demonstrate containment of microbiological aerosols by an independent, third-party facility (Health Protection Agency, Porton Down, UK or USAMRIID, Ft. Detrick, MD, USA). Improper use or maintenance may affect seal integrity and, thus, containment.
† BioSafe and BioSafety are terms intended to describe the enhanced biocontainment features of our products.
**Rotor is BioCertified when used in conjunction with optional BioSafe Bucket Covers.
**This rotor has been tested to demonstrate containment of microbiological aerosols ONLY while operating within the associated Beckman Coulter centrifuge.
Instruments not available in all countries.

FOCUS Information

The rotor recognition system in the 4417 series provides safety and convenience when different rotors are used. Each rotor is recognized at the beginning of a run and automatically limited to its rated maximum speed. In addition, by recognizing the rotor, the microprocessor can accurately calculate and display *g*-force during a run.



VWR®

VWR® symphony™ 4417/R Centrifuges

- Compact, space saving design
- Corrosion resistant, stainless steel rotor chamber
- Quiet, maintenance-free induction drive
- Imbalance detection with safety shut down
- Microprocessor control with splash resistant digital display
- Accommodates tubes from 0.2mL to 100mL

Description	Cat. No.	Each
Non-Refrigerated Cell Culture Centrifuge Bundle*	**89176-490**	**5348.04**
Non-Refrigerated Centrifuge Only	**89171-142**	**3552.50**
Refrigerated Cell Culture Centrifuge Bundle*	**89176-496**	**9068.01**
Refrigerated Centrifuge Only	**89171-144**	**7272.48**

*Bundles include the centrifuge with a 4 x 100mL swing-out rotor and carriers for 15mL and 50mL conical tubes

VWR offers a wide variety of centrifuges to fit every application. Find the right centrifuge and centrifuge tubes for your needs at vwr.com.

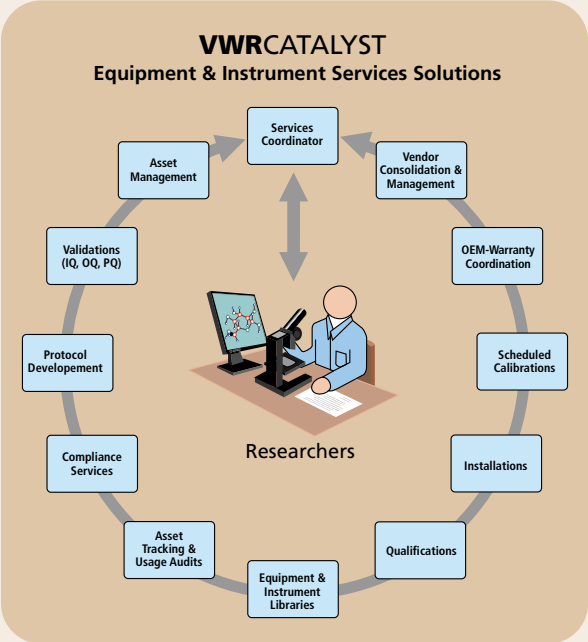
VWR® SuperClear™ Ultra-High Performance Centrifuge Tubes

- Leakproof, polypropylene tubes feature printed graduations and smooth inner walls for easy filling and sample preparation
- Printed writing area on side allows for permanent coding
- Autoclavable at 122°C (251.6°F); Freezable to –90°C (–130°F)
- Thick-wall construction for high-speed operation
- Flat caps provide an additional labeling surface
- Racks are made from Earth Friendly® recyclable plastic
- Leakproof
- DNase-, RNase-, and endotoxin-free
- Validated ISO 11137 Sterile Process

Sterility	Packaging	Cat. No.	Case of 500
15mL Tubes			
Nonsterile	50/Bag, 10 Bags/Case	**21008-214**	**198.04**
Nonsterile	25/Rack, 2 Racks/Pack, 10 Packs/Case	**21008-089**	**230.65**
Nonsterile	Bulk	**21008-105**	**202.46**
Sterile	50/Bag, 10 Bags/Case	**21008-216**	**224.02**
Sterile	25/Rack, 2 Racks/Pack, 10 Packs/Case	**21008-103**	**247.16**
50mL Tubes			
Nonsterile	50/Bag, 10 Bags/Case	**21008-240**	**215.06**
Nonsterile	25/Rack, 20 Racks/Case	**21008-169**	**280.74**
Nonsterile	Bulk	**21008-177**	**211.21**
Sterile	50/Bag, 10 Bags/Case	**21008-242**	**295.58**
Sterile	25/Rack, 20 Racks/Case	**21008-178**	**304.29**

VWRCATALYST Site Service Solutions

can help you keep your researchers and staff focused on your needs and goals, new development, and competitive edge.



Over the past 20 years we have performed hundreds of on and offsite services for our clients every day and have become the industry benchmark for those services. From autoclaving to warehouse management, and virtually every service in between, **VWR**CATALYST can answer all of your site service needs.

