VWR
We Enable Science

VWR INTERNATIONAL

ALL YOU NEED

FOR CELL CULTURE

- Serum
- Media
- Reagents & supplements
- Transfection
- RNAi
- Electroporation
- Tissue culture plasticware
- Instruments & equipment

And more...

VWR®
We Enable Science

IgGy
ANTIBODY SELECTOR

NEW

Increasing number of antibody brands

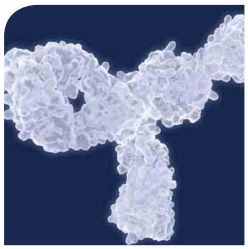
Many available conjugations

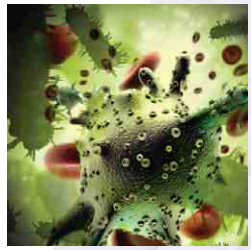
All major applications

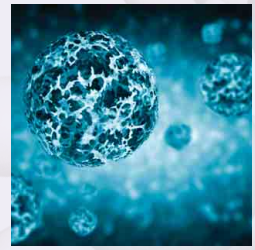
Multiple species

Competitive pricing

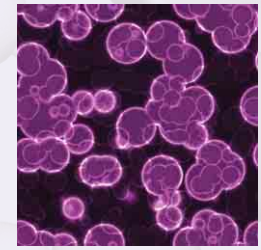
Select from more than 15 criteria to find the antibody you need go to **vwr.com/antibody**


Primary


Secondary


Monoclonal


Mouse Monoclonal


Polyclonal

Life Science | Genomics | Proteomics | Cell Biology

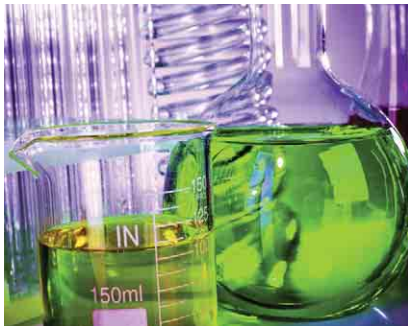


TABLE OF CONTENTS

Serum 5
- *Mad cow disease is not in the lab - BSE and FBS 30 years later 10*
- *Peace of mind begins with FreeAdd 12*

Serum albumin 19

Plasma 21

Classical media 23

Specialty media 27
- *Serum-free media, supplements and enzymes 30*

Salt solutions and salts 33

Cell culture reagents 37
- *Detection and elimination of Mycoplasma in cell culture 50*

Transfection reagents 63
- *Delivery of siRNA using INTERFERin® transfection reagent 69*
- *in vivo DNA and siRNA non viral delivery 71*

RNAi 73

Electroporation 77
- *Disruption of blood brain barrier using electroporation 81*

Cell counting 83
- *Comparison of cell counting methods between the EVE™ Automatic cell counter and a hemocytomer 89*

Filtration 91
- *Culturing embryonic stem cells using media filtered with Thermo Scientific Nalgene Rapid Flow PES filter units to reduce contamination risk 108*

Cell culture plasticware 121
- *Reconstruction of human epidermis using BRANDplates® Insert System 144*
- *Analysis of dialysed flask technology for antibody production 167*

Biocoating 173
- *Corning® Synthemax® II Sc substrate as an ideal surface for human neural stem cell culture 181*
- *The Nunclon Sphera surface supports formation of three dimensional cancer spheroids in suspension 188*

Cryoware 195
- *ChillProtect®: New protective medium for cold storage cells 210*

Pipetting 217

Instruments 227

Application Notes

THESE SYMBOLS INDICATE IMPORTANT PRODUCT FEATURES:

SYMBOLS

Autoclavable

HACCP Certified

Sterile

Selected for you

Sustainable

Ethernet interface

RS 232interface

USB interface

IP64 IP65 IP68

IP Classifications

2 year warranty 3 year warranty 5 year warranty

Warranty

CELL CULTURE SOLUTIONS

Grow & Passage

Sera & Media
Tissue culture plasticware
Coatings & ECM's
Antibiotics & supplements
Cell counters
CO_2 incubators
Roller bottle systems
...

Store

Cryoware
Liquid N_2 tanks
Freezing media
...

Transfect

Standard
High throughput
Bioproduction
In vivo
RNAi
Electroporation
...

Analyse

Microscopes
Viability reagents
Cell stains
Cell counters
...

Harvest

Detachment reagents
Cell scrapers
TFF filtration
...

VWR®
We Enable Science

SERUM

Fetal Bovine Serum (FBS) - US origin 6

Fetal Bovine Serum (FBS) - USDA approved 6

Fetal Bovine Serum (FBS) - South American origin 7

Fetal Bovine Serum (FBS) - Canadian origin 8

Fetal Bovine Serum (FBS) - EU origin 8

FBS alternatives 9

- *Mad cow disease is not in the lab - BSE and FBS 30 years later 10*
- *Peace of mind begins with FreeAdd 12*

Bovine calf serum 14

Newborn calf serum 14

Adult bovine serum 14

Other Sera 15

Fetal Bovine Serum (FBS) - US origin

Foetal bovine serum (FBS), US origin
Seradigm

Seradigm FBS, US origin, is certified by the International Serum Industry Association (ISIA) for quality and traceability.

Ultimate grade FBS offers the ultimate in product quality and viral safety, undergoing additional BVD virus testing using qPCR technology. Proprietary collection and production techniques provide additional features that elevate product quality, enhance traceability and improve regulatory compliance. This product is used by cell culturists who work with primary cell lines, in production environments and applications where regulatory or traceability concerns are paramount.

Premium grade FBS offers quality features, such as complete testing by independent third-party laboratories and raw material traceability that elevates it above comparable products. This product is used by cell culturists who require a high quality, high performance product for a wide variety of applications.

Description	Pk	Cat. No.
Ultimate grade		
FBS, ultimate grade, US origin	500 ml	**1600-500**
Premium grade		
FBS, premium grade, US origin	100 ml	**1500-100**
FBS, premium grade, US origin	500 ml	**1500-500**

Foetal bovine serum (FBS), US origin
Biowest

Sterile filtered

Foetal bovine serum (FBS) derived from clotted whole blood aseptically collected from foetus via cardiac puncture. Each manufactured batch is rigorously controlled, from the collection of serum through to final packaging.

- USA origin
- High quality serum, rigorously tested
- Full traceability and security

Description	Pk	Cat. No.
Foetal bovine serum, US origin	100 ml	**S1520-100**
Foetal bovine serum, US origin	500 ml	**S1520-500**
Foetal bovine serum, heat inactivated, US origin	100 ml	**S152H-100**
Foetal bovine serum, heat inactivated, US origin	500 ml	**S152H-500**

Biowest is a certified ISO 9001:2008 company. Registered by the French Ministry of Agriculture (EC regulation No. 1069/2009) under agreement no. FR 49.231.001 for the production of animal sera.

Fetal Bovine Serum (FBS) - USDA approved

Foetal bovine serum (FBS), USDA approved
Biowest

Sterile filtered

Foetal bovine serum (FBS) derived from clotted whole blood aseptically collected from foetus via cardiac puncture. Each manufactured batch is rigorously controlled, from the collection of serum through to final packaging. USDA approved sources from countries with excellent veterinary status are available. EDQM certified FBS guarantees that the origin and the manufacturing process has certified by the European Directorate for the Quality of Medicine and Healthcare. Countries of origin for EDQM certified serum are Panama, Costa Rica, Paraguay, Brazil, Chile and Mexico.

- High quality serum, rigorously tested
- Wide range of sources available
- Full traceability and security

Description	Pk	Cat. No.
Foetal bovine serum, Chilean origin, USDA approved	100 ml	**S1560-100**
Foetal bovine serum, Chilean origin, USDA approved	500 ml	**S1560-500**
Foetal bovine serum, Central American origin, USDA approved	100 ml	**S1600-100**

Continued on next page

Continued from previous page

Description	Pk	Cat. No.
Foetal bovine serum, Central American origin, USDA approved	500 ml	S1600-500
Foetal bovine serum, Mexican origin, USDA approved	100 ml	S1650-100
Foetal bovine serum, Mexican origin, USDA approved	500 ml	S1650-500
Foetal bovine serum, Australian origin, USDA approved	100 ml	S1700-100
Foetal bovine serum, Australian origin, USDA approved	500 ml	S1700-500
Foetal bovine serum, heat inactivated, Chilean origin, USDA approved	100 ml	S156H-100
Foetal bovine serum, heat inactivated, Chilean origin, USDA approved	500 ml	S156H-500
Foetal bovine serum, heat inactivated, Central American origin, USDA approved	100 ml	S160H-100
Foetal bovine serum, heat inactivated, Central American origin, USDA approved	500 ml	S160H-500
Foetal bovine serum, heat inactivated, Mexican origin, USDA approved	100 ml	S165H-100
Foetal bovine serum, heat inactivated, Mexican origin, USDA approved	500 ml	S165H-500
Foetal bovine serum, embryonic stem cell tested, Mexican origin, USDA approved	100 ml	S165S-100
Foetal bovine serum, embryonic stem cell tested, Mexican origin, USDA approved	500 ml	S165S-500

Biowest is a certified ISO 9001:2008 company. Registered by the French Ministry of Agriculture (EC regulation No. 1069/2009) under agreement no. FR 49.231.001 for the production of animal sera.

Fetal Bovine Serum (FBS) - South American origin

Foetal bovine serum (FBS), premium grade
Biowest

Sterile filtered, South American origin

Biowest foetal bovine serum (FBS) is derived from clotted whole blood aseptically collected from foetus via cardiac puncture. Each manufactured batch is rigorously controlled, from the collection of serum through to final packaging.

- Pre-selected and derived from own collection sources
- No time consuming batch testing required
- Defined endotoxin level: <5 EU/ml
- Defined haemoglobin level: <25 mg/100 ml
- Guaranteed growth promotion >80%*
- Low batch-to-batch variation

*tested on SP2/O-Ag14, HELA, L929 and MRC-5 cells

This premium grade product is intended for 'off-the-shelf' use. No batch-specific reservations will be held.

Description	Pk	Cat. No.
Foetal bovine serum, premium grade, South American origin	100 ml	S181B-100
Foetal bovine serum, premium grade, South American origin	500 ml	S181B-500
Foetal bovine serum, premium grade, heat inactivated, South American origin	100 ml	S181BH-100
Foetal bovine serum, premium grade, heat inactivated, South American origin	500 ml	S181BH-500

Biowest is a certified ISO 9001:2008 company. Registered by the French Ministry of Agriculture (EC regulation No. 1069/2009) under agreement no. FR 49.231.001 for the production of animal sera.

Foetal bovine serum (FBS), South American origin
Biowest

Sterile filtered

Foetal bovine serum (FBS) derived from clotted whole blood aseptically collected from foetus via cardiac puncture. Each manufactured batch is rigorously controlled, from the collection of serum through to final packaging.

- South American origin
- High quality serum, rigorously tested
- Full traceability and security

Description	Pk	Cat. No.
Foetal bovine serum, South American origin	100 ml	S1810-100
Foetal bovine serum, South American origin	500 ml	S1810-500
Foetal bovine serum, heat inactivated, South American origin	100 ml	S181H-100
Foetal bovine serum, heat inactivated, South American origin	500 ml	S181H-500
Foetal bovine serum, charcoal stripped, South American origin	100 ml	S181F-100
Foetal bovine serum, charcoal stripped, South American origin	500 ml	S181F-500
Foetal bovine serum, dialysed, South American origin	100 ml	S181D-100

Continued on next page

Continued from previous page

Description	Pk	Cat. No.
Foetal bovine serum, dialysed, South American origin	500 ml	S181D-500
Foetal bovine serum, embryonic stem cell tested, South American origin	100 ml	S181S-100
Foetal bovine serum, embryonic stem cell tested, South American origin	500 ml	S181S-500
Foetal bovine serum, ultra-low endotoxin, South American origin	100 ml	S1860-100
Foetal bovine serum, ultra-low endotoxin, South American origin	500 ml	S1860-500
Foetal bovine serum, lipid depleted, South American origin	100 ml	S181L-100
Foetal bovine serum, lipid depleted, South American origin	500 ml	S181L-500
Foetal bovine serum, tetracycline-free, South American origin	100 ml	S181T-100
Foetal bovine serum, tetracycline-free, South American origin	500 ml	S181T-500
Foetal bovine serum, iron supplemented, South American origin	100 ml	S181R-100
Foetal bovine serum, iron supplemented, South American origin	500 ml	S181R-500

Biowest is a certified ISO 9001:2008 company. Registered by the French Ministry of Agriculture (EC regulation No. 1069/2009) under agreement no. FR 49.231.001 for the production of animal sera.

Fetal Bovine Serum (FBS) - Canadian origin

Foetal bovine serum (FBS), Canadian origin

Biowest

Sterile filtered

Foetal bovine serum (FBS) derived from clotted whole blood aseptically collected from foetus via cardiac puncture. Each manufactured batch is rigorously controlled, from the collection of serum through to final packaging.

- Canadian origin
- High quality serum, rigorously tested
- Full traceability and security

Description	Pk	Cat. No.
Foetal bovine serum, origin: Canada	100 ml	S1500-100
Foetal bovine serum, origin: Canada	500 ml	S1500-500
Foetal bovine serum, heat inactivated, origin: Canada	100 ml	S150H-100
Foetal bovine serum, heat inactivated, origin: Canada	500 ml	S150H-500

Biowest is a certified ISO 9001:2008 company. Registered by the French Ministry of Agriculture (EC regulation No. 1069/2009) under agreement no. FR 49.231.001 for the production of animal sera.

Fetal Bovine Serum (FBS) - EU origin

Foetal bovine serum (FBS), EU origin

Biowest

Sterile filtered

Foetal bovine serum (FBS) derived from clotted whole blood aseptically collected from foetus via cardiac puncture. Each manufactured batch is rigorously controlled, from the collection of serum through to final packaging.

- EU origin
- High quality serum, rigorously tested
- BSE tested prior to production
- Full traceability and security

Description	Pk	Cat. No.
Foetal bovine serum, Danish origin	100 ml	S1750-100
Foetal bovine serum, Danish origin	500 ml	S1750-500
Foetal bovine serum, Irish origin	100 ml	S1780-100
Foetal bovine serum, Irish origin	500 ml	S1780-500
Foetal bovine serum, French origin	100 ml	S1820-100
Foetal bovine serum, French origin	500 ml	S1820-500
Foetal bovine serum, heat inactivated, French origin	100 ml	S182H-100
Foetal bovine serum, heat inactivated, French origin	500 ml	S182H-500
Foetal bovine serum, heat inactivated, Danish origin	100 ml	S175H-100
Foetal bovine serum, heat inactivated, Danish origin	500 ml	S175H-500

Biowest is a certified ISO 9001:2008 company. Registered by the French Ministry of Agriculture (EC regulation No. 1069/2009) under agreement no. FR 49.231.001 for the production of animal sera.

Foetal bovine serum (FBS), Instant FBS
Biowest

Instant FBS is a powdered, soluble foetal bovine serum offering quality, ease of use, convenient storage and ambient shipping.

- Easy to use - simply dissolve in cell culture water or directly into cell culture media (3 g of Instant FBS is equivalent to 50 ml of liquid FBS)
- Same quality as liquid FBS without the need to aliquot and refreeze, minimising the risk of contamination
- Can be stored in the fridge (+2 to 8 °C)
- Less weight and volume transported; less environmental contamination

Description	Pk	Cat. No.
Instant FBS, sterile, French origin	3 g	**S382G-N005L**
Instant FBS, sterile, French origin	25 g	**S382G-N005L25**
Instant FBS, sterile, South American origin	3 g	**S381G-N005L**

FBS alternatives

Serum replacement, FreeAdd 5X
Biowest

Sterile filtered liquid, storage 2 - 8 °C

FreeAdd 5X is a fully chemically defined substitute for animal serum. It provides the necessary nutritional support for cell growth, development and expression. It has been tested on a variety of cells and can be used in combination with basal medium to generate equal or even better cell culture performance.

- No hydrolysates or mixtures
- Non detectable endotoxin level
- Broad range (cell lines, primary cells, stem cells)
- GMP produced
- 100% batch-to-batch consistency

Description	Pk	Cat. No.
FreeAdd 5X	100 ml	**S6000-100**

Mad cow disease is not in the lab

BSE and FBS 30 years later

With the occurrence of BSE in the 1980´s, many regulations have been established to reduce the risk of bovine derived products in human consumption and other applications. These regulations have strongly influenced the preferences and selection of FBS in cell cultures. A lot of scientific work has been done in this field and today, much more is understood about the occurrence and transmission of this disease.

Background information

When BSE was first discovered in the UK in 1986[1], little was known about the cause of the disease or how it was transmitted. As a result, countries throughout the world responded by banning the importation of all bovine products, including blood products, from affected countries. After the discovery of the prion by Stanley Prusiner[2] as the causative agent of BSE, and his report of how it is spread by the feeding of Meat and Bone Meal (MBM) to cattle, the World Animal Health Organization (OIE), and regulatory authorities throughout the world, established standards banning the feeding of mammalian MBM to cattle and adopted slaughter practices that minimise the risk of BSE transmission.

Thanks to all these efforts, the rate of BSE cases has fallen dramatically, from 37 280 cases in 1992 alone in the U.K., to only 7 cases worldwide in 2013, two of which were atypical or spontaneous BSE cases[3].

In spite of the dramatic reduction (almost elimination) of BSE cases in the world, and cattle exporting countries having implemented proper risk reduction procedures, many importing countries still maintained disproportionate BSE related bans on bovine blood and blood by-products.

BSE regulations

In 2011 the European Union recommended the use of the OIE classification[4] to replace the former GBR risk class system[5]. Presently, there are 25 countries in the "negligible risk level", among them Australia, Brazil, Chile, Colombia, Denmark, New Zealand, Panama, Paraguay, USA, and Uruguay [see table 1[4]].

The European Union states that blood is safe when coming from "negligible BSE risk" and "controlled BSE risk" origins[6].

Since 1998 the EU has had a mandatory BSE monitoring programme in place - ID passports for all animals and BSE testing for cattle covering 100% of animals in pre-defined risk groups[7]. The traceability system is also useful for the tracking of other animal diseases and making EU origin the preferred choice in some applications.

Anyway, for Fetal Bovine Serum (FBS), the BSE risk has for many years been known to be ZERO, regardless of origin! The incubation time for BSE is recognised to be several years; which has been taken into consideration in the EU BSE control programme, initially covering animals older than 24 months[7]. Additionally, studies have shown that BSE from infected mother cows is not transmitted to the offspring[8].

biowest
The Serum Specialist

BIOWEST INNOVATION: AVOID LOSING TIME IN BATCH TESTING. USE FBS PREMIUM.

- No time-consuming batch testing
- Pre-selected and derived from own collection sources
- Defined endotoxin level: Lower 5 EU/ml
- Defined hemoglobin level: Lower 25 mg/100 ml
- Guaranteed growth promotion >80% *
- Low batch-to-batch variation

BIOWEST THE SERUM SPECIALIST!

Blood and blood by-products are exempt from BSE restrictions

At the beginning of the BSE outbreak, the understanding of the disease was low, and consequently meat and blood products were handled under the same regulations and restrictions, some of which are still in place ever since then.

Based on the improved knowledge of the questions surrounding BSE, in 2006 the OIE updated the Terrestrial Animal Health Code standards for BSE and clarified that: "Blood and blood by-products should not be subject to any importation restrictions relating to BSE, regardless of the BSE status of the exporting country, except that the cattle being slaughtered were not subjected to a stunning process, prior to slaughter, with a device injecting compressed air or gas into the cranial cavity, or to a pitching process"[9] and that: "blood and milk are not considered to play a role in the transmission of BSE"[10].

Regulations for Serum usage follow these developments

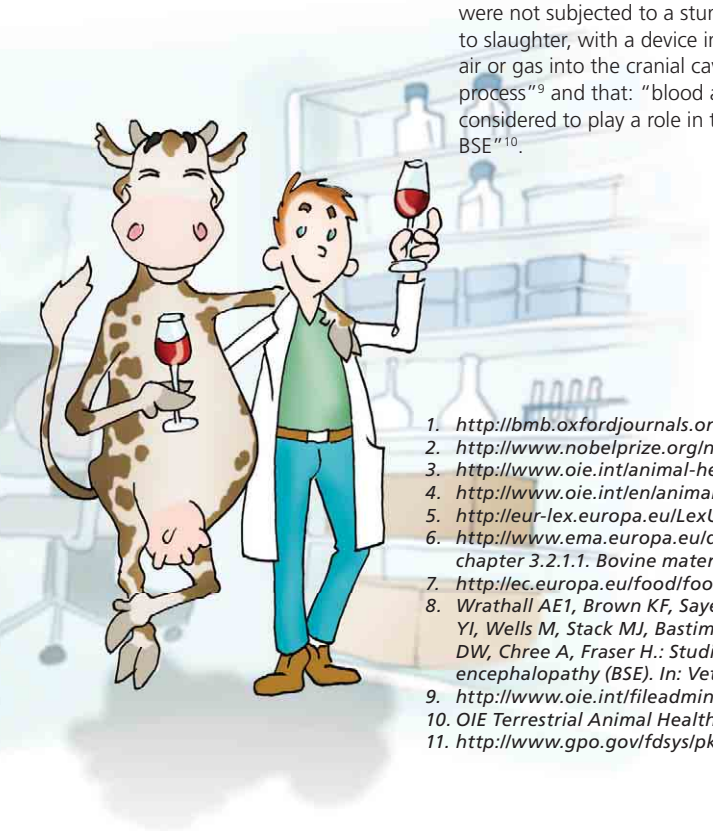
Other authorities follow the OIE recommendation and have adapted their regulations as well. The latest version of the 9 CFR 95.12 states that blood and blood products derived from bovines must come from animals that were "not subjected to a pithing process or to a stunning process with a device injecting compressed air or gas into the cranial cavity". This is the only USDA restriction relating to BSE for blood and blood products derived from bovines.

Conclusion

According to the OIE and other regulatory entities in the USA and EU, it can be concluded that BSE is irrelevant when selecting origins of bovine serum. MAD COW DISEASE IS OUT OF THE LAB – actually, it was never there in the first place!

Countries recognised as having a negligible BSE risk in accordance with Chapter 11.5 of the Terrestrial Code.

Argentina	Denmark	Netherlands	Slovenia
Australia	Finland	New Zealand	Sweden
Austria	Iceland	Norway	USA
Belgium	India	Panama	Uruguay
Brazil	Israel	Paraguay	
Chile	Italy	Peru	
Colombia	Japan	Singapore	



1. *http://bmb.oxfordjournals.org/content/66/1/185.full.pdf+html*
2. *http://www.nobelprize.org/nobel_prizes/medicine/laureates/1997/press.html*
3. *http://www.oie.int/animal-health-in-the-world/bse-specific-data/*
4. *http://www.oie.int/en/animal-health-in-the-world/official-disease-status/bse/list-of-bse-risk-status/*
5. *http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2011:073:0001:0018:EN:PDF*
6. *http://www.ema.europa.eu/docs/en_GB/document_library/Scientific_guideline/2009/09/WC500003700.pdf; chapter 3.2.1.1. Bovine materials*
7. *http://ec.europa.eu/food/food/biosafety/tse_bse/monitoring_en.htm*
8. *Wrathall AE1, Brown KF, Sayers AR, Wells GA, Simmons MM, Farrelly SS, Bellerby P, Squirrell J, Spencer YI, Wells M, Stack MJ, Bastiman B, Pullar D, Scatcherd J, Heasman L, Parker J, Hannam DA, Helliwell DW, Chree A, Fraser H.: Studies of embryo transfer from cattle clinically affected by bovine spongiform encephalopathy (BSE). In: Vet Rec. 2002 Mar 23;150(12):365-78. PMID:11936410*
9. *http://www.oie.int/fileadmin/Home/eng/Health_standards/tahc/2010/en_chapitre_1.11.5.htm*
10. *OIE Terrestrial Animal Health Code Chapter 11.5. Article 11.5.27*
11. *http://www.gpo.gov/fdsys/pkg/FR-2013-12-04/html/2013-28228.htm;*

Peace of mind begins with FreeAdd

Biowest FreeAdd, fully chemically defined substitute for animal serum, can be used in combination with basal medium to generate equal or better cell culture performance.
The use of animal serum in cell culture has been under regulatory pressure and recently facing short supply situation. Biowest, the serum specialist, supports the demand for a fully animal component-free replacement for serum.

Many other alternatives for Fetal Bovine Serum (FBS) still contain hydrolysates, plant extracts and/or animal or human proteins like albumins. FreeAdd is completely free from any components derived from animal or human materials and consists only of compounds that are each a highly purified chemical from either synthetic, recombinant or plant origin. This guarantees an extremely high consistency from batch-to-batch and a full traceability record.

KEY FEATURES

- Chemically defined
- Free from animal and human component
- Free from growth factors
- Free from non defined component like hydrolysates
- Free from virus and TSE/BSE
- Non detectable endotoxin level
- Ultra low (recombinant) protein content
- Applicable for most cell lines, stem cells, primary cells and insect cells
- Sterile produced
- Equal or better culture performance

KEY BENEFITS

- Prevention from potential risk of virus contamination
- Reduction of up and down stream processing costs
- Elimination of variation of batches
- Traceability
- Production under cGMP
- Reliability of supply
- Flexibility of packaging
- Availability of certification

KEY APPLICATIONS

Biowest's serum replacement FreeAdd can be universally applied to all types of cell cultures, there are no limitations regarding possible applications. But immediate benefits can be expected in specific applications.

In vitro testing

In vitro testing of chemical compounds, cosmetic raw materials and finished compounds, consumer products testing in general and above all during the development of new *in vitro* testing methods and models.
In the arena of *in vitro* testing, the influences and interferences of serum compounds, especially plasma proteins, growth factors etc are highly undesirable, as they can bias results and lead to false negative and false positive results.

Biopharmaceutical research and production

Biopharmaceutical research and production, such as monoclonal antibody production, vaccines, recombinant therapeutic protein production.
The direct benefits in this field are the regulatory friendly aspects of serum-free cultures because of infectious risk mitigation and the far reaching cost reduction aspects in the downstream processes.

Drug and preclinical research

There is a need for highly defined *in vitro* models during the drug discovery and development stages, because serum interferences can again falsify results resulting in false positive "hits" and "leads" as well as high background noise during pre-clinical *in vitro* ADMET studies. Also in this field, the regulator wants to see clear cut data, preferably generated in highly defined study models and platforms. In this sense it is recommended to avoid any interference from FBS or other animal compounds.

Stem cell cultures

Stem cell research, embryonic or other types of stem cell cultures, induced pluripotent stem cells this fast paced evolving fields are hindered in all senses by the presence of serum and animal compounds in the culture media, above all when it comes down to the point of bringing stem cell-based therapies to the clinic. Also interferences with FBS during the differentiation processes must be avoided.

biowest
The Serum Specialist

GENERAL INSTRUCTIONS FOR ADAPTING CELLS TO FREEADD CONTAINING MEDIUM

1. Preparation of final complete serum-free cell culture medium

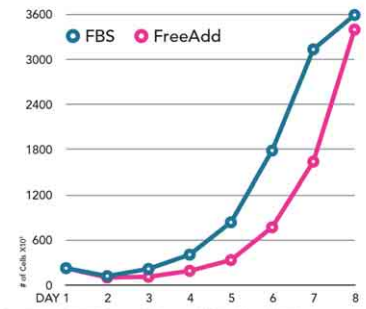
Add FreeAdd to basal cell culture medium at the same concentration as used to employ the preferred serum, e.g. 10% FBS. Do not add any antibiotics at this stage. In fact, antibiotics like many compounds bind to the plasma proteins of serum, in particular to the albumin fraction. As a result the same concentration of antibiotics will exhibit a much higher biological activity in serum- and albumin-free conditions and this increased activity may have deleterious impacts on cell growth.
In case 'antibiotic-free culture' is deemed unworkable, the use of gentamycin is suggested at the concentration of 50 mg/l.

2. Experimental: Adaptation steps

There are essentially two approaches to adapt cells to growth in serum-free environment.
Direct adaptation can be carried out by a direct transfer of the cells from the serum containing medium into the serum-free medium.
Sequential adaptation or weaning method pass the cells from the original serum containing medium sequentially through the following phases:
- Phase 1: 25% serum-free media / 75% serum supplemented media
- Phase 2: 50% serum-free media / 50% serum supplemented media
- Phase 3: 75% serum-free media / 25% serum supplemented media
- Phase 4: 100% serum-free media

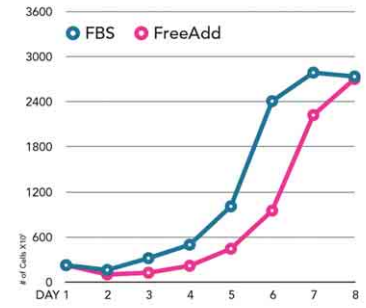
Cell cultures may consist of cell lines (adherent or suspension growth) or primary cultures. Moreover, from a functional point of view, cell types may be differentiated to various degrees or exhibit undifferentiated characteristics, as in the case of stem cell preparati¬ons. In each case, the adaptation protocol has to take into account the specific requirements of the cell type in order to guarantee the best chances for success. Separate specific adaptation procedures are available for reference.

Growth Curve
NIH/3T3 - mouse fibroblasts



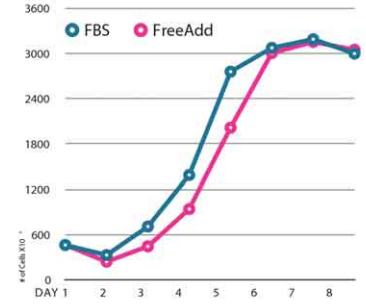
Growth curve of NIH/3T3 mouse fibroblasts in 2% FreeAdd vs 10% FBS.
NIH/3T3 mouse fibroblasts were grown in medium supplemented with 10% FBS until the start of the experiment and were seeded in medium supplemented with 2% of FreeAdd without FBS and without any transition period. The seeding densities were the same for the FBS control groups and the FreeAdd groups.
• seeding density 8,000 cells/cm2
• basal medium DMEM, high glucose
• medium was changed partially (75%) every 48 hours

Growth Curve
CHO-K1 - Chinese hamster ovary cell line



Growth curve of CHO-K1 Chinese hamster ovary cell line in 2% FreeAdd vs 10% FBS
CHO-K1 Chinese hamster ovary cell line were grown in medium supplemented with 10% FBS until the start of the experiment and were seeded in medium supplemented with 2% of FreeAdd without FBS and without any transition period. The seeding densities were the same for the FBS control groups and the FreeAdd groups.
• seeding density 10,000 cells/cm2.
• basal medium Kaighn's Modification of Ham's F-12Medium, with thymidine and hypoxanthine.
• medium was changed partially (75%) every 48 hours.

Growth Curve
RLEC - rat liver epithelial cell line



Growth curve of RLEC rat liver epithelial cell line in 2% FreeAdd vs 10% FBS.
RLEC rat liver epithelial cell line were grown in medium supplemented with 10% FBS until the start of the experiment and were seeded in medium supplemented with 2% of FreeAdd without FBS and without any transition period. The seeding densities were the same for the FBS control groups and the FreeAdd groups.
• seeding density 20,000 cells/cm2
• basal medium Nutrient Mixture F-12
• medium was changed partially (75%) every 48 hours

Bovine calf serum

Calf serum
Biowest

Description	Pk	Cat. No.
Calf serum	100 ml	**S0400-100**
Calf serum	500 ml	**S0400-500**
Calf serum, heat inactivated	100 ml	**S040H-100**
Calf serum, heat inactivated	500 ml	**S040H-500**
Calf serum, iron supplemented	500 ml	**S040R-500**

Newborn calf serum

Newborn calf serum
Biowest

Description	Pk	Cat. No.
Newborn calf serum	100 ml	**S0750-100**
Newborn calf serum	500 ml	**S0750-500**
Newborn calf serum, heat inactivated	100 ml	**S075H-100**
Newborn calf serum, heat inactivated	500 ml	**S075H-500**

Adult bovine serum

Adult bovine serum
Biowest

Description	Pk	Cat. No.
Bovine serum, French origin	100 ml	**S0250-100**
Bovine serum, French origin	500 ml	**S0250-500**
Bovine serum, French origin	1.000 ml	**S0250-1000**
Bovine serum, heat inactivated, French origin	100 ml	**S025H-100**
Bovine serum, heat inactivated, French origin	500 ml	**S025H-500**
Bovine serum, iron supplemented, French origin	500 ml	**S025R-500**

Other Sera

Cat (feline) serum
Biowest

Description	Pk	Cat. No.
Cat (feline) serum	10 ml	S2800-010
Cat (feline) serum	100 ml	S2800-100

Chicken serum
Biowest

Description	Pk	Cat. No.
Chicken serum	100 ml	S0500-100
Chicken serum	1.000 ml	S0500-1000
Chicken serum, heat inactivated	1.000 ml	S050H-1000

Dog serum
Biowest

Description	Pk	Cat. No.
Dog serum	10 ml	S2900-010
Dog serum	50 ml	S2900-050
Dog serum	100 ml	S2900-100
Dog serum (beagle)	10 ml	S2901-010
Dog serum (beagle)	100 ml	S2901-100

Donkey serum
Biowest

Description	Pk	Cat. No.
Donkey serum	100 ml	S2170-100
Donkey serum	500 ml	S2170-500

Donor foal serum
Biowest

Description	Pk	Cat. No.
Donor foal serum	100 ml	S0800-100
Donor foal serum	500 ml	S0800-500

Donor horse serum
Biowest

Description	Pk	Cat. No.
Donor horse serum	100 ml	**S0900-100**
Donor horse serum	500 ml	**S0900-500**
Donor horse serum, heat inactivated	100 ml	**S090H-100**
Donor horse serum, heat inactivated	500 ml	**S090H-500**

Foetal horse serum
Biowest

Description	Pk	Cat. No.
Foetal horse serum	100 ml	**S0960-100**
Foetal horse serum	500 ml	**S0960-500**

Goat serum
Biowest

Description	Pk	Cat. No.
Goat serum	100 ml	**S2000-100**
Goat serum	500 ml	**S2000-500**
Goat serum, heat inactivated	500 ml	**S200H-500**

Guinea pig serum
Biowest

Description	Pk	Cat. No.
Guinea pig serum	100 ml	**S2450-100**
Guinea pig serum	500 ml	**S2450-500**

Human sera
Biowest

Human serum 'off-the-clot' is processed from human blood that has been coagulation-induced. It is collected from volunteer donors.

Mainly sourced from France, Germany, Canada or USA, each batch is rigorously controlled and screened for Hepatitis B (HBS), Hepatitis C (HCV) and HIV Types 1 and 2 (HIV 1/2).

Special treatments are available on request. Please contact your local VWR Sales Office for more information.

Description	Pk	Cat. No.
Human serum AB male, HIV tested	100 ml	**S4190-100**
Human serum AB male, heat inactivated, HIV tested	100 ml	**S419H-100**
Human serum AB male, lipid depleted, HIV tested	100 ml	**S419L-100**
Human serum, HIV tested	100 ml	**S4200-100**

Important note: Products of human origin should be considered potentially infectious and handled accordingly.

Lamb serum
Biowest

Description	Pk	Cat. No.
Lamb serum	100 ml	**S2300-100**
Lamb serum	500 ml	**S2300-500**
Lamb serum, heat inactivated	500 ml	**S230H-500**

Mouse serum
Biowest

Description	Pk	Cat. No.
Mouse serum	10 ml	**S2160-010**
Mouse serum	20 ml	**S2160-020**
Mouse serum	50 ml	**S2160-050**
Mouse serum	100 ml	**S2160-100**
Mouse serum	500 ml	**S2160-500**

Porcine serum
Biowest

Description	Pk	Cat. No.
Porcine serum	100 ml	**S2400-100**
Porcine serum	500 ml	**S2400-500**
Porcine serum, heat inactivated	500 ml	**S240H-500**

Rabbit serum
Biowest

Description	Pk	Cat. No.
Rabbit serum	100 ml	**S2500-100**
Rabbit serum	500 ml	**S2500-500**
Rabbit serum, heat inactivated	500 ml	**S250H-500**

Rat serum
Biowest

Description	Pk	Cat. No.
Rat serum	10 ml	**S2150-010**
Rat serum	20 ml	**S2150-020**
Rat serum	50 ml	**S2150-050**
Rat serum	100 ml	**S2150-100**
Rat serum	500 ml	**S2150-500**

Sheep serum
Biowest

Description	Pk	Cat. No.
Sheep serum	100 ml	**S2350-100**
Sheep serum	500 ml	**S2350-500**
Sheep serum, heat inactivated	500 ml	**S235H-500**

SERUM ALBUMIN

Bovine (BSA) 20

Human 20

Bovine (BSA)

Bovine serum albumin (BSA)
Biowest

Bovine serum albumin (BSA) is commonly used in cell culture protocols, particularly where protein supplementation is necessary and the other components of serum are unwanted. In cell culture, its main role is as a carrier of small molecules. Because of its negative charge, BSA binds water, salts, fatty acids, vitamins and hormones, then carries these bound components between tissues and cells. The binding capacity also makes BSA an effective scavenger to remove toxic substances, including pyrogens, from the medium.

Description	Pk	Cat. No.
Bovine serum albumin, 30% liquid	100 ml	**A0296-100**
Bovine serum albumin, 30% liquid	500 ml	**A0296-500**
Bovine serum albumin, 30% liquid	1.000 ml	**A0296-1000**
Bovine serum, lyophilised, pH ~7	10 g	**P6154-10GR**
Bovine serum, lyophilised, pH ~7	100 g	**P6154-100GR**
Bovine serum, lyophilised, pH ~7	500 g	**P6154-500GR**
Bovine serum, lyophilised, pH ~7	1 kg	**P6154-KG**
Bovine serum albumin, protease-free	100 g	**P6155-100GR**
Bovine serum albumin, protease-free	500 g	**P6155-500GR**
Bovine serum albumin, protease-free	1 kg	**P6155-KG**
Bovine serum albumin, fatty acid-free	100 g	**P6156-100GR**
Bovine serum albumin, fatty acid-free	500 g	**P6156-500GR**
Bovine serum albumin, fatty acid-free	1 kg	**P6156-KG**

Human

Human serum albumin
Biowest

Human serum albumin is processed from human blood that has been coagulation-induced. It is collected from volunteer donors.

Mainly sourced from France, Germany, Canada or USA, each batch is rigorously controlled and screened for Hepatitis B (HBS), Hepatitis C (HCV) and HIV Types 1 and 2 (HIV 1/2).

Description	Pk	Cat. No.
Human serum albumin	100 g	**P6140-100GR**
Human serum albumin	500 g	**P6140-500GR**
Human serum albumin	1 kg	**P6140-KG**

Important note: Products of human origin should be considered potentially infectious and handled accordingly.

PLASMA

Animal 22
Human 22

Animal

Animal plasma
Biowest

Description	Pk	Cat. No.
Bovine plasma with sodium citrate	100 ml	**S0260-100**
Bovine plasma with sodium citrate	500 ml	**S0260-500**
Rat plasma with lithium heparin	50 ml	**S2140-050**
Rat plasma with lithium heparin	100 ml	**S2140-100**
Rat plasma with lithium heparin	500 ml	**S2140-500**
Rabbit plasma with EDTA	100 ml	**S2600-100**
Rabbit plasma with EDTA	500 ml	**S2600-500**
Rabbit plasma with sodium citrate	100 ml	**S2610-100**
Rabbit plasma with sodium citrate	500 ml	**S2610-500**
Rabbit plasma with sodium heparin	500 ml	**S26200-500**
Rabbit plasma with sodium heparin	100 ml	**S2620-100**
Dog plasma with lithium heparin	50 ml	**S2920-050**
Dog plasma with lithium heparin	100 ml	**S2920-100**

Human

Human plasma
Biowest

Human serum albumin is processed from human blood that has been coagulation-induced. It is collected from volunteer donors.

Mainly sourced from France, Germany, Canada or USA, each batch is rigorously controlled and screened for Hepatitis B (HBS), Hepatitis C (HCV) and HIV Types 1 and 2 (HIV 1/2).

Description	Pk	Cat. No.
Human plasma, pooled	100 ml	**S4180-100**
Human plasma, pooled	500 ml	**S4180-500**

Important note: Products of human origin should be considered potentially infectious and handled accordingly.