Keep your eye on the prize and let **VWR**CATALYST Site Services perform those essential but non-core tasks that distract your staff from their core mission.

For more information, contact **VWR**CATALYST by calling **1.888.793.2300** or emailing **vwr**catalyst@vwr.com

FOCUS Information

Polyplus-transfection is committed to providing you the very best tools and solutions for cell transfection. They guarantee the product performance and quality you need by developing, testing, and manufacturing their reagents in their own dedicated and ISO-accredited facilities.
These reagents are robust, deliver high efficiency, and are compatible with serum and antibiotics. Contact your VWR Sales Representative for complete details and pricing.

Polyplus transfection™
THE DELIVERY EXPERTS

jetPRIME™ DNA & siRNA Transfection Reagent, Polyplus-transfection

- Powerful transfection reagent that is gentle to cells
- Versatile use in both DNA & siRNA transfection
- High DNA transfection efficiency (see Fig. 1)
- Economical formula uses only a small amount of reagent and DNA per reaction (see Table 1)
- Comes with a specific buffer, so is ready to use

Buffer Concentration	Size, mL	Cat. No.	Each
1X	0.75	89129-922	253.00
1X	1.5	89129-924	430.00
1X	5 x 1.5	89129-926	1933.00
5X	5 x 1.5	89137-972	1853.00

INTERFERin™ siRNA Transfection Reagent, Polyplus-transfection

- Great silencing at 1nM for reliable results
- Over 90% gene silencing in a wide range of cell types
- Excellent cell viability
- INTERFERin-HTS is specifically designed for automated procedures

Size, mL	Cat. No.	Each
INTERFERin Reagent		
1	89129-930	206.00
5 x 1	89129-932	805.00
INTERFERin-HTS Reagent		
1.5	89137-968	450.00
4 x 1.5	89137-970	1620.00

jetPEI™ DNA Transfection Reagent for High Troughput Screening, Polyplus-transfection

- Exceptionally reproducible results
- Well suited for high-throughput screening, especially plasmid and shRNA libraries
- Stable up to four hours when combined with DNA
- Variety of protocols to fit your needs

Size, mL	Cat. No.	Each
jetPEI Reagent		
1	89129-938	268.00
4 x 1	89129-940	950.00
10	89137-958	2273.00
jetPEI Reagent plus Sodium Chloride Solution		
1	89129-916	288.00
4 x 1	89129-918	1008.00
10	89137-960	2350.00

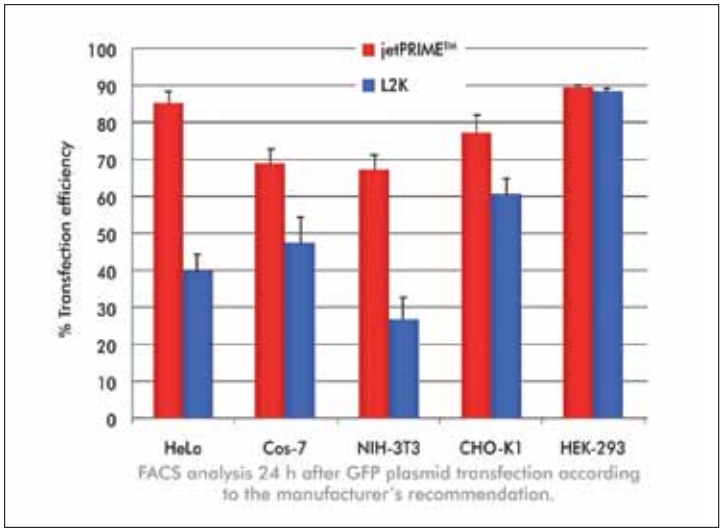


Fig. 1

6-well plates	Volume of reagent per well	Number of transfections per 1.5 ml vial
jetPRIME™	4 µl	375
L2K	10 µl	150

Table 1

In vivo-jetPEI™ Delivery Reagents, Polyplus-transfection

- Provides successful and reproducible delivery of DNA, siRNA, and oligonucleotides in vivo
- Multiple modes of administration in many species
- Reagent of choice for functional studies, RNA interference, gene therapy, and genetic vaccination
- Does not cause any detectable inflammatory response at therapeutic doses
- Comes with a glucose solution

Size, mL	Cat. No.	Each
in vivo-jetPEI Reagent		
0.1	89129-960	398.00
0.5	89129-962	1441.00

BTX™ ECM® 830 Square Wave Electroporation System, Harvard Apparatus

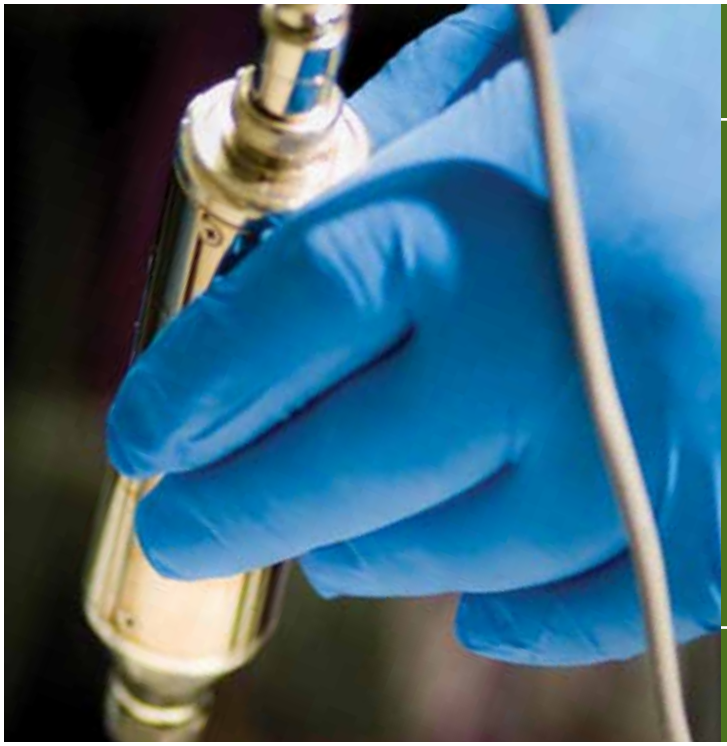
- Designed for all in vitro and in vivo applications
- Square wave pulse shaping leads to higher viability and efficiency of the testing material
- Low voltage mode offers 1V discrimination and ±5% accuracy
- Generator is short-circuit proof and features RS-232 and RS-485 interface ports
- Arc Quenching™ mechanism minimizes sample damage due to arcing
- Pulse length: 10µs–10sec
- Meets CE requirements

Description	Cat. No.	Each
Electroporation System	**58018-004**	**7964.14**
Generator Only	**47745-928**	**7363.92**

BTX™ ECM® 630 Exponential Decay Wave Electroporation System, Harvard Apparatus

- Features power platform technology, instant feedback, and on-line menu
- Time constant is easily and precisely controlled with the Precision Pulse™ system
- Over 200 ECM 630 protocols can be duplicated, as well as additional competitive protocols with the use of the resistor selection "NONE"
- Parameter settings are simplified with the single dial control
- Meets CE requirements

Description	Cat. No.	Each
Electroporation System with Cuvettes	**58017-932**	**6600.21**
Electroporation System with 96-Well Plates	**47745-926**	**5966.24**
Generator Only	**82019-202**	**8821.50**



Thermo SCIENTIFIC | NALGENE®

Nalgene® Cryogenic Vials with Bar Code, Thermo Scientific

- For storage in mechanical and vapor-phase liquid nitrogen freezers
- Chemically resistant bar codes make these vials ideal for automated data collection, sample inventory, or identity masking
- Self-standing vials made of polypropylene with polyethylene closures
- Certified sterile, noncytotoxic, and nonpyrogenic
- Temperature Range: –40 to 121°C

Capacity, mL	O.D. x H, mm	Packaging/Bag	Cat. No.	Case of
1.2	13.5 x 38.4	25	**73521-052**	500/ **332.29**
2	13.5 x 48.5	25	**73521-054**	500/ **332.29**
5	13.5 x 89.4	10	**73521-056**	250/ **254.52**

Nalgene® Cryogenic Vials, Thermo Scientific

- Polypropylene vials are ideal for storage in mechanical and vapor-phase liquid nitrogen freezers
- Screw cap comes with a sealing ring to ensure secure closure
- External thread position greatly reduces risk of contaminating contents
- Deep-skirted closure allows single-handed aseptic technique without exposing fingers to contents
- Convenient filling through large inner diameter of vial
- Sterilized by gamma radiation; certified noncytotoxic, and nonpyrogenic
- Temperature Range: –40 to 121°C

Volume, mL	O.D. x H, mm	Packaging	Cat. No.	Case of
1.2	13.5 x 38.1	25/Bag	**66008-706**	500/ **277.75**
1.2	13.5 x 38.1	Bulk	**66008-751**	1000/ **485.82**
2.0	13.5 x 48.3	25/Bag	**66008-728**	500/ **277.75**
2.0	13.5 x 48.3	Bulk	**66008-754**	1000/ **485.82**
5.0	13.5 x 92	10/Bag	**66008-732**	25/ **225.64**

Nunc® CryoTube® Vials with Internal Thread, Thermo Scientific

- Designed for cryogenic storage of cells, blood, serum, and other biological specimens
- Polypropylene tubes perform well in mechanical and liquid nitrogen freezers
- Silicone-gasketed screw caps stay sealed at extreme temperatures (–40 to 121°C)
- Starfoot-style vials permit one-hand operation when used with CryoTube racks
- Passed 95kPa testing for IATA requirements
- 12.5mm dia.
- Sterile