CLASSICAL MEDIA

Classical media 24

Classical media

Classical media

Biowest

Description	Pk	Cat. No.
BME with Earle's salts, without L-glutamine, without sodium bicarbonate (powder)	1 l	P0030-N1L
BME with Earle's salts, without L-glutamine, without sodium bicarbonate (powder)	10 l	P0030-N10L
BME with Earle's salts, without L-glutamine (liquid)	500 ml	L0042-500
CMRL 1066 without L-glutamine, without sodium bicarbonate (powder)	1 l	P0058-N1L
CMRL 1066 without L-glutamine, without sodium bicarbonate (powder)	5 l	P0058-N5L
CMRL 1066 without L-glutamine, without sodium bicarbonate (powder)	10 l	P0058-N10L
CMRL 1066 without L-glutamine (liquid)	500 ml	L0053-500
DMEM Ham's F-12, with L-glutamine, with 15 mM HEPES (liquid)	500 ml	L0093-500
DMEM Ham's F-12, with L-glutamine, with 25 mM HEPES (liquid)	500 ml	L0095-500
DMEM Ham's F-12, with L-glutamine, without sodium bicarbonate, with 15 mM HEPES (powder)	1 l	P0095-N1L
DMEM Ham's F-12, with L-glutamine, without sodium bicarbonate, with 15 mM HEPES (powder)	10 l	P0095-N10L
DMEM Ham's F-12, without L-glutamine, with 15 mM HEPES (liquid)	500 ml	L0094-500
DMEM Ham's F-12, without L-glutamine, with 25 mM HEPES (liquid)	500 ml	L0096-500
DMEM Ham's F-12, without L-glutamine, without HEPES, without glucose (liquid)	500 ml	L0091-500
DMEM Ham's F-12, without L-glutamine, without HEPES (liquid)	500 ml	L0090-500
DMEM Ham's F-12, with stable glutamine, with 15 mM HEPES (liquid)	500 ml	L0092-500
DMEM with 1 g/l glucose, with L-glutamine, with 25 mM HEPES, with sodium pyruvate (liquid)	500 ml	L0065-500
DMEM with 1 g/l glucose, with L-glutamine, without sodium bicarbonate, with sodium pyruvate (powder)	1 l	P0061-N1L
DMEM with 1 g/l glucose, with L-glutamine, without sodium bicarbonate, with sodium pyruvate (powder)	5 l	P0061-N5L
DMEM with 1 g/l glucose, with L-glutamine, without sodium bicarbonate, with sodium pyruvate (powder)	10 l	P0061-N10L
DMEM with 1 g/l glucose, with L-glutamine, without sodium bicarbonate, with sodium pyruvate (powder)	50 l	P0061-N50L
DMEM with 1 g/l glucose, with L-glutamine, with sodium pyruvate (liquid)	500 ml	L0060-500
DMEM with 1 g/l glucose, without L-glutamine, with sodium pyruvate (liquid)	500 ml	L0064-500
DMEM with 1 g/l glucose, with stable glutamine, with sodium pyruvate (liquid)	500 ml	L0066-500
DMEM with 4,5 g/l glucose, with L-glutamine, without sodium bicarbonate, without sodium pyruvate (powder)	1 l	P0103-N1L
DMEM with 4,5 g/l glucose, with L-glutamine, without sodium bicarbonate, without sodium pyruvate (powder)	5 l	P0103-N5L
DMEM with 4,5 g/l glucose, with L-glutamine, without sodium bicarbonate, without sodium pyruvate (powder)	10 l	P0103-N10L
DMEM with 4,5 g/l glucose, with L-glutamine, without sodium bicarbonate, without sodium pyruvate (powder)	50 l	P0103-N50L
DMEM with 4,5 g/l glucose, with L-glutamine, without sodium bicarbonate, with sodium pyruvate (powder)	1 l	P0102-N1L
DMEM with 4,5 g/l glucose, with L-glutamine, without sodium bicarbonate, with sodium pyruvate (powder)	5 l	P0102-N5L
DMEM with 4,5 g/l glucose, with L-glutamine, without sodium bicarbonate, with sodium pyruvate (powder)	10 l	P0102-N10L
DMEM with 4,5 g/l glucose, with L-glutamine, without sodium bicarbonate, with sodium pyruvate (powder)	50 l	P0102-N50L
DMEM with 4,5 g/l glucose, with L-glutamine, without sodium pyruvate (liquid)	500 ml	L0102-500
DMEM with 4,5 g/l glucose, with L-glutamine, with sodium pyruvate (liquid)	500 ml	L0104-500
DMEM with 4,5 g/l glucose, without L-glutamine, with 25 mM HEPES, without sodium pyruvate (liquid)	500 ml	L0100-500
DMEM with 4,5 g/l glucose, without L-glutamine, without sodium pyruvate (liquid)	500 ml	L0101-500
DMEM with 4,5 g/l glucose, without L-glutamine, with sodium pyruvate (liquid)	500 ml	L0106-500
DMEM with 4,5 g/l glucose, with stable glutamine, with 25 mM HEPES, without sodium pyruvate (liquid)	500 ml	L0107-500
DMEM with 4,5 g/l glucose, with stable glutamine, with sodium pyruvate (liquid)	500 ml	L0103-500
Fisher's medium, with L-glutamine, without sodium bicarbonate (powder)	1 l	P0105-N1L
Fisher's medium, with L-glutamine, without sodium bicarbonate (powder)	10 l	P0105-N10L
GMEM BHK 21, with L-glutamine, without sodium bicarbonate, without tryptose phosphate broth (powder)	1 l	P0120-N1L
GMEM BHK 21, with L-glutamine, without sodium bicarbonate, without tryptose phosphate broth (powder)	10 l	P0120-N10L
GMEM BHK 21, with L-glutamine, without sodium bicarbonate, without tryptose phosphate broth (powder)	50 l	P0120-N50L
Ham's F10, with L-glutamine, with 25 mM HEPES (liquid)	500 ml	L0130-500
Ham's F10, with L-glutamine, without sodium bicarbonate (powder)	1 l	P0146-N1L
Ham's F10, with L-glutamine, without sodium bicarbonate (powder)	5 l	P0146-N5L
Ham's F10, with L-glutamine, without sodium bicarbonate (powder)	10 l	P0146-N10L
Ham's F10, with L-glutamine, without sodium bicarbonate (powder)	50 l	P0146-N50L
Ham's F10, with L-glutamine (liquid)	500 ml	L0140-500
Ham's F10, without L-glutamine (liquid)	500 ml	L0145-500
Ham's F12 with L-glutamine (liquid)	500 ml	L0135-500
Ham's F12 with L-glutamine without sodium bicarbonate (powder)	1 l	P0134-N1L
Ham's F12 with L-glutamine without sodium bicarbonate (powder)	5 l	P0134-N5L
Ham's F12 with L-glutamine without sodium bicarbonate (powder)	10 l	P0134-N10L
Ham's F12 without L-glutamine (liquid)	500 ml	L0136-500
Ham's F14, with 6 g/l glucose and 1 mg/l ATP (liquid)	500 ml	L0138-500
IMDM, with L-glutamine, with 25 mM HEPES, without phenol red (powder)	1 l	P0192-N1L
IMDM, with L-glutamine, with 25 mM HEPES, without phenol red (powder)	10 l	P0192-N10L
IMDM, with L-glutamine, with 25 mM HEPES (liquid)	500 ml	L0190-500
IMDM, with L-glutamine, without sodium bicarbonate, with 25 mM HEPES (powder)	1 l	P0191-N1L
IMDM, with L-glutamine, without sodium bicarbonate, with 25 mM HEPES (powder)	10 l	P0191-N10L
IMDM, with L-glutamine, without sodium bicarbonate, with 25 mM HEPES (powder)	50 l	P0191-N50L
IMDM, without L-glutamine, without HEPES (liquid)	500 ml	L0192-500
IMDM, with stable glutamine, with 25 mM HEPES (liquid)	500 ml	L0191-500
Leibovitz L-15 medium, with L-glutamine (powder)	1 l	P0350-N1L
Leibovitz L-15 medium, with L-glutamine (powder)	5 l	P0350-N5L
Leibovitz L-15 medium, with L-glutamine (powder)	10 l	P0350-N10L
Leibovitz L-15 medium, without L-glutamine (liquid)	500 ml	L0300-500

Continued on next page

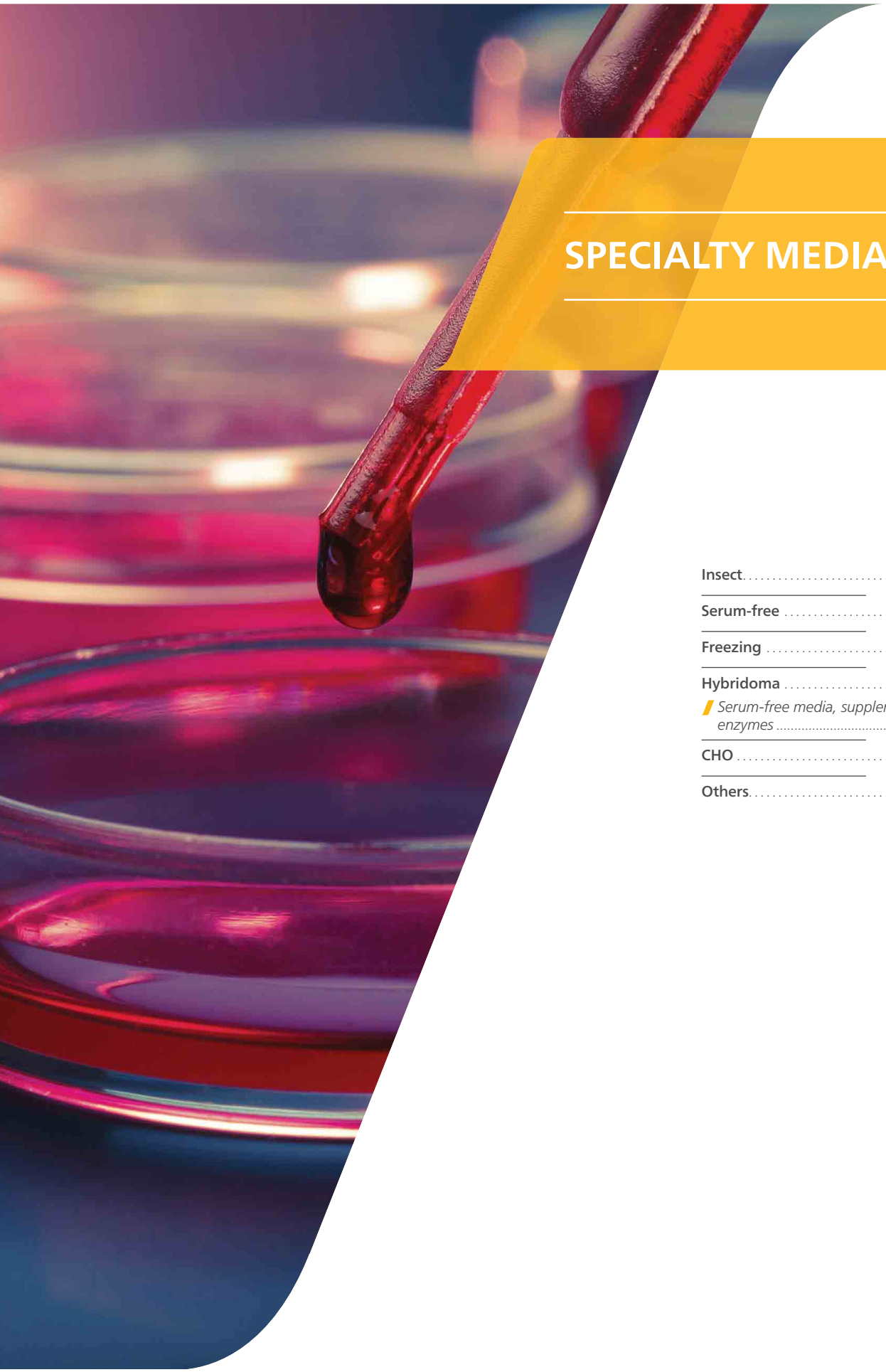
Continued from previous page

Description	Pk	Cat. No.
McCoy's 5A, with L-glutamine, without sodium bicarbonate (powder)	1 l	P0390-N1L
McCoy's 5A, with L-glutamine, without sodium bicarbonate (powder)	10 l	P0390-N10L
McCoy's 5A, with L-glutamine (liquid)	500 ml	L0210-500
McCoy's 5A, without L-glutamine (liquid)	500 ml	L0211-500
Medium 199, with Earle's modified salts, with L-glutamine, with 1,25 g/l sodium bicarbonate (liquid)	500 ml	L0355-500
Medium 199, with Earle's salts, without L-glutamine, with 25 mM HEPES (liquid)	500 ml	L0360-500
Medium 199, with Earle's salts, without L-glutamine (liquid)	500 ml	L0356-500
Medium 199, with Earle's salts, with stable glutamine, with 25 mM HEPES (liquid)	500 ml	L0361-500
Medium 199, with Hanks' salts, with L-glutamine (liquid)	500 ml	L0330-500
Medium 199, with Hanks' salts, without L-glutamine (liquid)	500 ml	L0325-500
Medium 199 modified with Hanks' salts, without L-glutamine, without sodium bicarbonate (powder)	1 l	P0410-N1L
Medium 199 modified with Hanks' salts, without L-glutamine, without sodium bicarbonate (powder)	10 l	P0410-N10L
Medium 199 modified with Hanks' salts, without L-glutamine, without sodium bicarbonate (powder)	50 l	P0410-N50L
Medium 199 with Earle's salts, with L-glutamine, without sodium bicarbonate, with 25 mM HEPES (powder)	1 l	P0425-N1L
Medium 199 with Earle's salts, with L-glutamine, without sodium bicarbonate, with 25 mM HEPES (powder)	10 l	P0425-N10L
Medium 199 with Earle's salts, with L-glutamine, without sodium bicarbonate, with 25 mM HEPES (powder)	50 l	P0425-N50L
Medium 199 with Earle's salts, with L-glutamine, without sodium bicarbonate (powder)	10 l	P0420-N10L
Medium 199 with Earle's salts, with L-glutamine, without sodium bicarbonate (powder)	1 l	P0420-N1L
Medium 199 with Earle's salts, with L-glutamine, without sodium bicarbonate (powder)	5 l	P0420-N5L
Medium 199 with Earle's salts, with L-glutamine, without sodium bicarbonate (powder)	50 l	P0420-N50L
MEM 10X with Earle's salts without L-glutamine, without sodium bicarbonate (liquid)	100 ml	X0311-100
MEM 10X with Earle's salts without L-glutamine, without sodium bicarbonate (liquid)	500 ml	X0311-500
MEM alpha modification, with Earle's salts, with L-glutamine, without sodium bicarbonate (powder)	1 l	P0440-N1L
MEM alpha modification, with Earle's salts, with L-glutamine, without sodium bicarbonate (powder)	5 l	P0440-N5L
MEM alpha modification, with Earle's salts, with L-glutamine, without sodium bicarbonate (powder)	10 l	P0440-N10L
MEM alpha modification, with Earle's salts, with L-glutamine, without sodium bicarbonate (powder)	50 l	P0440-N50L
MEM alpha modification, with L-glutamine, without ribonucleosides, without deoxyribonucleosides (liquid)	500 ml	L0475-500
MEM alpha modification, without L-glutamine, without ribonucleosides, without deoxyribonucleosides (liquid)	500 ml	L0476-500
MEM with Earle's salts, with L-glutamine, with 25 mM HEPES (liquid)	500 ml	L0444-500
MEM with Earle's salts, with L-glutamine, with NEAA, without sodium bicarbonate (powder)	1 l	P0450-N1L
MEM with Earle's salts, with L-glutamine, with NEAA, without sodium bicarbonate (powder)	10 l	P0450-N10L
MEM with Earle's salts, with L-glutamine, with NEAA, without sodium bicarbonate (powder)	50 l	P0450-N50L
MEM with Earle's salts, with L-glutamine, without NEAA, without sodium bicarbonate (powder)	1 l	P0451-N1L
MEM with Earle's salts, with L-glutamine, without NEAA, without sodium bicarbonate (powder)	5 l	P0451-N5L
MEM with Earle's salts, with L-glutamine, without NEAA, without sodium bicarbonate (powder)	10 l	P0451-N10L
MEM with Earle's salts, with L-glutamine, without NEAA, without sodium bicarbonate (powder)	50 l	P0451-N50L
MEM with Earle's salts, with L-glutamine (liquid)	500 ml	L0415-500
MEM with Earle's salts, without L-glutamine, with 25 mM HEPES (liquid)	500 ml	L0445-500
MEM with Earle's salts, without L-glutamine, with NEAA (liquid)	500 ml	L0430-500
MEM with Earle's salts, without L-glutamine (liquid)	500 ml	L0440-500
MEM with Earle's salts, with stable glutamine (liquid)	500 ml	L0416-500
MEM with Earle's salts with L-glutamine, without sodium bicarbonate, autoclavable (powder)	1 l	P0460-N1L
MEM with Earle's salts with L-glutamine, without sodium bicarbonate, autoclavable (powder)	10 l	P0460-N10L
MEM with Earle's salts with L-glutamine, without sodium bicarbonate, without 25 mM HEPES (powder)	1 l	P0452-N1L
MEM with Earle's salts with L-glutamine, without sodium bicarbonate, without 25 mM HEPES (powder)	10 l	P0452-N10L
MEM with Hanks' salts, with L-glutamine, with NEAA, without sodium bicarbonate (powder)	1 l	P0515-N1L
MEM with Hanks' salts, with L-glutamine, with NEAA, without sodium bicarbonate (powder)	10 l	P0515-N10L
MEM with Hanks' salts, with L-glutamine, with NEAA, without sodium bicarbonate (powder)	50 l	P0515-N50L
MEM with Hanks' salts, without L-glutamine, with 25 mM HEPES (liquid)	500 ml	L0470-500
MEM with Hanks' salts, without L-glutamine (liquid)	500 ml	L0465-500
RPMI 1640 Dutch modification, without L-glutamine, with 1 g/l sodium bicarbonate, with 20 mM HEPES (liquid)	500 ml	L0492-500
RPMI 1640 with L-glutamine, with 25 mM HEPES (liquid)	500 ml	L0495-500
RPMI 1640 with L-glutamine, without sodium bicarbonate, with 25 mM HEPES, without phenol red (powder)	1 l	P0876-N1L
RPMI 1640 with L-glutamine, without sodium bicarbonate, with 25 mM HEPES, without phenol red (powder)	10 l	P0876-N10L
RPMI 1640 with L-glutamine, without sodium bicarbonate, with 25 mM HEPES, without phenol red (powder)	50 l	P0876-N50L
RPMI 1640 with L-glutamine, without sodium bicarbonate, without glucose (powder)	1 l	P0883-N1L
RPMI 1640 with L-glutamine, without sodium bicarbonate, without glucose (powder)	10 l	P0883-N10L
RPMI 1640 with L-glutamine, without sodium bicarbonate, without phenol red (powder)	1 l	P0880-N1L
RPMI 1640 with L-glutamine, without sodium bicarbonate, without phenol red (powder)	10 l	P0880-N10L
RPMI 1640 with L-glutamine, without sodium bicarbonate, without phenol red (powder)	50 l	P0880-N50L
RPMI 1640 with L-glutamine, without sodium bicarbonate (powder)	1 l	P0860-N1L
RPMI 1640 with L-glutamine, without sodium bicarbonate (powder)	5 l	P0860-N5L
RPMI 1640 with L-glutamine, without sodium bicarbonate (powder)	10 l	P0860-N10L
RPMI 1640 with L-glutamine, without sodium bicarbonate (powder)	50 l	P0860-N50L
RPMI 1640 with L-glutamine (liquid)	100 ml	L0500-100
RPMI 1640 with L-glutamine (liquid)	500 ml	L0500-500
RPMI 1640 without L-glutamine, with 25 mM HEPES (liquid)	500 ml	L0490-500
RPMI 1640 without L-glutamine, without folic acid (liquid)	500 ml	L0503-500
RPMI 1640 without L-glutamine, without phenol red (liquid)	500 ml	L0505-500
RPMI 1640 without L-glutamine, without sodium bicarbonate, with 25 mM HEPES (powder)	1 l	P0875-N1L
RPMI 1640 without L-glutamine, without sodium bicarbonate, with 25 mM HEPES (powder)	10 l	P0875-N10L
RPMI 1640 without L-glutamine, without sodium bicarbonate, with 25 mM HEPES (powder)	50 l	P0875-N50L
RPMI 1640 without L-glutamine, without sodium bicarbonate, without phenol red (powder)	1 l	P0871-N1L
RPMI 1640 without L-glutamine, without sodium bicarbonate, without phenol red (powder)	10 l	P0871-N10L
RPMI 1640 without L-glutamine, without sodium bicarbonate (powder)	1 l	P0870-N1L

Continued on next page

Continued from previous page

Description	Pk	Cat. No.
RPMI 1640 without L-glutamine, without sodium bicarbonate (powder)	5 l	**P0870-N5L**
RPMI 1640 without L-glutamine, without sodium bicarbonate (powder)	10 l	**P0870-N10L**
RPMI 1640 without L-glutamine, without sodium bicarbonate (powder)	50 l	**P0870-N50L**
RPMI 1640 without L-glutamine (liquid)	100 ml	**L0501-100**
RPMI 1640 without L-glutamine (liquid)	500 ml	**L0501-500**
RPMI 1640 with stable glutamine, with 25 mM HEPES (liquid)	500 ml	**L0496-500**
RPMI 1640 with stable glutamine (liquid)	100 ml	**L0498-100**
RPMI 1640 with stable glutamine (liquid)	500 ml	**L0498-500**
Schneider's Insect Medium (liquid)	500 ml	**L0207-500**



SPECIALTY MEDIA

Insect 28

Serum-free 28

Freezing 28

Hybridoma 29

Serum-free media, supplements and enzymes 30

CHO 32

Others 32

Insect

Insect cell media
Biochrom

Description	For	Pk	Cat. No.
TC 100 insect cell medium (liquid)	insect cells	500 ml	**F0545**
Grace's insect cell medium (liquid)	insect cells	500 ml	**F0555**
Insectomed SF express, with L-glutamine, for the cultivation of *Spodoptera frugiperda* and *Drosophila melanogaster*	insect cells	500 ml	**F8275**

Serum-free

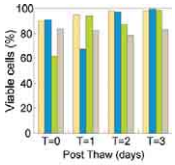
Serum-free media
Biochrom

Description	For	Pk	Cat. No.
Coon's F-12 modified liquid medium with 2,5 g/l $NaHCO_3$ and additives for serum free use, without L-glutamine	FRTL 5	500 ml	**F0855**
PFEK-1 protein and serum free medium	VERO, 3T6	500 ml	**F8045**
Start V medium	primary neuronal cells	500 ml	**F8075**
MCDB 153 basal medium with additives for serum free use, without L-glutamine	keratinocytes	500 ml	**F8105**
Sebomed® basal medium with 2,0 g/l $NaCO_3$ and 2,5 mM stable glutamine	human sebocyte cells	500 ml	**F8205**
Iscove's liquid medium with stable glutamine, with 3,024 g/l $NaHCO_3$, with 15 mg/l phenol red	primary haemopoietic cells	500 ml	**FG0465**
Iscove's liquid medium without L-glutamine with 3,024 g/l $NaHCO_3$, with 15 mg/l phenol red	primary hemopoietic cells	500 ml	**F0465**
TNB 100 basal medium with 3,86 g/l $NaHCO_3$, with L-glutamine	neuroblastoma glioma hybrid cells, neuronal primary cells	100 ml	**F8023**
TNB 100 lipid-protein complex, lyophilised	neuroblastoma glioma hybrid cells, neuronal primary cells	2,5 ml	**F8820**

Freezing

VWR CHEMICALS AMRESCO

Cryopreservation media, SeraFree™



Viability of post-thaw cultures of K562 cells. Cells frozen in AMRESCO SeraFree™ Cryopreservation Media (□) exhibited higher recovery than cells frozen in traditional RPMI freezing media containing DMSO and serum (▨). Viability of cells recovering from cryopreservation in AMRESCO SeraFree™ Cryopreservation Media was comparable or better than that of cells in Competitors 1 (▨) and 2 (■) serum-free freezing media. Viability was determined by standard trypan-blue exclusion assay.

SeraFree™ Cryopreservation Media is ready to use freezing media for cryopreservation of adherent or suspension cultured cells. The animal-free media composition eliminates batch-to-batch variability and is optimised for cell viability and cell growth after thawing. Suitable for use in environments that prohibit the use of animal-derived products.

- Sterile and endotoxin tested
- Ready to use, animal-free, RPMI- or DMEM-based media
- Optimises cell growth and cell viability after thawing
- Reduces potential for transmission of infectious diseases

Description	Pk	Cat. No.
Cryopreservation media, RPMI-based, SeraFree™	50 ml	**N655-50ML**
Cryopreservation media, RPMI-based, SeraFree™, 6×5 ml	30 ml	**N655-6X5ML**
Cryopreservation media, DMEM-based, SeraFree™	50 ml	**N676-50ML**

Freezing media, Biofreeze
Biochrom

Biofreeze is suitable for mammalian cells or to enable tissue reconstruction. It supersedes conventional freezing media because Biofreeze creates comparable cell viability after thawing. The function of DMSO is replaced by a less toxic anti-freezing agent.

- Contains no DMSO, which is toxic to cells
- Does not contain any substances of animal origin
- Free from genetically modified organisms

Description	Pk	Cat. No.
Biofreeze, freezing medium	25 ml	**392-0324**

VWR AMRESCO CHEMICALS

Dimethyl sulphoxide (DMSO) for cell culture

Ultrapure DMSO for use in cell culture applications.

- Quality >99,9%
- Easy to use - each pack contains 5×10 ml tubes
- Sterile tested

Description	Pk	Cat. No.
Dimethyl sulphoxide (DMSO), >99,9% pure, 5×10 ml	5	**N182-5X10ML**

Dimethyl sulfoxide (DMSO), cell culture grade

AppliChem

Dimethyl sulfoxide (DMSO) is widely used for the freezing of cells in cell culture instead of glycerol. DMSO is added to prevent the formation of ice crystals during the freezing process, otherwise cells would be destroyed. DMSO is commonly used at the concentration of 10%.

Description	Pk	Cat. No.
DMSO, cell culture grade	50 ml	**A3672.0050**
DMSO, cell culture grade	100 ml	**A3672.0100**
DMSO, cell culture grade	250 ml	**A3672.0250**

Dimethyl sulfoxide (DMSO), sterile filtered (ampoules)

AppliChem

Description	Pk	Cat. No.
DMSO (ampoules), 5×5 ml	1 KIT	**A7248.0005**
DMSO (ampoules), 5×10 ml	1 KIT	**A7248.0010**

Protective media for cold storage of cells, ChillProtec®

Biochrom

Adherent cells, cell suspensions or small tissue pieces are able to remain intact after cold storage when kept in ChillProtec® media. The protective medium reduces cell damage caused by cold. Applications for ChillProtec® include longer use of primary cells, temporary storage of fresh clinical specimens until cell isolation, storage of isolated cells and independent fixing at the start of the experiment, transport and shipping of cells and tissues, and short-term storage of remaining cells.

Two variation of the medium are available. ChillProtec® plus contains a macromolecular substance that has an additional protective effect on different cell types. It is recommended that cells are tested in both types.

Description	Pk	Cat. No.
ChillProtec®, sterile filtered	500 ml	**F2285**
ChillProtec® Plus, sterile filtered	500 ml	**F2295**

Hybridoma

Hybridoma media, serum-free

Biochrom

Serum-free media for the cultivation of hybridoma cells.

Hybridomed DIF 1000 liquid medium was developed to effectively grow hybridomas, but is also suitable for other cell lines. It is based on a 1:1 mixture of Iscove's medium and Ham's F-12, supplemented with transferrin, insulin, and a BSA/oleic acid complex. Myelomas, hybridomas and also other lymphoid and non-lymphoid cell lines are cultivated in Hybridomed and show growth rates comparable to those observed in serum-supplemented media. Successfully cultivated cells include: YAC-1 (mouse T-cell lymphoma), HeLa (human epitheloid carcinoma), BJA-B (human EVB-negative myeloma), BHK21 (syrian hamster kidney) and L-psv 129 (mouse L-fibroblast). The production of monoclonal antibodies or recombinant interleucin-2 equals to those achieved with serous medium. Only 0.05 mg/l riboflavin is used to avoid negative photo oxidative effects.

ISF-1 serum-free media supports growth and monoclonal antibody production of mouse hybridoma cell lines. ISF-1 does not contain exotic growth factors and is therefore cost efficient. In comparison to other commercially available serum-free media ISF-1 reveals superior performance with regard to cell growth, viability, and antibody productivity.

Description	For	Pk	Cat. No.
Hybridomed DIF 1000 serum-free medium for mammalian cells	hybridoma	500 ml	**F8055/1**
Serum-free media for hybridoma culture, ISF-1	hybridoma, CHO	1.000 ml	**F9061-01**

Serum-free media, supplements and enzymes

Serum-free media can be used to establish monitorable and reproducible cultivation conditions. Biochrom AG offers serum-free media for the cultivation of, inter alia, hybridoma, CHO, ceratinocytes, or insect cells. In order to ensure serum-free work, supplements and growth factors need to be added to the media. Animal-free enzymes are needed for the detachment of adherent cells. All serum-free cell culture products can be found in this overview.

WHAT CELL TYPES DO YOU INTEND TO CULTIVATE?

We recommend some suitable serum-free media for your cells. (Table 1.)

Supplements for serum-free media

Representing a defined medium for the clonal growth of human ceratinocytes, MCDB 153 basal medium needs to be added by 5 ng/ml EGF, 5 mg/l insulin, 1,4 mM hydrocortisone, 0,1 mM ethanolamine, and 0,1 mM phosphoethanolamine.1

HAT medium is used for the selection of hybridoma cells. HAT is composed of hypoxanthine, thymidine and aminopterin. Following a successful selection, the cells are cultivated in HT medium for several passages, before being transferred into normal hybridoma medium.

In order to allow cells to grow ideally under serum-free conditions, ITS (insulin, transferrin and selenium) may be added to the media. Insulin has different growth promoting effects on animal cells, such as, for example, promoting the absorption of glucose and amino acids2. Transferrin serves as carrier protein for iron ions. Selenium has an antioxidant effect when inside the medium.

Enzyme for serum-free cell culture

The source material of Biotase is obtained from invertebrates. Biotase can be used to detach cells carefully. Significant surface structures of the cells remain intact.
When using serum-free media, trypsinisation necessitates a trypsin inhibitor.

OUR TIP:

Serum-free cell freezing with BIOFREEZE

Biofreeze is a serum and DMSO-free freezing medium for the cryopreservation of cell cultures in liquid nitrogen. It is suitable for freezing a wide range of cell lines. Biofreeze has no cytotoxic effect and may be used within the framework of all traditional freezing methods.

Serum-free transport and cold storage of cells with ChillProtec®

Adherent cells, cell suspensions or small tissue pieces are able to remain intact after cold storage when kept in the new Chillprotec® medium. The protective medium reduces cell damage caused by cold. Primary human hepatocytes, for example, remained intact at 2 - 8 °C for several days.

References:
1. *Boyce, S.T. et al. (1983): Calcium-regulated differentiation of normal human epidermal keratinocytes in chemically defined clonal culture and serum-free serial culture, J of Invest. Dermatol., 81, 33-40.*
2. *Freshney R.I. Culture of animal cells. 5. Edition. Wiley-Liss. 2005*

Cell type (recommended)	Serum-free media (Biochrom AG)	Additives
CHO	**Octomed, ISF-1**	
FRTL 5	**Coon's F-12** serum-free with additives	Insulin, hydrocortisone, transferrin, glycyl-L-histidyl-L-lysine-acetate, somatostatin,thyrotropin
Hybridoma	**HybridoMed DIF 1000, ISF-1**	
Insect cells	**Insectomed SF express, TC-100 Grace's insect cell medium**	
Ceratinocytes	**MCDB 153** serum-free with additives	EGF, insulin, hydrocortisone, ethanolamine, phosphoethanol-amine
Lymphocytes	**Iscove's (IMDM)** serum-free with additives	Recombinant BSA, soybean, lipides, transferrin
Neuroblastoma, glioma hybrid cells, neuronal primary cells	**TNB 100** serum-free with additives	Lipide-protein complex
Neuronal primary rat cells	**Start V**	
Sebocytes	**Sebomed™**	
Vero, 3T6	**PFEK-1**	

Table 1. Serum-free media for your cells.

BIOCHROM AG

General recommendations:

ADAPTATION OF CELLS TO SERUM-FREE MEDIA

Adapting cells to serum-free media can be performed either directly or gradually in accordance with the following protocols.

The source material should be in the logarithmic growth phase featuring the maximum number of living cells (>90%). In principle, a successful adaptation also depends on the nature of the cell line used. It is as a result highly recommended that the retained cultures are kept in the original medium until the transfer into serum-free medium has been completed successfully.

Direct transfer of the cells:

1. Transfer the cells from serum containing medium into serum-free medium that has been warmed to reach +37 °C. The seeding density should correspond to that in the original culture. Incubate the cells at +37 °C and 5 - 10% CO2 depending on the medium.
2. Passage the cells for a minimum of 4 to 8 passages, while closely monitoring growth and viability.
3. If there is a significant decrease of growth and viability during these passages, the user should switch to the gradual adaptation method.

Gradual adaptation of the cells:

1. Seed the cells with a density twice as high as in the normal inoculum in a 3:1 mixture of serum containing to serum-free medium.
2. Having reached a density of 10^6 viable cells/ml, transfer the cells into a 1:1 mixture of serum containing to serum-free medium.
3. Once the cell density is 1x 10^6 viable cells/ml, transfer the culture into a 1:3 mixture of serum containing to serum-free medium.
4. Having reached a cell density of 1x 10^6 viable cells/ml, transfer the cells into 100% serum-free medium.

CHO

Cellvento™ CHO-100
Biochrom

Cellvento™ CHO-100 chemically defined cell culture medium is specifically developed for the growth of Chinese Hamster Ovary (CHO) cells and the expression of monoclonal antibodies and recombinant proteins in suspension culture. The formulation is of non-animal origin, chemically defined and contains no hydrolysates or components of unknown composition. It is formulated without phenol red and glutamine. Cellvento™ CHO-100 has been specially designed for high growth and performance of CHO-S cells, but may be suitable for use with other commonly used CHO cell lines.

Description	Pk	Cat. No.
Cellvento™ CHO-100	500 ml	**N100899-0.5**

Octomed
Biochrom

Octomed is a serum-free and protein-free medium designed for the growth of Chinese Hamster Ovary cells. High purity components used to manufacture this medium provide consistent and reliable results. The formulation makes it an excellent choice for the production and purification of recombinant proteins. Cell densities obtained in Octomed are comparable to those of serum-containing media.

Description	For	Pk	Cat. No.
Octomed serum-free protein-free medium	CHO	500 ml	**F8085**

Others

Endothelial culture medium
Corning

Endothelial culture medium is optimised to promote rapid growth (3- to 5-fold increase in cell number over five days) of endothelial cells from a variety of sources.

Delivery information: Kit comprises endothelial cell culture medium (500 ml), epidermal growth factor (5 µg), endothelial cell growth supplement (100 mg), and trypsin inhibitor (50 mg).

Description	Pk	Cat. No.
Endothelial culture medium, kit	500 ml	**734-2385**

Hepatocyte culture medium
Corning

Hepatocyte culture medium is a serum-free, fully-defined medium optimised for hepatocyte differentiation.

Delivery information: Kit comprises hepatocyte culture medium (500 ml) and EGF (5 µg).

Description	Pk	Cat. No.
Hepatocyte culture medium, kit	500 ml	**734-2386**

Intestinal epithelium differentiation media
Corning

Used as part of an integrated system designed to create *in vitro* intestinal models.

Delivery information: Pack contains seeding basal medium (500 ml), differentiation medium (500 ml), and MITO+ Serum Extender (2×0,5 ml).

Description	Pk	Cat. No.
Intestinal epithelium differentiation media, kit	1 KIT	**734-1433**

Intestinal Epithelium Differentiation Medium
Corning

Intestinal Epithelium Differentiation Medium (formerly Entero-STIM) promotes the rapid differentiation of intestinal epithelium *in vitro*.

Description	Pk	Cat. No.
Intestinal epithelium differentiation medium, 2×250 ml	500 ml	**734-1431**

Chromosome medium
Biochrom

The ready to use medium serves as a basis for chromosome analysis and is standardised. It is produced with and without lectins. The lectins produce the activation of the lymphocytes, in order to reach a high mitotic activity of the cells. The mitotic cells can consequently be stopped with Colchicine and Colcemid. After spreading ("to sprite") the cells on a microscope slide and the staining of the cells, the chromosomes can be shown in the different separating phases.

Description	Pk	Cat. No.
Chromosome medium A without phytohemagglutinin (PHA) L	100 ml	**F5013**
Chromosome medium B with phytohemagglutinin (PHA) L	100 ml	**F5023**

SALT SOLUTIONS & SALTS

DPBS 34

HBSS 34

EBSS 34

HEPES 34

Sodium bicarbonate 35

Calcium chloride 35

Magnesium chloride 35

Potassium chloride 35

Sodium chloride 35

Sodium pyruvate 35

DPBS

Dulbecco's phosphate buffered saline (DPBS)
Biowest

Description	Pk	Cat. No.
DPBS, with calcium, with magnesium (liquid)	500 ml	L0625-500
DPBS, with calcium, with magnesium (liquid)	1.000 ml	L0625-1000
DPBS, without calcium, without magnesium (liquid)	100 ml	L0615-100
DPBS, without calcium, without magnesium (liquid)	500 ml	L0615-500
DPBS, without calcium, without magnesium (liquid)	1.000 ml	L0615-1000
DPBS, without calcium, without magnesium (powder)	1 l	P0750-N1L
DPBS, without calcium, without magnesium (powder)	5 l	P0750-N5L
DPBS, without calcium, without magnesium (powder)	10 l	P0750-N10L
DPBS, without calcium, without magnesium (powder)	50 l	P0750-N50L
DPBS 10X, with calcium, with magnesium (liquid)	500 ml	X0520-500
DPBS 10X, without calcium, without magnesium (liquid)	100 ml	X0515-100
DPBS 10X, without calcium, without magnesium (liquid)	500 ml	X0515-500

HBSS

Hanks' balanced salt solution (HBSS)
Biowest

Description	Pk	Cat. No.
Hanks' balanced salt solution (HBSS)		
HBSS, with calcium, with magnesium, without sodium biocarbonate, with phenol red (liquid)	500 ml	L0608-500
HBSS, with calcium, with magnesium, without sodium biocarbonate, with phenol red (powder)	1 l	P0154-N1L
HBSS, with calcium, with magnesium, without sodium biocarbonate, with phenol red (powder)	10 l	P0154-N10L
HBSS, with calcium, with magnesium, with sodium biocarbonate, without phenol red (liquid)	500 ml	L0612-500
HBSS, with calcium, with magnesium, with sodium biocarbonate, with phenol red (liquid)	500 ml	L0606-500
HBSS, without calcium, without magnesium, without sodium biocarbonate, without phenol red (liquid)	500 ml	L0605-500
HBSS, without calcium, without magnesium, without sodium biocarbonate, without phenol red (powder)	1 l	P0153-N1L
HBSS, without calcium, without magnesium, without sodium biocarbonate, without phenol red (powder)	10 l	P0153-N10L
HBSS, without calcium, without magnesium, with sodium biocarbonate, without phenol red (liquid)	500 ml	L0607-500
HBSS, without calcium, without magnesium, with sodium biocarbonate, with phenol red (liquid)	100 ml	L0611-100
HBSS, without calcium, without magnesium, with sodium biocarbonate, with phenol red (liquid)	500 ml	L0611-500
HBSS 10X, with calcium, with magnesium, without sodium biocarbonate, with phenol red (liquid)	500 ml	X0509-500
HBSS 10X, without calcium, without magnesium, without sodium biocarbonate, without phenol red (liquid)	500 ml	X0507-500
HBSS 10X, without calcium, without magnesium, without sodium biocarbonate, with phenol red (liquid)	500 ml	X0513-500
HBSS 10X, without calcium, without magnesium, with sodium biocarbonate, without phenol red (liquid)	500 ml	X0510-500

EBSS

Earle's balanced salt solutions (EBSS)
Biowest

Description	Pk	Cat. No.
Earle's balanced salt solutions (EBSS)		
EBSS, with calcium, with magnesium (liquid)	500 ml	L0602-500
EBSS, without calcium, without magnesium (liquid)	500 ml	L0601-500
EBSS 10X, with calcium, with magnesium, without sodium bicarbonate (liquid)	100 ml	X0112-100
EBSS 10X, with calcium, with magnesium, without sodium bicarbonate (liquid)	500 ml	X0112-500
EBSS 10X, without calcium, without magnesium, without sodium bicarbonate (liquid)	500 ml	X0113-500

HEPES

HEPES buffer
Biowest

Description	Pk	Cat. No.
HEPES		
HEPES, cell culture tested (powder)	100 g	P5455-100GR
HEPES, cell culture tested (powder)	250 g	P5455-250GR
HEPES, cell culture tested (powder)	500 g	P5455-500GR
HEPES buffer, 1 M (liquid)	100 ml	L0180-100
HEPES buffer, 1 M (liquid)	500 ml	L0180-500

Sodium bicarbonate

Sodium bicarbonate
Biowest

Description	Pk	Cat. No.
Sodium bicarbonate, 7,5%	100 ml	L0680-100
Sodium bicarbonate, 7,5% (liquid)	500 ml	L0680-500
Sodium bicarbonate, cell culture tested (powder)	500 g	P2060-500GR
Sodium bicarbonate, cell culture tested (powder)	1 kg	P2060-KG

Calcium chloride

Calcium chloride

Description	Pk	Cat. No.
Calcium chloride 1 mol/l (2 N) aqueous solution	100 ml	E506-100ML
Calcium chloride 1 mol/l (2 N) aqueous solution	500 ml	E506-500ML

Magnesium chloride

Magnesium chloride

Description	Pk	Cat. No.
Magnesium chloride 1 mol/l (2 N) aqueous solution	100 ml	E525-100ML
Magnesium chloride 1 mol/l (2 N) aqueous solution	500 ml	E525-500ML

Potassium chloride

Potassium chloride
Biowest

Description	Pk	Cat. No.
Other salt solutions and salts		
Potassium chloride (powder)	500 g	P2035-500GR
Potassium chloride (powder)	1 kg	P2035-KG
Potassium chloride solution, 0,075 M	100 ml	L0643-100
Potassium chloride solution, 0,075 M (liquid)	500 ml	L0643-500

Sodium chloride

Sodium chloride

Description	Pk	Cat. No.
Sodium chloride 5 mol/l (5 N) aqueous solution	100 ml	E529-100ML
Sodium chloride 5 mol/l (5 N) aqueous solution	500 ml	E529-500ML

Sodium chloride
Biowest

Description	Pk	Cat. No.
Sodium chloride (powder)	1 kg	P2066-KG
Sodium chloride for dilution 8,5 g/l (powder)	5 l	P2065-N5L
Sodium chloride for dilution 9 g/l (powder)	5 l	P2064-N5L
Sodium chloride salt solution, 0,85% (liquid)	500 ml	L0640-500

Sodium pyruvate

Sodium pyruvate
Biowest

Description	Pk	Cat. No.
Sodium pyruvate solution, 100 mM	100 ml	L0642-100
Sodium pyruvate solution, 100 mM (liquid)	500 ml	L0642-500

Sodium pyruvate, cell culture grade
AppliChem

Description	Pk	Cat. No.
Sodium pyruvate	50 g	**A4859.0050**
Sodium pyruvate	100 g	**A4859.0100**
Sodium pyruvate	500 g	**A4859.0500**
Sodium pyruvate	1 kg	**A4859.1000**

CELL CULTURE REAGENTS

Cell dissociation/detachment - Animal derived 38

Cell dissociation/detachment - Non-animal derived 38

Cell separation 39

Cell stains 40

Antibiotics 44

Antimycotics 48

Mycoplasma - Detection 48

Detection and elimination of Mycoplasma in cell culture 50

Mycoplasma - Treatment 52

Mycoplasma - Prevention 53

Water 54

Supplements - Aminoacids 54

Supplements - Vitamines 57

Supplements - Sugars 57

Supplements - Growth supplements 58

Supplements - Attachment 60

Supplements - Other supplements 61

Cell dissociation/detachment - Animal derived

Trypsin
Biowest

Trypsin is a porcine pancreas-derived enzyme that is commonly used for the dissociation and disaggregation of anchorage-dependent mammalian cells and tissues. The concentration of trypsin necessary to dislodge the cells from their substrate depends on the sensitivity of the cells.