Volume, mL	Style	Cat. No.	Pack of
Non-Self-Standing Vials			
1.8	Round-Bottom	**66021-985**	500/ **627.72**
4.5	Round-Bottom	**66021-990**	300/ **581.07**
3.6	Round-Bottom	**66021-988**	400/ **658.84**
Skirted Self-Standing Vials			
1.0	Conical-Bottom	**66021-992**	500/ **627.72**
1.8	Round-Bottom	**66021-987**	450/ **582.65**
Starfoot Self-Standing Vials			
1.0	Conical-Bottom	**66021-993**	500/ **627.72**
1.8	Round-Bottom	**66021-986**	450/ **582.65**
4.5	Round-Bottom	**66021-991**	300/ **581.07**
3.6	Round-Bottom	**66021-989**	400/ **658.84**

Nunc® Cryobank Cryogenic Storage Vials, Thermo Scientific

- Vials snap into a 96-place automation-compatible rack, providing automated manipulation and safe transport
- Internally threaded caps feature a socket to allow opening and closing with a screwdriver
- Optional 2D code is laser-etched into the polypropylene bottom of the vial to prevent loss during storage
- Feature low protein adsorption and are ideal for cells and proteins
- DNAse- and RNAse-free and nontoxic according to USP class VI test
- Sterile and pyrogen-free; CE marked
- Temperature Range: –40 to 121°C

Volume, mL	Cat. No.	Case of 960
Uncoded		
0.5	**82030-512**	**511.65**
1.0	**82030-520**	**581.28**
2D Coded		
0.5	**82030-510**	**628.71**
1.0	**82030-518**	**702.38**

Nunc® CryoTube® Vials with External Thread, Thermo Scientific

- Polypropylene vials are designed for cryogenic storage of cell cultures, sperm, blood, and serum specimens
- Perform well in mechanical and liquid nitrogen freezers
- External-threaded screw cap reduces risk of contamination from handling
- Freestanding starfoot vials have a 12.5mm diameter with a 13mm diameter cap
- Stepneck vials and caps have a 12.4mm diameter
- Passed 95kPa testing for IATA requirements
- Sterile
- Temperature Range: –40 to 121°C

Description	Volume, mL	Cat. No.	Pack of
Round-Bottom			
Stepneck with Marking Area	1.8	**66021-997**	500/ **644.61**
Starfoot Vials with Marking Area	1.8	**66021-996**	450/ **579.69**
Starfoot Vials with Marking Area	4.5	**66021-984**	300/ **625.17**
Conical-Bottom			
Starfoot Vials with Marking Area	1.0	**66021-994**	500/ **644.61**

Nalgene® SYSTEM 100™ Cryogenic Vials, Thermo Scientific

- Self-standing to increase storage capacity
- Polypropylene construction withstands temperatures from –40 to 121°C
- Silicone gasketed closures ensure leakproof performance
- Externally threaded vials for aseptic technique
- Sterile, noncytotoxic, and nonpyrogenic
- Self-standing
- CE marked

Capacity, mL	O.D. x H, mm	Cat. No.	Case of 500
1.0	12 x 38	**66008-708**	**284.84**
1.5	12 x 48	**66008-710**	**284.84**
1.5 with Bar Code	12 x 48	**73521-058**	**352.49**

VWR® Cryogenic Vials with Closures

- Special base design allows them to be locked into a cryogenic rack and tray for single-handed manipulation
- Graduation marks and a large marking spot for easy labeling of contents
- Can be color-coded with cap inserts, sold separately
- Polypropylene vials can withstand temperatures to –196°C (–321°F)
- DNase- and RNase-free, nonpyrogenic, sterile

Capacity, mL	Thread	Cat. No.	Case of 500
Conical-Bottom, Self-Standing			
1.2	External	**89094-800**	**202.33**
1.2	Internal	**89094-802**	**209.36**
Round Bottom			
2	External	**89094-808**	**205.21**
2	Internal	**89094-804**	**212.78**
4	Internal	**89094-814**	**240.30**
5	Internal	**89094-820**	**315.94**
Round Bottom, Self-Standing			
2	External	**89094-806**	**205.21**
2	Internal	**89094-810**	**212.78**
4	External	**89094-812**	**231.72**
4	Internal	**89094-816**	**240.30**
5	External	**89094-818**	**269.39**
5	Internal	**89094-822**	**278.50**

ORDERING PRODUCTS IS EASY THROUGH VWR.COM

Our web site gives you maximum control over the ordering process. With all of the available options, you can simplify your purchasing process by matching it to your own business practices.

WHEATON
Science Products
a division of WHEATON Industries Inc.