Description	Pk	Cat. No.
Trypsin 0,25% in PBS, without calcium, without magnesium, with phenol red	100 ml	**L0909-100**
Trypsin 0,25% in PBS, without calcium, without magnesium, without phenol red	100 ml	**L0910-100**
Trypsin 2,5% in PBS, without calcium, without magnesium, without phenol red	100 ml	**X0915-100**
Trypsin 2,5% in HBSS, without calcium, without magnesium, without phenol red	100 ml	**X0920-100**
Trypsin-EDTA 1X in PBS, without calcium, without magnesium, with phenol red	100 ml	**L0930-100**
Trypsin-EDTA 1X in PBS, without calcium, without magnesium, with phenol red	500 ml	**L0930-500**
Trypsin-EDTA 1X in PBS, without calcium, without magnesium, without phenol red	100 ml	**L0940-100**
Trypsin-EDTA 1X in PBS, without calcium, without magnesium, without phenol red	500 ml	**L0940-500**
Trypsin-EDTA 1X, with sodium chloride, lyophilised	1 g	**P0940-1GR**
Trypsin-EDTA 1X, with sodium chloride, lyophilised	100 g	**P0940-100GR**
Trypsin-EDTA 10X	100 ml	**X0930-100**
Trypsin 0,25% EDTA in HBSS, without calcium, without magnesium, with phenol red	100 ml	**L0931-100**
Trypsin 0,25% EDTA in HBSS, without calcium, without magnesium, with phenol red	500 ml	**L0931-500**
Trypsin 0,25% EDTA 0,02% in HBSS, without calcium, without magnesium, with phenol red	100 ml	**L0932-100**
Trypsin 1:250 powder (porcine)	100 g	**P5957-100GR**

Trypsin inhibitor
Biochrom

When using serum-free media, a trypsin inhibitor is required after trypsinisation. Trypsin inhibitor from soybeans is a sterile and ready for use solution.

Description	Pk	Cat. No.
Trypsin inhibitor	5 ml	**L2181**

Cell dissociation/detachment - Non-animal derived

Accutase
Biowest

Accutase is a ready to use cell detachment solution of proteolytic and collagenolytic enzymes. Accutase is a direct replacement for trypsin solution.

Description	Pk	Cat. No.
Accutase	100 ml	**L0950-100**

Versene
Biowest

Versene can be used instead of trypsin. It is a chelating agent that disperses the cells by cutting the cytoplasmic bridges between them. Versene has the advantage of being able to withstand autoclave temperature, which is a guarantee of sterility. In addition, it is less aggressive cells than trypsin, which is useful for studies on cell growth.

Description	Pk	Cat. No.
Versene	100 ml	**L0630-100**

Biotase
Biochrom

Biotase is an enzyme sourced from invertebrates that is used for separating cells. Biotase has been shown to have a more sustained enzyme effect on the sub-cultivation of adherent growing cells than either trypsin or papain. Working with biotase the incubation time is sometimes longer in comparison with other enzyme preparations, but the important surface texture of the cells remains preserved, which is important for reattachment after passaging. The enzymatic effect is stopped by adding foetal bovine serum (FBS) or, if necessary, by dilution (washing).

- No TSE/BSE risk as the raw substance is extracted from invertebrates
- An effective alternative to trypsin or papain

Description	Pk	Cat. No.
Biotase	100 ml	**L2193**

Papain
Biochrom

Papain offers a non-animal alternative to trypsin. Papain is able to hydrolyse proteins and peptides, preferably those with basic amino acids. The ready to use preparation (61,25 mg/l) in PBS without Ca2+, Mg2+ is derived from papaya fruit (Carica papaya).

Description	Pk	Cat. No.
Papain	100 ml	L2223

Cell separation

Percoll™ PLUS
GE Healthcare

Percoll™ PLUS is non toxic, almost chemically inert, and does not adhere to membranes. Percoll™ PLUS is used for preparation of cells, subcellular particles and larger viruses. Preformed gradients can be stored for weeks without change in gradient shape, provided that the gradient is sterile, and remains unfrozen. Percoll™ PLUS can be buffered within the pH range 5,5 to 10 without change in properties. Both concentrated and diluted Percoll™ PLUS can be resterilised by autoclaving for 30 minutes at 120 °C. The medium is available in easy-to-open, resealable 250 ml and 1 l bottles.

- Percoll™ PLUS has verified low endotoxin level, and is non toxic, sterile and re-sterilisable, even after adjustment to physiological ionic strength
- Gradients can either be preformed or spontaneously generated by centrifugation at moderate speeds in an angle-head rotor
- Iso-osmotic gradients throughout cover a range of densities up to 1,3 g/ml
- Low viscosity allows cell isolations on preformed gradients in only a few minutes using low centrifugal forces (200 to 1000×g).

Note: Percoll™ PLUS is for *in vitro* research use only.

Description	Pk	Cat. No.
Percoll™ PLUS	1 l	17-5445-01
Percoll™ PLUS	250 ml	17-5445-02

Percoll™
GE Healthcare

Percoll is a low viscosity density gradient medium for preparation of cells, subcellular particles, and larger viruses (down to ~ 70S) under gentle conditions which preserve viability and morphological integrity. The low viscosity of the medium enables cell preparation on preformed gradients in only a few minutes using low centrifugal forces (200 to 1000×g). The medium is available in easy-to-open, resealable 250 ml and 1 l bottles.

- Non cytotoxic
- Adjustable to physiological ionic strength and pH
- Gradients can either be preformed or spontaneously generated by centrifugation at moderate speeds in an angle-head rotor
- Gradients are iso-osmotic throughout and cover a range of densities up to 1,3 g/ml

Note: Percoll™ is for *in vitro* research use only.

Description	Pk	Cat. No.
Percoll™	250 ml	17-0891-02
Percoll™	1 l	17-0891-01
Percoll™, 6×1 l	6	17-0891-09

Ficoll-Paque™ PLUS
GE Healthcare

Ficoll-Paque™ PLUS is a sterile density gradient centrifugation medium for separation of mononuclear cells from human blood.

- Maintains viability and representative distribution of B and T lymphocytes
- Low levels of endotoxin (<0,12 EU/ml)

Description	Pk	Cat. No.
Ficoll-Paque™ PLUS, 6×100 ml	6	17-1440-02
Ficoll-Paque™ PLUS, 6×500 ml	6	17-1440-03

Ficoll-Paque™ PREMIUM
GE Healthcare

Ficoll-Paque™ PREMIUM products are a range of sterile, ready to use density gradient media for the preparation of mononuclear cells.

Ficoll-Paque™ PREMIUM: Optimised for the isolation of mononuclear cells from human peripheral blood, bone marrow, and umbilical cord blood.

Ficoll-Paque™ PREMIUM 1.084: Can be used for isolating a broad range of human mononuclear cells including those of a higher density and for separating blood cells from mice or rats.

Ficoll-Paque™ PREMIUM 1.073: Can be used when isolating lower density human mononuclear cells (e.g. mesenchymal stromal cells or monocytes).

- Manufactured according to GMP and ISO 13485:2003 standards and the recommendations of the United States Pharmacopeia
- Sterile and ready to use
- Low levels of endotoxin (<0,12 EU/ml) secured and tested
- Non cytotoxic

Description	Pk	Cat. No.
Ficoll-Paque™ PREMIUM, 6×100 ml	6	**17-5442-02**
Ficoll-Paque™ PREMIUM, 6×500 ml	6	**17-5442-03**
Ficoll-Paque™ PREMIUM 1.084, 6×100 ml	6	**17-5446-02**
Ficoll-Paque™ PREMIUM 1.073, 6×100 ml	6	**17-5446-52**

Lymphocyte separation media, Lymphosep
Biowest

Lymphosep is designed for the simple, rapid isolation of lymphocytes from whole blood that has been diluted and treated with anti-coagulant or defibrinating agent.

Description	Pk	Cat. No.
Lymphosep, Lymphocyte Separation Media	100 ml	**L0560-100**
Lymphosep, Lymphocyte Separation Media	500 ml	**L0560-500**

Cell stains

Fluorescent dye, Corning® Calcein AM
Corning

The fluorescent dye calcein acetoxymethylester (calcein AM) can be used to label cells when performing analyses such as tumour cell invasion, endothelial cell migration, endothelial cell tubulogenesis, and other cell-based assays.

The cell viability indicator calcein AM is a non-fluorescent, cell permeant compound that is hydrolysed by intracellular esterases into the fluorescent anion calcein. Corning® Calcein AM can be used to fluorescently pre- and post-label viable cells to perform kinetic and endpoint experiments, respectively.

Note: Cells are known to tolerate different fluorescent dyes for varying amounts of time in culture. Cells labelled with calcein AM should be exposed to the dye for less than eight hours.

Description	Pk	Cat. No.
Calcein AM	500 µG	**734-1434**
Calcein AM	1 mg	**734-1435**

DAPI
AppliChem

DAPI (4',6-Diamidine-2-phenylindole dihydrochloride) is an excellent dye for staining DNA. The most popular application of DAPI is its use as a reagent to detect mycoplasma or virus DNA (eg. vaccinia infection or 'unwanted' viral contamination of cells) in cell culture.

Description	Pk	Cat. No.
DAPI	10 mg	**A1001.0010**
DAPI	25 mg	**A1001.0025**
DAPI	100 mg	**A1001.0100**

Fluorescent dye, Corning® DiIC12(3)

Corning

The fluorescent dye DiIC12(3) can be used to label cells when performing analyses such as tumour cell invasion, endothelial cell migration, endothelial cell tubulogenesis, and other cell-based assays.

DiIC12(3) is a lipophilic neuronal tracer that is commonly used for labelling neuronal projections as well as lipid bilayers in other cell types. Because DiIC12(3) exhibits low toxicity and minimal effects on cell viability, this dye can be used to pre-label cells for a variety of applications.

Note: Cells are known to tolerate different fluorescent dyes for varying amounts of time in culture. While cells labeled with calcein AM should be exposed to the dye for less than eight hours, DiIC12(3) can be used for several days in culture without adversely affecting cells.

Description	Pk	Cat. No.
DiIC12(3)	100 mg	**734-1436**

VWR CHEMICALS

Fluorescent viability stain, Quick-View™

Quick-View™ Fluorescent Viability Stain is a ready to use staining reagent for easy discrimination between live and dead mammalian cells. Supplied in an easy to use dropper bottle, the single staining solution is a mixture of Acridine Orange for live cell identification and ethidium bromide for identification of dead cells. The Acridine Orange stained live cells appear green and ethidium bromide stained dead cells appear red when visualised by fluorescence microscopy.

- Pre-mixed, ready to use dye solution
- Dropper bottle format minimises contact with hazardous reagents
- Cells can be visualised immediately upon dye addition
- Stains both suspended and adherent cells

Pk	Cat. No.
5 ml	**N600-5ML**

VWR CHEMICALS

MTT thiazoyl blue tetrazolium bromide

MTT, a yellow tetrazole dye, can be reduced to a water-insoluble purple formazan compound by mitochondrial reductase enzymes. Since reduction only occurs in living cells the quantitation of formazan can be equated to the number of viable cells in the population.

- Sensitive colorometric substitute for radioisotopes in cell proliferation and cytotoxicity studies
- Applications include cell viability assays, dose response curves and cytotoxicity assays

Description	Pk	Cat. No.
MTT	500 mg	**0793-500MG**
MTT	1 g	**0793-1G**
MTT	5 g	**0793-5G**

VWR CHEMICALS

Trypan Blue, 0,4% solution

Trypan Blue is a dye used in cell culture applications to determine cell viability. A researcher can remove a sample of cells from culture and combine in a 1:1 ratio with the Trypan Blue solution. Under the microscope, dead cells will appear a blue color and viable cells will appear clear and translucent. Using a hemacytometer, a researcher can quantify the percentage of dead cells within a population.

Description	Pk	Cat. No.
Trypan Blue, 0,4% solution	100 ml	**K940-100ML**

Trypan Blue

Biowest

Trypan Blue is a stain used to distinguish viable from non viable cells.

Description	Pk	Cat. No.
Trypan Blue, 0,5% solution	100 ml	**L0990-100**
Trypan Blue, powder	1 g	**P0935-1GR**

Cytoplasmic membrane labelling kits, CellBrite™

Biotium

CellBrite™ cytoplasmic membrane labelling kits are designed to label cell cytoplasmic membranes with fluorescence. The labelling is stable and non toxic, suitable for long-term tracking of cells. The kit utilises a fluorescent membrane dye pre-dissolved as an optimised staining solution. Cell staining is accomplished by adding the supplied dye solution directly to normal culture media, followed by a brief incubation period. By combining CellBrite™ membrane stains, it is possible to label multiple cell populations with distinctive colours, a capability useful for the studies of cell-cell interactions.

- Cell staining made simple by direct addition of the supplied dye solution to normal culture media
- Highly lipophilic dye ensuring no dye transfer between cells, resulting in stable labelling
- Bright, photostable and non toxic

Description	Pk	Cat. No.
CellBrite™ Green	1 ml	**30021.**
CellBrite™ Orange	1 ml	**30022.**
CellBrite™ Red	1 ml	**30023.**
CellBrite™ Blue	1 KIT	**30024.**

Near-IR cytoplasmic membrane stains

Biotium

Carbocyanine dyes label cytoplasmic membranes and intracellular membrane structures efficiently and permanently. They have been used as tracers for studies of cell fusion, cellular adhesion, and migration applications due to their properties of low cytotoxicity and high resistance to intercellular transfer.

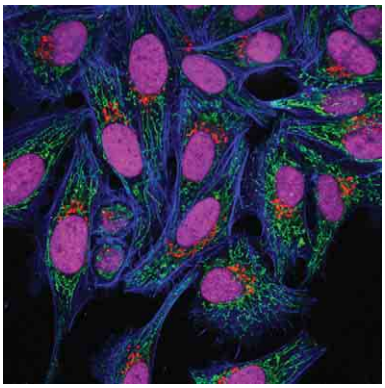
CellBrite™ IR680 is far-red/near-infrared carbocyanine dye for labelling cell membranes with excitation/emission at 683/724 nm. The fluorescence emission of CellBrite™ IR680 can be imaged by confocal microscopy or near-infrared *in vivo* imaging, allowing researchers to assess cellular labelling *in vitro* by microscopy prior to small animal injection.

DiR [DilC$_{18}$(7); 1,1′-dioctadecyl-3,3,3′,3′-tetramethylindotricarbocyanine iodide] is a lipophilic, near-infrared fluorescent cyanine dye. The dye is useful for labeling cytoplasmic membrane. The two long 18-carbon chains insert into the cell membrane, resulting in specific and stable cell staining with no or minimal dye transfer between cells. A stock solution of the dye can be made in ethanol. Cell staining can be effected using the dye at 1 - 10 µM concentration and 10 - 20 minute incubation time.

Description	Pk	Cat. No.
CellBrite™ IR680, 2 mM in DMSO	100 µl	**30070.**

RedDot™1 and RedDot™2

Biotium



RedDot™1 and RedDot™2 are two far-red DNA-binding dyes designed as nuclear counterstains for live or fixed and permeabilised cells. Respectively RedDot™ dyes combine the advantages of existing nuclear counterstains, such as DAPI, Draq™5 and Draq™7, with some key advantages. Spectrally similar to Draq™5 and Draq™7, the RedDot™ dyes are excitable by several common laser lines and emit fluorescence in the far-red spectral region. RedDot™ fluorescence emission is well separated from the emission peaks of other popular fluorescent probes, making RedDot™ dyes ideal counterstains for multicolour imaging. Cell permeable RedDot™1 stains the nuclei of live cells rapidly and specifically. Cell membrane-impermeable RedDot™2 has excellent selectivity for dead cells.

- RedDot™ dyes can be used to stain adherent or suspension cells and tissue sections
- Highly thermostable and photostable
- Providing convenient handling and ideal for demanding applications such as confocal microscopy

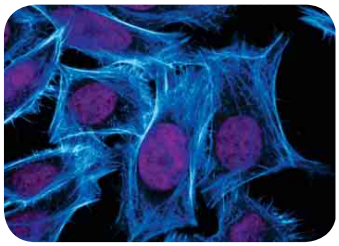
Description	Pk	Cat. No.
RedDot™1, trial kit (15 - 20 tests)	25 µl	**40060-T**
RedDot™1, 200X in water for live cell nuclear staining (150 - 200 tests)	250 µl	**40060.**
RedDot™1, 200X in water for live cell nuclear staining (600 - 1000 tests)	1 ml	**40060-1**
RedDot™2, trial kit (15 - 20 tests)	25 µl	**40061-T**
RedDot™2, 200X in DMSO for selective staining of dead cells, or nuclear counterstaining of fixed and permeabilised cells (150 - 200 tests)	250 µl	**40061.**
RedDot™2, 200X in DMSO for selective staining of dead cells, or nuclear counterstaining of fixed and permeabilised cells (600 - 1000 tests)	1 ml	**40061-1**

CF™ Dye Bioconjugates for Cell Staining

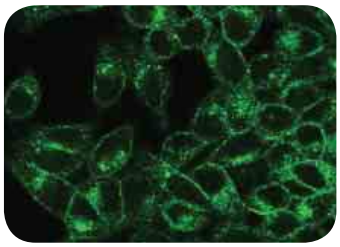
Biotium offers a wide selection of fluorescent CF™ dye-labeled bioconjugates for cell staining. CF™ dyes are next-generation fluorescent dyes designed with superior brightness and photostability, with colors ranging from blue to near-infrared for multi-color flexibility.

CF™ dye bioconjugates

Conjugate	Application
Annexin V	Apoptosis (phosphatidylserine) detection in unfixed cells
α-Bungarotoxin	Acetylcholine receptor probe for neuromuscular junction staining
Bovine serum albumin	Fluid phase endocytosis tracer; in vivo blood flow tracer
Cholera Toxin Subunit B	GM1 receptor probe for lipid raft staining, endocytic vesicle tracking, or neuronal tracing
Concanavalin A (Con A)	Carbohydrate-binding lectin that selectively binds to α-mannopyranosyl and α-glucopyranosy residues.
Dextran, 10,000 MW, anionic and fixable	Fluid phase marker for cell permeability and intracellular trafficking studies
Nucleotides dCTP, ddCTP, UTP, dUTP	DNA/RNA probe labeling, TUNEL assay
Phalloidin	Filamentous actin staining in fixed cells and tissue sections
Streptavidin	Detection of biotinylated probes
Transferrin (human)	Endocytosis probe for labeling recycling endosomes
Wheat germ agglutinin	Carbohydrate-binding lectin with high affinity for sialic acid and N-acetylglucosamine, useful for bacterial gram staining

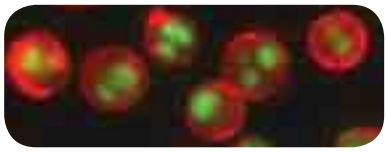


Actin filaments in HeLa cells stained with CF405M phalloidin (blue). Nuclei are stained with Biotium's far-red nuclear counterstain RedDot2 (magenta).



Labeling of recycling endosomes in HeLa cells by uptake of CF488A transferrin.

Frozen section of skeletal muscle stained with CF633 a-bungarotoxin (magenta) to detect nicotinic acetylcholine receptors at the neuromuscular junction. Nuclei are stained with DAPI (blue).



Apoptotic Jurkat cell stained with CF™647 Annexin V (red). Apoptotic cell nuclei are stained with Biotium's NucView 488 Caspase-3 Substrate (green).

Biotium

Antibiotics

VWR CHEMICALS

Actinomycin D, ultra pure grade

Prevents RNA transcription by binding DNA at transcription initiation sites. Binds GC-rich DNA sequences.

Recommended working concentration: 1 µg/ml in DMSO

Description	Pk	Cat. No.
Actinomycin D	5 mg	J608-5MG

VWR CHEMICALS

Antibiotics

Description	Pk	Cat. No.
Actinomycin D	5 mg	J608-5MG
Amphotericin B, 250 mg/ml solution	20 ml	K721-20ML
Ampicillin sodium salt, working concentration 50 µg/ml	25 g	0339-EU-25G
Ampicillin sodium salt, working concentration 50 µg/ml	100 g	0339-EU-100G
Carbenicillin	1 g	J358-1G
Carbenicillin	250 mg	J358-250MG
Chloramphenicol, working concentration 20 µg/ml	100 g	0230-EU-100G
Cycloheximide	100 mg	94271-100MG
Cycloheximide	1 g	94271-1G
Cycloheximide	5 g	94271-5G
Cycloheximide	25 g	94271-25G
D-cycloserine	1 g	K646-1G
G418 antibiotic solution (Geneticin)	20 ml	J847-20ML
G418 sulphate	100 mg	E859-100MG
G418 sulphate	1 g	E859-1G
G418 sulphate	5 g	E859-5G
Gentamycin sulphate, 50 mg/ml solution, working concentration 15 µg/ml	20 ml	E737-20ML
Gentamycin sulphate, USP grade	10 g	0304-10G
Gentamycin sulphate, USP grade	5 g	0304-5G
Hygromycin B	100 mg	J607-100MG
Hygromycin B, 50 mg/ml solution, working concentration 150 µg/ml	20 ml	K547-20ML
Kanamycin sulphate, 25 mg/ml solution	20 ml	E710-20ML
Kanamycin sulphate, 50 mg/ml solution	20 ml	E713-20ML
Kanamycin sulphate, working concentration 30 µg/ml	10 g	0408-EU-10G
Kanamycin sulphate, working concentration 30 µg/ml	25 g	0408-EU-25G
Mitomycin C	2 mg	J594-2MG
Mycophenolic acid	100 mg	J592-100MG
Nalidixic acid	250 g	0677-250G
Nalidixic acid	50 g	0677-50G
Neomycin sulphate, working concentration 50 µg/ml	25 g	0558-EU-25G
Penicillin/Streptomycin	20 ml	E490-20ML
Penicillin/Streptomycin, 100X solution, working concentration 10 ml/l, tissue culture grade	100 ml	K952-100ML
Penicillin/Streptomycin/Amphotericin	20 ml	E485-20ML
Puromycin dihydrochloride	25 mg	J593-25MG
Streptomycin sulphate, working concentration 30 µg/ml	50 g	0382-EU-50G
Streptomycin sulphate, working concentration 30 µg/ml	100 g	0382-EU-100G
Streptozotocin	1 g	N407-1G
Tetracycline, 50 mg/ml solution	20 ml	E709-20ML
Tetracycline hydrochloride, working concentration 15 µg/ml	25 g	0422-EU-25G

Antibiotics

Biowest

The use of antibiotics is a helpful tool in the cell culture field or where fluids have to be conserved and protected from bacterial contamination.

Most of the antibiotics suppress the growth of micro-organisms by blocking an anabolic pathway. Nanomycopulitine actively kills the bacteria in all three stages of development without interfering with the eukaryotic metabolism.

Continued on next page

Continued from previous page

Description	Pk	Cat. No.
Gentamycin sulfate, solution (10 mg/ml)	10 ml	L0011-010
G418 Geneticin solution	10 ml	L0015-010
G-418 sulphate	1 g	P0017-1GR
G-418 sulphate	5 g	P0017-5GR
Gentamycin sulphate	1 g	P4020-1GR
Gentamycin sulphate	5 g	P4020-5GR
Kanamycin solution 100X	20 ml	L0008-020
Gentamycin sulphate 10 mg/ml	100 ml	L0011-100
Gentamycin sulphate 50 mg/ml	10 ml	L0012-010
Gentamycin sulphate 50 mg/ml	100 ml	L0012-100
Glutamine-Penicillin-Streptamycin 100X	100 ml	L0014-100
G418 (Geneticin) solution	20 ml	L0015-020
G418 (Geneticin) solution	100 ml	L0015-100
Penicillin-Streptomycin	100 ml	L0018-100
Penicillin-Streptomycin solution 100X	20 ml	L0022-020
Penicillin-Streptomycin solution 100X	100 ml	L0022-100
Peniciilin G sodium salt, 1 million units	1	P0018-1MU
Nanomycopulitine concentrate 20X	10 ml	L-X16-010
Nanomycopulitine concentrate 20X	100 ml	L-X16-100

VWR CHEMICALS

Amphotericin B, solubised solution, for tissue culture

An antifungal polyene believed to act by altering membrane permeability.Recommended working concentration: 2.5 µg/ml.

Description	Pk	Cat. No.
Amphotericin B, 250 mg/ml solution	20 ml	K721-20ML

VWR CHEMICALS

Ampicillin sodium salt

Interferes with formation of bacterial cell wall. Working concentration: 50 µg/ml.

Description	Pk	Cat. No.
Ampicillin sodium salt, working concentration 50 µg/ml	25 g	0339-EU-25G
Ampicillin sodium salt, working concentration 50 µg/ml	100 g	0339-EU-100G

VWR CHEMICALS

Carbenicillin, disodium salt

A penicillin derivative that inhibits cell wall synthesis in gram-negative and gram-positive bacteria.

Recommended working concentration: 0,1 - 30 µg/ml

Description	Pk	Cat. No.
Carbenicillin	1 g	J358-1G
Carbenicillin	250 mg	J358-250MG

VWR CHEMICALS

Chloramphenicol

Inhibits protein synthesis at peptidyltransferase.

Description	Pk	Cat. No.
Chloramphenicol, working concentration 20 µg/ml	100 g	0230-EU-100G

Colcemid

Biowest

Colcemid arrests the division of cells in mitosis. It prevents the formation of the spindle apparatus responsible for cell division, thereby permitting an accumulation of metaphases.

Description	Pk	Cat. No.
Colcemid, 10 µg/ml in PBS (Demecolcin)	10 ml	L0040-010
Colcemid, 10 µg/ml in PBS (Demecolcin)	20 ml	L0040-020
Colcemid, 10 µg/ml in PBS (Demecolcin)	50 ml	L0040-050
Colcemid, 10 µg/ml in PBS (Demecolcin)	100 ml	L0040-100

Cycloheximide, crystalline

Inhibitor of protein synthesis in eucaryotic organisms. Widely used to determine protein half-life and as a selection agent for yeast and fungi. Working concentration: 100 - 1000 µg/ml.

Description	Pk	Cat. No.
Cycloheximide	100 mg	94271-100MG
Cycloheximide	1 g	94271-1G
Cycloheximide	5 g	94271-5G
Cycloheximide	25 g	94271-25G

G418 antibiotic solution (Geneticin)

Used as a selection agent for both prokaryotic and eukaryotic transfected cells. An aminoglycoside similar to gentamycin, G418 is toxic to bacterial, yeast, higher plant and mammalian cells in addition to protozoans and helminths. Transformants survive in G418 supplemented media by expression of an aminoglycoside-modifying enzyme.

Recommended working concentration: 400 µg/ml

Description	Pk	Cat. No.
G418 antibiotic solution (Geneticin)	20 ml	J847-20ML

G418 sulphate, ultra pure grade

Selection agent for both prokaryotic and eukaryotic transfected cells. Mode of Action: An aminoglycoside similar to gentamycin, G418 is toxic to bacterial, yeast, higher plant and mammalian cells in addition to protozoans and helminths. Transformants survive in G418 supplemented media by expression of an aminoglycoside-modifying enzyme.

Recommended working concentration: 400 µg/ml

Description	Pk	Cat. No.
G418 sulphate	100 mg	E859-100MG
G418 sulphate	1 g	E859-1G
G418 sulphate	5 g	E859-5G

Gentamycin solution, 50 mg/ml

Filtered through a 0,22 µm filter. 15 µg/ml working concentration, binds to the 30S subunit of bacterial ribosome.

Description	Pk	Cat. No.
Gentamycin solution, 50 mg/ml	20 ml	E737-20ML

Gentamycin sulphate, tissue culture grade

Antibiotic that primarily targets gram-bacteria by binding to the 30S subunit of bacterial ribosome. Recommended working concentration: 15 µg/ml.

Description	Pk	Cat. No.
Gentamycin sulphate, USP grade	10 g	0304-10G
Gentamycin sulphate, USP grade	5 g	0304-5G

Gentamycin sulphate

Biowest

Description	Pk	Cat. No.
Gentamycin sulfate, solution (10 mg/ml)	10 ml	L0011-010

Hygromycin B

An aminoglycoside antibiotic that inhibits protein synthesis in bacteria, fungi and higher eucaryotic cells. Widely used as a selection agent for procaryotic and eucaryotic cells carrying the hygromycin resistance gene.

Recommended working concentration 100 µg/ml

Description	Pk	Cat. No.
Hygromycin B, ultra-pure grade	100 mg	J607-100MG

Kanamycin sulphate solution

Kanamycin is an aminoglycoside antibiotic that inhibits protein synthesis in gram-negative and gram-positive bacteria and in mycoplasma. Recommended working concentration: 30 µg/ml.

Description	Pk	Cat. No.
Kanamycin sulphate, 25 mg/ml solution	20 ml	E710-20ML
Kanamycin sulphate, 50 mg/ml solution	20 ml	E713-20ML

Kanamycin sulphate

Binds to the 70S subunit of bacterial ribosome. Recommended working concentration: 30 µg/ml.

Description	Pk	Cat. No.
Kanamycin sulphate, working concentration 30 µg/ml	10 g	0408-EU-10G
Kanamycin sulphate, working concentration 30 µg/ml	25 g	0408-EU-25G

Neomycin sulphate

Description	Pk	Cat. No.
Neomycin sulphate, working concentration 50 µg/ml	25 g	0558-EU-25G

Penicillin streptomycin, 100X solution

Description	Pk	Cat. No.
Penicillin/Streptomycin, 100X solution, working concentration 10 ml/l, tissue culture grade	100 ml	K952-100ML

Puromycin dihydrochloride

A broad spectrum antibiotic that inhibits protein synthesis in both procaryotic and eucaryotic organisms. Widely used as a selection agent for cells carrying the *Pac* resistance gene encoding puromycin N-acetyl-transferase.

Recommended working concentration: 50 µg/ml

Description	Pk	Cat. No.
Puromycin dihydrochloride	25 mg	J593-25MG

Streptomycin sulphate

Description	Pk	Cat. No.
Streptomycin sulphate, working concentration 30 µg/ml	50 g	0382-EU-50G
Streptomycin sulphate, working concentration 30 µg/ml	100 g	0382-EU-100G

Tetracycline hydrochloride

Description	Pk	Cat. No.
Tetracycline hydrochloride, working concentration 15 µg/ml	25 g	0422-EU-25G

Tetracycline, 50 mg/ml solution

Inhibits protein synthesis in gram-positive and gram-negative bacteria.

Recommended working concentration: 15 µg/ml

Description	Pk	Cat. No.
Tetracycline, 50 mg/ml solution	20 ml	E709-20ML

Antimycotics

Amphotericin B, solubised solution, for tissue culture

An antifungal polyene believed to act by altering membrane permeability.Recommended working concentration: 2.5 µg/ml.

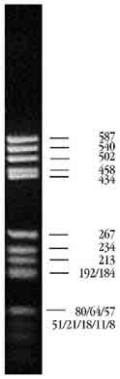
Description	Pk	Cat. No.
Amphotericin B, 250 mg/ml solution	20 ml	K721-20ML

Antimycotics
Biowest

Description	Pk	Cat. No.
Amphotericin B	20 ml	L0009-020
Amphotericin B	50 ml	L0009-050
Amphotericin B	100 ml	L0009-100
Amphotericin B	250 mg	P4030-250MG
Antibiotic-antimycotic 100X	20 ml	L0010-020
Antibiotic-antimycotic 100X	100 ml	L0010-100

Mycoplasma - Detection

PCR Mycoplasma Test Kit
AppliChem



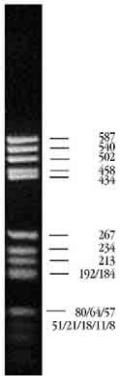
Ready to use PCR mix for the detection of mycoplasma in cell culture.

The PCR Mycoplasma Test Kit is designed to detect the presence of mycoplasma contamination in biological materials, such as cultured cells. Mycoplasma detection by the direct culture procedure is time-consuming and some mycoplasma species are difficult to cultivate. With PCR testing, results are obtained within a few hours, since the presence of contaminant mycoplasma can be easily detected simply by verifying the bands of amplified DNA fragments in electrophoresis. There is no need to prepare probes labelled with radioisotopes, or to calculate enzyme, dNTPs or buffer concentrations. Instead, a ready-to-use, optimised PCR mix is supplied. The primer set allows detection of various mycoplasma species (*M. fermentans, M. hyorhinis, M. arginini, M. orale, M. salivarium, M. hominis, M. pulmonis, M. arthridtidis, M. bovis, M. pneumoniae, M. pirum, M. capricolum*) as well as *Acholeplasma* and *Spiroplasma* species, with high sensitivity and specificity.

Delivery information: Kit contains reaction mix (including PCR primer nucleotide mix and HotStart *Taq* polymerase), reaction buffer solution and positive template control.

Description	Pk	Cat. No.
PCR Mycoplasma Test Kit	20 Tests	A3744.0020

PCR Mycoplasma Test Kit II
AppliChem



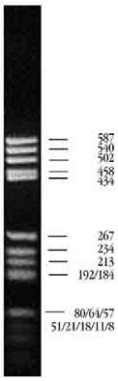
Lyophilised PCR mix for the detection of mycoplasma in cell culture by conventional PCR.

Meets criteria of section 2.6.7 of Ph. Eur.

Delivery information: Supplied without *Taq* DNA polymerase. Kit contains PCR primer nucleotide mix, reaction buffer solution, water (PCR grade), positive template control, and internal control DNA. Shipped at room temperature.

Description	Pk	Cat. No.
PCR Mycoplasma Test Kit II	50 Tests	A8994.0050

qPCR Mycoplasma Test Kit
AppliChem



Lyophilised PCR mix for the detection of mycoplasma in cell culture by Real-Time/qPCR.

Delivery information: Supplied without *Taq* DNA polymerase. Kit contains PCR primer mix (incl. primers, probes, nucleotides), reaction buffer solution, water (PCR grade), positive template control, and internal control DNA.

Description	Pk	Cat. No.
qPCR Mycoplasma Test Kit	25 Tests	**A9019.0025**
qPCR Mycoplasma Test Kit	100 Tests	**A9019.0100**

DAPI
AppliChem

DAPI (4',6-Diamidine-2-phenylindole dihydrochloride) is an excellent dye for staining DNA. The most popular application of DAPI is its use as a reagent to detect mycoplasma or virus DNA (eg. vaccinia infection or 'unwanted' viral contamination of cells) in cell culture.

Description	Pk	Cat. No.
DAPI	10 mg	**A1001.0010**
DAPI	25 mg	**A1001.0025**
DAPI	100 mg	**A1001.0100**

Detection and elimination of Mycoplasma in cell culture

Here we review AppliChem's proven solutions and latest additions in the field of Mycoplasma contamination and treatment.

Surveys of cultures from labs all over the world reveal a strong prevalence of contamination by Mycoplasma and other mollicutes. Depending on the method of detection 10 - 40% of continuous cell lines have been tested positively. The species most frequently found are *Mycoplasma orale*, *M. fermentans* (human), *M. arginini*, *Acholeplasma laidlawii* (bovine), and *M. hominis* (swine).

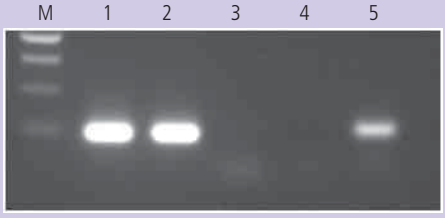
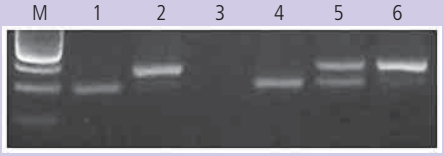
Effects. Mycoplasmas are parasitic bacteria that lack a cell wall. Depending on the species Mycoplasma penetrate the surface of mammalian host cells or live on the cell surface. The complete loss of a cell culture due to Mycoplasma growth is rarely observed. But in most cases the parasites grow unnoted while dramatically affect the growth and behaviour of the mammalian cells. There is an almost infinite variety of possible effects. To name a few, inhibition of cell proliferation, chromosome breakage, translocation events, degradation of DNA/RNA, induction of inflammatory cytokines and other factors such as Interleukins (IL-1, IL-6, IL-10), or TNF.

Sources. There are various possible sources for contamination by Mycoplasma. During recent years, a rising awareness of the problem may have changed the contribution of the individual sources. Culture reagents such as bovine serum have been a considerable source of contamination in the past. Today, most labs prefer Mycoplasma-free tested sera. Laboratory personnel may introduce Mycoplasma into cultures, are now trained to avoid contamination during the handling of cultures. However, other sources are even more difficult to avoid.

Mycoplasma detection by microscopy

	DAPI BioChemica
Synonym	4',6-Diamidino-2-phenylindole dihydrochloride
Specification	Assay (TLC): Min. 98% Solubility (1%; H_2O): Clear
UV spectrum:	λ_{max} 223 nm, 261 nm, 342 nm λ_{min} 246 nm, 282 nm
Directions	To prepare a stock solution, dissolve DAPI in double distilled water to a final concentration of 1 - 5 mg/ml Working solution: Dilute the stock solution with methanol to a final concentration of 1 µg/ml
Detection procedure (outline)	Examine cells grown on cover slips and fixed by methanol under fluorescence microscope (excitation: 365 nm; emission maximum at 450 nm)

Mycoplasma detection by standard PCR

	PCR Mycoplasma Test Kit	PCR Mycoplasma Test Kit II
Possible band patterns	 **M DNA marker** 1. Positive control 2. Positive control 3. Negative control (water) 4. Negative control (buffer only) 5. Positive sample	 **M DNA marker** 1. Negative control 2. Positive control 3. Inhibited sample 4. Negative sample 5. Contaminated positive sample 6. Heavily contaminated positive sample
Kit components	• Reaction mix (dNTPs, PCR primers, Taq DNA polymerase) • Buffer solution • Positive template control	• Reaction mix (PCR primers, dNTPs) • PCR grade water • Buffer solution • Positive template control • Internal control DNA **This kit meets criteria of section 2.6.7 of Ph. Eur.**
Taq DNA polymerase	Included	Not included
Form of delivery	Ready-to-use master mix, liquid	Single components, lyophilised
Shipping	Cooled	Ambient temperature
Cat. No.	A3744.0010 10 tests	A8994.0025 25 tests
	A3744.0025 25 tests	A8994.0050 50 tests
		A8994.0100 100 tests

Mycoplasma detection by Real Time/qPCR		
	qPCR Mycoplasma Test Kit	
Application	This qPCR Mycoplasma test kit is suited for use in combination with different instruments: LightCycler® 1,2, 1,5, 2,0, 480, Rotor-Gene™ 3000, 6000, ABI Prism® 7000, iCycler iQ®, iQ™ 5, Opticon 2, Chromo 4, MX300P®, MX4000®.	
Kit components	• Reaction mix (including primers, probes, nucleotides) • Positive template control • Buffer solution • PCR grade water • Internal control DNA **This kit meets criteria of section 2.6.7 of Ph. Eur.**	
Taq DNA polymerase	Not included	
Form of delivery	Single components, lyophilised	
Shipping	Ambient temperature	
Cat. No.	A9019.0025	25 tests
	A9019.0100	100 tests

PCR Mycoplasma Test Kit (A3744)

Any addition to the culture is relevant, such as virus suspensions, antibody solutions, or media ingredients. Mycoplasma from original tissue isolates contribute to less than 1% to the reported cases. The most common source by far is cross contamination from infected cultures. Labs exchange infected cultures and thereby inadvertently distribute Mycoplasma.

AppliChem provides the tools for detection and treatment of Mycoplasma for every cell culture laboratory. For the detection by microscopy we are offering the proven fluorescent dye DAPI.

Detection by PCR. In recent years the sensitive polymerase chain reaction (PCR) became a standard method for the detection of Mycoplasma contamination in biological samples such as mammalian cell cultures. PCR is established in almost all life science labs either as standard PCR or Real-Time/quantitative PCR. For your preferred set-up, we offer three different kits to choose from. rRNA gene sequences of prokaryotes including Mycoplasma are well conserved, whereas the lengths and sequences of the spacer region in the rRNA differ from species to species. The detection procedure utilises the PCR for amplification of a conserved and Mycoplasma specific 16S rRNA gene region. This system does not allow the amplification of DNA originating from other sources, such as cultured cells or bacteria, which affect the detection result. Amplification of the gene sequence with PCR using this primer set enhances not only the sensitivity, but also the specificity of detection. Amplified products are detected by agarose gel electrophoresis or by Real-Time/quantitative PCR.

Treatment of Mycoplasma infections in cell cultures

AppliChem offers well proven treatments to achieve reliable elimination of Mycoplasma infections from mammalian cell cultures. Precious cell cultures that are infected cannot always be simply discarded and replaced by new ones. For both biological and economic reasons, it is important to eliminate Mycoplasma from cell cultures being used for basic research, diagnostics and biotechnological production.

Treatment	Myco-1 &-2	
Application	For the treatment of all mammalian cell lines including embryonic stem cells (ES cells). Both agents are used in combination, one after another.	
Components	Myco-1 (A5222), based on the antibiotic Tiamulin (from *Pleurotus mutilus*) Myco-2 (A5233), based on the antibiotic Minocyclin	
Form of delivery	Sterile 100X concentrated antibiotic solutions	
Cat. No.	A8360.0010	1 set (2x 10 ml)
	A8360.0020	1 set (2x 20 ml)
	A8360.0100	1 set (2x 100 ml)
Treatment	**Myco-3**	
Application	Eliminates the most common Mycoplasma species including *M. orale, M. hyorhinis, M. fermentans, M. arginini*, as well as *A. laidlawii*. At the concentrations recommended for use (1 µg/ml), no cytotoxic effects have been found.	
Components	Myco-3 is based on the antibiotic Ciprofloxacin	
Form of delivery	100X concentrated antibiotic solution	
Cat. No.	A5240.0010	10 ml
	A5240.0020	20 ml
	A5240.0100	100 ml
Treatment	**Myco-4**	
Application	Novel combination of antibiotic and biophysical agents. For maximum efficiency and a broad spectrum. Almost 100% of permanent eradication of Mycoplasma is achieved.	
Components	One kit is needed for a treatment. Each kit contains • 1 vial of Starter Treatment solution • 3 vials of Main Treatment solution	
Form of delivery	Sterile, ready-to-use solutions	
Cat. No.	A8366.0002	2 kits
	A8366.0005	5 kits
	A8366.0010	10 kits

Mycoplasma - Treatment

Mycoplasma Treatment Kit, Myco-1 & 2 set
AppliChem

For the treatment of Mycoplasma-infected cells.

Myco-1 & 2 set contains Myco-1 (A5222) and Myco-2 (A5233). Myco-1 is based on the antibiotic Tiamulin, which is produced by the fungus *Pleurotus mutilus*. Myco-2 is based on Minocycline, a Tetracycline derivative. Myco-1 and Myco-2 are generally used sequentially in combination. Embryonic stem cells (ES cells) were successfully treated with the two reagents. No cytotoxic effects were observed.

Description	Pk	Cat. No.
Myco-1 & 2 set, 2×10 ml	1 SET	**A8360.0010**
Myco-1 & 2 set, 2×20 ml	1 SET	**A8360.0020**
Myco-1 & 2 set, 2×100 ml	1 SET	**A8360.0100**

Mycoplasma Treatment Kit, Myco-3
AppliChem

For the treatment of Mycoplasma infected cells.

Myco-3 is a 100X concentrated solution based on the ciprofloxacin antibiotic, which is a member of the fluoroquinolone group. Many mycoplasma species have been found to be sensitive to Myco-3, including *A. laidlawii*, *M. orale*, *M. hyorhinis*, *M. fermentans*, and *M. arginini.* These species are responsible for most of the contamination in cell culture. At the concentrations recommended for use (1 µg/ml), no cytotoxic effects have been found, and the treatment is easy to perform. The pH value of Myco-3 is acidic (pH 4 to 5). When added to medium the pH change is negligible.

Description	Pk	Cat. No.
Myco-3, 100X	10 ml	**A5240.0010**
Myco-3, 100X	20 ml	**A5240.0020**
Myco-3, 100X	100 ml	**A5240.0100**

Mycoplasma Treatment Kit, Myco-4
AppliChem

For the treatment of Mycoplasma infected cells.

Myco-4 is a combination of a standard antibiotic and a biological reagent. In comparison to most bacteria, Mycoplasma lack cell walls but are surrounded by a cytoplasmic membrane. This biological reagent integrates into the Mycoplasma membrane and compromises its integrity. By the combination with a standard antibiotic, the effective dose of both, the reagent and the antibiotic, can be reduced to a minimum for lowest cytotoxicity, still causing a highly reliable and definite elimination of Mycoplasma. These biophysical properties make the development of resistant strains very unlikely. One application comprises 4 vials, a Starter Treatment and three Main Treatment solutions. The Starter Treatment kills most of the mycoplasma particles without harming the cells. The Main Treatment kills all remaining particles leading to a permanent eradication.

- Cytotoxic effects are very low in most cell lines - changes in cell morphology are only rarely observed during the treatment
- Almost 100 % of permanent eradication for mycoplasma is achieved
- Suitable for all permanent mammalian cell lines
- Broad spectrum - any type of Mycoplasma, Acholeplasma, Spiroplasma, and Entomoplasma can be successfully treated
- Can be used with antibiotic selection agents, for example G418, Blastocyclin, and Hygromycin; it also does not interfere with killer genes turned on by Tetracyclin or Doxycyclin
- Low resistance risk due to the combination of antibiotic and a biophysical mode of action directly killing the mycoplasma

Delivery information: Each kit contains 1 vial of Starter Treatment solution and 3 vials of Main Treatment solution. Each component is a sterile, ready-to-use solution, aliquoted per vial for single applications of approx. 520 µl/vial.

Description	Pk	Cat. No.
Myco-4, 2 kits	2 KIT	**A8366.0002**

Mycoplasma - Prevention

Incubator-Clean™
AppliChem

Incubator-Clean™ disinfectant solution prevents contamination with, and growth of, fungi (and spores), bacteria (and spores, including Tuberculosis bacteria), viruses (including HIV and Hepatitis B) and mycoplasma in incubators and/or on sterile work benches. The active ingredients are quaternary benzylammonium compounds.

- Free of mercury, formaldehyde, phenol or alcohol
- Non corrosive to aluminium, tin-plated iron, chrome, nickel, steel, high grade steel and copper
- Non toxic and biodegradable ingredients

Recommended use: Spray incubators once every 2 weeks; spray sterile benches once a day, or preferably before each laboratory worker begins to use the work area.

Description	Pk	Cat. No.
Incubator-Clean™	500 ml	**A5230.0500**
Incubator-Clean™	1 l	**A5230.1000**

Disinfectant for incubators, Incuwater-Clean™
AppliChem

The water required to create the humidity is a potential source of contamination which can disperse into the incubator. Incuwater-Clean™ is an effective, non toxic, non volatile disinfectant that does not damage stainless steel or copper trays.

- For the prevention of microbial growth in incubator water baths
- In concentrate format (100x) – use 50 ml per 5 litres of water
- Economical – replace bath contents with sterile water and dose with Incuwater-Clean™ every 2- 4 weeks

Description	Pk	Cat. No.
Incuwater-Clean™	100 ml	**A5219.0100**

Water bath disinfection reagent, Aquabator-Clean™
AppliChem

Aquabator-Clean™ is designed for disinfecting water baths. It protects against growth of fungi and bacteria.

- Supplied as a concentrate - 10 ml per litre of water
- Biodegradable
- Non irrtating to skin at recommended concentrations

Note: Not suitable for CO_2 incubators.

Description	Pk	Cat. No.
Aquabator-Clean™ (100X)	250 ml	**A9390.0250**

CellCultureGuard
AppliChem

CellCulture Guard is a 100X concentrated solution containing a combination of novel antibiotics to protect cell cultures from contamination by microorganisms. The antibiotics in CellCultureGuard replace conventional antibiotics such as penicillin, streptomycin, nystatin and amphotericin B.

Description	Pk	Cat. No.
CellCultureGuard, 100X	50 ml	**A8906.0050**

Water

Water, cell culture grade
Biowest

Description	Pk	Cat. No.
Cell culture water, pyrogen-free	100 ml	**L0970-100**
Cell culture water, pyrogen-free	500 ml	**L0970-500**
Cell culture water, pyrogen-free	1.000 ml	**L0970-1000**

Supplements - Aminoacids

BME and MEM amino acid concentrates
Biowest

Concentrated solutions of amino acids, vitamins or non essential amino acids can be added to a basal medium to enrich it and the resulting medium used as a classical MEM or BME. The final concentration of the MEM or BME must be 1X.

Description	Pk	Cat. No.
BME amino acids, 100X, without L-glutamine (liquid)	100 ml	**X0552-100**
MEM amino acids, 50X, without L-glutamine (liquid)	100 ml	**X0554-100**

MEM Non Essential Amino Acids (NEAA)100X concentrate
Biowest

Concentrated solutions of amino acids, vitamins or non essential amino acids can be added to a basal medium to enrich it and the resulting medium used as a classical MEM or BME. The final concentration of the MEM or BME must be 1X.

Description	Pk	Cat. No.
MEM NEAA, 100X, without L-glutamine (powder)	100 ml	**X0557-100**

VWR AMRESCO CHEMICALS

L-alanine, high purity grade
Non polar, aliphatic , non essential amino acid. Involved in regulation of a variety of metabolic functions.

Description	Pk	Cat. No.
L-alanine	100 g	**0106-100G**
L-alanine	250 g	**0106-250G**

VWR AMRESCO CHEMICALS

L(+)-Asparagine, high purity
Animal-free amino acid. Polar. Amide.

Description	Pk	Cat. No.
L-asparagine	100 g	**94341-100G**
L-asparagine	500 g	**94341-500G**

L-asparagine, anhydrous

Animal-free amino acid. Polar. Amide.

Description	Pk	Cat. No.
L-asparagine	100 g	**94341-100G**
L-asparagine	500 g	**94341-500G**

L(+)-Aspartic acid high purity

Animal-free amino acid. Polar. Acidic.

Description	Pk	Cat. No.
L-aspartic acid	1 kg	**0192-1KG**
L-aspartic acid	500 g	**0192-500G**

L-aspartic acid, high purity grade

Animal-free amino acid. Polar. Acidic.

Description	Pk	Cat. No.
L-aspartic acid	1 kg	**0192-1KG**
L-aspartic acid	500 g	**0192-500G**

L-glutamine, high purity grade

Animal-free amino acid. Polar. Acidic.

Description	Pk	Cat. No.
L-glutamine	1 kg	**0374-1KG**
L-glutamine	500 g	**0374-500G**

Glutamine

Biowest

L-glutamine is an essential amino acid required by virtually all mammalian and insect cells grown in culture. It is a crucial component of many cell culture media and serves as a major energy source for cells in culture. L-glutamine is very stable as a dry powder and as a frozen solution. However, in liquid media or stock solutions, L-glutamine can degrade relatively rapidly. L-glutamine is also more labile in cell culture solution than other amino acids.

Dipeptide derivatives of L-glutamine (stable glutamine) prevent the intramolecular cyclisation reaction associated with solutions of L-glutamine. These derivatives are therefore stable in solution and allow the formulation of cell culture media containing L-glutamine that may be stored at 4 °C for extended periods. Solutions containing these derivatives can even be autoclaved without appreciable degradation of the product (30 minutes at 121 °C results in <5% loss of the product).

The dipeptide derivatives are metabolised within the cells to yield L-glutamine plus the second amino acid. This results in more consistent delivery of L-glutamine to cells and avoids toxic build-up of ammonia in cell cultures. This feature can be especially important for ammonia-sensitive cell lines.

Description	Pk	Cat. No.
L-glutamine, 100X, 200 mM	100 ml	**X0550-100**
L-glutamine (powder)	100 g	**P1012-100GR**
L-glutamine (powder)	500 g	**P1012-500GR**
L-glutamine (powder)	1.000 g	**P1012-KG**
L-glutamic acid (powder)	100 g	**P1011-100GR**
L-glutamic acid (powder)	500 g	**P1011-500GR**
L-glutamic acid (powder)	1 kg	**P1011-KG**
L-alanyl-L-glutamine, stable glutamine, 100X, 200 mM	100 ml	**X0551-100**
L-alanyl-L-glutamine, stable glutamine (powder)	1 g	**P1031-1GR**
L-alanyl-L-glutamine, stable glutamine (powder)	10 g	**P1031-10GR**
L-alanyl-L-glutamine, stable glutamine (powder)	100 g	**P1031-100GR**

L-glutamic acid, free acid

Animal-free amino acid. Polar. Acidic.

Description	Pk	Cat. No.
L-glutamic acid	1 kg	**0421-1KG**

L-glycine, biotechnology grade

Description	Pk	Cat. No.
L-glycine	1 kg	0167-1KG
L-glycine	5 kg	0167-5KG
L-glycine	10 kg	0167-10KG
L-glycine	12 kg	0167-12KG
L-glycine	50 kg	0167-50KG

L-histidine, monohydrochloride

Animal-free amino acid. Polar. Basic.

Description	Pk	Cat. No.
L-histidine	25 g	E806-25G
L-histidine	100 g	E806-100G
L-histidine	500 g	E806-500G

Cell culture growth supplements

Corning

Description	Pk	Cat. No.
2.5S NGF, mouse, natural	10 µG	734-1305
2.5S NGF, mouse, natural	100 µG	BDAA356004
2.5S NGF, mouse, natural (2×500 µg)	1 mg	734-1410
7S NGF, mouse, natural	100 µG	BDAA354009
Basic Fibroblast Growth Factor (bFGF), human recombinant	10 µG	734-1405
Basic Fibroblast Growth Factor (bFGF), human recombinant (10×10 µg)	10	734-1407
Basic Fibroblast Growth Factor (bFGF), human recombinant (5×10 µg)	50 µG	734-1406
Bovine pituitary extract	75 mg	BDAA356123
Bovine Pituitary Extract	15 mg	734-1311
Corning® MITO+ Serum Extender	5 ml	734-1317
Corning® Nu-Serum™	500 ml	734-2389
Corning® Nu-Serum™ IV	500 ml	734-1318
EGF, human recombinant	100 µG	734-1309
EGF, human recombinant, 10×100 µg	1 mg	BDAA356052
EGF, mouse natural (culture grade)	100 µG	734-1304
Endothelial cell growth supplement (ECGS)	100 mg	734-2391
Endothelial Cell Growth Supplement (ECGS)	15 mg	734-1306
ITS+ premix media additive, aqueous solution	20 ml	734-1315
ITS premix media additive, lyophilised	20 ml	392-0320
ITS premix media additive, lyphilised	5 ml	392-2505
T-Cell Culture Supplement with ConA, rat	100 ml	734-1310
VEGF, human recombinant	10 µG	BDAA354107

Cell culture supplements, amino acids

AppliChem

Description	Pk	Cat. No.
L-arginine base	1 kg	A3653.1000
L-arginine hydrochloride	1 kg	A3680.1000
L-cysteine	1 kg	A3671.1000
L-cysteine hydrochloride monohydrate	500 g	A3665.0500
L-hydroxyproline	100 g	A3742.0100
L-hydroxyproline	250 g	A3742.0250
L-isoleucine	1 kg	A3642.1000
L-leucine	1 kg	A3496.1000
L-lysine monohydrate	100 g	A3448.0100
L-lysine monohydrochloride	1 kg	A3713.1000
L-methionine	1 kg	A3897.1000
L-proline	1 kg	A3926.1000
L-serine	1 kg	A3943.1000
L-threonine	1 kg	A3946.1000
L-tryptophane	100 g	A3410.0100
L-tryptophane	1 kg	A3410.1000
L-tyrosine	1 kg	A3401.1000
L-valine	1 kg	A3406.1000

Supplements - Vitamines

MEM vitamins, 100X concentrate
Biowest

Concentrated solutions of amino acids, vitamins or non essential amino acids can be added to a basal medium to enrich it and the resulting medium used as a classical MEM or BME. The final concentration of the MEM or BME must be 1X.

Description	Pk	Cat. No.
MEM vitamins, 100X, without L-glutamine (liquid)	100 ml	X0556-100

Cell culture supplements, vitamins
AppliChem

Description	Pk	Cat. No.
4-aminobenzoic acid (PABA)	50 g	A0966.0050
D-pantothenic acid	25 g	A2088.0025
D-pantothenic acid	100 g	A2088.0100
Folic acid	10 g	A2085.0010
Folic acid	100 g	A2085.0100
L-ascorbic acid	100 g	A1052.0100
L-ascorbic acid	250 g	A1052.0250
L-ascorbic acid	1 kg	A1052.1000
Menadione	25 g	A2091.0025
Thiamine hydrochloride	50 g	A0955.0050
Thiamine hydrochloride	100 g	A0955.0100
Thiamine hydrochloride	250 g	A0955.0250
Vitamin A acetate	10 g	A2094.0010
Vitamin D_2	5 g	A2089.0005

Supplements - Sugars

Cell culture supplements, sugars

Description	Pk	Cat. No.
D(+) galactose	100 g	0637-100G
D(+) galactose	250 g	0637-250G
D(+) galactose	500 g	0637-500G
D(+)-maltose monohydrate	100 g	1B1184-100G
D(+)-maltose monohydrate	500 g	1B1184-500G
D(+)-maltose monohydrate	1 kg	1B1184-1KG
D-fructose	1 kg	0226-1KG
D-fructose	2,5 kg	0226-2.5KG
D-fructose	5 kg	0226-5KG
D-fructose	12 kg	0226-12KG
D-fructose	50 kg	0226-50KG
D-glucose, anhydrous	500 g	0188-500G
D-glucose, anhydrous	1 kg	0188-1KG
D-glucose, anhydrous	2,5 kg	0188-2.5KG
D-glucose, anhydrous	5 kg	0188-5KG
D-glucose, anhydrous	12 kg	0188-12KG
D-glucose, anhydrous	50 kg	0188-50KG
Glucose 20% sterile solution	100 ml	E545-100ML

D-glucose monohydrate (Dextrose), cell culture tested
Biowest

D-glucose monohydrate is a common natural sugar involved in processes such as energy production, glycosylation, and formation of glycans that provide structure to cells. It is involved in a detrimental process in cells called glycation. It is used as a supplement for cell culture and in numerous cellular processes.

Description	Pk	Cat. No.
D-glucose monohydrate	500 g	P5030-500GR
D-glucose monohydrate	1 kg	P5030-KG

Sucrose
AppliChem

Description	Pk	Cat. No.
D(+)-sucrose	1 kg	A2188.1000

Supplements - Growth supplements

Fibroblast Growth Factors (bFGF)
Corning

Corning® basic Fibroblast Growth Factors (bFGF), human recombinant are heparin-binding mitogenic proteins that enhance proliferation of a wide variety of cell types under serum-free or serum-reduced conditions.

Description	Pk	Cat. No.
Basic Fibroblast Growth Factor (bFGF), human recombinant	10 µG	**734-1405**
Basic Fibroblast Growth Factor (bFGF), human recombinant (5×10 µg)	50 µG	**734-1406**
Basic Fibroblast Growth Factor (bFGF), human recombinant (10×10 µg)	10	**734-1407**

Epidermal Growth Factors (EGF)
Corning

Epidermal growth factor (EGF) is a low-molecular weight mitogenic protein that stimulates proliferation of a wide variety of cell types *in vitro*. EGF can also be used for receptor, gene expression, wound healing studies, and to culture cells in reduced-serum or serum-free culture systems.

Description	Pk	Cat. No.
EGF, mouse natural (culture grade)	100 µG	**734-1304**
EGF, human recombinant	100 µG	**734-1309**
EGF, human recombinant, 10×100 µg	1 mg	**BDAA356052**

Endothelial Cell Growth Supplement (ECGS)
Corning

Endothelial cell growth supplement (ECGS) is a broadly used supplement to culture a variety of cells, particularly endothelial cells. ECGS contains various growth factors (for example, acidic FGF or ECGF-a).

Description	Pk	Cat. No.
Endothelial Cell Growth Supplement (ECGS)	15 mg	**734-1306**
Endothelial cell growth supplement (ECGS)	100 mg	**734-2391**

Bovine Pituitary Extract (BPE)
Corning

Bovine pituitary extract (BPE) is a broadly used supplement to culture a variety of epithelial and endothelial cells. BPE contains growth factors (for example, basic FGF) and hormones.

Description	Pk	Cat. No.
Bovine Pituitary Extract	15 mg	**734-1311**
Bovine pituitary extract	75 mg	**BDAA356123**

7S Nerve Growth Factor (NGF)
Corning

Useful for maintenance and differentiation of sympathetic and sensory neurons, and neuronal cells *in vitro*. NGF also has wound healing activity and can be used in degenerative brain disease and nerve injury models.

Tested for ability to stimulate neurite outgrowth of chick dorsal root ganglia. Filtered (0,2 µm membrane) and tested and found negative for the presence of bacteria, fungi, and mycoplasma.

Description	Pk	Cat. No.
7S NGF, mouse, natural	100 µG	**BDAA354009**

2.5S Nerve Growth Factor (NGF)
Corning

Useful for maintenance and differentiation of sympathetic and sensory neurons, and neuronal cells *in vitro*. NGF also has wound healing activity and can be used in degenerative brain disease and nerve injury models.

Tested for ability to stimulate neurite outgrowth of chick dorsal root ganglia. Filtered (0,2 µm membrane) and tested and found negative for the presence of bacteria, fungi, and mycoplasma.

Description	Pk	Cat. No.
2.5S NGF, mouse, natural	10 µG	**734-1305**
2.5S NGF, mouse, natural	100 µG	**BDAA356004**
2.5S NGF, mouse, natural (2×500 µg)	1 mg	**734-1410**

Serum replacement, Nu-Serum™
Corning

Corning® Nu-Serum™ growth media supplement provides a low-protein alternative to newborn calf, foetal bovine, and other sera routinely used for cell culture. The low-protein content facilitates protein purification, virus production, monoclonal antibody production and screening, and increases the frequency of successful transfection of cells.

Formulation: Frozen solution containing 25% newborn serum, EGF, ECGS, insulin, human transferrin, triiodothyronine, progesterone, estradiol-17ß, testosterone, hydrocortisone, selenous acid, o-phosphorylethanolamine, glucose, amino acids, vitamins, and other trace elements and nutrients contained in the Ham's F12 medium base.

Description	Pk	Cat. No.
Corning® Nu-Serum™	500 ml	**734-2389**

Serum replacement, Nu-Serum™ IV
Corning

Corning® Nu-Serum™ IV growth media supplement provides a low-protein alternative to newborn calf, foetal bovine, and other sera routinely used for cell culture. The low-protein content facilitates protein purification, virus production, monoclonal antibody production and screening, and increases the frequency of successful transfection of cells.

Formulation: Frozen solution containing 25% foetal bovine serum, EGF, ECGS, insulin, human transferrin, triiodothyronine, progesterone, estradiol-17ß, testosterone, hydrocortisone, selenous acid, o-phosphorylethanolamine, glucose, amino acids, vitamins, and other trace elements and nutrients contained in the Ham's F12 medium base.

Description	Pk	Cat. No.
Corning® Nu-Serum™ IV	500 ml	**734-1318**

Vascular Endothelial Growth Factor (VEGF)
Corning

Vascular Endothelial Growth Factor (VEGF), human recombinant, is a member of the PDGF family with endothelial cell-specific activities, e.g., angiogenic and mitogenic factor.

Description	Pk	Cat. No.
VEGF, human recombinant	10 µG	**BDAA354107**

Culture Supplement with ConA, rat
Corning

Corning® T-Cell Culture Supplement with ConA (IL-2 culture supplement), rat, is used to promote proliferation and activation of T-cells and support high-titre HIV production by leukocytes.

Description	Pk	Cat. No.
T-Cell Culture Supplement with ConA, rat	100 ml	**734-1310**

ITS Universal Culture Supplements
Corning

Corning® ITS Universal Culture Supplements contain insulin, human transferrin, and selenous acid, the three most universally essential components of defined culture media. They stimulate cell proliferation of a variety of cells under serum-reduced conditions.

Description	Pk	Cat. No.
ITS premix media additive, lyophilised	20 ml	**392-0320**
ITS premix media additive, lyphilised	5 ml	**392-2505**
ITS+ premix media additive, aqueous solution	20 ml	**734-1315**

MITO+ Serum Extender
Corning

Corning® MITO+ Serum Extender is a concentrated, fully defined formulation of hormones, growth factors (EGF and FGF), and other metabolites (insulin and steroid hormones). It can be used to culture a variety of cells under serum-free or serum-reduced conditions.

Description	Pk	Cat. No.
Corning® MITO+ Serum Extender	5 ml	**734-1317**

Cell culture growth supplements
Biochrom

Description	Pk	Cat. No.
HAT supplement for serum-free media	100 ml	**F0483**
Hydrocortisone	10 ml	**K3520**
Ethanolamine	10 ml	**K3530**
Phosphoethanolamine	10 ml	**K3540**
Insulin, human recombinant <rh>, Zn salt, ≥12,9 USP units/ml	5 ml	**K3620**

Cell culture growth supplements, Transferrin

AppliChem

Description	Pk	Cat. No.
Apo-Transferrin, human	100 mg	A3008.0100
Apo-Transferrin, human	250 mg	A3008.0250
Apo-Transferrin, human	1 g	A3008.0001
Holo-Transferrin, human	100 mg	A3124.0100
Holo-Transferrin, human	250 mg	A3124.0250

Supplements - Attachment

Poly-D-Lysine

Corning

Poly-D-lysine (PDL) is a synthetic molecule used as a coating to enhance cell attachment to plastic and glass surfaces. It has been used to culture a wide variety of cell types, particularly neurons, glial cells, and transfected cells.

Description	Pk	Cat. No.
Poly-D-Lysine	20 mg	734-1102

Collagen I

Corning

Collagen I is found in most tissues and organs, but is most plentiful in dermis, tendon, and bone. Used as a thin coating in cell and tissue culture, it is often used to enhance cell attachment and proliferation. When applied as a gel it can be used to promote expression of cell-specific morphology and function. Collagen I is commonly used to culture endothelial cells, hepatocytes, muscle cells, and a variety of other cell types. The HC formulation of rat tail collagen I is used for three dimensional applications requiring a sturdy gel that provides a maximal 3D support matrix (guidelines are included with product).

Quality control: All preparations are quality controlled by SDS-PAGE and tested and found negative for bacteria, fungi, and mycoplasma. Source material for human collagen I tested for hepatitis B antigen and HIV-1 antibody.

Description	Pk	Cat. No.
Collagen I, human	250 µG	734-1084
Collagen I, human	10 mg	392-0319
Collagen I, bovine	30 mg	392-2502
Collagen I, rat tail	100 mg	734-1097
Collagen I, high concentration, rat tail	100 mg	734-1085
Collagen I, rat tail (10×100 mg)	1 g	734-1096

Collagen II

Corning

Collagen II is the principal collagenous component of cartilage, intervertebral disc, and vitreous humour. Collagen II supports chondrocyte adhesion and may influence the differentiated phenotype of these cells. In culture, collagen II is used for attachment and differentiation of chondrocytes. It can also be used as an in vivo model in rats and mice for arthritis studies (injection of bovine collagen II induces arthritis).

Description	Pk	Cat. No.
Collagen II, bovine	5 mg	734-1272

Collagen III

Corning

Collagen III is found in several stromal connective tissues including the dermis of young organisms, human skin, and cornea. It can be used as a thin coating on tissue culture surfaces to promote cell attachment and to modulate cell behaviour.

Description	Pk	Cat. No.
Collagen III, human	250 µG	734-0104

Collagen IV

Corning

Collagen IV is a ubiquitous component of basement membranes, the sheet-like matrix that underlies epithelial and endothelial cells and surrounds muscle fat and nerve cells. It can be used as a thin coating on tissue culture surfaces to promote cell attachment and proliferation and to study its effects on cell behaviour.

Description	Pk	Cat. No.
Collagen IV, mouse	1 mg	734-0099
Collagen IV, human	250 µG	734-0105
Collagen IV, human	500 µG	BDAA354261
Collagen IV, mouse	10 mg	734-0100

Collagen V
Corning

Collagen V is found in whole placenta, amnion, chorion, and cornea. It can be used as a thin coating on tissue culture surfaces to study collagen V effects on cell behavior. Collagen V has been shown to inhibit endothelial cell proliferation selectively.

Description	Pk	Cat. No.
Collagen V, human	250 µG	**734-0106**

Fibronectin
Corning

Fibronectin (FN) is found in interstitial matrix and plasma. The principal function of fibronectin appears to be in cellular migration during wound healing and development. It can be used as a thin coating on tissue culture surfaces to promote attachment, spreading and proliferation of a variety of cell types.

Description	Pk	Cat. No.
Fibronectin, human	1 mg	**734-0085**
Fibronectin, human	5 mg	**734-0101**
Fibronectin, human, 5×5 mg	25 mg	**734-0103**

Laminin
Corning

Laminin, a major component of basement membranes, has numerous biological activities including promotion of cell adhesion, migration, growth, and differentiation, including neurite outgrowth. It can be used as a thin coating on tissue culture surfaces or as a soluble additive to culture medium. The Laminin/Entactin Complex, high concentration (HC) is a special formulation that has been developed for three-dimensional (3D) culture.

Description	Pk	Cat. No.
Laminin, mouse	1 mg	**734-1098**
Ultrapure laminin, mouse	1 mg	**734-1099**
Laminin/entactin complex, high concentration, mouse	10,5 mg	**734-1273**

Cell attachment factors
Biochrom

Description	Pk	Cat. No.
Collagen A, 0,1% solution in HCl, Type I, 1 mg/ml, 6×5 ml	6	**L7220**
Collagen G, 0,4% solution in 15 mmol/l HCl, Type I, 4 mg/ml	100 ml	**L7213**
Fibronectin from human citrate plasma	1 mg	**L7117**
Gelatine (porcine skin) in ultra pure water, 10 mg/ml, 6×5 ml	6	**L7230**
Polylysine, 0,1 mg/ml, 6×5 ml	6	**L7240**

Supplements - Other supplements

Collagenase, from *Clostridium histolyticum*
Biochrom

The treatment of tissue with collagenase effects a careful, selective reduction of the intercellular matrix and does not influence the growth ability of the cells.

For optimal results, an exactly adjusted mixture of the proteolytic enzymes is necessary. For this purpose four different types of Collagenase, CLS I, CLS II, CLS III and CLS IV, are available. The last one is normally applied with other enzymes like trypsin, elastase, or hyaluronidase. The trypsin or trypsin/EDTA generally used in cell cultures attacks the matrix only slowly, causing moreover irreversible damages of the released cells.

Description	Pk	Cat. No.
Collagenase CLS I	100 mg	**C1-28**
Collagenase CLS II	100 mg	**C2-28**
Collagenase CLS III	100 mg	**C3-28**
Collagenase CLS IV	100 mg	**C4-28**

VWR amresco CHEMICALS

Glycerol, 20% sterile solution

Used as a cryopreservative in bacterial preservation media.

Description	Pk	Cat. No.
Glycerol 20% sterile solution	100 ml	**E550-100ML**

Phytohaemagglutinin-M (PHA-M)

Biowest

Phytohaemagglutinin is a lectin extracted from red kidney beans (*Phaseolus vulgaris*). PHA-M is the mucoprotein form and is a crude extract used for the stimulation of cell proliferation in lymphocyte culture. PHA-M also has a powerful erythroagglutinating property and it was originally used for separating leukocytes from whole blood.

Description	Pk	Cat. No.
PHA-M, lyophilised	5 ml	**P9010-005**

Phenol red, sodium salt

Biowest

Description	Pk	Cat. No.
Phenol red, sodium salt	10 g	**P5648-10GR**

Flavin mononucleotide monosodium salt dihydrate

AppliChem

Description	Pk	Cat. No.
Flavin mononucleotide monosodium salt dihydrate	10 g	**A0601.0010**

TRANSFECTION REAGENTS

Standard 64

High throughput 64

siRNA 65

In vivo 65

Bioproduction 66

Specialty 67

- *Delivery of siRNA using INTERFERin® transfection reagent* 69
- *in vivo DNA and siRNA non viral delivery* 71

Standard

DNA and siRNA transfection reagent, jetPRIME®
Polyplus-transfection

The jetPRIME® DNA and/or siRNA transfection reagent is a powerful, and versatile reagent designed to ensure high DNA transfection efficiency and excellent gene silencing in a variety of adherent cells. It is ideal for co-transfection of DNA and siRNA. jetPRIME® is gentle to cells since it requires low amounts of reagent and nucleic acid during transfection. Effective and non toxic DNA and siRNA delivery is essential for reliable scientific results.

- High DNA transfection efficiency
- Uses low amounts of reagent and nucleic acid
- One reagent for DNA and/or siRNA transfection
- Gentle to cells

Supplied with an optimised sterile buffer which must be used to ensure successful transfection experiments. The concentrated buffer provided with 114-75C must be diluted 1:5 in sterile H_2O just prior to use. 1,5 ml is sufficient to perform ~375 transfections in 6-well plates.

Description	Pk	Cat. No.
jetPRIME® DNA and siRNA transfection reagent, 0,1 ml, with 5 ml jetPRIME® buffer	0,1 ml	**114-01**
jetPRIME® DNA and siRNA transfection reagent, 0,75 ml, with 60 ml jetPRIME® buffer	0,75 ml	**114-07**
jetPRIME® DNA and siRNA transfection reagent, 1,5 ml, with 2×60 ml jetPRIME® buffer	1,5 ml	**114-15**
jetPRIME® DNA and siRNA transfection reagent, 5×1,5 ml, with 10×60 ml jetPRIME® buffer	7,5 ml	**114-75**
jetPRIME® DNA and siRNA transfection reagent, 5×1,5 ml, with 120 ml 5X jetPRIME® buffer	7,5 ml	**114-75C**

High throughput

HTS DNA transfection reagent, jetPEI®
Polyplus-transfection

jetPEI® transfection reagent is a linear polyethylenimine derivative, free of components of animal origin, providing highly effective and reproducible gene delivery. jetPEI® transfection reagent is particularly well suited for automated or manual High Throughput Screening (HTS) with three protocols available: Reverse, batch and forward.

- Fast and efficient methods to transfect cells for HTS
- Exceptionally reproducible results
- Well suited for automation
- Compatible with serum and antibiotics
- Reverse, batch and forward protocols available

Delivery information: 150 mM NaCl sterile complex-formation solution is required to dilute the reagent and DNA. 1 ml of jetPEI® transfection reagent is sufficient to perform 2000 transfections in 96-well plates.

Description	Pk	Cat. No.
jetPEI® HTS DNA transfection reagent, 0,1 ml, with 5 ml NaCl solution	100 µl	**101-01N**
jetPEI® HTS DNA transfection reagent, 1 ml, with 50 ml NaCl solution	1 ml	**101-10N**
jetPEI® HTS DNA transfection reagent, 4×1 ml, with 4×50 ml NaCl solution	4 ml	**101-40N**
jetPEI® HTS DNA transfection reagent, 10 ml, with 2×250 ml NaCl solution	10 ml	**101B-010N**

Transfection reagent diluent, 150 mM NaCl solution
Polyplus-transfection

This 150 mM NaCl solution is recommended as dilution reagent for DNA transfection with jetPEI®.

Description	Pk	Cat. No.
150 mM NaCl solution	250 ml	**702-250**
150 mM NaCl solution	50 ml	**702-50**

HTS siRNA transfection reagent, INTERFERin®-HTS
Polyplus-transfection

INTERFERin®-HTS is a siRNA transfection reagent especially developed for High Throughput Screening (HTS) applications providing great silencing efficiency, excellent reproducibility and high cell viability with very low amounts of reagent. INTERFERin®-HTS is cost-effective, easy to handle, compatible with serum and antibiotics, and comes with reverse and forward protocols for 96- and 384-well plates. For routine transfections see INTERFERin® siRNA tranfection reagent.

- Great silencing from 10 to 50 nM siRNA
- Designed for automated procedures
- Reproducible at all levels
- Cost effective, using only a small volume of reagent per well

1,5 ml of INTERFERin®-HTS is sufficient to transfect 200 to 300 96-well plates.

Description	Pk	Cat. No.
INTERFERin®-HTS siRNA transfection reagent, 0,2 ml	200 µl	**410-002**
INTERFERin®-HTS siRNA transfection reagent, 1,5 ml	1,5 ml	**410-015**
INTERFERin®-HTS DNA and siRNA transfection reagent, 4×1,5 ml	6 ml	**410-060**

siRNA

siRNA transfection reagent, INTERFERin®
Polyplus-transfection

INTERFERin® is a powerful, ready to use siRNA reagent which provides more than 90% silencing efficiency at 1 nM siRNA in a wide variety of cells. For high throughput screening applications see INTERFERin®-HTS.

- Easy standard protocol
- Gentle mode of action for more robust data and excellent cell viability
- Compatible with serum and antibiotics

Delivery information: 1 ml of INTERFERin® is sufficient to perform 500 to 1000 transfections in 24-well plates.

Description	Pk	Cat. No.
INTERFERin® siRNA transfection reagent, 0,1 ml	100 µl	**409-01**
INTERFERin® siRNA transfection reagent, 1 ml	1 ml	**409-10**
INTERFERin® siRNA transfection reagent, 5×1 ml	5	**409-50**

siRNA transfection reagent, riboxx® FECT

riboxx® FECT is a dedicated reagent for transfection of all formats of siRNA, microRNA mimics and RNA in primary cells, adherent cells or cells in suspension. By combining riboxx® FECT with iBONi® siRNA, up to 90% of gene silencing is achieved. The concentration required to knock down gene expression ranges from 1 to 20 nM.

- Efficient delivery of siRNA, miRNA or RNA into primary cells or immortalized cells
- Optimised protocols for a broad range of cell types

Description	Pk	Cat. No.
riboxx® FECT transfection reagent	250 µl	**F-00100-0250**
riboxx® FECT transfection reagent	750 µl	**F-00100-0750**
riboxx® FECT transfection reagent	1.500 µl	**F-00100-1500**

in vivo

DNA/siRNA delivery reagent, *in vivo*-jetPEI®
Polyplus-transfection

in vivo-jetPEI® reagent provides versatile, reproducible and reliable delivery of nucleic acid (DNA and siRNA) in animal models, for functional studies and RNA interference experiments using various administration routes. It is also well suited as a delivery vehicle for therapeutic approaches, including gene therapy, genetic vaccination, immune therapy and cancer treatment.

- Successful delivery of DNA, siRNA and oligonucleotides *in vivo*
- Multiple modes of administration in many species
- No detectable inflammatory response
- Reproducible results

Delivery information: 10% glucose solution is included. 0,1 ml of *in vivo*-jetPEI® delivery reagent is sufficient to perform up to 20 intravenous injections in mouse with 50 µg of DNA.

Description	Pk	Cat. No.
in vivo-jetPEI® delivery reagent, 0,1 ml, with 10 ml glucose solution (10%)	100 µl	**201-10G**
in vivo-jetPEI® delivery reagent, 0,5 ml, with 2×10 ml glucose solution (10%)	500 µl	**201-50G**

Delivery reagent, *in vivo*-jetPEI®-Gal
Polyplus-transfection

in vivo-jetPEI®-Gal is a galactose-conjugated *in vivo*-jetPEI® derivative designed to enhance delivery to cells expressing galactose-specific membrane lectins, such as the asialoglycoprotein receptor (ASGP-R or Gal/GalNAc receptor).

Delivery information: 10% glucose solution is included. 0,1 ml of *in vivo*-jetPEI®-Gal delivery reagent is sufficient to perform up to 20 intravenous injections in mouse with 50 µg of DNA.

Description	Pk	Cat. No.
in vivo-jetPEI™-Gal delivery reagent, 0,1 ml, with 10 ml glucose (10%)	100 µl	**202-10G**

Delivery reagent, *in vivo*-jetPEI®-Man
Polyplus-transfection

in vivo-jetPEI®-Man is a mannose-conjugated *in vivo*-jetPEI® derivative designed to enhance delivery to cells expressing mannose-specific membrane receptors.

Delivery information: 10% glucose solution is included. 0,1 ml of *in vivo*-jetPEI®-Man delivery reagent is sufficient to perform up to 20 intravenous injections in mouse with 50 µg of DNA.

Description	Pk	Cat. No.
in vivo-jetPEI®-Man delivery reagent, 0,1 ml, with 10 ml glucose (10%)	100 µl	**203-10G**

Delivery reagent, *in vivo*-jetPEI®-FluoF
Polyplus-transfection

in vivo-jetPEI®-FluoF delivery reagent is a fluorescein-conjugated linear polyethylenimine derivative (green label) designed to perform biodistribution studies using fluorescent labelling.

- Excitation at 490 nm; emission at 520 nm
- Easy to use

Delivery information: 10% glucose solution is included. 0,1 ml of *in vivo*-jetPEI®-FluoF delivery reagent is sufficient to perform up to 20 intravenous injections in mouse with 50 µg of DNA.

Description	Pk	Cat. No.
in vivo-jetPEI®-FluoF delivery reagent, 0,1 ml, with 10 ml glucose (10%)	100 µl	**205-10G**

Delivery reagent, *in vivo*-jetPEI®-FluoR
Polyplus-transfection

in vivo-jetPEI®-FluoR delivery reagent is a tetramethylrhodamine-conjugated linear polyethylenimine derivative (red label) designed to perform biodistribution studies using fluorescent labelling.

- Excitation at 555 nm; emission at 580 nm
- Easy to use

Delivery information: 10% glucose solution is included. 0,1 ml of *in vivo*-jetPEI®-FluoR delivery reagent is sufficient to perform up to 20 intravenous injections in mouse with 50 µg of DNA.

Description	Pk	Cat. No.
in vivo-jetPEI®-FluoR delivery reagent, 0,1 ml, with 10 ml glucose (10%)	100 µl	**206-10G**

siRNA transfection reagent (brain delivery), jetSI® 10 mM
Polyplus-transfection

jetSI® 10 mM is dedicated to the delivery of siRNA into the brain (Froidevaux et al. (2006), EMBO Rep 7:1035).

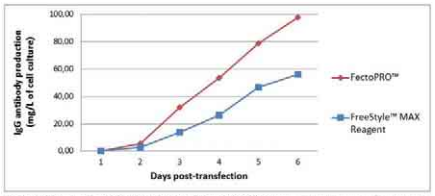
When using plasmid based approaches (shRNA) in the brain, *in vivo*-jetPEI® is recommended.