CryoELITE™ Cryogenic Vials, WHEATON

- 2mL vials are made from low binding, cryogenic grade, virgin polypropylene
- Colored caps match CryoFile™ storage box colors to easily color code projects
- Cap seal exceeds DOT and IATA regulations for ultimate sample protection during transportation and freeze-thaw cycles
- Loctagon™ vial skirt provides stability in freestanding position for easy open and closing with one hand
- Bottom format allows unrestricted view of the optional 2D bar code for automated screening
- Dimensions for external thread vials: 12x50mm; dimensions for internal thread vials: 12x49mm

Cap Color	Writing Patch	Sterile	Cat. No.	Case of
Vials with External Thread				
Natural	No	No	**89125-492**	1000/ **327.71**
Natural	Yes	No	**89125-490**	1000/ **402.06**
Natural	Yes	Yes	**89125-512**	500/ **211.43**
Blue	Yes	Yes	**89125-510**	500/ **211.43**
Green	Yes	Yes	**89125-508**	500/ **211.43**
Pink	Yes	Yes	**89125-504**	500/ **211.43**
Red	Yes	Yes	**89125-502**	500/ **211.43**
White	Yes	Yes	**89125-500**	500/ **211.43**
Yellow	Yes	Yes	**89125-506**	500/ **211.43**
Vials with Internal Thread				
Natural	No	No	**89125-452**	1000/ **327.71**
Natural	Yes	No	**89125-450**	1000/ **402.06**
Natural	Yes	Yes	**89125-478**	500/ **211.56**
Blue	Yes	Yes	**89125-476**	500/ **211.56**
Green	Yes	Yes	**89125-474**	500/ **211.56**
Pink	Yes	Yes	**89125-470**	500/ **211.56**
Red	Yes	Yes	**89125-468**	500/ **211.56**
White	Yes	Yes	**89125-466**	500/ **211.56**
Yellow	Yes	Yes	**89125-472**	500/ **211.56**

Vials with External Thread

Vials with Internal Thread

FOCUS Information

Using a color coded system to identify different sample groups is a fast and easy way to minimize freezer fluctuations and maximize your efficiency in the lab. When you match your CryoELITE vial cap color to the CryoFile storage box color, you can visually identify specific lots and be in and out of the freezer in much less time.

CryoELITE™ 2D Data Matrix Bar Code Bottom Inserts, WHEATON

- Optional insert allows for immediate bar coding of samples
- Can also be applied to the vial at a future date
- Insert easily press fits and locks into the bottom of the vial

Sterile	Cat. No.	Case of 500
Yes	**89134-436**	**185.76**
No	**89134-438**	**180.91**

CryoFile™ Storage Boxes, WHEATON

- Colors match CryoELITE vials for easy sample identification
- Partitions are numbered from 1–81 with the numbering system printed on both the lid and the bottom of the box
- Lids provide space to write additional sample information
- Fits 1.2 and 2mL vials
- Water-repellent material provides longer durability
- Boxes withstand temperatures down to –196°C
- Dimensions: 13L x 13W x 5.2Hcm (5⅛ x 5⅛ x 2")

Color	Cat. No.	Case of 15
Blue	**89092-392**	**80.83**
Green	**89092-376**	**80.83**
Pink	**89092-380**	**80.83**
Red	**89092-396**	**80.83**
White	**89092-388**	**80.83**
Yellow	**89092-384**	**80.83**

Aspects of Cryopreservation

Arne Johansson, Senior Scientist, Thermo Scientific

Fig. 1
CryoFlex protective tubing used as a "cane" for lowering CryoTubes into liquid nitrogen.

A variety of types and brands of vials are used for the storage of biological materials at low temperature. The purpose of storage at low temperature is to keep and maintain materials for later use, e.g., to preserve original cells for later culture. It is of great importance that the storage vials do not cause any change or damage to the sample, which is often irreplaceable.

When choosing a suitable vial or container for cryopreservation, the following aspects should be considered:

- Tightness
- Toxicity
- Mutagenicity
- Pyrogenicity
- Sterility
- Tightness

For long term storage of samples, particularly in liquid nitrogen, a completely leak proof seal is needed. If liquid nitrogen enters the vial during storage, the vial may explode when it is thawed due to vaporization of the liquid nitrogen inside the vial. When heated to room temperature, liquid nitrogen will expand about 700 times, or create a pressure of about 700 atmospheres if expansion is prohibited! At ultralow temperatures, any sealing material becomes inflexible, so there is always a theoretical risk of leakage when a mechanical closure is used.

To avoid the risk of vials that have been stored in liquid nitrogen exploding, they may be kept in the gas phase in the nitrogen container for a minimum of 24 hours before removal to higher temperatures. This will allow any liquid nitrogen present to boil off slowly thus preventing the dramatic expansion described above. To ensure 100% leak proof storage, mechanically closed containers must be hermetically sealed in an outer protective envelope.

Toxicity

In order to preserve the viability of living samples, such as cultured cells, possibly for years, it is necessary that the vial material is absolutely non-toxic. Plastic vials are commonly used for storing such samples at low or ultralow temperatures. However, the choice of plastic grade for these vials is very critical as some grades may contain impurities or additives, which are toxic to cells. When choosing vials for cryopreservation, proven non-toxicity of the vial material is therefore of great importance.

Mutagenicity

As one purpose of storing samples, including cultured cells, is to maintain a reference stock of unaltered material, consideration should be given to the possible mutagenic effect of components that may be absorbed from the vial. It should be noted that the effect of mutagenic components absorbed during storage may only be expressed after a number of post-storage cell divisions, as mutagenesis is a long term effect on life processes, which are brought to a standstill during storage. Thus, the results of mutagenicity may not appear until the cells have been subcultured several times.