Delivery information: jetSI® 10 mM delivery reagent is sufficient to perform 25 injections in mouse brain with 100 ng siRNA. DOPE solution is required but not supplied.

Description	Pk	Cat. No.
jetSI® 10 mM siRNA transfection reagent (brain delivery), 0,5 ml	0,5 ml	**403-05**

Bioproduction

DNA transfection reagents, FectoPRO™ Transfection kit
Polyplus-transfection



FectoPRO™ gives amazing antibody production yields in suspension CHO cells. Cells were seeded at 1 x 10^6 cells/ml in 30 ml of FreeStyle™ CHO Expression Medium and transfected with FectoPRO™ (0.8 µg DNA/ml) or FreeStyle™ MAX Reagent (1.25 µg DNA/ml) following recommended protocols for the respective reagents. Recombinant mouse IgG production yield was assayed 1 to 6 days after transfection using protein G biosensor (fortéBIO™ octet RED96 system).

Data kindly provided by ProteoGenix SAS (France)

FreeStyle™ is a trademark of Life Technologies™ Corporation.

The FectoPRO™ Transfection kit is specifically designed for enhanced Transient Gene Expression (TGE) in suspension CHO and HEK-293 cells in various serum-free media, using low DNA amount (<1 µg/ml of cell culture). The FectoPRO™-mediated transfection process is easily scalable from a few millilitres to several litres of cell culture, ensuring robust reproducible protein production.

- High protein and antibody production yields
- Compliant with biomanufacturing guidelines
- Cost-effective TGE: Uses low plasmid DNA amount
- Easily scalable
- Compatible with various mammalian expression media and cell systems
- Reproducible production yields

Delivery information: Each kit contains equal parts FectoPRO™ Reagent and FectoPRO™ Booster. FectoPRO™ Booster is also available separately.

Description	Pk	Cat. No.
FectoPRO™ (1 ml FectoPRO™ Reagent, 1 ml FectoPRO™ Booster)	1 ml	**116-001**
FectoPRO™ (10 ml FectoPRO™ Reagent, 10 ml FectoPRO™ Booster)	10 ml	**116-010**
FectoPRO™, 10×10 ml, (10×10 ml FectoPRO™ Reagent, 10×10 ml FectoPRO™ Booster)	1 KIT	**116-100**
FectoPRO™ Booster	10 ml	**704-10**

Transfection reagent, PEIpro™
Polyplus-transfection

PEIpro™ is a ready to use 1 mg/ml optimised linear polyethylenimine (PEI) reagent for the production of recombinant proteins by Transient Gene Expression (TGE) in suspension-adapted mammalian cell lines cultivated in shaker flasks, platform shakers or stirred tank bioreactors. PEIpro™ can also be used for viral vector production (lentiviruses, adenoviruses, AAV, etc.) using cell lines cultivated in serum-free culture media.

PEIpro™ undergoes full chemical testing and is compliant with the regulatory guidelines for raw materials used in bioproduction. The reagent is supplied with advanced quality controls including a specific transfection efficiency test that ensures excellent lot-to-lot consistency, and an implied license statement.

Description	Pk	Cat. No.
PEIpro™ transfection reagent	10 ml	**115-010**
PEIpro™ transfection reagent	375 ml	**115-375**
PEIpro™ transfection reagent	1 l	**115-01L**

For bioproduction and research use only. Not intended for animal or human diagnostic or therapeutic use.

Specialty

DNA transfection reagent, jetPEI®-Hepatocyte
Polyplus-transfection

jetPEI®-Hepatocyte is a DNA transfection reagent designed to transfect Hepatocyte-like cells. jetPEI®-Hepatocyte is recommended to transfect primary hepatocytes and cell lines such as human hepatocarcinoma HepG2 and primary hepatocytes.

- 50% efficiency in hepatocyte-like cells and primary hepatocytes
- Gentle to cells
- Easy to use protocol
- Compatible with serum and antibiotics

Delivery information: 150 mM NaCl solution is included. 0,5 ml of jetPEI®-Hepatocyte transfection reagent is sufficient to perform up to 160 transfections in 24-well plates.

Description	Pk	Cat. No.
jetPEI®-Hepatocyte DNA transfection reagent, 0,1 ml, with 5 ml NaCl solution	100 µl	**102-01N**
jetPEI®-Hepatocyte DNA transfection reagent, 0,5 ml, with 50 ml NaCl solution	500 µl	**102-05N**

DNA transfection reagent, jetPEI®-Macrophage
Polyplus-transfection

jetPEI®-Macrophage DNA transfection reagent is dedicated to the transfection of macrophage primary cells and cell lines which express mannose receptors, such as RAW 264.7.

- Efficient transfection in macrophage-derived cells and primary macrophages
- Easy to use protocol
- Compatible with serum and antibiotics

Delivery information: 150 mM NaCl solution is included. 0,5 ml of jetPEI®-Macrophage transfection reagent is sufficient to perform up to 250 transfections in 24-well plates.

Description	Pk	Cat. No.
jetPEI®-Macrophage DNA transfection reagent, 0,1 ml, with 5 ml NaCl 150 mM	100 µl	**103-01N**
jetPEI®-Macrophage DNA transfection reagent, 0,5 ml, with 50 ml NaCl 150mM	500 µl	**103-05N**

DNA transfection reagent, jetPEI®-HUVEC
Polyplus-transfection

jetPEI®-HUVEC is a powerful transfection reagent optimised for the transfection of primary human endothelial cells, such as HUVEC (Human umbilical vein endothelial cells). Transfection efficiencies up to 50% have been reached with this reagent. jetPEI®-HUVEC is also recommended for the transfection of vascular endothelial cells of various origins and appears to be well suited for such fragile primary cells.

- 50% transfection efficiency in HUVEC
- As efficient as electroporation
- Easy to use protocol
- Good cell viability
- Compatible with serum and antibiotics

Delivery information: 150 mM NaCl solution is included. 0,5 ml of jetPEI®-HUVEC transfection reagent is sufficient to perform up to 125 transfections in 24-well plates.

Description	Pk	Cat. No.
jetPEI®-HUVEC DNA transfection reagent, 0,1 ml, with 5 ml NaCl solution	100 µl	**108-01N**
jetPEI®-HUVEC DNA transfection reagent, 0,5 ml, with 50 ml NaCl solution	500 µl	**108-05N**

DNA transfection reagent, jetPEI®-FluoF

Polyplus-transfection

jetPEI®-FluoF is a fluorescein-conjugated linear polyethylenimine derivative (green label). It is designed to visualise transfected cells using confocal or normal fluorescence microscopy and flow cytometry.

- Excitation at 490 nm; emission at 520 nm
- Easy protocol
- Compatible with serum and antibiotics

Delivery information: 150 mM NaCl solution (50 ml) is included. 0,5 ml of jetPEI®-FluoF transfection reagent is sufficient to perform up to 250 transfections in 24-well plates.

Description	Pk	Cat. No.
jetPEI®-FluoF DNA transfection reagent, 0,5 ml, with 50 ml NaCl solution 150 mM	500 µl	**105-05N**

DNA transfection reagent, jetPEI®-FluoR

Polyplus-transfection

jetPEI®-FluoR is a tetramethylrhodamine-conjugated linear polyethylenimine derivative (red label) useful for double labelling and colocalisation experiments.

- Excitation at 555 nm; emission at 580 nm
- Easy protocol
- Compatible with serum and antibiotics

Delivery information: 150 mM NaCl solution (50 ml) is included. 0,5 ml of jetPEI®-FluoR transfection reagent is sufficient to perform up to 250 transfections in 24-well plates.

Description	Pk	Cat. No.
jetPEI®-FluoR DNA transfection reagent, 0,5 ml, with 50 ml NaCl solution 150 mM	500 µl	**106-05N**

Protein delivery reagent, PULSin®

Polyplus-transfection

PULSin® protein delivery reagent is dedicated to the delivery of proteins, antibodies and peptides into cells and offers a powerful approach to functional studies. PULSin® can be used to target intracellular proteins with antibodies in living cells without fixation.

- Effective and robust delivery into the cytoplasm
- Delivery to a wide variety of cells including primary cells
- Highly efficient transfer
- Easy to use

Delivery information: Supplied with 20 µg R-Phycoerythrin (positive control) and Hepes dilution buffer. 0,4 ml of PULSin® protein delivery reagent is sufficient for 24 reactions in 6-well plates.

Description	Pk	Cat. No.
PULSin® protein delivery reagent, 0,1 ml, with 20 ml Hepes buffer	100 µl	**501-01**
PULSin® protein delivery reagent, 0,4 ml, with 20 ml Hepes buffer	0,4 ml	**501-04**

Delivery of siRNA using INTERFERin® transfection reagent

Transfection of chemically synthesised siRNA is the simplest way of transiently suppressing the expression of a gene in cell culture. Gene silencing is selective and allows accurate conclusions to be derived, providing the delivery process itself is not "interfering". Among other factors, off target effects are concentration dependent. The efficiency of siRNA delivery into the cytoplasm is therefore of prime importance in order to keep concentrations as low as possible.

EFFICIENT AND UNIFORM GENE SILENCING

As a sensitive readout, antiGL3 luciferase siRNA was delivered with INTERFERin® into A549 Luc cells stably expressing the GL3 luciferase gene. A mismatched siRNA (anti-GL2 luciferase) was used as a control and the GL3 luciferase gene expression was measured 48 hours after transfection. As shown in Figure 1, over 90% inhibition of gene expression was observed with 1 nM siRNA. Yet even at 10 picomolar siRNA, 50% inhibition of the luciferase gene expression was still observed.

INTERFERin® is not just based on electrostatic carrier/cargo attraction like cationic reagents used for plasmid DNA or RNA transfection. Its active ingredient was developed from first principles to bind into the deep and shallow major groove of double stranded RNA. The carrier/cargo interaction is as a result tight enough to transfect even the short siRNA into the cytoplasm. Finally, the INTERFERin® formulation and protocol were optimised and further developed into a robust and easy-to-use siRNA transfection reagent.

Efficient delivery at picomolar levels ensures uniform delivery at nanomolar levels. Poor siRNA delivery leads to uneven RNA interference within the cell population that can generate different or partial phenotypes. Using INTERFERin®, transfection of 1 nM lamin A/C siRNA shows that lamin A/C expression is reduced to barely detectable levels in >95% CaSki cells (Figure 2).

THE TRANSFECTION PROTOCOL REMAINS STANDARD

INTERFERin® is a stable aqueous solution shipped ready-to-use. The transfection protocol is as fast and simple as plasmid transfection (Figure 3).

One day before transfection, adherent cells are plated in order to reach 30 to 50% confluency the day of transfection. INTERFERin® (1 - 2 µl) is added to siRNA in 100 µl cell culture medium. After incubation, the siRNA/INTERFERin® complexes are added to the cell culture well. Unlike manufacturer's recommendation of most other siRNA delivery reagents, the INTERFERin® protocol calls for the cells to be kept in their original growth medium with serum and antibiotics. This is not only time and money saver, but it also helps keep cells healthy during transfection (Figure 4 shows A549 cells transfected with INTERFERin® and with a serumless transfection reagent). Gene expression analysis can be performed between 24 and 96 hours post transfection. Protocols for multiplicates and larger or smaller well sizes are simply derived from this basic protocol. If required, specific protocols for suspension cells such as THP-1 and K562 are also available.

For High Throughput Screening experiments, INTERFERin®-HTS reagent should be recommended. This siRNA transfection reagent was specially developed for HTS applications and comes with a reverse protocol for 96 and 384 well plates.

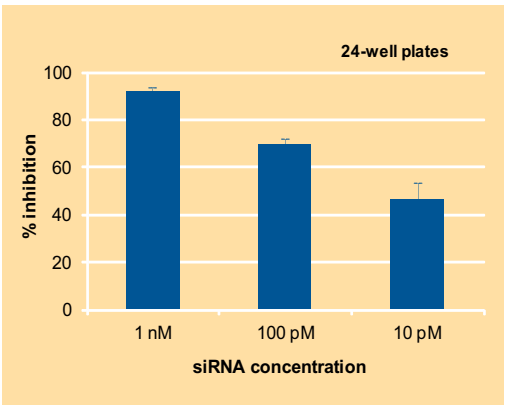


Figure 1. INTERFERin®-mediated siRNA transfection inhibits luciferase expression in A549-GL3Luc cells. Cells were transfected in 24 well plates in the presence of serum with decreasing concentrations of Luciferase siRNA (GL3Luc) duplexes using INTERFERin®. Luciferase expression was measured after 48 hours. No inhibition was observed with control siRNA duplexes (mismatch GL2Luc, data not shown).

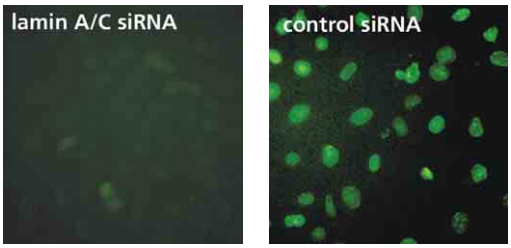


Figure 2. Efficient Lamin A/C silencing using INTERFERin®. CaSki cells were transfected with 1 nM of 21-mer siRNA duplexes matching the lamin A/C sequence using INTERFERin®. After 48 hours, lamin A/C silencing efficiency was determined by immunofluorescence microscopy.

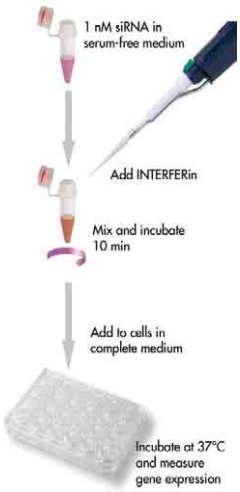


Figure 3. INTERFERin® standard protocol in 24 well plates

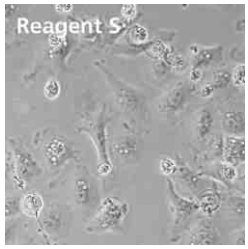


Figure 4. Comparison of cell morphology 48 hours after siRNA delivery using INTERFERin® or competitor reagent. A549-GL3Luc cells were transfected in the presence of serum with 1 nM of GL3Luc siRNA duplexes using INTERFERin® or competitor S according to the manufacturer's protocol.

Adherent cell lines			
A549	Luciferase	1 nM	**>90%**
CaSki	GAPDH/Lamin A/C	1 nM	
HCT-116	GAPDH	10 nM	
HeLa	GAPDH/Lamin A/C	1 nM	
HuH-7	GAPDH	25 nM	
MCF7	GAPDH/Lamin A/C	1 nM	
MRC-5	GAPDH	10 nM	
NIH-3T3	Vimentin	1 nM	
PC-3	GAPDH	25 nM	
RAW 264.7	Eg5	1 nM	
SiHa	GAPDH/Lamin A/C	1 nM	
SW480	GAPDH	20 nM	
SW620	GAPDH	20 nM	
CaCo2	GAPDH	10 nM	**85%**
HepG2	GAPDH	1 nM	**60 - 70%**
Primary cells			
Murine embryonic fibroblasts	GAPDH	1 nM	**>90%**
Primary human fibroblasts	GAPDH/Lamin A/C	1 nM	
Primary human hepatocytes	GAPDH	1 nM	
Primary human keratinocytes	GAPDH	10 nM	
Primary human melanocytes	GAPDH	10 nM	**>80%**
Suspension cell lines			
K562	GAPDH	5 nM	**>80%**
THP-1	GAPDH	5 nM	

Table 1. Selected successfully transfected cell lines and primary cells and silencing efficiencies obtained with INTERFERin®.

A VERSATILE AND ROBUST REAGENT

Transfection efficiency and gene silencing vary with cell type and target gene. Thanks to the powerful delivery and low toxicity of INTERFERin® (*vide supra*), only the siRNA concentration needs to be varied, generally in the 1 - 10 nM range, in order to reach satisfactory silencing results (Table 1)*.
*Suspension cells are cultured and hence transfected in different conditions.

A table with nearly 150 entries each providing cell type and silencing efficiency/publication reference, when available, can be found on the Polyplus website (www.polyplus-transfection.com, Cell Transfection Database with keyword "INTERFERin®").

Description	Size (ml)	Cat. No.
INTERFERin® siRNA transfection reagent	0,1	PPLU409-01
	1	PPLU 409-10
	5 x 1	PPLU 409-10

in vivo DNA and siRNA non viral delivery

in vivo- jetPEI® delivery reagent: An easy way to perform functional studies in animal models

Based on their intrinsic ability to infect cells, recombinant viruses are today the most widely used means of nucleic acid delivery in living organisms.
But viral vectors also have limitations due to mutagenesis, carcinogenesis, immune response and time costs. Non viral vectors such as in vivo-jetPEI® offer a reliable and safe alternative1. In-vivo-jetPEI® is a polymer-based reagent, successfully used to deliver DNA and siRNA for research purposes such as functional studies, RNAi in vivo studies2, gene therapy3 or genetic vaccination4. In addition, in vivo-jetPEI® is currently used for the delivery of therapeutic nucleic acids in several clinical trials.

Successful *in vivo* delivery in many organs

in vivo-jetPEI® mediates gene expression or silencing, (depending on the delivered molecule) in many organs such as lung, heart, spinal cord, brain as well as in tumours (Table 1). A wide panel of delivery routes has been tested in many species (mouse, rat, hamster, shrimp, rabbit, piglet…). More literature references are available on the Polyplus website (Product Citation Database).

An easy to handle protocol

The *in vivo*-jetPEI® protocol is very easy to use (Figure 1). It requires mixing the nucleic acid and the reagent in 5% glucose and then injecting the complexes into the animal. This protocol is fast and suitable for numerous administration routes. The formation of the *in vivo*-jetPEI®/nucleic acid complexes in 5% glucose result in 50 nm stable nanoparticles which are sufficiently small to diffuse into the tissues and enter the cells *via* endocytosis.

A reliable and safe DNA and siRNA delivery reagent

The success of nucleic acid therapy relies on the ability to efficiently deliver the appropriate therapeutic materials into the target tissue or cells with low toxicity and limited immune response.

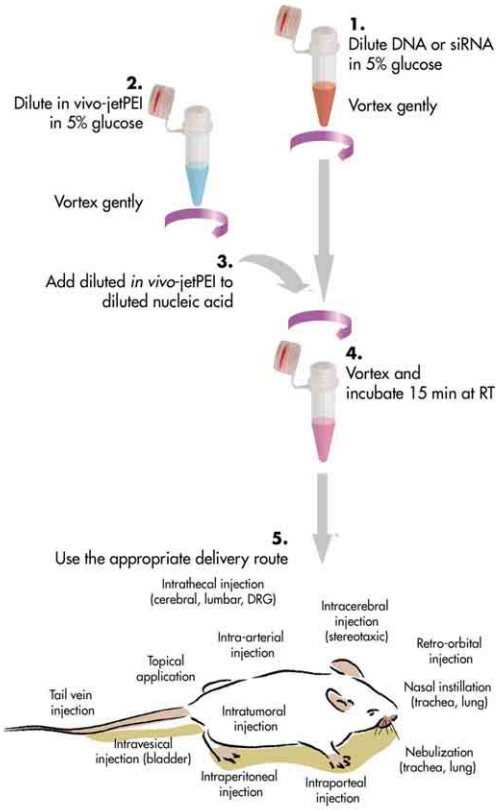


Figure 1. *in vivo*-jetPEI® delivery protocol

Table 1 Selected successfully targeted organs using *in vivo*-jetPEI® for nucleic acid delivery, according to different administration routes.

Target organ	Delivery routes	Nucleic acid	References
Bladder	Bladder instillation	DNA	Amit et al., Int J Clin Exp Med, 2011
Brain	Intracerebral injection	DNA	Uchida et al., J Neurosci, 2010
	Intracerebral injection	shRNA plasmid	Hassani et al., Nucl Acid Res, 2007
Eye	Intravitreal injection	shRNA plasmid	Liao et al., Biotechniques, 2007
Heart	Retro-orbital injection	DNA	Dallabrida et al., Faseb J, 2008
	Intracardiac injection	siRNA	Cilenti et al., J Mol Cell Cardiol, 2011
Immune cells	Tail vein injection	Oligonucleotides	Takagi et al., Immunity, 2011
	Topical application	DNA	Lisziewicz et al., Current Drug Deliv, 2006
	Intraperitoneal injection	Poly(I:C)	Tormo et al., Cancer Cell, 2009
Liver	Mesenteric vein injection	shRNA plasmid	Paranjpe et al., Am J Pathol, 2010
	Superior temporal vein injection	DNA	Wong et al., J Control Rel, 2011
Lung	Intravenous injection	DNA	Ansaldi et al., PLoS One, 2011
	Tail vein injection	shRNA plasmid	Zeng et al., Microvasc res, 2010
	Tail vein injection	siRNA	Lively et al., J Allergy Clin Immunol, 2008
Spinal cord	Intrathecal injection	siRNA	Liu et al., Brain Res, 2010
Tumours	Intraperitoneal injection	DNA	Hine et al., Mol Ther, 2011
	Intratumoral injection	siRNA	Wang et al., Oncotarget, 2011
	Intraperitoneal injection	Poly(I:C)	Wu et al., Cancer Immunol Immunother, 2011

In order to explore the potential of *in vivo*-jetPEI® to deliver both plasmid DNA and siRNA in animals, we first administered systemically a plasmid expressing the luciferase gene which resulted in maximal luciferase expression in the lungs (data available on the Polyplus website and comparable to Figure 2A.).
In a second experiment, siRNA matching the luciferase sequence was mixed with the plasmid and complexed with *in vivo*-jetPEI® prior to systemic injection (Figure 2B). A scramble siRNA was used as a negative control (Figure 2A). Systemic administration of a siRNA directed against luciferase showed a mean silencing superior to 90% as compared to the negative control. Therefore specific inhibition of protein synthesis can be achieved by *in vivo*-jetPEI® mediated siRNA delivery in animal models.

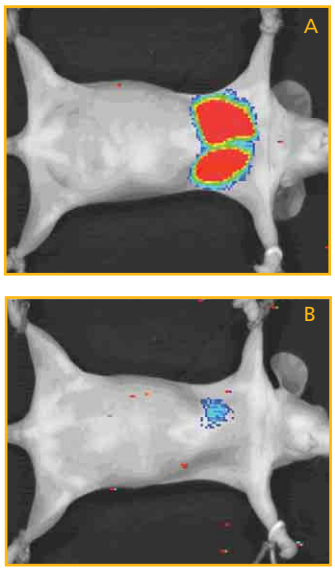


Figure 2. *In vivo* delivery of DNA and siRNA using *in vivo*-jetPEI®. pCMV-Luc was co-transfected with a control siRNA (A) or with a siRNA directed against luciferase (B) using in vivo-jetPEI® by tail vein injection in mice. Luciferase gene expression was monitored in living mice 24 hours later by bioluminescence imaging.

Polyplus transfection™
THE DELIVERY EXPERTS

No detectable inflammatory response

Viral vectors can elicit an immune response following injection; however, avoiding side effects is crucial for *in vivo* research experiments and subsequent clinical applications. Following *in vivo*-jetPEI® systemic delivery of DNA (data available on the Polyplus website) and siRNA, there is no induction of major pro-inflammatory cytokines such as TNF-alpha, IL-6 and IL-12/IL-23 (Figure 3). In addition, no increase in sera levels of hepatic enzymes are detected 24 hours after complex injection, suggesting that *in vivo*-jetPEI® does not trigger hepatotoxicity[5]. Therefore *in vivo*-jetPEI® does not induce any significant inflammatory response after systemic injection of DNA or siRNA, making it the reagent of choice for safe *in vivo* DNA and siRNA delivery experiments.

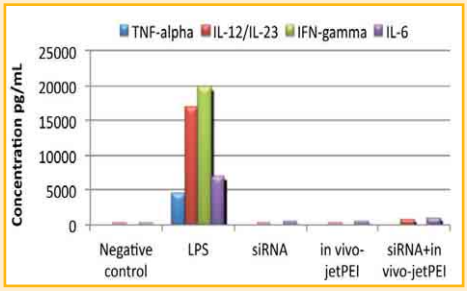


Figure 3. Serum concentration of TNF-α, IL12/IL23, IFNγ and IL6 following tail vein siRNA delivery using *in vivo*-jetPEI™ (N/P=8) respectively measured 1, 6, 12h and 6h after injection. The negative control consists of 5% glucose solution and the positive control consists of E.coli LPS. siRNAs were delivered with or without *in vivo*-jetPEI®.

in vivo-jetPEI®, a reagent of choice for therapeutic applications

in vivo-jetPEI® was selected as the delivery vector of choice at an early stage in several drug development programmes, due to its safety and high delivery efficiency. Currently, several phase I-II clinical trials for cancer therapies[6,7,8], heart disease[9], brain injury[10] and HIV immune gene therapy[4] using *in vivo*-jetPEI® are in progress. Indeed, *in vivo*-jetPEI® is available at cGMP grade for use in humans in pre-clinical and clinical trials and is supported by the appropriate manufacturing quality controls.

Conclusion

in vivo-jetPEI® is the delivery reagent of choice for functional studies and RNA interference experiments *in vivo*. It is also well suited as a delivery vehicle for therapeutic goals, including viral diseases and cancer.

in vivo-jetPEI® provides versatile, reproducible, safe and reliable nucleic acid delivery in animals, with an easy to handle protocol. 0.1 ml of *in vivo*-jetPEI® is sufficient to perform up to 20 intravenous injections in mice (40 - 50 µg of DNA or siRNA per injection).

The Polyplus technical support team of hand-on experienced scientists offers a personalised support to set-up your experiments upon request.

Description	Reagent size (ml)	Glucose solution size (ml)	Cat. No.
in vivo-jetPEI® delivery reagent	0.1	10	PPLU201-10G
	0.5	2x 10	PPLU201-50G

References

1 *Boussif, O., et al. (1995). "A versatile vector for gene and oligonucleotide transfer into cells in culture and in vivo: polyethylenimine." Proc Natl Acad Sci U S A 92(16): 7297-301.*
2 *Poeck, H., et al. (2008). "5'-Triphosphate-siRNA: turning gene silencing and Rig-I activation against melanoma." Nat Med 14(11): 1256-63.*
3 *Ohana P., et al. (2004). "Regulatory sequences of the H19 gene in DNA based therapy of bladder cancer." Gene Ther. Mol. Bio. 8: 181-92.*
4 *Lisziewicz J., et al. (2004). "DermaVir: a novel topical vaccine for HIV/AIDS." J Invest Dermatol 124: 160-9.*
5 *Bonnet, M. E., et al. (2008). "Systemic delivery of DNA or siRNA mediated by linear polyethylenimine (L-PEI) does not induce an inflammatory response." Pharm Res 25(12): 2972-82.*
6 *Sidi A. A., et al. (2008). "Phase 1/2a, Dose-escalation, safety and efficacy of intravesical plasmid (BC-819) in patients with superficial transitional cell cancer of the bladder (STCCB)." J Urology 179: 2379-83.*
7 *Vernejoul, F., et al. (2006). "Gene therapy based on gemcitabine chemosensitization suppresses pancreatic tumor growth." Mol Ther 14(6): 758-67.*
8 *Tormo, D., et al. (2009). "Targeted activation of innate immunity for therapeutic induction of autophagy and apoptosis in melanoma cells." Cancer Cell 16(2): 103-14.*
9 *Taljaard, M., et al. (2010). "Rationale and design of Enhanced Angiogenic Cell Therapy in Acute Myocardial Infarction (ENACT-AMI): the first randomized placebo-controlled trial of enhanced progenitor cell therapy for acute myocardial infarction." Am Heart J 159(3): 354-60.*
10 *Campbell, M., et al. (2008). "RNAi-mediated reversible opening of the blood-brain barrier." J Gene Med 10(8): 930-47.*

RNAi

siRNA controls 74

miRNA - miRNA controls 74

siRNA controls

iBONi® siRNA controls

iBONi® siRNA controls are designed to be used as positive, negative or transfection controls for validation of gene silencing experiments. iBONi® siRNAs controls originate either from published experimental data or have been successfully tested by independent scientists in human, mouse and rat cells. All iBONi® siRNA controls include the riboxx® siRNA design, which increases the potency of the siRNAs and reduces off-target effects.

Description	Pk	Cat. No.
siRNA pool controls		
iBONi® siRNA pool negative control (5 nmol)	5 Nmo	**K-00100-0005**
iBONi® siRNA pool negative control (10 nmol)	10 Nmo	**K-00100-0010**
siRNA positive controls		
iBONi® siRNA positive control - P1 firefly luciferase (GL3) (2 nmol)	2 Nmo	**K-00101-0002**
iBONi® siRNA positive control - P1 firefly luciferase (GL3) (5 nmol)	5 Nmo	**K-00101-0005**
iBONi® siRNA positive control - P2 (KIF11/Eg-5) (2 nmol)	2 Nmo	**K-00201-0002**
iBONi® siRNA positive control - P2 (KIF11/Eg-5) (5 nmol)	5 Nmo	**K-00201-0005**
iBONi® siRNA positive control - P3 (EGFP) (2 nmol)	2 Nmo	**K-00301-0002**
iBONi® siRNA positive control - P3 (EGFP) (5 nmol)	5 Nmo	**K-00301-0005**
iBONi® siRNA positive control - P4H (GAPDH, human) (2 nmol)	2 Nmo	**K-00401-0002-H**
iBONi® siRNA positive control - P4H (GAPDH, human) (5 nmol)	5 Nmo	**K-00401-0005-H**
iBONi® siRNA positive control - P4M (GAPDH, mouse) (2 nmol)	2 Nmo	**K-00401-0002-M**
iBONi® siRNA positive control - P4M (GAPDH, mouse) (5 nmol)	5 Nmo	**K-00401-0005-M**
iBONi® siRNA positive control - P4R (GAPDH, rat) (2 nmol)	2 Nmo	**K-00401-0002-R**
iBONi® siRNA positive control - P4R (GAPDH, rat) (5 nmol)	5 Nmo	**K-00401-0005-R**
siRNA negative controls		
iBONi® siRNA negative control - N1 (2 nmol)	2 Nmo	**K-00501-0002**
iBONi® siRNA negative control - N1 (5 nmol)	5 Nmo	**K-00501-0005**
iBONi® siRNA negative control - N2 (2 nmol)	2 Nmo	**K-00601-0002**
iBONi® siRNA negative control - N2 (5 nmol)	5 Nmo	**K-00601-0005**
iBONi® siRNA negative control - N3 (2 nmol)	2 Nmo	**K-00701-0002**
iBONi® siRNA negative control - N3 (5 nmol)	5 Nmo	**K-00701-0005**
iBONi® siRNA negative control - N4 (2 nmol)	2 Nmo	**K-00801-0002**
iBONi® siRNA negative control - N4 (5 nmol)	5 Nmo	**K-00801-0005**
iBONi® siRNA negative control - N5 (2 nmol)	2 Nmo	**K-00901-0002**
iBONi® siRNA negative control - N5 (5 nmol)	5 Nmo	**K-00901-0005**
iBONi® siRNA transfection control - T1H (GAPDH, human) (2 nmol)	2 Nmo	**K-00910-0002-H**
iBONi® siRNA transfection control - T1H (GAPDH, human) (5 nmol)	5 Nmo	**K-00910-0005-H**
iBONi® siRNA transfection control - T1M (GAPDH, mouse) (2 nmol)	2 Nmo	**K-00911-0002-M**
iBONi® siRNA transfection control - T1M (GAPDH, mouse) (5 nmol)	5 Nmo	**K-00911-0005-M**
iBONi® siRNA transfection control - T1R (GAPDH, rat) (2 nmol)	2 Nmo	**K-00912-0002-R**
iBONi® siRNA transfection control - T1R (GAPDH, rat) (5 nmol)	5 Nmo	**K-00912-0005-R**

miRNA - miRNA controls

miRNA controls, CONmiR® and CONTRAmiR®

CONnmiR® and CONTRAmiR® controls are designed to be used as positive or negative controls for validation of gene silencing experiments. CONnmiR® and CONTRAmiR® controls originate either from published experimental data or have been successfully tested by independent scientists in human, mouse and rat cells. All CONmiR® controls include the riboxx® miRNA design.

- Display the riboxx® miRNA design
- No known homology to miRNAs in human, mouse and rat
- Published sequences or validated in independent experiments

Description	Pk	Cat. No.
CONmiR® controls		
CONmiR® Negative Control-N1 (2 nmol)	1 Nmo	**K-01000-0002**
CONmiR® Negative Control-N1 (5 nmol)	5 Nmo	**K-01000-0005**
CONmiR® Negative Control-N2 (2 nmol)	1 Nmo	**K-01010-0002**
CONmiR® Negative Control-N2 (5 nmol)	5 Nmo	**K-01010-0005**
CONmiR® Negative Control-N3 (2 nmol)	1 Nmo	**K-01020-0002**
CONmiR® Negative Control-N3 (5 nmol)	5 Nmo	**K-01020-0005**
CONTRAmiR® controls		
CONTRAmiR® Negative Control-N1 (2 nmol)	2 Nmo	**K-01030-0002**
CONTRAmiR® Negative Control-N1 (5 nmol)	5 Nmo	**K-01030-0005**
CONTRAmiR® Negative Control-N2 (2 nmol)	2 Nmo	**K-01040-0002**
CONTRAmiR® Negative Control-N2 (5 nmol)	5 Nmo	**K-01040-0005**
CONTRAmiR® Negative Control-N3 (2 nmol)	2 Nmo	**K-01050-0002**
CONTRAmiR® Negative Control-N3 (5 nmol)	5 Nmo	**K-01050-0005**

iBONi® siRNA First

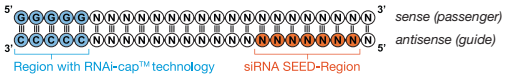
- **Starter package for gene silencing experiments**
- **All-in-one solution with perfectly matched siRNA tools**
- **Gene Silencing Guarantee**

iBONi® siRNA First is a powerful, all-in-one RNAi solution with perfectly compatible elements, developed specially for starting up gene silencing experiments. It includes a bundle of four pre-designed IBONI® siRNAs bearing the proprietary RNAi-cap™ Technology. IBONI® siRNA First also contains a riboxx®FECT Transfection Reagent and an iBONi® siRNA Transfection Control with a fluorescent label, which can be used as a control of the transfection efficiency.

Potent siRNA

iBONi® siRNA Quattro

- Increased potency
- Reduced off-target effects
- Gene Silencing Guarantee

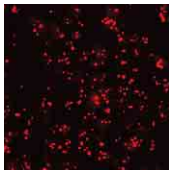


The riboxx siRNA design allows optimal annealing to the target mRNA, and includes a RNAi-cap™ Technology. It enables a directional modulation of RISC unwinding of siRNA duplex, enhancing loading of the guide strand to the RISC complex. As a consequence, much less siRNA are needed for an effective gene silencing with a subsequent reduction of off-target effects [1].

Efficient Delivery

riboxx®FECT Transfection Reagent

- Effective siRNA delivery
- For adherent cells or cells in suspension
- Perfect compatibility with Riboxx products



riboxx®FECT is a reagent dedicated for the transfection of small interfering RNA (siRNA), microRNA (miRNA) and RNA in adherent cells or cells in suspension in vitro. By combining riboxx®FECT with the potent iBONi® siRNA, up to 90% of gene silencing can be achieved. The concentrations needed to knock down gene expression typically ranging from 1 nM to 50 nM.

iBONi® siRNA Controls

iBONi® siRNA Transfection Control

- To be used as siRNA delivery control
- Pre-designed double-stranded RNA
- Fluorescent label on the 5' end

iBONi® siRNA Negative Control-N3

- Gene silencing specificity control
- Pre-designed double-stranded siRNA
- Validated by independent scientists

[1] Nolte A, Ott K, Rohayem J, Walker T, Schlensak C, Wendel HP. Modification of small interfering RNAs to prevent off-target effects by the sense strand. New Biotechnology. 2013; 30(2):159-65.

iBONi® siRNA Pool

- **Mix of 4x pre-designed siRNAs**
- **Superior knockdown potency**
- **Less off-target effects**

iBONi® siRNA Pool is a mixture of 4x pre-designed siRNAs targeting the same mRNA sequence. The iBONi® siRNA Pool provides a simple and cost-effective way to perform a highly effective and specific gene silencing. With the iBONi® siRNA Pool, Riboxx provides the entire sequence information.

Superior Knockdown Potency of the iBONi® siRNA Pool

iBONi® siRNAs Pool leads to even better gene knockdown than single siRNAs.

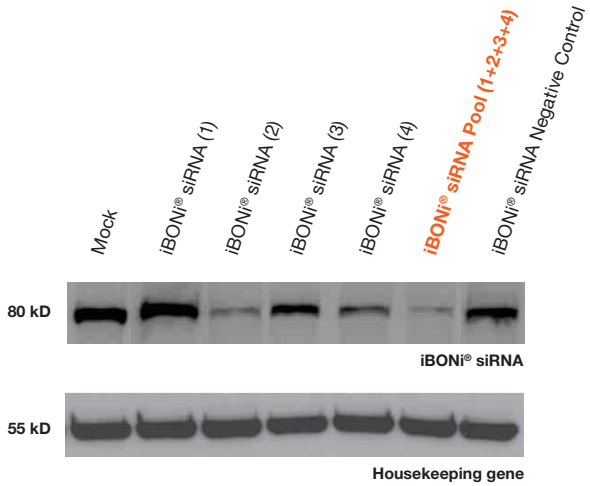
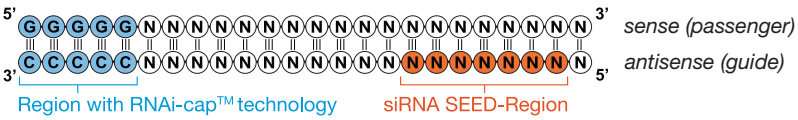


Figure 1. High knockdown potency of the iBONi® siRNA Pool in comparison to the single iBONi® siRNAs. *Cell monolayers were transfected with the single iBONi® siRNAs (1 to 4) or a pool of the 4x siRNAs (iBONi® siRNA Pool (1+2+3+4)) at 20 nM / well for 72 h using transfection reagent.*

The iBONi® siRNA Design



The iBONi® siRNA displays the RNAi-cap™ technology at the opposite position of the seed-region. The RNAi-cap™ technology enables directional modulation of RISC unwinding of siRNA duplex, enhancing loading of the guide strand to the RISC complex. As a consequence, much less siRNA are needed for an effective gene silencing with a subsequent reduction of off-target effects and toxicity [1].

[1] Nolte A, Ott K, Rohayem J, Walker T, Schlensak C, Wendel HP. Modification of small interfering RNAs to prevent off-target effects by the sense strand. New Biotechnology. 2013; 30(2):159-65.

ELECTROPORATION

Electroporators 78

Cuvettes 79

Plates 80

Disruption of blood brain barrier using electroporation 81

Electroporators

Electroporation system, twin wave, for all cells, Gemini X²
BTX

The Gemini X² system is designed for researchers who need ultimate experiment flexibility. In one easy setup, square wave and exponential decay waves can be applied to cells in any format. Electroporation of suspension cells can be achieved in cuvettes and 96 well plates. Additionally, the Gemini X² can be paired with BTX speciality electrodes to deliver genes and drugs *in vivo*, *in utero*, *in ovo*, to ex plant tissues as well as suspension cells. It incorporates remote operation functionality via footswitch or PC and internal log storage of experiment data for easy optimisation, quality control requirements and troubleshooting.

- Twin wave technology offers both square and exponential decay wave forms to electroporate a full range of cell types
- Simple user interface for easy touch screen programming
- Resistance measurement helps to avoid arcing, which can damage cells; voltage accuracy ±5%
- 80 pre-set protocols with unlimited custom protocol storage
- Multi-pulsing exponential decay allows for true high throughput 96-well pulsing for bacteria
- Software for quick protocol updating and remote operations for robotics; software updates can be performed remotely
- Log data storage for record keeping and troublehooting

RoHS compliant

Delivery information: Complete Gemini X² system includes Gemini X² generator, safety dome, 30 cuvettes (10 each 1, 2 and 4 mm gap size), and cuvette rack. Complete Gemini X² HT system also includes HT 200 plate handler, 1×2 mm HT plate and 1×4 mm HT plate. Speciality electrodes are available separately.

Display	Touch screen
Interfaces	USB/PC
Pulse Interval	100 ms - 30 s
Pulse width	10 µs - 1 s
Voltage Range	5 - 3000 V
Weight (kg)	33
W×D×H (mm)	280×320×200

Description	Pk	Cat. No.
Gemini X², complete system	1	**732-2376**
Gemini X² HT, complete system	1	**732-2365**
Gemini X², generator only	1	**731-1013**

Description	Pk	Cat. No.
Accessories		
Electroporation plates, 96-well, 2 mm gap, 125 µl	1	**732-0476**
Electroporation plates, 96-well, 4 mm gap, 250 µl	1	**732-0477**
Electroporation plates, 25-well, 4 mm gap, 250 µl	1	**732-0345**
Electroporation plates, 25-well, 4 mm gap, 250 µl	6	**732-0479**
Electroporation plates, 25-well, 2 mm gap, 125 µl	1	**732-0480**
Electroporation plates, 25-well, 2 mm gap, 125 µl	6	**732-0481**

Electroporation system, twin wave, for suspension cells, Gemini SC²
BTX

The Gemini SC² system is essential for researchers electroporating cells in suspension. In one simple setup, square wave and exponential decay waves can be applied to cells in cuvettes. With a wide range of pulsing parameters, advanced safety features as well as dozens of pre-set protocols, the Gemini SC² can be used in any laboratory requiring efficient cell transfection or transformation without the use of costly reagents.

- Twin wave technology offers both square and exponential decay wave forms to electroporate any suspension cells
- Simple user interface for easy touch screen programming
- Resistance measurement helps to avoid arcing, which can damage cells; voltage accuracy ±5%
- 50 pre-set protocols for mammalian and bacterial applications with unlimited custom protocol storage
- Software for quick protocol updating and remote operations for robotics; software updates can be performed remotely

RoHS compliant

Delivery information: Complete Gemini SC² system includes Gemini SC² generator, safety dome, 30 cuvettes (10 each 1, 2 and 4 mm gap size), and cuvette rack.

Display	Touch screen
Interfaces	None
Pulse Interval	100 ms - 30 s (SW only)
Pulse width	50 µs - 100 ms
Voltage Range	10 - 3000 V

Continued on next page

Continued from previous page

Weight (kg)	33
W×D×H (mm)	280×320×200

Description	Pk	Cat. No.
Gemini SC², complete system	1	731-1012
Gemini SC², generator only	1	731-1011

Description	Pk	Cat. No.
Accessories		
Cuvettes with 1,0 mm gap size, grey cap	50	732-0020
Cuvettes with 2,0 mm gap size, blue cap	50	732-0021
Cuvettes with 4,0 mm gap size, yellow cap	50	732-0023

Cuvettes

VWR COLLECTION

STERILE SELECTED FOR YOU

Electroporation cuvettes

The VWR electroporation cuvettes are made from clear, medical grade polycarbonate and are compatible with all common commercially available electroporators. Available in 3 gap sizes to meet common application requirements - 1 mm for highest field strength, suitable for bacteria; 2 mm gap for intermediate requirements; 4 mm gap for lowest field strength, suitable for mammalian cells and some plant cells.

- Sterilised by gamma irradiation and individually packaged for assured sterility
- Polished aluminium lowers arcing frequency
- Colour coded caps for easy identification of gap sizes
- Round caps for easy, single handed cap removal

Description	Volume (µl)	Pk	Cat. No.
Cuvettes with 1 mm gap size, grey cap	20 - 90	50	732-1135
Cuvettes with 2 mm gap size, blue cap	40 - 400	50	732-1136
Cuvettes with 4 mm gap size, yellow cap	80 - 800	50	732-1137

STERILE

Electroporation cuvettes, Cuvettes Plus™
BTX

High quality, disposable cuvettes for transfection or transformation of all cell types. Available in three gap sizes: 1.0 mm (for bacterial cells), 2.0 mm (for bacteria, plant or mammalian cells) or 4.0 mm (mammalian and plant cells), these cuvettes are compatible with most electroporation systems.

- Three cuvette sizes to suit all applications
- Packaged with a transfer pipette for the fast and easy removal of samples and gamma irradiated together for sterility
- Cuvette caps are round for easy, one-handed removal, and are colour-coded for quick identification
- Polished aluminium electrodes in the cuvettes lowers arcing frequency
- Cuvettes (without cap) are autoclavable

Delivery information: Each sterilised package includes a disposable cuvette and a bonus pipette, which is used for complete removal of the sample after electroporation.

Description	Volume (µl)	Pk	Cat. No.
Cuvettes with 1,0 mm gap size, grey cap	20 - 70	50	732-0020
Cuvettes with 2,0 mm gap size, blue cap	40 - 400	50	732-0021
Cuvettes with 4,0 mm gap size, yellow cap	80 - 800	50	732-0023

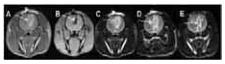
Description	Pk	Cat. No.
Cuvette rack, 20 numbered positions	1	732-0779

Plates

Electroporation plates

BTX

Description	Pk	Cat. No.
Electroporation plates, 96-well, 2 mm gap, 125 µl	1	**732-0476**
Electroporation plates, 96-well, 4 mm gap, 250 µl	1	**732-0477**
Electroporation plates, 25-well, 4 mm gap, 250 µl	1	**732-0345**
Electroporation plates, 25-well, 4 mm gap, 250 µl	6	**732-0479**
Electroporation plates, 25-well, 2 mm gap, 125 µl	1	**732-0480**
Electroporation plates, 25-well, 2 mm gap, 125 µl	6	**732-0481**



Disruption of blood brain barrier using electroporation

Hjouj M. et al., MRI Study on Reversible and Irreversible Electroporation Induced Blood Brain Barrier Disruption 2012, PLoS One.

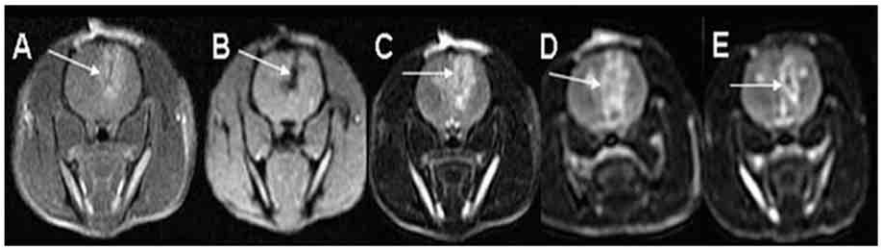
ABSTRACT

Electroporation, is known to induce cell membrane permeabilisation in the reversible (RE) mode and cell death in the irreversible (IRE) mode. Using an experimental system designed to produce a continuum of IRE followed by RE around a single electrode we used MRI to study the effects of electroporation on the brain. Fifty-four rats were injected with Gd-DOTA and treated with a G25 electrode implanted 5.5 mm deep into the striata. MRI was acquired immediately after treatment, 10 min, 20 min, 30 min and up to three weeks following the treatment using: T1W, T2W, Gradient Echo (GE), serial SPGR (DCE-MRI) with flip angles ranging over 5 – 25°, and diffusion-weighted MRI (DWMRI). Blood brain barrier (BBB) disruption was depicted as clear enhancement on T1W images. The average signal intensity in the regions of T1-enhancement, representing BBB disruption, increased from 1887 ±83 (arbitrary units) immediately post treatment to 2246 ±94 20 min post treatment, then reached a plateau towards the 30 min scan where it reached 2289 ±87. DWMRI at 30 min showed no significant effects. Early treatment effects and late irreversible damage were clearly depicted on T2W. The enhancing volume on T2W has increased by an average of 2.27 ±0.27 in the first 24 – 48 hours post treatment, suggesting an inflammatory tissue response. The permanent tissue damage, depicted as an enhancing region on T2W, 3 weeks post treatment, decreased to an average of 50 ±10% of the T2W enhancing volumes on the day of the treatment which was 33 ±5% of the BBB disruption volume. Permanent tissue damage was significantly smaller than the volume of BBB disruption, suggesting, that BBB disruption is associated with RE while tissue damage with IRE. These results demonstrate the feasibility of applying reversible and irreversible electroporation for transient BBB disruption or permanent damage, respectively, and applying MRI for planning/monitoring disruption volume/shape by optimising electrode positions and treatment parameters.

METHODS

Intracranial electrode placement

The bregma was identified through a midline scalp incision, and one 1 mm burr hole was drilled in the right or left region of the skull, 3 mm anterior and 2 mm lateral to the bregma. 25 gauge stainless steel electrodes were placed stereotactically in the striatum at a depth of 5.5 mm. A second, large 4 cm by 8 cm flat electrode was pressed against the rat chest after applying conducting gel for better electric coupling. The electrodes were connected to the pulse generator. Control rats Underwent similar procedures, including electrode implantation, without applying the electric pulses.



Electroporation treatment protocol

Rats were treated using a conventional electroporator power supply (BTX 830 or Gemini X2; Harvard Apparatus, Holliston, MA). Voltages used in the experiments ranged from 250 to 650 V, the number of pulses ranged from 50 to 90, the pulse duration ranged from 50 to 70 ms, and the pulse delivery frequency was 4 Hz.

MRI sequences for depicting electroporation effects in the rat brain

T1W (A), Gradient-Echo (B) and T2W (C–E) MRI of a rat treated with one intracranial electrode and another external flat electrode pressed against the rat chest. Treatment was performed with 50 pulses of 650 V, 70 µs duration and a frequency of 4 Hz. Significant BBB disruption is depicted as bright enhancement on the T1W images acquired 30 min after treatment (A). The GE image (B) shows signal void along the path of the electrode suggesting haemorrhage. T2W images depict tissue response to the treatment as bright enhancement (C–E). It can be seen that 1 day post treatment (D) the volume of tissue changes seems larger than on the day of the treatment (A), but then the volume is reduced by day 8 (E)

RESULTS

Application of thermal reversible electroporation and non thermal irreversible electroporation electric fields to the rat brain demonstrates the feasibility of applying electroporation for significant and transient BBB disruption with and without permanent tissue damage, under real time MR treatment monitoring and with late MR monitoring of treatment effects. Significant correlation was found between treatment voltage extent of NTRE and BBB disruption volume. BBB disruption volume was significantly correlated with later volume of tissue damage and in all cases depicted a larger volume than the final damage. These results imply that MRI may be used for treatment monitoring of brain electroporation where preservation of healthy tissue is crucial. Furthermore, electroporation may be applied for a combined treatment of systemic chemo + local electroporation, for destruction of brain tumour tissue by IRE, while chemotherapy is efficiently delivered to the surrounding infiltrated tissue due to the larger coverage of temporary BBB disruption.

VWR
We Enable Science

ALL YOU NEED GUIDES

Biobanking

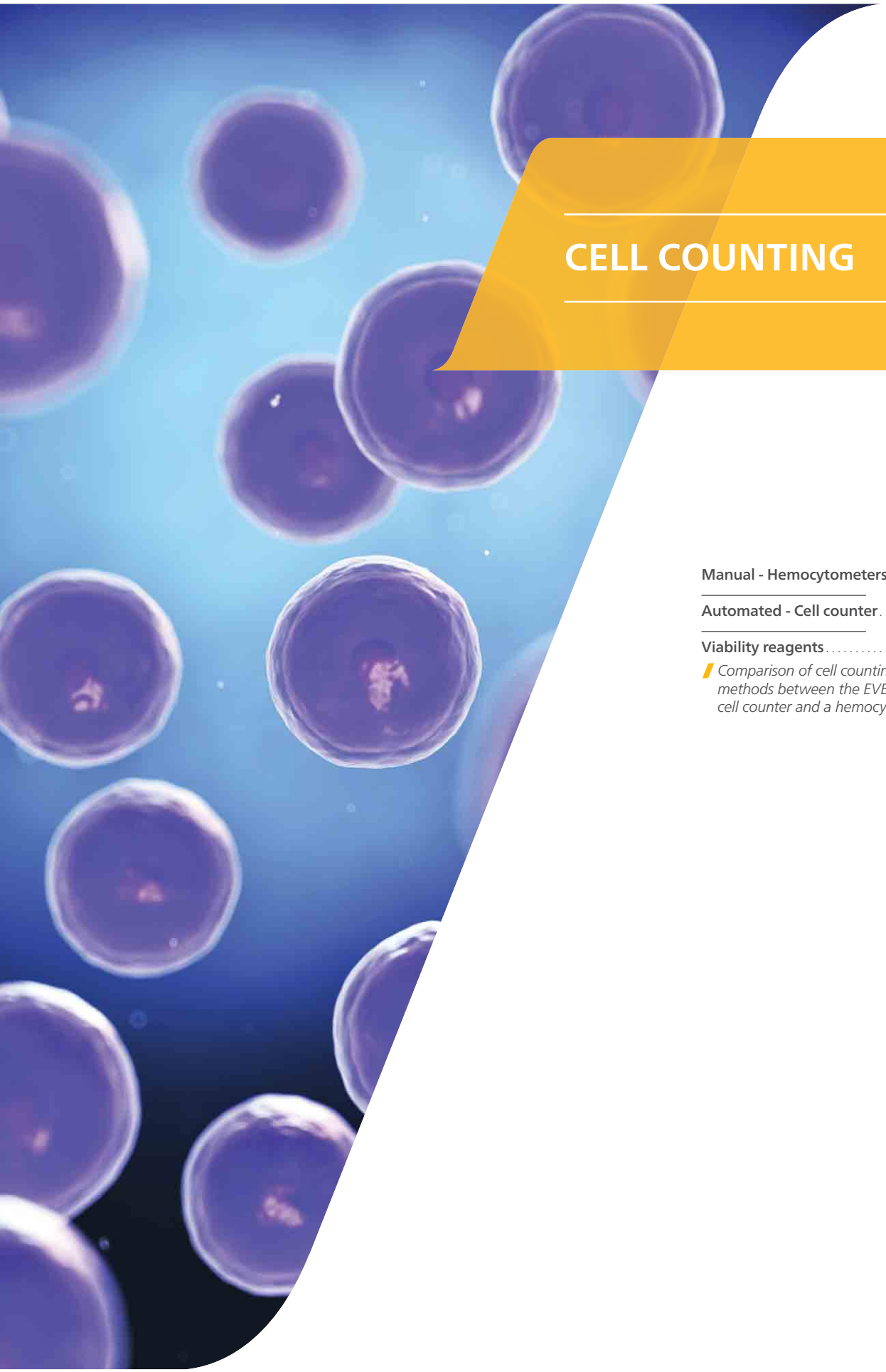
Genomics

Liquid handling

Proteomics

Handy reference tools for your application or technique. Go to vwr.com to see the latest additions.

Request your copy from your local VWR sales office



CELL COUNTING

Manual - Hemocytometers 84

Automated - Cell counter 86

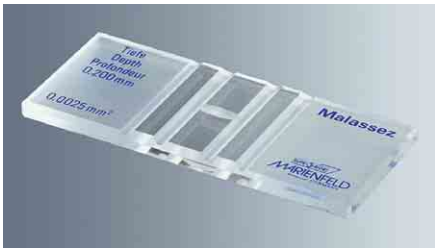
Viability reagents 87

Comparison of cell counting methods between the EVE™ Automatic cell counter and a hemocytomer 89

Manual - Hemocytometers

IVD

Cell counter, Malassez
Marienfeld



In vitro **diagnostic applications**

- With double net ruling and two cover glasses
- Dark lined, without clamps
- Thickness 0,4 mm

Chamber depth: 0,2 mm

Description	Pk	Cat. No.
Cell counting chamber, double, dark lined, Malassez	1	631-0975

IVD

Cell counters, Bürker
Marienfeld

Glass

These cells counters for investigations of cell suspensions are equipped with two sets of grids. They are engraved into two ground and polished surfaces on the central ridge (=chamber bottom). This central ridge is located between two elevated ridges that are also ground and polished.

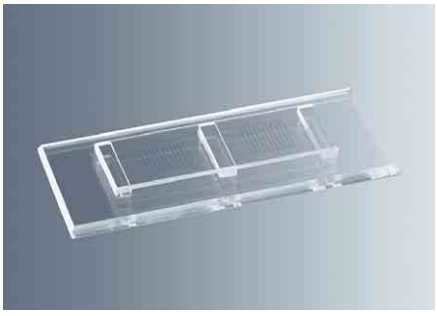
- *In vitro* diagnostic applications

Conform to DIN 12847 and the German Calibration Ordinance

Delivery information: Supplied in a transparent plastic box.

Description	Pk	Cat. No.
Cell counting chamber, bright lined, Bürker	1	631-0921
Cell counting chamber, dark lined, Bürker	1	631-0920
Cell counting chamber, dark lined, with clamps, Bürker	1	630-1541

Cell counters, McMaster
Marienfeld



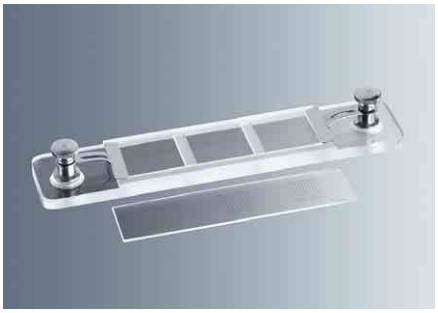
For counting worm eggs

This counting chamber is suitable for solid media.

- Cover glass with two counting grids (~10×10 mm, divided into 10 parts), affixed on three supports
- Distance between bottom plate and cover glass: ~ 1,5 mm

Description	Pk	Cat. No.
Cell counting chamber with two grids, McMaster, 75×32 mm	1	630-1508

Cell counters, McMaster
Marienfeld



These cell counters are suitable for liquid media and for counting worm eggs.

- Separate cover glass
- Three counting grids
- One pair of clamps to fix the cover glass

Depth: 1,5 mm

Description	Pk	Cat. No.
Counting chamber with three grids and clamps, ground edges and rounded corners, 127×26 mm	1	**631-0695**

IVD

Cell counters, Neubauer Improved
Marienfeld

For *in vitro* diagnostic (IVD) applications

These counting chambers are designed for counting leucocytes and erythrocytes.

- Double net ruling
- Two counting grids with one division

Depth: 0,1 mm

Thickness: 0,4 mm

Approved for IVD applications according to IVD directive 98/79/EC.

Supplied with two cover glasses.

Description	Pk	Cat. No.
Cell counter, dark-lined, without clamps, depth 0,1 mm, Improved Neubauer	1	**631-0696**

IVD

Cell counting chambers, Thoma
Marienfeld

For the determination of the yeast cell number and IVD applications.

Chamber depth: 0,1 mm

Conform to IVD directive 98/79/EC

Description	Pk	Cat. No.
Cell counting chamber, Thoma, dark lined, with clamps	1	**720-1898**
Cell counting chamber, Thoma, dark lined, without clamps	1	**631-0697**

Cell counters, Bürker

These cell counters are suitable for blood tests and urine analysis.

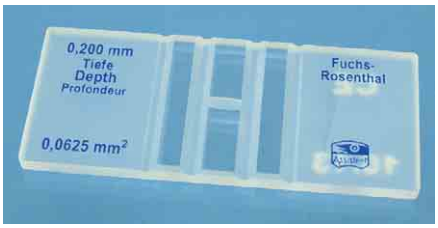
- 169 squares (0,05×0,05 mm) of 0,0025 mm^2 each for erythrocytes
- 144 squares (0,2×0,2 mm) of 0,04 mm^2 each for leucocytes

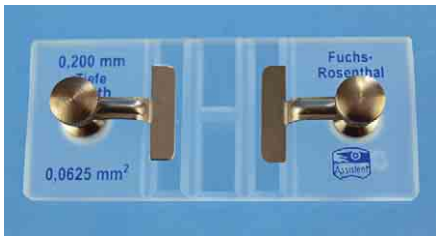
Chamber depth: 0,1 mm

Total area of ruling: 9,3 mm^2

Description	Pk	Cat. No.
Cell counter, double, Bürker	1	**631-0923**

Cell counters, Fuchs-Rosenthal





For counting cells in cerebro-spinal fluid

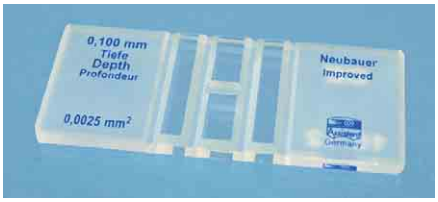
This ruling is used for counting leukocytes, eosinophils and cells in cerebro-spinal fluid.

- Subdivision: 16 square groups of 1 mm^2 each, consisting of 16 mini squares (0,25×0,25 mm) each

Total area of ruling: 16 mm^2

Description	Pk	Cat. No.
Cell counter, double, Fuchs-Rosenthal, depth 0,2 mm	1	**631-0929**

Cell counters, Neubauer Improved



These cell counters are designed for blood tests and urine analysis. Nine large squares of 1 mm^2 each correspond to Neubauer ruling. The central square of 1 mm^2 contains – owing to the closer intermediate lines – 25 squares of 16 mini squares 0,05×0,05 mm each.

- Counting erythrocytes corresponds to Thoma method
- Counting leucocytes in five large squares of 1 mm^2 each

Depth of chamber: 0,1 mm

Total area of ruling: 9,0 mm^2

Description	Pk	Cat. No.
Cell counter, double, Improved Neubauer	1	**631-0926**

Counting chamber, McMaster

For blood tests and urine analysis

Counting chamber with cover glass and two counting areas.

Description	Pk	Cat. No.
Cell counter, McMaster	1	**630-1507**

Automated - Cell counter

Automated cell counter, EVE™, NanoEnTek

EVE™ is a benchtop automatic cell counter designed to measure cell count and viability accurately and precisely. It uses the standard trypan blue technique.

- Fine distinction of clumped cells: Accurate results with advanced analysis algorithm
- Broad range of cell sizes and types: Primary (tissue and blood) cell lines and stem cells
- User firendly: Touch screen LCD without any maintenance needed
- Data store analysis: 500 test results, tranfer to PC via USB drive
- Cell size gating: Select range of cell size using gating function

Description	Pk	Cat. No.
Automatic cell counter incl. power supply and USB drive, 50 slides with 1 ea X 1,5 ml of trypan blue (0,4 %)	1	**734-2675**
Cell counting slides for 100 counts with 1 ea X 1,5 ml of trypan blue (0,4 %), EVS-050	50	**734-2676**
Cell counting slides for 2000 counts with 20 ea X 1,5 ml of trypan blue (0,4 %), EVS-1000	1.000	**734-2677**
Cell counting slides for 10000 counts with 100 ea X 1,5 ml of trypan blue (0,4 %), EVS-5000	5.000	**734-2678**
Test beads 1,0X10^6 beads/ml	1 Vial	**734-2674**

Viability reagents

VWR AMRESCO CHEMICALS

MTT thiazoyl blue tetrazolium bromide

MTT, a yellow tetrazole dye, can be reduced to a water-insoluble purple formazan compound by mitochondrial reductase enzymes. Since reduction only occurs in living cells the quantitation of formazan can be equated to the number of viable cells in the population.

- Sensitive colorometric substitute for radioisotopes in cell proliferation and cytotoxicity studies
- Applications include cell viability assays, dose response curves and cytotoxicity assays

Description	Pk	Cat. No.
MTT	500 mg	**0793-500MG**
MTT	1 g	**0793-1G**
MTT	5 g	**0793-5G**

Cell viability assay kits

Biotium

MTT, XTT, and resazurin are reduced by mitochondrial metabolic activity to yield coloured or fluorescent products, and thus are useful for and assaying cell viability and quantitating cell number. MTT and XTT are reduced to coloured formazin salts that can be measured by absorbance. MTT generates an insoluble formazin salt, requiring cell lysis before the absorbance can be measured, while XTT does not require cell lysis for measurement. Resazurin is a non-fluorescent blue dye that is reduced to the pink fluorescent compound resorufin, which can be measured by fluorescence or absorbance.

Description	Pk	Cat. No.
MTT Cell Viability Assay kit, 1000 assays	1 KIT	**30006.**
XTT Cell Viability Assay kit, 1000 assays	1 KIT	**30007.**
Resazurin Cell Viability Assay kit, 2500 assays (25 ml)	1 KIT	**30025-1**
Resazurin Cell Viability Assay kit, 10 000 assays (100 ml)	1 KIT	**30025-2**

ATP-Glo™ Bioluminometric Cell Viability Assay

Biotium

ATP-Glo™ Bioluminometric Cell Viability Assay takes advantage of the ATP-dependent oxidation of D-Luciferin by Firefly luciferase and the resulting production of light in order to assess the amount of ATP in a cell culture, which is proportional to the number of viable cells. The ATP-Glo™ kit can be used to detect as little as a single cell or 0,01 picomole of ATP, with signal linearity for ATP detection within 6 orders of magnitude. This assay is designed for detection using a single sample luminometer or a luminometer with an injector in 96-well plate format. The luminescent signal is stable for up to one minute.

Description	Pk	Cat. No.
ATP-Glo™ Bioluminometric Cell Viability Assay kit	200 Assays	**30020-1**
ATP-Glo™ Bioluminometric Cell Viability Assay kit	1.000 Assays	**30020-2**

Calcein-AM Cell Viability Assay kits

Biotium

Calcein-AM is a non-fluorescent, membrane permeable compound. Esterase activity in the cytoplasm of viable cells converts calcein-AM to the green fluorescent, membrane impermeant compound calcein, which is retained in viable cells with intact plasma membranes. The Viability/Cytotoxicity Assay kit for Animal Live & Dead Cells pairs calcein-AM with the vital dye ethidium homodimer III for quantitation of live and dead cells.

Description	Pk	Cat. No.
Calcein-AM Cell Viability Assay kit, 1000 assays	1 KIT	**30026.**
Viability/Cytotoxicity Assay kit for Animal Live & Dead Cells, 300 assays	1 KIT	**30002.**

MCB Glutathione Detection kit

Biotium

Diminished cellular glutathione (GSH) level occurs early in apoptosis due to GSH efflux from mitochondria. Monochlorobimane (MCB) reacts with thiols to form a blue fluorescent product allowing fluorometric quantitation of GSH in cell lysates.

Description	Pk	Cat. No.
MCB Glutathione Detection kit, 100 assays	1 KIT	**30019.**

CFDA SE Cell Proliferation Assay Kit

Biotium

Cell proliferation dyes diffuse passively into cells and covalently label intracellular proteins, resulting in long term cell labelling. They are non-fluorescent until they are hydrolysed by intracellular esterases. The dyes then react with intracellular amines forming fluorescent conjugates that are retained in the cell. Immediately after staining, a single, bright fluorescent population will be detected by flow cytometry. With each cell division, daughter cells inherit roughly half of the fluorescent label, allowing the number of cell divisions that occur after labelling to be detected by the appearance of successively dimmer fluorescent peaks on a flow cytometry histogram compared to cells analysed immediately after staining. Staining is formaldehyde fixable.

CFDA SE Cell Proliferation Dye is hydrolysed in cells to release green fluorescent carboxy-fluorescein, for detection in the FITC channel.

Delivery information: Each CFDA SE Cell Proliferation Assay kit contains ten single use (10×50 µg) dye vials, anhydrous DMSO for preparing dye stock solutions, and a detailed labelling protocol.

Description	Pk	Cat. No.
CFDA SE Cell Proliferation Assay kit	1 KIT	**30050.**

Apoptosis and Necrosis Quantitation kits

Biotium

Apoptosis and Necrosis Quantitation Kit provides a convenient assay for detecting apoptotic (green) and necrotic (red) cells within the same cell population by flow cytometry or fluorescence microscopy. In addition, the Apoptosis and Necrosis & Healthy Cells Quantitation Kit includes a membrane permeable blue fluorescent dye (excitation/emission bound to DNA: 350/461 nm) for staining the nuclei of the entire cell population.

Apoptosis and necrosis are two processes by which cells die. Apoptosis is an active, regulated disassembly of the cell from within. During apoptosis, phosphatidylserine (PS) is translocated from the inner to the outer surface of the cell, allowing the dying cell to be engulfed by phagocytic cells. Annexin V is a 35 kD Ca2+-dependent phospholipid binding protein with a high affinity for PS. Both kits features Annexin V labelled with fluorescein (FITC) (excitation/emission: 492/514 nm) for staining PS on the surface of apoptotic cells with green fluorescence.

Necrosis normally results from a severe cellular insult. Both internal organelle and plasma membrane integrity are lost, resulting in spilling of cell contents into the surrounding environment. Ethidium Homodimer III (EthD-III) is a highly positively charged nucleic acid probe, which is impermeant to live cells and early apoptotic cells, but stains necrotic cells and late apoptotic cells with red fluorescence (excitation/emission bound to DNA: 528/617 nm). EthD-III is a superior alternative to propidium iodide (PI) or Ethidium Homodimer I due to its significantly higher affinity for DNA and higher fluorescence quantum yield.

- Simple: Simultaneous detection of apoptotic, necrotic and healthy cells possible in a single assay
- Fast: Single 15 - 30 minute staining step
- Sensitive: EthD-III is a superior alternative to both PI and EthD-I for staining necrotic cells

Description	Pk	Cat. No.
Apoptosis & Necrosis Quantification kit, 50 assays	1 KIT	**30017.**
Apoptosis, Necrotic & Healthy Cell Quantification kit, 50 assays	1 KIT	**30018.**

DCDAPH

Biotium

DCDAPH (1,1-dicyano-6-(4-N,N-dimethylaminophenyl)-1,3,5-hexatriene) is a NIR fluorescent probe that has proved to have affinity to Aβ plaques in fluorescent staining of brain sections as well as in an in vivo binding assay using Aβ 1-42 aggregates. DCDAPH has high affinity (Ki= 37 nM, Kd=27 nM) to Aβ 1-42 aggregates.

Description	Pk	Cat. No.
DCDAPH	5 mg	**80030.**

VWR CHEMICALS

Fluorescent viability stain, Quick-View™

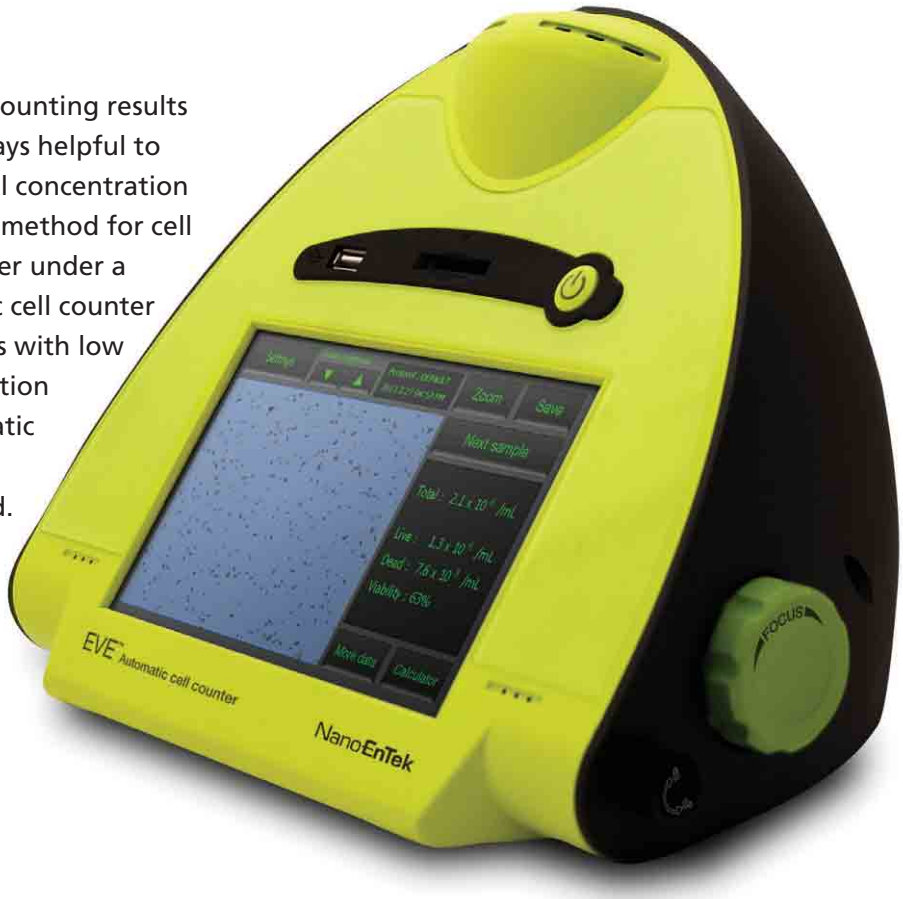
Quick-View™ Fluorescent Viability Stain is a ready to use staining reagent for easy discrimination between live and dead mammalian cells. Supplied in an easy to use dropper bottle, the single staining solution is a mixture of Acridine Orange for live cell identification and ethidium bromide for identification of dead cells. The Acridine Orange stained live cells appear green and ethidium bromide stained dead cells appear red when visualised by fluorescence microscopy.

- Pre-mixed, ready to use dye solution
- Dropper bottle format minimises contact with hazardous reagents
- Cells can be visualised immediately upon dye addition
- Stains both suspended and adherent cells

Pk	Cat. No.
5 ml	**N600-5ML**

Comparison of cell counting methods between the EVE™ Automatic cell counter and a hemocytomer

Many researchers need to check counting results before each experiment. It is always helpful to achieve the standardisation of cell concentration between samples. Most common method for cell counting is using a hemocytometer under a microscope. The EVE™ Automatic cell counter provides accurate counting results with low variation in less time. This application note compares the EVE™ Automatic cell counter, to a conventional hemocytometer counting method.



EVE™ Automatic cell counter

The EVE™ Automatic cell counter uses state-of-the-art optics and provides image analysis to automatic cell counting. The EVE™ is a bench top cell counter designed to measure cell count and viability (live, dead and total cells) fast and precisely, using the standard trypan blue technique (Figure 1).

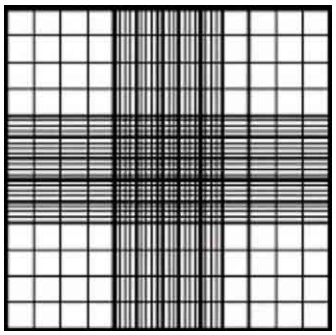
Using the same amount of sample that you currently use with the hemocytometer, the EVE™ takes less than 20 seconds per sample for a typical cell count and is compatible with a wide variety of eukaryotic cells plus provides information on cell size.

The EVE™ offers an intuitive user interface and support with the option to save and print cell count data using the EVE™ Software and USB drive, which is supplied with the instrument or available separately.
(For detailed information, please visit our website; http://www.nanoentek.com)

Hemocytometer, manual cell counting method

The hemocytometer is used for manual cell counting. It consists of 9 large squares, each measuring 1x1 mm, giving a total area of 3 x 3 mm of counting area. The volume of the chamber is 0.1 µm of each 1 x 1 mm square, giving a total volume for each.

Figure 1. Automatic cell counter, EVE™
Uses a disposable chamber that contains two enclosed chambers can count the cells with just 3 steps. Step 1. Load the sample, step 2, adjust focus, step 3. Obtain the results.



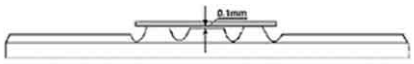


Figure 2. Hemocytometer, manual cell counting method.

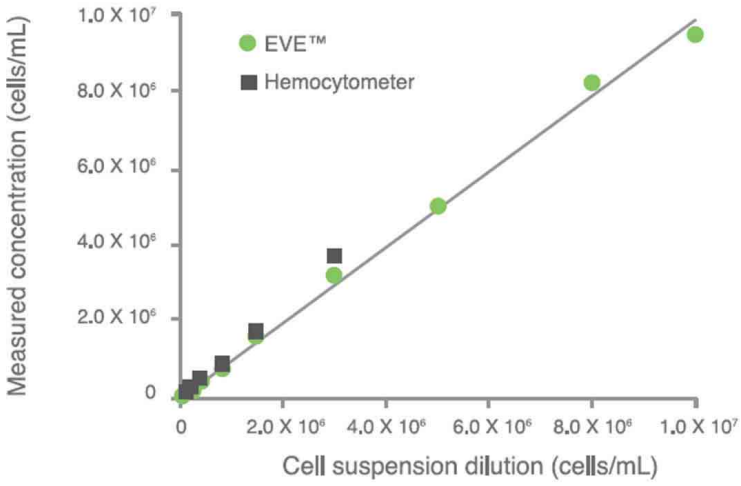


Figure 3. Measuring from the EVE™ extends further along the high concentration range compared to the hemocytometer readings. The EVE™ Automatic Cell Counter has a significantly higher effective concentration range than the hemocytometer.

Sample preparation

To compare total cell counting result between the EVE™ Automatic cell counter and traditional hemocytometer, HeLa cell line was used. Cells were grown in defined medium in humidified 5% CO_2 incubator at 37°C. Cells were trypsinised using standard methods to prepare cell suspensions for counting. The cell samples were prepared in the range of 1 x 10^4 ml ~ 1 x 10^7 ml.

10 µl of the sample and the 0.4% trypan blue stain were mixed well using a pipette. 10 µl of the sample mixture was loaded on EVE™ Cell counting slide and hemocytometer.

Result

The results show that the glass hemocytometer counting method was less accurate than EVE™ Automatic cell counter. Moreover, the EVE™ Automatic cell counter counted a broader range of cell concentration than the hemocytometer. It also significantly extended further along the high concentration range than the hemocytometer readings.

In conclusion, EVE™ Automatic cell counter is the more efficient automatic cell counter for a broad range of cells. It not only reduces error from human variation in comparison with the traditional counting method, but also provides accurate and fast counting result through counting software and enclosed disposable chamber. Therefore, EVE™ Automatic cell counter ideal for various research applications in which cell counting and viability test are required.

Cell Type	Animal	Organ	Growth Properties
HeLa	Human	Skin	Adherent
NIH-3T3	Mouse	Embryo	Adherent
U-2 OS	Human	Bone	Adherent
Jurkat	Human	Blood	Suspension
KG-1	Human	Blood	Suspension
HepG2	Human	Liver	Adherent
Hep3B	Human	Liver	Adherent
LNCaP	Human	Prostate	Adherent
SH-SY5Y	Human	Brain	Adherent
SCN2.2	Rat	Brain	Adherent
F9	Mouse	Embryo	Adherent
MCF7	Human	Breast	Adherent
A549	Human	Lung	Adherent
GH3	Rat	Pituitary gland	Adherent

Description	Contents	Cat. No.
Eve™ Automatic cell counter	Main device, power supply, USB stick, Eve cell counting slide, 50 slides (100 counts) with 1.5 ml of trypan blue (0.4%)	**734-2675**
Eve™ cell counting slide	50 slides (100 counts) with 1.5 ml of trypan blue (0.4%)	**734-2676**
Eve™ cell counting slide	1000 slides (2000 counts) with 1.5 ml of trypan blue (0.4%)	**734-2677**
Eve™ cell counting slide	5000 slides (10 000 counts) with 1.5 ml of trypan blue (0.4%)	**734-2678**
Test beads	1 ml	**734-2674**

FILTRATION

Membrane filtration 92

Syringe filters 93

Syringes 99

Filtration plates 100

Vacuum filtration systems 104

Culturing embryonic stem cells using media filtered with Thermo Scientific Nalgene Rapid Flow PES filter units to reduce contamination risk 108

Capsule filtration 114

Ultrafiltration - Spin filters 118

Ultrafiltration - TFF systems 120

Membrane filtration

Membrane filters Nuclepore™ track etched
Whatman (GE Healthcare)

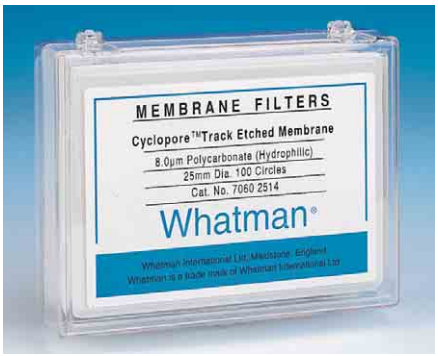
PC

These filters are made from high quality PC film and have sharply defined pore sizes, high flow rates and excellent chemical and thermal resistance. Suitable for epifluorescence microscopy, environmental analysis, cell biology, EPA testing, fuel testing, bioassays, parasitology, air analysis and water microbiology.

- Low protein binding and low extractables
- High chemical resistance and good thermal stability
- Low, consistent ash and tare weights
- Smooth flat surface for good visibility of particles

Type	Pore size (µm)	Size (mm)	Pk	Cat. No.
PC	0,1	13	100	**515-2005**
PC	0,2	13	100	**515-2006**
PC	0,4	13	100	**515-2007**
PC	0,1	25	100	**515-2028**
PC	0,2	25	100	**515-2029**
PC	0,4	25	100	**515-2030**
PC	0,015	47	100	**515-2075**
PC	0,05	47	100	**515-2077**
PC	0,08	47	100	**515-2078**
PC	0,1	47	100	**515-2079**
PC	0,2	47	100	**515-2080**
PC	0,4	47	100	**515-2081**
PC	5,0	47	100	**515-2087**

Membrane filters, Cyclopore™ track etched
Whatman (GE Healthcare)



Hydrophilic PC, autoclavable

For air monitoring, analytical methods, water analysis, blood filtration and cell analysis, general filtration, microscopy, microorganisms analysis, nucleic acid studies and oceanographic studies. The smooth flat microporous membrane ensures particles are retained on the surface so that they are easily visible under a microscope.

- Free of contaminants, low tare weight
- Minimum water adsorption
- Very low levels of non specific protein binding

Thickness	7 - 20 µm
Max. temperature (°C)	140
Weight	0,7 - 2,0 mg/cm^2

Pore size (µm)	Ø (mm)	Pk	Cat. No.
0,2	25	100	**516-4532**
0,4	25	100	**516-4533**
0,2	47	100	**514-0049**
0,4	47	100	**516-4549**
1,0	47	100	**516-4552**

Membrane filters, Nuclepore™ black
Whatman (GE Healthcare)

Membranes for use with epifluorescence microscopy

Nuclepore™ black dyed PC membranes are high performance membranes ideally suited for applications using epifluorescence microscopy. Black membranes greatly reduce background fluorescence, which results in improved microorganism and particulate visibility.

Using these membranes in combination with epifluorescence techniques, rapid enumeration of viable and non-viable microorganisms and particulate matter can be conducted in 30 minutes or less. Conventional culturing methods require incubation times of more than 24 hours. Use black track etched membranes with epifluorescence techniques to achieve rapid, direct enumeration of microorganisms.

- PC track etched membrane dyed black with Irgalan Black
- Flat, smooth surface assures surface capture of microorganisms and particles
- Extremely low non-specific absorption

Pore size (µm)	Ø (mm)	Pk	Cat. No.
0,2	25	100	**515-2048**
0,4	25	100	**515-2049**
0,8	25	100	**515-2051**

Syringe filters

VWR COLLECTION

SELECTED FOR YOU

Syringe filters

Membranes with pore size of 0,2 µm are used for filtration of fine particles, those of 0,45 µm are appropriate for clarifications.