Pyrogenicity

Cryopreservation vials may be used for the storage of substances used in pharmacological studies. Pyrogenic impurities released from the vial are unacceptable because they could possibly interfere with the effects of pharmacological substances. Endotoxins are known to be especially adsorptive to polypropylene, the type of plastic used for cryopreservation vials. One should therefore pay special attention to the possible presence of these pyrogens.

Sterility

To maintain the integrity of the stored material, it must be free from contamination with foreign micro-organisms. A proven Sterility Assurance Level (SAL) is another important criterion for the choice of vial.

VWR® CryoPro® Storage Boxes and Dividers

- Durable fiberboard construction with a protective, moisture-repellant coating
- Liquid nitrogen freezer boxes feature slots for safe drainage and reduced consumption
- Boxes with dividers feature a lid with a numbered grid for superior inventory control
- Boxes without dividers can accommodate dividers (sold separately) for 16 to 100 places
- Dividers can fit in any 12.7x12.7cm (5x5") LN_2 cryogenic or mechanical freezer box

Dimensions, L x W x H, cm (in.)	No. of Places	Cat. No.	Price
Liquid Nitrogen Cryogenic Freezer Boxes with Drain Slots			
7 x 7 x 5.1 (2 3/4 x 2 3/4 x 2)	25	**82007-160**	Cs. 204/ **1110.78**
12.7 x 12.7 x 5.1 (5 x 5 x 2)	81	**97014-322**	Cs. 120/ **641.19**
12.7 x 12.7 x 5.1 (5 x 5 x 2)	100	**82007-158**	Cs. 120/ **659.26**
Mechanical Cryogenic Freezer Boxes			
12.7 x 12.7 x 5.1 (5 x 5 x 2)	–	**82021-114**	Pk. 12/ **42.88**
12.7 x 12.7 x 5.1 (5 x 5 x 2)	–	**82007-142**	Cs. 120/ **391.41**
12.7 x 12.7 x 5.1 (5 x 5 x 2)	81	**82007-162**	Cs. 120/ **446.45**
12.7 x 12.7 x 7.6 (5 x 5 x 3)	–	**82021-116**	Pk. 12/ **52.06**
12.7 x 12.7 x 7.6 (5 x 5 x 3)	–	**82007-144**	Cs. 120/ **475.20**
Fiberboard Dividers			
12.7 x 12.7 x 2.5 (5 x 5 x 1)	16	**82021-118**	Pk. 12/ **23.53**
12.7 x 12.7 x 2.5 (5 x 5 x 1)	25	**82021-120**	Pk. 12/ **23.53**
12.7 x 12.7 x 2.5 (5 x 5 x 1)	49	**82021-122**	Pk. 12/ **23.53**
12.7 x 12.7 x 2.5 (5 x 5 x 1)	64	**82021-124**	Pk. 12/ **23.53**
12.7 x 12.7 x 2.5 (5 x 5 x 1)	81	**82021-126**	Pk. 12/ **23.53**
12.7 x 12.7 x 2.5 (5 x 5 x 1)	100	**82021-128**	Pk. 12/ **23.53**

VWR® Cryogenic Dot and Strip Labels

- Ideal for all cryostorage, liquid nitrogen, refrigeration, and ultra-low temperature freezer applications
- Can be placed in most incubators
- Features a unique adhesive that can withstand extreme temperatures from –196 to 121°C (–321 to 250°F) without the need for lamination

Description	Dimensions, WxH mm (in.)	Color	Packaging	Cat. No.	Case of
Rolls of Labels					
Dots for 0.5–1.5 mL Tubes	9.5 (3/8) dia.	White	Roll of 1000	**89097-576**	1000/ **52.78**
Dots for 0.5–1.5 mL Tubes	9.5 mm (3/8) dia.	Multicolor	Roll of 5000	**89097-584**	5000/ **172.38**
Dots for 1.5–2 mL Tubes	13 (1/2) dia.	White	Roll of 1000	**89097-580**	1000/ **55.47**
Strips for 1.5–2 mL Tubes	33 x 13 (1 1/4 x 1/2)	White	Roll of 1000	**89097-574**	1000/ **55.47**
Boxes of Laser Printer Label Sheets					
Dots for 0.5–1.5 mL Tubes	9.5 (3/8) dia.	White	20 Sheets, 192/Sheet	**89097-590**	20/ **92.87**
Strips for 0.5 mL Tubes	24 x 13 (1 x 1/2)	White	20 Sheets, 119/Sheet	**89097-582**	20/ **107.58**
Strips for 1.5–2 mL Tubes	33 x 13 (1 1/4 x 1/2)	White	20 Sheets, 85/Sheet	**89097-572**	20/ **111.18**
Strips for 1.5–2 mL Tubes	33 x 13 (1 1/4 x 1/2)	Multicolor	25 Sheets, 85/Sheet	**89097-588**	25/ **172.40**
Strips for Racks or Boxes	67 x 25 (2 5/8 x 1)	White	20 Sheets, 30/Sheet	**89097-578**	20/ **91.72**

VWR® CryoPro® Rack Systems, BR Series

- The perfect solution for medium to large storage needs
- Allows for quick and accurate inventorying and recovery of specimens
- BR-1 model can hold 25-cell cardboard or plastic boxes
- BR-2, -3, and -4 models can hold 100-cell cardboard or plastic boxes
- Rollerbases are available for safely moving full tanks

Description	Dimensions, H x O.D., cm (in.)	Liquid Nitrogen Capacity, L	Neck Diameter, cm (in.)	Static Evaporation Rate, L/Day	Cat. No.	Each
BR-1 Rack System	67.3 x 50.8 (26 1/2 x 20)	47	12.7 (5)	0.39	**55709-208**	**2965.07**
BR-2 Rack System	68 x 55.9 (26 3/4 x 22)	61	21.6 (8 1/2)	0.85	**55709-210**	**5051.47**
BR-3 Rack System	95 x 55.9 (37 3/8 x 22)	121	21.6 (8 1/2)	0.99	**55709-212**	**5819.81**
BR-4 Rack System	95 x 65.5 (37 3/8 x 26 3/16)	175	21.6 (8 1/2)	0.99	**55709-214**	**6556.92**

OmniSolv® Dimethyl Sulfoxide, EMD Millipore

Assay (by GC): 99.9% min.
Synonyms: *DMSO; Methyl Sulfoxide*
CAS No.: 67-68-5
Merck Index: 13.329
Formula: $(CH_3)_2SO$
Formula Weight: 78.13
Density: 1.10 g/L

Size, L	Packaging	Cat. No.	Case of
1	Poly-Coated Glass Bottle	EM-MX1456P-6	6/ **761.08**
4	Glass Bottle	EM-MX1456-1	4/ **1348.46**
4	Poly-Coated Glass Bottle	EM-MX1456P-1	4/ **1386.71**

SeraFree™ Cryopreservation Media, AMRESCO

- Suitable for use in environments that prohibit the use of animal-derived products
- Optimized for cell viability and growth after thawing
- Reduces the potential for transmission of infectious agents
- Available in RPMI or DMEM media formulations
- Tested for sterility and endotoxins

Description	Size, mL	Cat. No.	Each
DMEM Cryopreservation Media	6 x 5	**97063-280**	**105.10**
DMEM Cryopreservation Media	50	**97063-278**	**105.10**
RPMI Cryopreservation Media	6 x 5	**97063-274**	**105.10**
RPMI Cryopreservation Media	50	**97063-272**	**105.10**

VWR® CryoPro® Liquid Dewars, L Series

- Conveniently store and dispense large or small quantities of liquid nitrogen
- Customize to your specific application with accessories (available separately)

Description	O.D. x H, cm (in.)	Liquid Nitrogen Capacity, L	Neck Diameter cm (in.)	Static Evaporation Rate, L/Day	Weight Empty, kg (lbs.)	Weight Full, kg (lbs.)	Cat. No.	Each
L-4 Liquid Dewar	18.5 x 42.6 (7 1/4 x 16 3/4)	4	3.5 (1 3/8)	0.19	2.7 (6)	6 (13)	**82021-112**	**997.38**
L-5 Liquid Dewar	22.2 x 46.2 (8 3/4 x 18 3/16)	5	5.6 (2 3/16)	0.15	4 (8.8)	8 (17.6)	**55709-234**	**905.86**
L-10 Liquid Dewar	26 x 54.6 (10 1/4 x 21 1/2)	10	5.6 (2 3/16)	0.18	6 (13.2)	14 (30.9)	**55709-236**	**976.55**
L-20 Liquid Dewar	36.8 x 62.7 (14 1/2 x 24 11/16)	21	5.1 (2)	0.18	9 (19.8)	26 (57.3)	**55709-238**	**1224.33**
L-30 Liquid Dewar	43.2 x 61.1 (17 x 24)	32	6.4 (2 1/2)	0.22	12 (26.4)	38 (83.8)	**55709-240**	**1380.51**
L-50 Liquid Dewar	43.2 x 77.9 (17 x 30 11/16)	50	6.4 (2 1/2)	0.49	15 (33)	56 (123.5)	**55709-242**	**1830.27**

VWR® CryoCooler Freeze Controller

- Polycarbonate freeze controller provides the 1°C/min. cooling rate required for successful cell preservation
- Floating rigid insert helps prevent contamination
- Holds up to eighteen 1.2–2mL cryogenic vials

Description	Cat. No.	Each
CryoCooler	**414004-284**	**57.21**

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VWR® symphony™ Ultra-Low Temperature Freezers

- Audible, visual, and mobile messaging alarm options available
- Vacuum thermal insulation technology increases storage space
- Four gasketed inner doors are standard, creating compartments that can be further subdivided with adjustable shelves
- Temperature range: –86 to –50°C (–123 to –58°F)
- Three-year warranty on parts and labor and a five-year warranty on the compressor
- UL and C-UL listed