According to USP Class VI

Cellulose acetate membrane	Surface not treated by wetting agents. Especially useful for cell culture applications.
	Certified non pyrogenic and non cytotoxic.
	Delivered with certificate.
	-
PES membrane	Very low level of extractables and high flow rate. For cell culture applications.
	Certified non pyrogenic and non cytotoxic.
	Delivered with certificate.
	-

Pore size (µm)	Ø (mm)	Pk	Cat. No.
Cellulose acetate membrane			
0,2* **	25	50	**514-0061**
0,2 **	25	100	**514-0060**
0,45	25	100	**514-0062**
0,45*	25	50	**514-0063**
PES membrane			
0,2	25	100	**514-0072**
0,2*	25	50	**514-0073**
0,45	25	100	**514-0074**
0,45*	25	50	**514-0075**

* Sterile, individually wrapped
** Retains 10^7 Brevundimonas diminuta per cm^2 according to modified ASTM F838

PALL Life Sciences

Syringe filters, Acrodisc® Supor®

Hydrophilic polyethersulphone membrane: PP housing (except 25 and 32 mm: acrylic and Acrodisc Serum: ABS)

Low protein binding filters for sterile filtration of biological samples, serum and cell culture media.

Acrodisc and Acrodisc PF syringe filters with 0,2 µm Supor membrane were challenged with bovine serum or a bacterial culture (10^{-7} cfu/ml) at a constant pressure of 1,4 bar. Built-in prefilter enhances throughput of viscous, particulate-laden or proteinaceous solutions.

Ø (mm)	Pore size	Inlet/outlet	Max. temperature (°C)	Max. pressure (bar)	Water flow rate
Acrodisc Supor®					
13	0,2 µm	Luer lock female/Luer male	55	5,2	22 ml/min (3,1 bar)
	0,45 µm				35 ml/min (3,1 bar)
	0,8 µm				150 ml/min (3,1 bar)
25	0,1 µm				35 ml/min (3,1 bar)
	0,2 µm				175 ml/min (3,1 bar)
	0,45 µm				300 ml/min (3,1 bar)
	0,8 µm				700 ml/min (3,1 bar)
32	0,1 µm				100 ml/min (3,1 bar)
	0,2 µm				490 ml/min (3,1 bar)
	0,45 µm				700 ml/min (3,1 bar)
Acrodisc Supor® PF with membrane prefilter					
25	0,8/0,2 µm	Luer lock female/Luer male	55	5,2	145 ml/min (3,1 bar)
Serum Acrodisc® with glass fibre prefilter					
37	GF/0,2 µm	Luer lock female/Luer male	55	5,2	425 ml/min (3,1 bar)

Pore size (µm)	Filtration area (cm^2)	Ø (mm)	Sterile	Pk	Cat. No.
Acrodisc Supor®					
0,2	1	13	+	75	**514-4122**
0,45	1	13	+	75	**514-4123**
0,8	1	13	+	75	**514-4124**
0,1	2,8	25	+	50	**514-4125**
0,2	2,8	25	+	50	**514-4126**
0,45	2,8	25	+	50	**514-4127**
0,8	2,8	25	+	50	**514-4128**
0,1	5,8	32	+	50	**514-4130**
0,2	5,8	32	+	50	**514-4131**
0,45	5,8	32	-	1.000	**514-4132**
0,45	5,8	32	+	50	**514-4133**
Acrodisc Supor® PF with membrane prefilter					
0,8/0,2	2,8	25	+	50	**514-4102**
Serum Acrodisc® with glass fibre prefilter					
GF/0,2	7,5	37	+	20	**514-4119**

PALL Life Sciences

Syringe filters optimised for scale-up, Acrodisc®

Simplifies scale-up and minimises revalidation; no need to change membrane materials during transition to pilot or production. PP housing; four membrane chemistries assure compatibility with a wide range of fluids:

Supor® membrane has high flow rates and throughputs and is ideal for solutions where low protein binding is required. Not recommended with some ketones.

Fluorodyne® II membrane offers high flow rates and is ideal for applications where PVDF membrane is specified. Not recommended with some ethers.

Ultipor® membrane provides broad solvent and chemical compatibility and low extractables.

Posidyne® membrane enhances bioburden and pyrogen removal from aqueous solutions.

- Integrity testable (water bubble point)
- Bacterial retention tested
- Sterilised by gamma irradiation to eliminate potential contamination by EtO residuals

Applications: Drug development studies, determination of product compatibility and recovery, preliminary filterability testing, small-volume liquid sterilisation.

Inlet/outlet	female luer lock inlet, male slip luer outlet				
Filtration area (cm²)	2,8				
Max. temperature (°C)	60				
Max. pressure (bar)	5,4				
Water flow rate	130 ml/min (2,1 bar)	78 ml/min (2,1 bar)	130 ml/min (2,1 bar)	77 ml/min (2,1 bar)	-
Membrane	Supor®	Ultipor®	Fluorodyne® II	Posidyne®	Supor® EKV

Membrane	Pore size (µm)	Ø (mm)	Pk	Cat. No.
Supor®	0,8/0,2	25	50	**516-8971**
Ultipor®	0,2	25	50	**516-8972**
Fluorodyne® II	0,2	25	50	**516-8973**
Posidyne®	0,2	25	50	**516-7717**
Supor® EKV	0,2	25	50	**514-4238**

PALL Life Sciences

Syringe filters, Acrodisc® DMSO-safe

Nylon membrane, PP housing, sterile

For solutions containing dimethylsulfoxide (DMSO). Sterilisation of media used for cell cryopreservation.

Inlet/outlet	Female Luer lock, male slip Luer
Max. temperature (°C)	55
Max. pressure (bar)	6,2
Water flow rate	60 ml/min (2,1 bar)

Type	Pore size (µm)	Filtration area (cm²)	Ø (mm)	Sterile	Pk	Cat. No.
DMSO-Safe	0,2	2,8	25	+	50	**514-4011**

Syringe filters, GD/X™
Whatman (GE Healthcare)

PP housing, autoclavable

Contain a unique pre-filtration stack of GMF 150 and GF/F glass microfibre media, which allows filtration of the most difficult samples with less hand pressure. Compared to an unprotected membrane, these filters can process three to seven times more sample volume. Ideal for hard to filter, heavily particulate laden samples and for dissolution testing.

Inlet/outlet	Max. pressure (bar)	Dimensions	Weight	Ø (mm)
Luer lock female/Luer male	5,2	20,8×29,8 mm	3 g	25

Continued on next page

Continued from previous page

Membrane	Pore size (µm)	Filtration area (cm²)	Ø (mm)	Sterile	Pk	Cat. No.
Cellulose acetate	0,2	4,6	25	+	50	**514-0541**
Cellulose acetate	0,45	4,6	25	+	50	**514-0542**
PES	0,2	4,6	25	+	50	**514-0537**
PES	0,45	4,6	25	+	50	**514-0538**

Syringe filters, Puradisc™ FP 30
Whatman (GE Healthcare)

PC housing

For filtration of aqueous solutions up to 100 ml

Hydrophilic cellulose acetate, with extremely low protein binding

Hydrophilic cellulose nitrate, versatile membranes for the filtration of aqueous solutions

Pore size	Inlet/outlet	Max. pressure (bar)	Dimensions	Weight
Cellulose acetate				
0,2 µm	Female Luer lock/male Luer	6,9	26×34 mm	4,7 g
0,45 µm				
0,8 µm				
1,2 µm				
Cellulose nitrate				
5,0 µm	Female Luer lock/male Luer	6,9	26×34 mm	4,7 g

Type	Pore size (µm)	Filtration area (cm²)	Ø (mm)	Sterile	Colour code	Pk	Cat. No.
Cellulose acetate							
FP 30 CA-S	0,2	5,7	30	+	Red	50	**514-1111**
FP 30 CA	0,2	5,7	30	-	Red	50	**514-1117**
FP 30 CA	0,2	5,7	30	-	Red	100	**514-1141**
FP 30 CA	0,2	5,7	30	-	Red	500	**514-1121**
FP 30 CA-S, Female Luer lock/male Luer lock inlet/outlet connections	0,2	5,7	30	+	Red	50	**514-1112**
FP 30 CA-S	0,45	5,7	30	+	White	50	**514-1113**
FP 30 CA	0,45	5,7	30	-	White	50	**514-1127**
FP 30 CA	0,45	5,7	30	-	White	100	**514-1140**
FP 30 CA	0,45	5,7	30	-	White	500	**514-1123**
FP 30 CA-S	0,8	5,7	30	+	Green	50	**514-1114**
FP 30 CA	0,8	5,7	30	-	Green	50	**514-1124**
FP 30 CA-S	1,2	5,7	30	+	Orange	50	**514-1115**
FP 30 CA	1,2	5,7	30	-	Orange	50	**514-1125**
Cellulose nitrate							
FP 30 CN	5,0	5,7	30	-	Black	50	**514-0490**
FP 30 CN	5,0	5,7	30	-	Black	100	**514-0101**
FP 30 CN	5,0	5,7	30	-	Black	500	**514-1126**

Syringe filters, SPARTAN™
Whatman (GE Healthcare)

Hydrophilic regenerated cellulose membrane, PP housing

HPLC certified filters for the filtration of organic and aqueous solutions in HPLC. Low protein binding and high chemical resistance.

Tested and certified for UV-absorbing substances at wavelengths of 210 and 254 nm with water, methanol and acetonitrile; ensuring consistent quality between batches.

Inlet/outlet: Luer lock female/Luer male.

Pore size (µm)	Ø (mm)	Colour code	Pk	Cat. No.
0,2 *	13	Dark Brown	500	**514-1231**
0,2	30	Dark Brown	100	**514-1224**
0,45	30	Light Brown	100	**514-1228**

* Mini-Tip outlet

PALL Life Sciences

Venting filters

Acro® 37 TF vent devices

Hydrophobic membrane PP reinforcened PTFE; PP housing, autoclavable

Multipurpose filter for small volume venting and gas filtration, ideal for small bioreactors and fermenters.

Bacterial air vents

Hydrophobic glass laminated (polyester/glass fiber/polyester) membrane: PP housing, autoclavable

Economical, disposable depth filter for venting applications or sterile gas delivery. Prevents the passage of aerosols, protecting equipment and staff.

Aerosol retention: 99,97% 0,3 µm (DOP) at 32 l/min/100 cm^2

Acro® 50 vent devices

Emflon® II (hydrophobic PVDF) membrane: PP housing, autoclavable

Ideal for venting of bioreactors, fermentation tanks and carboys or sterile gas purging of culture vessels. Ideal for attachment to disposable systems that need to undergo gamma irradiation.

514-4227: with vent, 514-4228 without vent, 100% integrity tested

Airflow rate (l/min)	3,58 (0,2 bar)	40 (0,4 bar)	27 (1 bar)
Inlet/outlet	stepped hose barbs 6,4 - 9,5 mm Ø	stepped hose barbs 6,4 - 12,7 mm Ø	
Max. temperature (°C)	100	121	60
Ø (mm)	37		50

Pore size (µm)	Filtration area (cm^2)	Ø (mm)	Pk	Cat. No.
Acro® 37 TF vent devices				
0,2	7,5	37	24	**514-4117**
0,2	7,5	37	200	**514-4118**
Bacterial air vents				
1 *	7,5	37	10	**514-4114**
1	7,5	37	24	**514-4107**
Acro® 50 vent devices				
0,2	20	50	3	**514-4227**
0,2	20	50	100	**514-4228**

* sterile

PALL Life Sciences

Venting filters, AcroVent®

PTFE hydrophobic membrane, PP housing

Economical, disposable device decreasing contamination risks. Ideal for gas lines for CO_2 incubators.

Airflow rate (l/min)	8 (0,2 bar)
Inlet/outlet	for tubing Ø 6,4 - 12,7 mm
Max. pressure (bar)	4,1
Max. temperature (°C)	130

Pore size (µm)	Filtration area (cm²)	Pk	Cat. No.
0,2	19,6	10	**514-4108**

PALL Life Sciences

Venting filters, Acro® 50

Membrane: PTFE on a hydrophobic PP support; housing: PP, autoclavable

Reusable filters with superior performance for critical applications, ideal for use with bioreactors and fermenters and for filtration of aggressive solvents.

Airflow rate (l/min)	8 (0,2 bar)			12 (0,2 bar)	15 (0,2 bar)
Inlet/outlet	stepped hose barbs 6,4 - 12,7 mm Ø	1/8" MNPT	9,5 mm Ø straight	stepped hose barbs 6,4 - 12,7 mm Ø	1/8" MNPT
Max. pressure (bar)	4,1				
Max. temperature (°C)	130				
Pore size	0,2 µm			0,45 µm	1 µm
Ø (mm)	50				

Pore size (µm)	Filtration area (cm²)	Pk	Cat. No.
0,2	19,6	18	**514-4109**
0,2	19,6	72	**516-7600**
0,2 *	19,6	18	**516-7627**
0,2 **	19,6	18	**516-7628**
0,45	19,6	18	**514-4110**
1	19,6	18	**514-4111**
1 *	19,6	18	**515-0125**

Description	Pk	Cat. No.
Integrity test kit		
Integrity test kit, includes pressure gauge, three-way valve and 10 ml syringe	1	**516-8934**

* inlet/outlet: 1/8" MNPT
** inlet/outlet: 9,5 mm diameter straight

PALL Life Sciences

Venting filters, Vacushield™

Hydrophobic PTFE membrane, PP housing

Protects valves and pump components from damage due to liquids. Protects laboratory personnel from potential biohazards, airborne and aerosol contaminants.

Aerosol retention: 99,97% of 0,3 µm DOP particles at 32 l/min/100 cm²

Airflow rate (l/min)	8 (0,2 bar)
Inlet/outlet	for tubing Ø 6,4 - 12,7
Max. pressure (bar)	1
Max. temperature (°C)	130
Ø (mm)	50

Pore size (µm)	Filtration area (cm²)	Ø (mm)	Pk	Cat. No.
0,45	19,6	50	3	**514-4115**

Venting filters, HEPA-VENT™ and HEPA-CAP™
Whatman (GE Healthcare)

Glass microfibre filter, PP housing, autoclavable

In line devices, particularly suitable for the sterile venting of fermentors, incubators or reaction vessels to prevent airborne particles from entering or exiting the vessel.

The glass microfibre filtration media is mildly hydrophobic for resistance to bacterial growth and has been laminated on both sides to prevent fibre release.

- Retains 99,97% of airborne particles >0,3 µm, ideal for clean air applications
- Allows bi-directional flow
- Depth filter design allows for high loading capacity

Airflow rate (l/min)	90 at 0,69 bar	225 at 0,35 bar	700 at 0,35 bar
Connections	for 6-10 mm Ø. int		for 9,5 - 12 mm Ø. int
Housing type	disc	capsule	

Type	Filtration area (cm²)	Pk	Cat. No.
Hepa-Vent™	16	10	**515-0113**
Hepa-Cap™ 36	625	1	**516-1104**
Hepa-Cap™ 75	1300	1	**516-1105**

Syringes

Single-use syringes, 2-piece, NORM-JECT®

Disposable, two-piece, without needle, PP barrel and PE piston, latex- and silicone oil-free

- Defined position of the plunger at volume "0" to feel when plunger is completely inserted
- No dead space for 1 ml insulin and tuberculin syringe
- Extended graduation for wider range of applications
- Positive safety stop to prevent accidental spills

Syringes are also available with especially designed oral tip, which prevents accidental Luer or hypodermic connection, in volumes of 5 or 10 ml. Incompatible with injection needles. Please enquire for details.

Packaging: Sterile versions are packed in individual blister strips. Non sterile versions are bulk packed.

Description	Capacity (ml)	Pk	Cat. No.
Sterile			
Single-use insulin syringe with insulin graduation, 100IU, Luer tip	1	100	**613-2002**
Single-use insulin syringe with insulin graduation, 40IU, Luer tip	1	100	**613-2000**
Single-use tuberculin syringe with ml graduation, Luer tip	1	100	**613-2001**
Single-use syringe, Luer lock tip	2	100	**613-2004**
Single-use syringe, Luer tip	2	100	**613-2003**
Single-use syringe, Luer lock tip	5	100	**613-2006**
Single-use syringe, Luer tip	5	100	**613-2005**
Single-use syringe, Luer lock tip	10	100	**613-2008**
Single-use syringe, Luer tip	10	100	**613-2007**
Single-use syringe, Luer lock tip	20	100	**613-2010**
Single-use syringe, Luer tip	20	100	**613-2009**
Single-use syringe, catheter tip	30	50	**613-2034**
Single-use syringe, Luer lock tip	30	50	**613-2035**
Single-use syringe, Luer tip	30	50	**613-2033**
Single-use syringe, catheter tip	50	30	**613-2037**
Single-use syringe, Luer lock tip	50	30	**613-2038**
Single-use syringe, Luer tip	50	30	**613-2036**
Non sterile, mini bulk packaging			
Single-use tuberculin syringe with ml graduation, Luer tip	1	100	**613-2151**
Single-use syringe, Luer lock tip	2	100	**613-2153**
Single-use syringe, Luer tip	2	100	**613-2152**
Single-use syringe, Luer lock tip	5	100	**613-2155**
Single-use syringe, Luer tip	5	100	**613-2266**

Continued on next page

Continued from previous page

Description	Capacity (ml)	Pk	Cat. No.
Non sterile, mini bulk packaging			
Single-use syringe, Luer lock tip	10	100	**613-2157**
Single-use syringe, Luer tip	10	100	**613-2267**
Single-use syringe, Luer lock tip	20	100	**613-2159**
Single-use syringe, Luer tip	20	100	**613-2268**
Single-use syringe, Luer lock tip	30	50	**613-2160**
Single-use syringe, Luer tip	30	50	**613-2161**
Single-use syringe, Luer lock tip	50	30	**613-2162**
Single-use syringe, Luer tip	50	30	**613-2163**

Filtration plates

PALL Life Sciences

Filter plates, 96-well, for aqueous filtration, AcroPrep™ Advance

The AcroPrep™ Advance filter plate portfolio includes a variety of membrane types and pore sizes to provide the best possible performance for a wide range of sample preparation and high throughput screening applications. AcroPrep™ Advance filter plates are ideal for concentration, purification and desalting of proteins and peptides; bead and chromatography resin-based applications; gross fractionation and lysate clarification; and general filtration.

AcroPrep™ Advance 96-well filter plates for aqueous filtration

Applications include general sample preparation, gross fractionation, cell harvesting, and cell-based assays.

- Efficient particulate removal - a range of membranes and pore sizes ensures optimal processing of particulate-laden samples
- Well geometry results in faster, more uniform filtration rates across the plate with reduced hold-up volume
- Output tip geometry provides direct flow of samples into receiver plate without concerns about cross contamination
- Automation compatible - manufactured in accordance with SBS guidelines, allowing plates to be run in manual, semi-automated and automated processes
- Easy identification - allows for labelling on the smooth top surface and textured window, as well as provides easy usage orientation through the A1 corner notch

Dimensions	
Length:	128 mm
Width:	86 mm
Height (with lid):	18 mm (350 µl only)
Height (without lid):	14 mm (350 µl); 33 mm (1 ml); 47 mm (2 ml)
Well bottom area:	0,25 cm^2
Recommended operating vacuum:	≥254 mm Hg
Recommended centrifugal force:	1500 ×g
Typical vacuum filtration performance:	0,2 µm Supor: processing time 9 mins; hold up volume 8 µl 1,0 µm glass fibre: processing time 2 mins; hold up volume 19 µl 30 - 40 µm PP/PE: processing time 1 mins; hold up volume 4 µl
Materials of construction:	Filter media: Supor® (polyethersulfone), glass fibre (borosilicate glass without binder), and PP/PE non-woven media Plate housing: PP Lid: PS

Description	Well volume (µl)	Recommended working volume (µl)	Pk	Cat. No.
AcroPrep™ Advance, 1 ml, 0,2 µm Supor® membrane	1000	≤900	5	**738-0116**

PALL Life Sciences

Filter plates, 96-well, for lysate clearance, AcroPrep™ Advance

The AcroPrep™ Advance filter plate portfolio includes a variety of membrane types and pore sizes to provide the best possible performance for a wide range of sample preparation and high throughput screening applications. AcroPrep™ Advance filter plates are ideal for concentration, purification and desalting of proteins and peptides; bead and chromatography resin-based applications; gross fractionation and lysate clarification; and general filtration.

AcroPrep™ Advance 96-well filter plates for lysate clearance

Applications include removal of bacterial debris prior to plasmid purification, removal of bacterial and cellular debris prior to protein purification, and clearance of gross particulates.

- Integrated prefilter yields consistent filtration of samples with high levels of gross particulate
- Well geometry results in faster, more uniform filtration rates across the plate with reduced hold-up volume
- Output tip geometry provides direct flow of samples into receiver plate without concerns about cross contamination
- Biologically inert materials allows clarification of most types of lysates without loss of target molecules

Dimensions	
Length:	128 mm
Width:	86 mm
Height (with lid):	18 mm (350 µl only)
Height (without lid):	14 mm (350 µl); 33 mm (1 ml); 47 mm (2 ml)
Well bottom area:	0,25 cm^2
Recommended operating vacuum:	≥254 mm Hg
Recommended centrifugal force:	1500 ×g
Typical processing time:	518-0030 Vacuum: 2 seconds Centrifuge: <2 minutes 518-0031, 738-0129, 738-0133 Vacuum: 9 seconds Centrifuge: <2 minutes
Typical hold-up volume:	518-0030 Vacuum: 17 µl 518-0031, 738-0129, 738-0133 Vacuum: 13 µl
Materials of construction:	Filter media: 3 µm glass fibre/0.2 µm Supor® membrane and 3 µm glass fibre/1.2 µm Supor® membrane Plate housing: PP Lid: P

Description	Well volume (µl)	Recommended working volume (µl)	Pk	Cat. No.
AcroPrep™ Advance, 350 µl, 3,0 µm glass fibre/1,2 µm Supor® membrane	350	≤300	10	**518-0030**
AcroPrep™ Advance, 350 µl, 3,0 µm glass fibre/0,2 µm Supor® membrane	350	≤300	10	**518-0031**
AcroPrep™ Advance, 1 ml, 3,0 µm glass fibre/0,2 µm Supor® membrane	1000	≤900	5	**738-0129**
AcroPrep™ Advance, 2 ml, 3,0 µm glass fibre/0,2 µm Supor® membrane	2000	≤1900	5	**738-0133**

PALL Life Sciences

Filter plates, 96-well, for multiplexing, AcroPrep™ Advance

The AcroPrep™ Advance filter plate portfolio includes a variety of membrane types and pore sizes to provide the best possible performance for a wide range of sample preparation and high throughput screening applications. AcroPrep™ Advance filter plates are ideal for concentration, purification and desalting of proteins and peptides; bead and chromatography resin-based applications; gross fractionation and lysate clarification; and general filtration.

AcroPrep™ Advance 96-well filter plates for multiplexing

Applications include bead-based multiplexing assays and flow cytometry.

- Smooth well wall provides efficient bead recovery, ensuring reproducible results
- High performance membrane - does not trap microspheres in the membrane matrix
- Low levels of false positives - in serological assays, Supor® membrane effectively removes IgG complexes, thus reducing non-specific reactivity of the microspheres
- Well geometry results in faster, more uniform filtration rates across the plate with reduced hold-up volume; outlet tip geometry minimises sample leakage and loss during incubation steps so that acquisition times are not affected
- Low non-specific binding - intrinsic plate and membrane properties minimise target loss

Continued on next page

Continued from previous page

Dimensions	
Length:	128 mm
Width:	86 mm
Height (with lid):	18 mm
Height (without lid):	14 mm
Well bottom area:	0,25 cm^2
Recommended operating vacuum:	≥254 mm Hg
Recommended centrifugal force:	1500 ×g
Typical processing time:	Vacuum: 2 seconds Centrifuge: <2 minutes
Typical hold-up volume:	Vacuum: 5 µl Centrifuge: 3 µl
Materials of construction:	Filter media: PP/PE non-woven membrane and Supor® (polyethersulfone) membrane Plate housing: PP Lid: PS

Description	Well volume (µl)	Recommended working volume (µl)	Pk	Cat. No.
AcroPrep™ Advance, 350 µl, 0,2 µm Supor® membrane	350	≤300	10	**518-0022**
AcroPrep™ Advance, 350 µl, 0,45 µm Supor® membrane	350	≤300	10	**518-0023**

PALL Life Sciences

Filter plates, 96-well, for protein purification, AcroPrep™ Advance

The AcroPrep™ Advance filter plate portfolio includes a variety of membrane types and pore sizes to provide the best possible performance for a wide range of sample preparation and high throughput screening applications. AcroPrep™ Advance filter plates are ideal for concentration, purification and desalting of proteins and peptides; bead and chromatography resin-based applications; gross fractionation and lysate clarification; and general filtration.

AcroPrep™ Advance 96-well filter plates for protein purification

Application include high throughput protein purification, screening of chromatography resins, screening of chromatography conditions, protein fractionation, and antibody purification.

- Supor® membrane offers optimal support to retain chromatography resins whilst allowing smooth flow of buffers; Mustang® membrane is able to withstand high flow rates to render fast purification of biomolecules
- Well geometry results in faster, more uniform filtration rates across the plate with reduced hold-up volume
- Outlet tip geometry minimises sample leakage and loss during incubation steps
- Low non-specific binding - intrinsic plate properties prevent target molecules from binding to the plate

Dimensions	
Length:	128 mm
Width:	86 mm
Height (with lid):	18 mm (350 µl only)
Height (without lid):	14 mm (350 µl); 33 mm (1 ml)
Well bottom area:	0,25 cm^2
Recommended operating vacuum:	≥254 mm Hg
Recommended centrifugal force:	1500 ×g
Typical processing time:	518-0024, 738-0117, 738-0118 Vacuum: 2 seconds Centrifuge: <2 minutes 738-0113, 738-0114, 738-0127, 738-0128 Vacuum: 14 seconds Centrifuge: <2 minutes
Typical hold-up volume:	518-0024, 738-0117, 738-0118 Vacuum: 5 µl Centrifuge: 3 µl 738-0113, 738-0114, 738-0127, 738-0128 Vacuum: 21 µl Centrifuge: 12 µl
Materials of construction:	Filter media: Supor® (polyethersulfone), Mustang® Q (anion exhange), and Mustang® S (cation exchange) membranes Plate housing: PP Lid: P

Description	Well volume (µl)	Recommended working volume (µl)	Pk	Cat. No.
AcroPrep™ Advance, 350 µl, 1,2 µm Supor® membrane	350	≤300	10	**518-0024**
AcroPrep™ Advance, 1 ml, 0,45 µm Supor® membrane	1000	≤900	5	**738-0117**
AcroPrep™ Advance, 1 ml, 1,2 µm Supor® membrane	1000	≤900	5	**738-0118**

PALL Life Sciences

Filter plates, 96-well, for solvent filtration, AcroPrep™ Advance

The AcroPrep™ Advance filter plate portfolio includes a variety of membrane types and pore sizes to provide the best possible performance for a wide range of sample preparation and high throughput screening applications. AcroPrep™ Advance filter plates are ideal for concentration, purification and desalting of proteins and peptides; bead and chromatography resin-based applications; gross fractionation and lysate clarification; and general filtration.

AcroPrep™ Advance 96-well filter plates for solvent filtration

Applications include metabolic studies, molecular or drug synthesis reactions, sample preparation using solvents, and aggressive filtration applications.

- Chemically resistant materials provide a stable platform to process samples in organic solvents
- Low non-specific binding - inert materials of construction ensure complete recovery of samples
- Well geometry results in faster, more uniform filtration rates across the plate with reduced hold-up volume
- Output tip geometry provides direct flow of samples into receiver plate without concerns about cross contamination

Dimensions	
Length:	128 mm
Width:	86 mm
Height (with lid):	18 mm (350 µl only)
Height (without lid):	14 mm (350 µl); 33 mm (1 ml); 47 mm (2 ml)
Well bottom area:	0,25 cm^2
Recommended operating vacuum:	≥254 mm Hg
Recommended centrifugal force:	1500 ×g
Materials of construction:	Filter media: PTFE (polytetrafluoroethylene) membrane or GHP (hydrophilic polypropylene) membrane Plate housing: PP Lid: PS

Description	Well volume (µl)	Recommended working volume (µl)	Pk	Cat. No.
AcroPrep™ Advance, 350 µl, 0,2 µm PTFE membrane	350	≤300	10	**738-0109**
AcroPrep™ Advance, 350 µl, 0,45 µm PTFE membrane	350	≤300	10	**738-0110**
AcroPrep™ Advance, 1 ml, 0,2 µm GHP membrane	1000	≤900	5	**518-0051**
AcroPrep™ Advance, 1 ml, 0,45 µm GHP membrane	1000	≤900	5	**518-0052**

PALL Life Sciences

Filter plates, 96-well, for ultrafiltration, AcroPrep™ Advance

The AcroPrep™ Advance filter plate portfolio includes a variety of membrane types and pore sizes to provide the best possible performance for a wide range of sample preparation and high throughput screening applications. AcroPrep™ Advance filter plates are ideal for concentration, purification and desalting of proteins and peptides; bead and chromatography resin-based applications; gross fractionation and lysate clarification; and general filtration.

AcroPrep™ Advance 96-well filter plates for ultrafiltration

Applications include size exclusion, PCR clean-up, nucleic acid purification, and protein separation.

- High biomolecule recovery - Omega® membrane typically results in ≥90% recovery of target biomolecules
- Well geometry results in faster, more uniform filtration rates across the plate with reduced hold-up volume for maximum sample recovery
- Low non-specific binding - intrinsic plate and membrane properties prevent target molecules from binding to the plate

Dimensions	
Length:	128 mm
Width:	86 mm
Height (with lid):	18 mm (350 µl only)
Height (without lid):	14 mm (350 µl); 33 mm (1 ml)
Well bottom area:	0,25 cm^2
Recommended operating vacuum:	≥254 mm Hg
Recommended centrifugal force:	1500 ×g
Typical vacuum filtration performance:	10K Omega: processing time 20 mins; hold up volume 5 µl 30K Omega: processing time 8 mins; hold up volume 6 µl 100K Omega: processing time 4 mins; hold up volume 7 µl
Typical centrifugal filtration performance:	3K Omega: processing time 45 mins; hold up volume 2 µl 10K Omega: processing time 8 mins; hold up volume 2 µl 30K Omega: processing time 8 mins; hold up volume 2 µl 100K Omega: processing time 5 mins; hold up volume 2 µl
Materials of construction:	Filter media: Omega® (modified polyethersulfone) membrane Plate housing: PP Lid: PS

Continued on next page

Continued from previous page

Description	Well volume (µl)	Recommended working volume (µl)	Pk	Cat. No.
AcroPrep™ Advance, 350 µl, Omega™ 3K MWCO	350	≤300	10	**518-0027**
AcroPrep™ Advance, 350 µl, Omega™ 10K MWCO	350	≤300	10	**518-0032**
AcroPrep™ Advance, 350 µl, Omega™ 30K MWCO	350	≤300	10	**518-0028**
AcroPrep™ Advance, 350 µl, Omega™ 100K MWCO	350	≤300	10	**518-0029**
AcroPrep™ Advance, 1 ml, Omega™ 3K MWCO	1000	≤900	5	**738-0123**
AcroPrep™ Advance, 1 ml, Omega™ 10K MWCO	1000	≤900	5	**738-0124**
AcroPrep™ Advance, 1 ml, Omega™ 30K MWCO	1000	≤900	5	**738-0125**
AcroPrep™ Advance, 1 ml, Omega™ 100K MWCO	1000	≤900	5	**738-0126**

Vacuum filtration systems

VWR COLLECTION

STERILE SELECTED FOR YOU

Bottle top filtration systems

Designed for the preparation of buffers, tissue culture media, microbiological media and other biological fluids. These vacuum filtration systems feature large diameter Pall membranes for guaranteed performance and maximum throughput. The bottle-top filtration system design includes a receiver bottle with an ergonomic shape, moulded finger grips and a patented bottle cap. The centrifuge tube and funnel system, allows the user to filter fluids directly into a 15 ml or 50 ml tube.

Each separate piece is compatible with the Quick-Connect™ pedestal base, which allows for a convenient one-time vacuum hose connection and one handed operation. A cradle ring is also available for use with existing laboratory stands. Systems are available with 0,1 µm (mycoplasma filtering grade), 0,2 µm (sterilising grade) or 0,45 µm (clarification grade) asymmetric PES membranes. All items are made from FDA-grade, Class VI materials and are gamma sterilised.

- Quick-Connect™ pedestal base or cradle ring allows for hands-free filtration. Weighted for extra stability
- Quick-Connect™ pedestal base ensures that the unit is always correctly placed
- Forward-facing, large, raised graduation marks allow for easy visualisation of volumes
- Vacuum on/off switch located at the front
- Vacuum hose adapter to use with conventional filtration set ups

Delivery information: Complete system includes filtration funnel, media bottle or centrifuge tube and hose adapter.

Description	Membrane	Capacity (ml)	Pore size (µm)	Membrane Ø (mm)	Pk	Cat. No.
Complete filtration units						
Centrifuge tube filtration unit	PES	15	0,1	40	24	**514-0367**
Centrifuge tube filtration unit	PES	15	0,2	40	24	**514-0317**
Centrifuge tube filtration unit	PES	15	0,45	40	24	**514-0318**
Centrifuge tube filtration unit	PES	50	0,1	40	24	**514-0366**
Centrifuge tube filtration unit	PES	50	0,2	40	24	**514-0308**
Centrifuge tube filtration unit	PES	50	0,45	40	24	**514-0309**
Media bottle filtration unit	PES	250	0,1	66	12	**514-0348**
Media bottle filtration unit	PES	250	0,2	66	12	**514-0296**
Media bottle filtration unit	PES	250	0,45	66	12	**514-0299**
Media bottle filtration unit	PES	500	0,1	90	12	**514-0349**
Media bottle filtration unit	PES	500	0,2	90	12	**514-0297**
Media bottle filtration unit	PES	500	0,45	90	12	**514-0300**
Media bottle filtration unit	PES	1000	0,1	90	12	**514-0350**
Media bottle filtration unit	PES	1000	0,2	90	12	**514-0298**
Media bottle filtration unit	PES	1000	0,45	90	12	**514-0301**
Filtration funnels only						
Filtration funnel for centrifuge tube	PES	15	0,1	40	30	**514-0363**
Filtration funnel for centrifuge tube	PES	15	0,2	40	30	**514-0364**
Filtration funnel for centrifuge tube	PES	15	0,45	40	30	**514-0365**
Filtration funnel for centrifuge tube	PES	50	0,1	40	30	**514-0359**
Filtration funnel for centrifuge tube	PES	50	0,2	40	30	**514-0360**
Filtration funnel for centrifuge tube	PES	50	0,45	40	30	**514-0362**
Filtration funnel for media bottle	PES	250	0,1	66	24	**514-0354**
Filtration funnel for media bottle	PES	250	0,2	66	24	**514-0302**
Filtration funnel for media bottle	PES	250	0,45	66	24	**514-0305**
Filtration funnel for media bottle	PES	500	0,1	90	24	**514-0355**
Filtration funnel for media bottle	PES	500	0,2	90	24	**514-0303**
Filtration funnel for media bottle	PES	500	0,45	90	24	**514-0306**

Continued on next page

Continued from previous page

Description	Membrane	Capacity (ml)	Pore size (µm)	Membrane Ø (mm)	Pk	Cat. No.
Filtration funnels only						
Filtration funnel for media bottle	PES	1000	0,1	90	24	**514-0358**
Filtration funnel for media bottle	PES	1000	0,2	90	24	**514-0304**
Filtration funnel for media bottle	PES	1000	0,45	90	24	**514-0307**

Description	Pk	Cat. No.
Accessories		
Quick-Connect™ pedestal base	1	**514-0319**
Cradle ring	1	**514-0324**

VWR COLLECTION

STERILE

SELECTED FOR YOU

Media bottles with cap

391-0314

391-0315

PS, PC or PETG, with PP screw cap, sterile

VWR Collection disposable, round, Easy Grasp media bottles have been designed for storage of sterile solutions, such as tissue culture media, serum and buffers. These bottles are available in three low extractable plastics: polycarbonate which can withstand up to three autoclave cycles and offers good alcohol resistance; polystyrene for general purpose cell culture aqueous solutions; and PETG for most general laboratory solution storage.

- Sloped design improves bottle stability when placed on the work surface
- Narrow bottle shoulder combined with moulded finger grips improves the ability to securely grip the bottle with gloved hands
- Easy Grasp bottle cap facilitates uncapping, tightening and bottle stacking, as well as providing a convenient gripping surface while transporting

Manufactured with class VI materials in a ISO 13485 facility

Capacity (ml)	Pk	Cat. No.
PS bottles with PP cap, sterile		
250	24	**391-0283**
500	24	**391-0284**
1000	24	**391-0286**
PC bottles with PP cap, sterile		
250	24	**391-0297**
500	24	**391-0298**
1000	24	**391-0299**
PETG bottles with PP cap, sterile		
250	24	**391-0294**
500	24	**391-0295**
1000	24	**391-0296**
PS bottles with PP cap, non sterile		
250	24	**391-0317**
500	24	**391-0318**
1000	24	**391-0319**
PC bottles with PP cap, non sterile		
250	24	**391-0321**
500	24	**391-0322**
1000	24	**391-0323**
PETG bottles with PP cap, non sterile		
250	24	**391-0314**
500	24	**391-0315**
1000	24	**391-0316**

Vacuum filtration systems, Standard Line

PS funnel and collection reservoir

Systems for vacuum filtration of aqueous solutions including cell culture media, buffers or other biological fluids. Once filtration is complete, solution can be stored in the collection reservoir until needed.

PES membrane: Low protein binding and low extractables. Ideal for tissue culture applications.

0,2 µm: Ideal for sterilisation applications and media preparation

0,45 µm: Ideal for buffer clarification

- Each individual unit is lot numbered for traceability
- Once filtration is complete, solution can be stored in the collection reservoir until needed

Non pyrogenic, non cytotoxic

ISO 10993-5, 1999

Packaging: Individually packaged in easy to peal bags, receiver bottle cap is individually wrapped.

Delivery information: Includes the filtration funnel with either 0,2 µm, or 0,45 µm PES membrane, vacuum port, lid, collection reservoir and cap for storage.

Description	Capacity (ml)	Pore size (µm)	Membrane Ø (mm)	Pk	Cat. No.
Complete filtration units					
Complete filtration unit	150	0,20	50	12	**514-0328**
Complete filtration unit	150	0,45	50	12	**514-0329**
Complete filtration unit	250	0,20	50	12	**514-0330**
Complete filtration unit	250	0,45	50	12	**514-0331**
Complete filtration unit	500	0,20	75	12	**514-0332**
Complete filtration unit	500	0,45	75	12	**514-0333**
Complete filtration unit	1000	0,20	91	12	**514-0334**
Complete filtration unit	1000	0,45	91	12	**514-0335**
Filtration cups only					
Filtration cup	150	0,20	50	24	**514-0336**
Filtration cup	150	0,45	50	24	**514-0337**
Filtration cup	250	0,20	50	24	**514-0338**
Filtration cup	250	0,45	50	24	**514-0339**
Filtration cup	500	0,20	75	24	**514-0340**
Filtration cup	500	0,45	75	24	**514-0341**
Filtration cup	1000	0,20	91	24	**514-0342**
Filtration cup	1000	0,45	91	24	**514-0343**
PS reservoir bottles (caps included)					
Reservoir bottle with cap	150			24	**514-0344**
Reservoir bottle with cap	250			24	**514-0345**
Reservoir bottle with cap	500			24	**514-0346**
Reservoir bottle with cap	1000			24	**514-0347**

PALL Life Sciences

STERILE

Bottle top filters, VacuCap®

Polyethersulfone membrane with acrylic housing, sterile

Gamma sterilised bottle top filters for fast vacuum filtration of 100 ml to 5 litres of aqueous solutions. Patented small design accepts a variety of collection vessels and reduces storage space and waste.

Type	Pore size (µm)	Membrane Ø (mm)	Filtration area (cm^2)	Pk	Cat. No.
VacuCap® 60	0,1	60	30	10	**515-0016**
VacuCap® 60	0,2	60	30	10	**515-0017**
VacuCap® 60	0,45	60	30	10	**515-0018**
VacuCap® 60	0,2**	60	30	10	**516-9813**
VacuCap® 60 PF	0,8/0,2 *	60	30	10	**515-0019**
VacuCap® 90	0,1	90	60	10	**515-0012**
VacuCap® 90	0,2	90	60	10	**515-0013**
VacuCap® 90	0,45	90	60	10	**515-0014**
VacuCap® 90	0,2 **	90	60	10	**516-9812**
VacuCap® 90	0,45 **	90	60	10	**515-0155**
VacuCap® 90 PF	0,8/0,2 *	90	60	10	**515-0015**

Description	Pk	Cat. No.
Accessories		
Feedline accessory kit	1	**516-6919**

* with prefilter
** with individually attached tubing

Culturing embryonic stem cells using media filtered with Thermo Scientific Nalgene Rapid-Flow PES filter units to reduce contamination risk

Robert Scott, Stephanie Carter, Cindy Neeley and Joseph Granchelli

KEY WORDS

Thermo Scientific™ Nalgene™ Rapid-Flow™, PES filters, stem cells, embryonic stem cells, leukemia inhibitory factor, pluripotency.

Eliminating contamination is important in cell culture and sterile filtering of media is a standard practice to reduce the possibility of introducing contaminants to the culture system. However, due to the fastidious nature of embryonic stem cells (ESC), this common precautionary measure is often curtailed for fear of removing critical media components or adding deleterious compounds during the filtration process. Therefore, many stem cell researchers forego filtering certain media components such as growth factors, leading to higher risk of contamination. The purpose of this study is to show that Rapid-Flow PES filters do not remove critical media components or add harmful elements, and that ESC grown in media filtered through Rapid-Flow PES filters maintain normal growth and pluripotency.

INTRODUCTION

Maintaining pluripotent cells in culture represents a unique challenge for stem cell researchers. The culture system has to be closely controlled since any changes may easily trigger spontaneous differentiation or cell death. Growth factors, such as the leukaemia inhibitory factor (LIF) normally expressed in the trophoectoderm of the developing embryo, are often added to the culture media to promote long-term maintenance and prevent unwanted differentiation of pluripotent stem cells. The cost of these media supplements is often high, but they are critical in maintaining the pluripotency of cells. Therefore, it is important to ensure that growth factors are maintained in the growth media at the proper concentrations.