Volume, L (cu. ft.)	Electrical	Interior Dimensions, H x W x D, cm (in.)	Exterior Dimensions, H x W x D, cm (in.)	Shipping Weight, kg (lbs.)	Cat. No.	Each
626 (22)	115V, 60 Hz	131 x 76 x 63 (51 1/2 x 30 x 24 13/16)	197 x 91 x 83.5 (77 1/2 x 35 13/16 x 33)	350 (772)	**414005-088**	**14,712.79**
626 (22)	220V, 60 Hz	131 x 76 x 63 (51 1/2 x 30 x 24 13/16)	197 x 91 x 83.5 (77 1/2 x 35 13/16 x 33)	350 (772)	**414005-087**	**14,712.79**
722 (25.4)	220V, 60 Hz	131 x 87 x 63 (51 1/2 x 34 1/4 x 24 13/16)	197 x 91 x 115 (77 1/2 x 35 13/16 x 45 1/8)	370 (816)	**414004-216**	**17,661.55**
810 (28.6)	220V, 60 Hz	131 x 87 x 71 (51 1/2 x 34 1/4 x 28)	198 x 114.6 x 98 (77 7/8 x 45 1/8 x 38 5/8)	380 (837)	**414004-658**	**19,005.88**

VWR Signature™ Ultra-Low Temperature Freezers

- Audible alerts to unsafe conditions
- Advanced microprocessor control to simplify programming, set-up, and monitoring
- Increased reserve of BTUH capacity for greater energy efficiency
- Automatic low voltage compensation minimizes wear on compressors
- Temperature range: –86 to –50°C (–123 to –58°F)

Volume, L (cu. ft.)	Electrical	Interior Dimensions, H x W x D, cm (in.)	Exterior Dimensions, H x W x D, cm (in.)	Shipping Weight, kg (lbs.)	Cat. No.	Each
Upright Freezers						
368 (13)	120V, 60 Hz	131 x 58 x 49 (51 1/2 x 23 x 19 5/16)	198 x 85 x 79 (78 x 33 1/2 x 31)	313 (690)	**14230-104**	**15,267.06**
368 (13)	230V, 50/60 Hz	131 x 58 x 49 (51 1/2 x 23 x 19 5/16)	198 x 85 x 79 (78 x 33 1/2 x 31)	313 (690)	**14230-102**	**15,267.06**
490 (17.3)	120V, 60 Hz	131 x 58 x 64 (51 1/2 x 23 x 25 3/16)	198 x 85 x 94 (78 x 33 1/2 x 37)	358 (790)	**14230-106**	**15,672.71**
490 (17.3)	230V, 50/60 Hz	131 x 58 x 64 (51 1/2 x 23 x 25 3/16)	198 x 85 x 94 (78 x 33 1/2 x 37)	358 (790)	**14230-108**	**15,672.71**
650 (23)	120V, 60 Hz	131 x 78 x 64 (51 1/2 x 30 3/4 x 25 3/16)	198 x 104 x 94 (78 x 41 x 37)	390 (860)	**53516-568**	**18,513.45**
650 (23)	230V, 50/60 Hz	131 x 78 x 64 (51 1/2 x 30 3/4 x 25 3/16)	198 x 104 x 94 (78 x 41 x 37)	390 (860)	**14230-110**	**18,513.45**
793 (28)	230V, 50/60 Hz	131 x 93 x 69 (51 1/2 x 36 5/8 x 27 1/8)	198 x 119 x 94 (78 x 47 x 37)	445 (980)	**97014-798**	**21,786.72**
Chest Freezers						
85 (3)	120V, 60 Hz	42 x 47 x 47 (16 1/2 x 18 1/2 x 18 1/2)	111 x 72 x 73 (43 3/4 x 26 1/2 x 28 3/4)	159 (350)	**14230-112**	**10,374.83**
359 (12.7)	120V, 60 Hz	71 x 108 x 47 (28 x 43 1/2 x 18 1/2)	103 x 183 x 73 (40 1/2 x 72 x 28 3/4)	338 (745)	**14230-122**	**14,336.11**
359 (12.7)	230V, 50/60 Hz	71 x 108 x 47 (28 x 43 1/2 x 18 1/2)	103 x 183 x 73 (40 1/2 x 72 x 28 3/4)	338 (745)	**14230-120**	**14,076.75**
566 (20)	120V, 60 Hz	71 x 169 x 47 (28 x 66 1/2 x 18 1/2)	103 x 244 x 73 (40 1/2 x 96 x 28 3/4)	386 (852)	**14230-130**	**14,984.54**
566 (20)	230V, 50/60 Hz	71 x 169 x 47 (28 x 66 1/2 x 18 1/2)	103 x 244 x 73 (40 1/2 x 96 x 28 3/4)	386 (852)	**14230-128**	**14,984.54**

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