Growth media for cell culture is often sterile filtered in an effort to minimise the risk of contamination. Polyethersulphone (PES) membrane filters are used for this purpose due to the low protein binding and low extractable properties of the material. Filtering media for highly sensitive stem cells, however, introduces the possibility of removing important growth factors or adding compounds from the filter that may adversely affect the culture. To avoid this, many researchers add the most critical components (e.g. LIF) to the media after filtering.

While this preserves the integrity of these components, it can be a vehicle for contamination. Here we show that filtering stem cell growth media using Rapid-Flow PES filter units does not remove substantial amounts of LIF, nor does it add compounds that impair the growth of cells. Finally, filtering the complete stem cell growth media using Nalgene Rapid-Flow PES filter units does not adversely affect stem cells, allowing them to maintain their normal growth and pluripotency characteristics.

EQUIPMENT

Mutidrop Combi plate dispenser, Thermo Scientific Varioskan Flash spectrophotometer, Thermo Scientific.

Thermo SCIENTIFIC

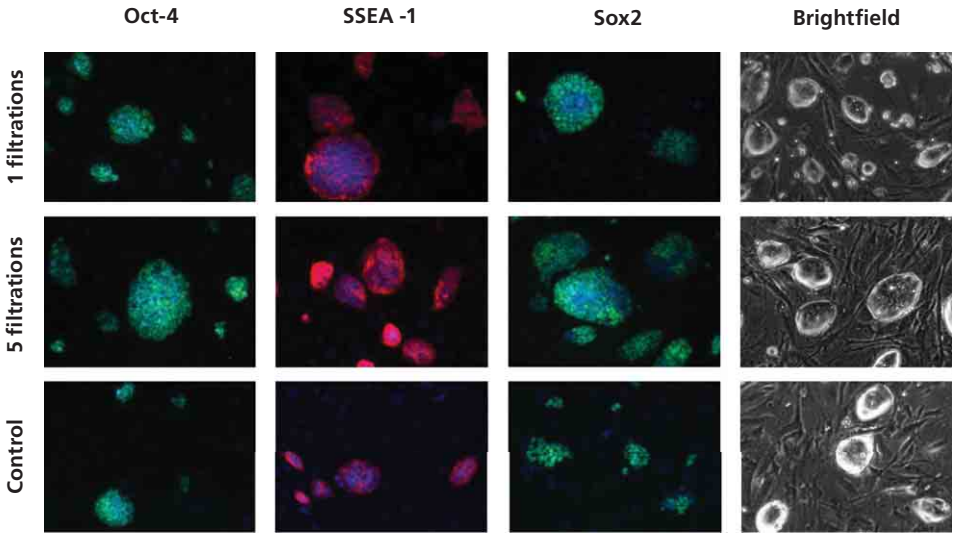


Figure 1. Immunofluorescence staining of pluripotent markers on mESC after being cultured for 5 passages in filtered media. 1 filtration = media filtered once after formulation; 5 filtrations = media filtered 5 times after formulation; and Control = media not filtered. Cells were counterstained with DAPI nuclear stain. mESC cultured in filtered media yielded comparable results to unfiltered controls.

METHODS

Mouse LIF ELISA

All reagents were prepared according to the instructions for use of the Mouse LIF ELISA Quantikine assay kit (R&D Systems). 1500 ml of Mouse ESC complete media was prepared and divided into three 500 ml aliquots. Each aliquot was filtered through ten 500 ml Rapid-Flow units of the same lot, and a sample of media was removed for testing after each filtration. Three different lots of the Rapid-Flow filters were used. New filter units were used for each filtration. Media samples were diluted 1:4 with PBS and tested according to LIF ELISA kit instructions. Plates were read on the Thermo Scientific Varioskan at 450 nm. A reference reading at 570 nm was subtracted from the test absorbance to eliminate background absorbance. The corrected absorbencies of the calibrator series were used to create a calibration curve with an R^2 value of 0.99. Linear regression analysis was then used to calculate the LIF concentration of the unknown samples.

Mouse Embryo Assay (MEA)

Mouse embryo assay testing was conducted using an independent third-party Quality Control testing laboratory. Briefly, three 50 ml batches of embryo culture media were filtered through Rapid-Flow filters from three different lots. Four 0.7 µl droplets of filtered media were placed in the wells of a Nunc IVF Multidish, and 21 embryos were cultured in the media for each filter lot. 15 embryos were cultured separately in unfiltered media as controls. Embryos were monitored for 96 hours to determine their progression to blastocyst stage. Embryos were scored after this time, and a result greater than 70% of embryos progressing to blastocyst stage was considered a passed test.

Stem cell culture

Stem cells were obtained from an established pluripotent culture of mESC. Seven batches of mESC growth medium were prepared and sterile filtered prior to adding LIF. After adding LIF, 3 of the batches were filtered once using Rapid-Flow filter units of 3 different lots. An additional 3 batches of medium were filtered 5 times using Rapid-Flow filter units of 3 different lots. Each filtration was performed using a new filter unit. mESC were seeded on Nunc 6-well Multidishes with mitotically inactivated Mouse Embryonic Fibroblast (MEF) feeder cells previously seeded in MEF specific growth media. MEF media was exchanged with test media upon mESC seeding. Cultures were maintained on 6-well dishes with MEFs through 5 passages. Cells were grown 2 days between passages and media was changed on each day between passages. All feeding and passaging was performed with the proper medium batch corresponding to the test condition. Brightfield photographs were taken in the fifth passage of cells on 6-well Multidishes. Also on the fifth passage, an additional Nunc 96-well optical bottom plate was cultured with mESC for approximately 30 hours before immunostaining of pluripotency markers.

Immunocytochemistry

Immunocytochemistry was performed in a Nunc 96-well optical bottom plate with a MEF feeder layer. Cells were fixed with 4% paraformaldehyde solution for 15 minutes. Cells were rinsed 3 times with DPBS and were blocked with 10% goat

serum diluted in DPBST (DPBS with 0.1% TX-100) for 30 minutes at room temperature. Primary antibodies, SSEA-1, Oct-4, and Sox2 were diluted 1:400 in blocking solution and were added for an overnight incubation at 2 – 8 °C. The cells were rinsed with DPBST 3 times and the appropriate secondary antibody (Alexa-488-gAM IgG, Alexa 488-gAR IgG, and Alexa 555-gAM IgM) diluted 1:1000 in blocking solution were incubated for 1 hour at room temperature. Cells were rinsed once with DPBST and DAPI diluted 1:1000 in DPBS was incubated for 5 minutes at room temperature. Cells were rinsed 2 times with DPBST followed by 2 washes with DPBS. The cells were stored in the second DPBS wash in the dark at 2 – 8 °C until image analysis was completed. Brightfield and fluorescent images were visualised with a Zeiss Axiovert 200 microscope and images were acquired with a Photometrics CoolSNAP ES2 camera. Image analysis was completed with AxioVision software.

RESULTS AND DISCUSSION

Nalgene Rapid-Flow PES filters do not diminish LIF content in the mESC growth media

The amount of LIF in mESC complete media was measured following successive filtration. ELISA results indicate that one time filtration did not appreciably affect the LIF concentration. Even over the course of 10 filtrations, no more than 5% of LIF in the growth media is lost to filtration.

Nalgene Rapid-Flow PES filters do not add deleterious compounds to the filtered media

The highly sensitive Mouse Embryo Assay was conducted to assess potential harmful additions to the culture media from the filtration process. For 2 out of 3 tested filter lots, 95% of mouse embryos tested grew to blastocyst stage by 96 hours. For the remaining filter lot, 100% of the embryos progressed to blastocyst stage after 96 hours. These results indicate that filtering of media using Nalgene Rapid Flow PES filters does not add any deleterious compounds to the media that will affect cell growth.

Media filtered with Nalgene Rapid-Flow PES filters support mESC growth and pluripotency

Mouse embryonic stem cells were cultured on feeder cells through 5 passages using filtered medium. The mESC proliferated well throughout the span of the culture and displayed normal ESC morphology (Figure 2, brightfield). The mESC pluripotency was evaluated by immunofluorescence staining of SSEA-1, OCT-4, and Sox2 markers (Figure 1). In both brightfield and immunostained conditions, mESC cultured in filtered media yield comparable results as that of the control. These results indicate that mESC pluripotency was maintained throughout the time in culture with filtered medium containing LIF.

DISCUSSION

Multiple media filtrations were conducted during this study in order to magnify any possible effect the filtration may have. For each successive filtration a new filter unit was used so that any compound that may have been removed by filtration would be truly eliminated, and any compound that may have been added by the filter would continue to be added as new filters were used. Such stringent conditions are unlikely under normal application usage, however, such a study ensures that any minimal effect that filtering may have becomes apparent during experimentation.

Despite the extreme conditions posed by multiple media filtrations, embryonic stem cells continued to grow well and maintain pluripotency throughout the passages. These results indicate Nalgene Rapid-Flow PES filters are a safe solution for maintaining sterility in stem cell cultures.

CONCLUSION

- Nalgene Rapid-Flow filter units do not retain nor add components to the filtered media
- ESC grown in complete media filtered through Rapid-Flow PES filter units maintain normal growth and pluripotency
- Nalgene Rapid-Flow PES filter units are a safe solution for maintaining sterility in stem cell cultures

Materials	Cat. No.
Rapid-Flow PES filter units, Nalgene	514-0025
Mouse embryonic stem cells (mESC) PRX-6BN, Primogenix	SV30109.01
Mouse embryonic fibroblasts, GlobalStem	GSC-6001G
Mouse LIF Quantikine Assay, R&D Systems	MLF00
Anti-Sox2 antibody, Cell Signaling	4900S
Anti-Oct-4 antibody, Millipore	MAB4419
ES Cell Characterization Kit with anti-SSEA-1 antibody, Millipore	SCR001
DAPI, Thermo Scientific Pierce™ Protein Research	62248*
Growth media	
- AdvanceSTEM DMEM, Thermo Scientific HyClone™	SH30824.01*
- DMEM/High Glucose, HyClone	SH30022.01*
- Fetal bovine serum, HyClone	SH3007003*, SH3007003EH*
- Penicillin-Streptomycin, Hyclone	SV30010*
- SG-200, HyClone	SH30590.01*
- Nucleosides, Millipore	ES-008-D
- 2-Mercaptoethanol, Sigma™	M7522
- Leukaemia inhibitory factor, Millipore	ESG1107
- HTF, LifeGlobal™	GMHT
DPBS, HyClone	SH30028.02*
0.1% Gelatine in sterile water, Millipore	ES-006-B
6-well Multidish, Thermo Scientific Nunc™	391-8036
96-well optical bottom plate, Nunc	734-2088
4-well IVF Multidish, Nunc	734-1175

**Thermo Scientific products*

Vacuum filtration units, Rapid-Flow™ filters MF 75, Nalgene®
Thermo Scientific

Hydrophilic PES membrane, PS graduated housing, sterile

Ideal for biological and pharmaceutical sterilisation requirements. Universal tissue culture membrane with lowest protein binding and extractables. Rapid-Flow™ filters with 0,2 µm PES membranes are STEM CELL TESTED.

- 0,1 µm filters guard against mycoplasma contamination
- 0,2 µm filters remove all bacteria, ideal for sterilisation
- 0,45 µm filters for particle removal and fluid clarification
- 90 mm diameter filters provide large surface area for serum and other hard to filter solutions
- The new multi-column design of the membrane support delivers uniformity and consistency. The Rapid-Flow™ membrane support coupled with the PES membranes offers fast flow rates and higher throughput

Description	Capacity (ml)	Pore size (µm)	Membrane Ø (mm)	Pk	Cat. No.
Complete unit	115	0,2	50	12	**514-0023**
Complete unit	150	0,1	50	12	**514-0612**
Complete unit	150	0,2	50	12	**514-0024**
Complete unit	150	0,45	50	12	**734-5033**
Complete unit	250	0,1	50	12	**514-0614**
Complete unit	250	0,2	50	12	**514-0027**
Complete unit	250	0,45	50	12	**734-5039**
Complete unit	500	0,1	75	12	**514-0613**
Complete unit	500	0,2	75	12	**514-0025**
Complete unit	500	0,45	75	12	**734-5035**
Complete unit	500	0,2	90	12	**514-0028**
Complete unit	500	0,45	90	12	**734-5041**
Complete unit	1000	0,1	90	12	**514-0378**
Complete unit	1000	0,2	90	12	**514-0026**
Complete unit	1000	0,45	90	12	**734-5037**
Top filter for 33 mm neck	150	0,2	50	12	**514-0031**
Top filter for 45 mm neck	150	0,2	50	12	**514-0032**
Top filter for 33 mm neck	500	0,2	75	12	**514-0029**
Top filter for 45 mm neck	500	0,2	75	12	**514-0030**
Top filter for 33 mm neck	1000	0,2	90	12	**514-0033**
Top filter for 45 mm neck	1000	0,2	90	12	**514-0034**

Conical filter unit, Nalgene®
Thermo Scientific

Rapid-Flow™ PES membrane, PS housing, sterile

The optimal choice for small volume tissue culture work. Offers clean, fast filtration of 20 to 50 ml of media or buffers.

- Low protein binding
- Non-cytotoxic and non-pyrogenic

Delivery information: Comes assembled with 50 ml conical tube and a separate closure. Includes two reusable stands in each case.

Capacity (ml)	Pore size (µm)	Membrane Ø (mm)	Pk	Cat. No.
50	0,2	50	12	**514-0590**

Tube top vacuum filters
Corning

PS funnel, cellulose acetate membrane

- 50 mm diameter membrane
- Minimises unnecessary transfers by filtering directly into 50 ml centrifuge tube
- Includes two centrifuge tube stands with each case
- Each PP centrifuge tube is supplied with an individually wrapped cap for storage
- Individually packaged, sterile, certified non-pyrogenic

Membrane	Capacity (ml)	Pore size (µm)	Membrane Ø (mm)	Pk	Cat. No.
CA	150	0,22	50	12	**734-1831**
CA	150	0,45	50	12	**734-1830**

Vacuum filter systems
Corning

Vacuum filter systems available in four sizes: 150 ml; 250 ml; 500 ml and 1 l.

Adapters are colour coded by membrane type for easy product identification: polyethersulfone (PES) yellow; cellulose acetate (CA) orange; cellulose nitrate (CN) blue; nylon (NY) red.

- Angled hose connector simplifies vacuum line attachment
- Receiver bottles feature easy grip sides for improved handling
- Individually packaged, sterile, certified non-pyrogenic
- Caps for receiver bottles are sterile and individually packaged
- Extra plastic storage bottles are available

Membrane	Capacity (ml)	Pore size (µm)	Membrane Ø (mm)	Pk	Cat. No.
150 ml funnel/receiver bottle capacity, 50 mm diameter membrane					
PES	150	0,22	50	12	**513-3357**
CA	150	0,22	50	12	**513-3358**
CA	150	0,45	50	12	**513-3359**
250 ml funnel/receiver bottle capacity, 50 mm diameter membrane					
CA	250	0,22	50	12	**513-3346**
CA	250	0,45	50	12	**513-3347**
PES	250	0,22	50	12	**513-3354**
500 ml funnel/receiver bottle capacity, 70 mm diameter membrane					
CA	500	0,22	70	12	**513-3348**
CA	500	0,45	70	12	**513-3349**
PES	500	0,22	70	12	**513-3355**
PES	500	0,1	70	12	**514-0169**
1000 ml funnel/receiver bottle capacity, 90 mm diameter membrane					
CA	1000	0,45	90	12	**734-1845**
CA	1000	0,22	90	12	**734-1846**
PES	1000	0,22	90	12	**513-3356**
CA*	1000	0,22	90	12	**734-1900**
CA*	1000	0,45	90	12	**734-1901**
PES	1000	0,1	90	12	**514-0168**

* 500 ml funnel with 70 mm membrane

Bottle top vacuum filters
Corning

Bottle top vacuum filters with adaptors colour coded by membrane type: Polyethersulfone (PES) yellow; cellulose acetate (CA) orange; nylon (NY) red.

- Available in 33 mm and 45 mm neck sizes to fit most glass and plastic media storage bottles
- Individually packaged, sterile and certified non pyrogenic
- 45 mm neck sizes fit on Corning® plastic storage bottles

Membrane	Capacity (ml)	Pore size (µm)	Membrane Ø (mm)	Neck	Pk	Cat. No.
150 ml capacity, 50 mm diameter membrane						
CA	150	0,22	50	33 mm	48	**513-3361**
CA	150	0,45	50	33 mm	48	**513-3344**
CA	150	0,22	50	45 mm	48	**513-3360**
CA	150	0,45	50	45 mm	48	**513-3345**
PES	150	0,22	50	33 mm	48	**734-1890**
PES	150	0,22	50	45 mm	48	**734-1891**
500 ml capacity, 70 mm diameter membrane						
NY	500	0,2	70	45 mm	12	**734-1811**
CA	500	0,45	70	33 mm	12	**734-1841**
CA	500	0,22	70	45 mm	12	**734-1842**
CA	500	0,45	70	45 mm	12	**734-1843**
CA	500	0,22	70	33 mm	12	**734-1848**
PES	500	0,22	70	33 mm	12	**513-3362**
PES	500	0,22	70	45 mm	12	**525-3409**
1000 ml capacity, 90 mm diameter membrane						
CA	1000	0,22	90	45 mm	12	**734-1810**
PES	1000	0,22	90	45 mm	12	**734-1896**

Storage bottles, square, polycarbonate
Corning

PC, square

These storage bottles are easier to handle, require less space on the shelf or in the autoclave, and are ideal for mixing, sampling and storage.

- More break-resistant than other glass or plastic bottles
- Screened white enamel graduations are easier to see than moulded graduations
- Large white marking spot for easier identification
- Bottles can be autoclaved once at 121 °C and 15 psi (repeated autoclaving weakens PC and is not recommended)
- Can be stored up to –80 °C

Capacity (ml)	Cap size (mm)	Packed	Pk	Cat. No.
150	45	1/bag, 24 bags/case	24	**734-4205**
250	45	1/bag, 24 bags/case	24	**734-4206**
500	45	1/bag, 24 bags/case	24	**734-4207**
1000	45	1/bag, 24 bags/case	24	**734-4208**

Storage bottles, polystyrene
Corning

Easy Grip style

Traditional style

PS

Disposable polystyrene bottles for storage of media, buffers and other aqueous solutions

- Low profile, easy grip style has sides that facilitate handling
- Traditional style has smooth sides
- Plug seal caps (45 mm) provide an airtight seal and help minimise the risk of contamination
- Bottles can be used with Corning® vacuum filter systems
- Sterile, certified non-pyrogenic

Capacity (ml)	Cap size (mm)	Packed	Pk	Cat. No.
Corning® Easy Grip style storage bottles				
150	45	2/pack, 12 packs/case	24	**734-1897**
250	45	2/pack, 12 packs/case	24	**734-1824**
500	45	2/pack, 12 packs/case	24	**734-1825**
1000	45	2/pack, 12 packs/case	24	**734-1847**
Costar® traditional style storage bottles				
125	45	1/pack, 24 packs/case	24	**700-1786**
250	45	1/pack, 12 packs/case	12	**700-1785**
500	45	1/pack, 12 packs/case	12	**700-1787**
1000	45	1/pack, 12 packs/case	12	**700-1783**

Capsule filtration

PALL Life Sciences

Positive pressure filters, AcroCap™

Supor® (hydrophilic polyethersulfone) membrane, acrylic housing: 0,2 µm vent

Positive pressure filtration of aqueous laboratory solutions. For sterilisation or clarification of up to three litres of serum-free cell and tissue culture media, media additives and other aqueous solutions. Ideal for sterilisation of solutions that tend to foam when filtered under vacuum.

- Integral hydrophobic vent prevents air lock
- Reduce mycoplasma using 0,1 µm pore size membrane
- Sterilised by gamma irradiation to eliminate the risk of cytotoxic residuals

Water flow rate at 1 bar: 0,1 µm: 90 ml/min; 0,2 µm: 220 ml/min; 0,45 µm: 500 ml/min

Inlet/outlet 6,4 mm hose barb, inner accepts male Luer, removable filling bell attached to outlet

Max. pressure 2,1 bar

Max. temperature 55 °C

All products include one filter holder per package.

Pore size (µm)	Filtration area (cm^2)	Pk	Cat. No.
0,1	15	10	**515-0010**
0,2	15	10	**515-0009**
0,45	15	10	**515-0011**

PALL Life Sciences

Membrane filters, AcroPak™ 20

PP housing with PC filling bell, with upstream vent

Suitable for the sterile filtration of media and buffers up to 2 litres.

Inlet/outlet for tubing diameter 6,4 - 12,7 mm, outlet with filling bell

Max. pressure: 4,1 bar

Max. Temperature: 60 °C

Supor®

Hydrophilic polyethersulfone membrane with built-in prefilter

High flow rates, ideal for solutions where low protein binding is required. Not recommended for use with some ketones

Type	Pore size (µm)	Filtration area (cm²)	Pk	Cat. No.
Supor®*	0,8/0,2	20	3	**514-4097**

* sterile

PALL Life Sciences

Filtration capsules, AcroPak™ 200

PP housing, vent plug and support material, PC filling bell, Supor® EKV membrane

Designed for buffers, tissue culture media and other biological fluids.

- High filtration area and compact size are ideal for upscale trials
- Minimal hold-up volume
- Good wettability for reliable integrity test
- Gamma sterilised, non-pyrogenic and provided with a removable filling bell (except sanitary flange option)
- Very high flow rates and consistently higher total solution throughputs due to superior porosity over other membranes

Applications:

- Designed to quickly process difficult to filter solutions within 5 to 21 liter, such as serum, serum-supplemented culture media and ascites fluid
- Ideal in situations where rapid filtration or short processing times are essential

Filtration area (cm²)	220	
Inlet/outlet	6,4 - 12,7 mm stepped hose barb	13 mm sanitary flange
Dimensions	Housing Ø: 53 mm without vent, 67 mm with vent Housing length: 105 mm	Housing Ø: 53 mm without vent, 67 mm with vent Housing length: 73 mm
Max. temperature (°C)	60	
Max. pressure (bar)	4,1	

Type	Pore size (µm)	Pk	Cat. No.
AcroPak™ 200, with 6,4 - 12,7 mm stepped hose barb	0,2	3	**516-6942**
AcroPak™ 200, with 13 mm sanitary flange	0,2	3	**516-6943**

PALL Life Sciences

STERILE

Filtration capsules, AcroPak™ 200

PP housing with PC filling bell, with upstream vent, sterile

Suitable for the sterile filtration of media and buffers up to 20 litres.

Supor®

Hydrophilic polyethersulfone membrane with built-in prefilter

High flow rates, ideal for solutions where low protein binding is required. Not recommended for use with some ketones

Continued on next page

Continued from previous page

Inlet/outlet	6,4 - 12,7 mm Ø stepped hose barb with filling bell on outlet	6,4 mm MNPT/ 6,4 - 12,7 mm stepped barb
Max. temperature (°C)	60	
Max. pressure (bar)	4,1	

Type	Pore size (µm)	Filtration area (cm²)	Pk	Cat. No.
Supor®, 6,4 - 12,7 mm Ø stepped hose barb with filling bell on outlet	0,8/0,2	200	3	**514-4098**
Supor®, 6,4 mm MNPT/ 6,4 - 12,7 mm stepped barb	0,8/0,2	200	3	**514-0248**

PALL Life Sciences

STERILE

Filtration capsules, AcroPak™ 400, 800 and 1500

PP housing, vent plug and support material, PC filling bell, Supor® EKV membrane

For cost-effective filtration of buffers, tissue culture media and other biological solutions.

- Disposable design reduces labor costs associated with assembling, cleaning and testing stainless steel filter holders
- Encapsulated format
- Extended life with built-in MachV asymmetric prefilter layer for maximum flow and throughput performance
- Low adsorption and high chemical compatibility with hydrophilic PES membrane for high compatibility over the entire pH range and low protein binding
- Gamma-irradiated, non-pyrogenic and non-cytotoxic
- Inherently hydrophilic for reliable integrity testing

Applications:

- Suitable for sterile filtration of a wide range of fluids, including: buffers, biological fluids, cell culture media, ophthalmic products

Type	AcroPak™ 400		AcroPak™ 800		AcroPak™ 1500	
Filtration area (cm²)	375		750		1500	
Inlet/outlet	25 - 38 mm sanitary flange	13 mm hose barb	25 - 38 mm sanitary flange	13 mm hose barb	25 - 38 mm sanitary flange	13 mm hose barb
Dimensions	Housing Ø (including valves): 94 mm Housing length: 117 mm	Housing Ø (including valves): 94 mm Housing length: 157 mm		Housing Ø (including valves): 94 mm Housing length: 197 mm	Housing Ø (including valves): 94 mm Housing length: 174 mm	Housing Ø (including valves): 94 mm Housing length: 210 mm
Max. temperature (°C)	40					
Max. pressure (bar)	5,2					

Type	Pore size (µm)	Pk	Cat. No.
AcroPak™ 400, with 25 - 38 mm sanitary flange inlet/outlet connection, gamma-irradiated	0,2	1	**516-6946**
AcroPak™ 400, with 13 mm hose barb inlet/outlet connection with filling bell on outlet, gamma-irradiated	0,2	1	**516-6947**
AcroPak™ 800, with 25 - 38 mm sanitary flange inlet/outlet connection, gamma-irradiated	0,2	1	**516-6948**
AcroPak™ 800, with 13 mm hose barb inlet/outlet connection with filling bell on outlet, gamma-irradiated	0,2	1	**516-6949**
AcroPak™ 1500, with 25 - 38 mm sanitary flange inlet/outlet connection, gamma-irradiated	0,2	1	**516-6950**
AcroPak™ 1500, with 13 mm hose barb inlet/outlet connection with filling bell on outlet, gamma-irradiated	0,2	1	**516-6951**

PALL Life Sciences

AcroPak™ capsules 500, 1000 and 1500

Membrane: Supor® hydrophilic polyethersulfone; housing:PP; filling bell: PC; sterile

For filtration of liquids requiring prefiltration such as serum-containing media. Ideal for solutions requiring low protein binding. Ensure sterile, mycoplasma-free cell culture media with the 0,1 µm pore size.

• 100% integrity tested to assure sterile filtrate

Type	Sample volume	Water flow rate	Inlet/outlet	Max. temperature (°C)	Max. pressure (bar)	Filtration area (cm^2)
0,1/0,1 µm	50 l	0,2 l/min (0,1 bar)	6,4 - 12,7 mm hose barb with filling bell	60 (2,1 bar)	4,1	500
0,2/0,2 µm		0,6 l/min (0,1 bar)				
0,8/0,2 µm		1,1 l/min (0,1 bar)				
0,8/0,45 µm		1,13 l/min (0,1 bar)				
0,1/0,1 µm	100 l	0,4 l/min (0,1 bar)				1000
0,2/0,2 µm		1,1 l/min (0,1 bar)				
0,8/0,2 µm		1,6 l/min (0,1 bar)				
0,8/0,45 µm		2,5 l/min (0,1 bar)				
0,2/0,2 µm	150 l	1,6 l/min (0,1 bar)	12,7 mm straight hose barb			1500
0,8/0,2 µm		2,2 l/min (0,1 bar)				

Pore size (µm)	Filtration area (cm^2)	Pk	Cat. No.
0,1/0,1	500	1	**516-7544**
0,2/0,2	500	1	**516-7542**
0,8/0,2	500	1	**515-0001**
0,8/0,45	500	1	**515-0003**
0,1/0,1	1000	1	**516-7545**
0,2/0,2	1000	1	**516-7543**
0,8/0,2	1000	1	**515-0002**
0,8/0,45	1000	1	**515-0004**
0,2/0,2	1500	1	**515-0127**
0,8/0,2	1500	1	**515-0126**

Capsule filters, Polycap™
Whatman (GE Healthcare)

High purity PP housing which is free of adhesives or chemicals. Autoclavable.

Capsules with high filtration area suitable for use with large volumes of samples

Applications:

Polycap™ AS (Aqueous Solution) - recommended for filtering aqueous solutions. It combines a glass microfiber (GMF) prefilter and a nylon membrane, prolonging the life of the filter and allowing larger volumes and difficult samples to be filtered easily.

Polycap™ SPF (Serum Prefilter) - optimised for prefiltration applications and typically used upstream of a Polycap™ AS or a Polycap™ PES capsule.

Type	Filtration area (cm^2)	Inlet/outlet	Max. pressure (bar)
Polycap™ AS 75	820	Stepped barb for 6 - 10 mm tubing	4,1
		Stepped barb for 10 - 12 mm tubing	
Polycap™ SPF 36	260	Stepped barb for 6 - 10 mm tubing	
Polycap™ SPF 75	535		

Type	Pore size (µm)	Pk	Cat. No.
Polycap™ AS 75, nylon, with glass fibre prefilter, sterile	0,45	1	**515-0112**
Polycap™ AS 75, nylon, with glass fibre prefilter, sterile	1,0	1	**516-4441**
Polycap™ SPF 36, PES, with glass fibre prefilter	1,0	1	**515-0107**
Polycap™ SPF 75, PES, with glass fibre prefilter	1,0	1	**515-0110**

Ultrafiltration - Spin filters

PALL Life Sciences

Centrifugal devices, Nanosep®

Simple concentrating and desalting of 50 to 500 µl samples.

- Rapid processing of samples
- Typical recoveries are greater than 90%, available with low protein binding Omega™ membrane

Housing: Low binding PP.

Ultrasonically welded seals prevent bypass or seal failure.

Fits standard centrifuge rotors that accept 1,5 ml tubes.

MWCO (kD)	Colour code	Pk	Cat. No.
3	Grey	24	**516-8480**
3	Grey	100	**516-8481**
3	Grey	500	**516-0584**
10	Blue	24	**516-8490**
10	Blue	100	**516-8491**
10	Blue	500	**516-8492**
30	Red	24	**516-8501**
30	Red	100	**516-8502**
30	Red	500	**516-8503**
100	Transparent	24	**516-8519**
100	Transparent	100	**516-8520**
100	Transparent	500	**516-8521**
300	Orange	24	**516-8530**
300	Orange	100	**516-8531**
300	Orange	500	**516-8532**

PALL Life Sciences

Centrifugal devices, Microsep™ Advance and Macrosep® Advance

Microsep™ Advance centrifugal devices

Precise, quick recovery of microlitre volumes of concentrate.

- High recoveries, typically greater than 90%
- With deadstop to prevent samples from spinning to dryness
- Fits centrifuges that accept standard 17×100 mm tubes

Macrosep® Advance centrifugal devices

Quickly concentrates up to 20 ml of biological sample without valuable sample loss.

- High recoveries, typically greater than 90%
- With deadstop to prevent samples from spinning to dryness
- Low protein-binding Omega™ membrane and polypropylene housing minimise losses due to non specific binding
- Fits centrifuges that accept standard 50 ml conical tubes

Dead volume	Filtration area (cm^2)	Max. RCF (×g)	Sample volume (µl)	Temperature (°C)	Ø×H (mm)
Microsep™ Advance with Omega™ membrane					
>65 µl	3,3	14000	max. 5000	0 - 40	17×120
Microsep™ Advance with Supor® membrane					
>65 µl	3,3	14000	max. 5000	0 - 40	17×120
Macrosep® Advance with Omega™ membrane					
>450 µl	7,2	14000	max. 20000	0 - 40	50×120
Macrosep® Advance with Supor® membrane					
>450 µl	7,2	14000	max. 20000	0 - 40	50×120

MWCO (kD)	Pore size (µm)	Colour code	Pk	Cat. No.
Microsep™ Advance with Omega™ membrane				
1		Yellow	24	**516-9920**
1		Yellow	100	**516-0485**
3		Grey	24	**516-0370**
3		Grey	100	**516-0371**
10		Blue	24	**516-0372**

Continued on next page

Continued from previous page

MWCO (kD)	Pore size (µm)	Colour code	Pk	Cat. No.
Microsep™ Advance with Omega™ membrane				
10		Blue	100	**516-0373**
30		Red	24	**516-0374**
30		Red	100	**516-0375**
100		Clear	24	**516-0376**
100		Clear	100	**516-0377**
Microsep™ Advance with Supor® membrane				
	0,2	Aqua	24	**516-0378**
	0,2	Aqua	100	**516-0381**
	0,45	Lilac	24	**516-0382**
	0,45	Lilac	100	**516-0383**
Macrosep® Advance with Omega™ membrane				
1		Yellow	6	**516-0483**
1		Yellow	24	**516-9919**
1		Yellow	100	**516-0484**
3		Grey	6	**516-0354**
3		Grey	24	**516-0355**
3		Grey	100	**516-0356**
10		Blue	6	**516-0357**
10		Blue	24	**516-0358**
10		Blue	100	**516-0359**
30		Red	6	**516-0360**
30		Red	24	**516-0361**
30		Red	100	**516-0362**
100		Clear	6	**516-0363**
100		Clear	24	**516-0364**
100		Clear	100	**516-0365**
Macrosep® Advance with Supor® membrane				
	0,2	Aqua	24	**516-0366**
	0,2	Aqua	100	**516-0367**
	0,45	Lilac	24	**516-0368**
	0,45	Lilac	100	**516-0369**

PALL Life Sciences

Centrifugal devices, Jumbosep™

Convenient and reliable concentration, purification and diafiltration of 15 to 60 ml biological samples. Concentrate 60 ml sample volumes to 4 ml in 30 minutes.

- High recoveries, typically greater than 90%
- Built-in deadstop prevents spinning to dryness

Can be used with rotors for 250 ml tubes. Economical device as sample reservoir and filtrate receiver can be sanitised or autoclaved and reused.

Dead volume	0,2 ml
Filtration area (cm²)	15,2
Max. RCF (×g)	3000
Sample volume (µl)	Max. 60000
Temperature (°C)	0 - 40
Ø×H (mm)	60×113

MWCO (kD)	Colour code	Pk	Cat. No.
Starter kits			
3	Grey	1	**516-9342**
10	Blue	4	**516-8159**
30	Red	4	**516-8160**
100	Clear	4	**516-8161**
300	Orange	4	**516-8162**
*	—	4	**516-0581**

Continued on next page

Continued from previous page

Description	MWCO (kD)	Pk	Cat. No.
Membrane inserts			
Membrane insert	3	12	**516-9472**
Membrane insert	10	12	**516-8500**
Membrane insert	30	12	**516-8511**
Membrane insert	100	12	**516-8529**
Membrane insert	300	12	**516-8540**
Accessories			
Filtrate receiver and cap		12	**516-8157**

* without membrane insert

Ultrafiltration - TFF systems

PALL Life Sciences

Tangential flow filtration systems, Minimate™ TFF

Streamline laboratory scale concentration, desalting and buffer exchange processes up to 1 litre.

Applications

- Concentrate and desalt proteins, peptides or nucleic acids (DNA, RNA, oligonucleotides)
- Recover antibodies or recombinant proteins from clarified cell culture media
- Process metal sensitive enzymes and molecules
- Fractionate large from small biomolecules
- Concentrate viruses or gene therapy vectors
- Prepare samples prior to column chromatography
- Concentrate samples after gel filtration
- Depyrogenate water, buffers and media solutions

Description	Pk	Cat. No.
Minimate™ TFF system, complete with pump	1	**516-0186**
Minimate™ TFF system, complete with pump, UK-plug	1	**516-0205**

Description	Pk	Cat. No.
Accessories		
Reservoir assembly with stirrer, and gauge without pump	1	**516-0187**
Reservoir assembly with stirrer, and gauge without pump, UK-plug	1	**516-0206**

PALL Life Sciences

Tangential flow filtration capsules, Minimate™

Disposable TFF devices with Omega™ membrane for bioprocessing applications, accelerate and simplify processes of up to 1 litre. Scaleable.

MWCO (kD)	Pk	Cat. No.
0,65	1	**515-0124**
1	1	**515-0116**
3	1	**515-0117**
5	1	**515-0118**
10	1	**516-6879**
30	1	**516-6880**
50	1	**515-0119**
70	1	**515-0120**
100	1	**516-6881**
300	1	**515-0121**
500	1	**515-0122**
1000	1	**515-0123**

Description	Pk	Cat. No.
Accessories		
Minimate™ fitting kit: male Luer to 3,2 mm hose barb, female Luer to 3,2 mm hose barb, 3,2 mm i.d. tubing, tubing screw clamp, tubing clamps, adhesive strips (loop and hook)	1	**518-0075**

CELL CULTURE PLASTICWARE

Flasks - Treated 122

Cell scrapers 125

Flasks - Erlenmeyer 126

Dishes - Treated 129

Dishes - Non-treated 131

Multiwell plates - Treated 132

Multiwell plates - Non-treated 136

Microplates - Treated 138

Microplates - Non-treated 140

Inserts 142

Reconstruction of human epidermis using BRANDplates® Insert System 144

Slides - Chamber slides 150

Slides - Microscope slides 152

Tubes 153

Bioproduction - Flasks 157

Bioproduction - Roller bottles 158

Bioproduction - Spinner flasks 161

Bioproduction - Cell factories 163

Bioproduction - Bioreactors 166

Analysis of dialysed flask technology for antibody production 167

IVF 169

Flasks - Treated

Cell culture flasks, Standard Line

Crystal clear virgin PS, sterile and certified non pyrogenic

VWR Collection flasks are vacuum gas plasma treated for consistent cell attachment and growth. Vented caps incorporate a 0,22 µm hydrophobic filter to allow gas exchange and minimise risk of contamination. Plug seal caps can be used in closed systems (providing a liquid and gas-tight seal) or used in an open system (simply unscrew the cap one quarter of a turn).

- Angled neck design offers good pipette and cell scraper access
- Upper triangular and wide base shape provide better stability
- Volume graduations on both sides with special writing area
- Choice of vented or plug seal caps

Manufactured in 100 000 grade cleanroom environment.

Packaging: Packed in resealable self-standing bags allowing flasks to remain upright, lowering the risk of contamination.

Capacity (ml)	Cap	Culture area (cm^2)	Packed	Pk	Cat. No.
25	Plug seal	12,5	10/bag	200	**734-2310**
25	Vented	12,5	10/bag	200	**734-2309**
50	Plug seal	25	10/bag	200	**734-2312**
50	Vented	25	10/bag	200	**734-2311**
250	Plug seal	75	5/bag	100	**734-2314**
250	Vented	75	5/bag	100	**734-2313**
600	Plug seal	182,5	5/bag	40	**734-2316**
600	Vented	182,5	5/bag	40	**734-2315**
850	Plug seal	300	3/bag	18	**734-2601**
850	Vented	300	3/bag	18	**734-2600**

Cell culture flasks
Corning

Optically clear PS

Available with a choice of treated surface. Corning® CellBIND® Surface increases surface wetability for more even and consistent cell attachment. Ultra-Low Attachment flasks feature a covalently bound hydrogel layer that minimises cell attachment, protein absorption and cellular activation.

- Treated for optimal cell attachment
- Printed with lot numbers for ease in traceability
- Sterilised by gamma radiation
- Certified non pyrogenic

Cap	Description	Neck	Pk	Cat. No.
25 cm^2 growth area flasks				
Phenolic	Triangular, TC treated	Angled	500	**734-1531**
Vented	Triangular, TC treated	Angled	200	**734-1532**
Vented	Rectangular, CellBIND® surface	Canted	200	**734-0090**
Vented	Rectangular, Ultra-Low Attachment	Canted	24	**734-4140**
Plug seal	Rectangular, TC treated	Canted	500	**734-1700**
Phenolic	Rectangular, TC treated	Canted	500	**734-1706**
Vented	Rectangular, TC treated	Canted	200	**734-1712**
Vented	Rectangular, non-treated	Canted	200	**734-2272**

Continued on next page

Continued from previous page

Cap	Description	Neck	Pk	Cat. No.
75 cm² growth area flasks				
Phenolic	Modified triangular	Straight	100	**734-1543**
Vented	Modified triangular	Straight	100	**734-1544**
Vented	Rectangular, CellBIND® surface	Canted	100	**734-0091**
Vented	Rectangular, Ultra-Low Attachment	Canted	24	**734-4139**
Vented	Rectangular, TC treated	Canted	100	**734-1713**
Plug seal	Rectangular, TC treated	Canted	100	**734-1715**
Phenolic	Rectangular, TC treated	Canted	100	**734-1716**
Vented	Rectangular, non-treated	Canted	100	**734-2273**
92,6 cm² growth area RoboFlask™ vessels				
Flat (without septum)	Cell culture vessel for manual use, TC treated, with barcode	Straight	50	**734-4041**
Septum	Cell culture vessel for automation, CellBIND® surface, with barcode	Straight	100	**734-4042**
Septum	Cell culture vessel for manual use, TC treated, with barcode	Straight	50	**734-4044**
Septum	Cell culture vessel for manual use, TC treated, with barcode	Straight	100	**734-4045**
100 cm² growth area low profile flasks				
Vented	Low profile, CellBIND® surface	Canted	60	**734-4047**
Vented	Low profile, TC treated	Canted	60	**734-4141**
150 cm² growth area flasks				
Vented	Rectangular, CellBIND® surface	Canted	50	**734-0092**
Plug seal	Rectangular, TC treated	Canted	50	**734-1717**
Phenolic	Rectangular, TC treated	Canted	50	**734-1718**
Vented	Rectangular, TC treated	Canted	50	**734-1719**
162 cm² growth area flasks				
Phenolic	Traditional, TC treated	Canted	25	**734-1540**
Vented	Traditional, TC treated	Canted	25	**734-1541**
175 cm² growth area flasks				
Vented	Rectangular, CellBIND® surface	Angled	50	**734-0093**
Phenolic	Rectangular, CellBIND® surface	Angled	50	**734-1206**
Plug seal	Rectangular, TC treated	Angled	50	**734-1722**
Vented	Rectangular, TC treated	Angled	50	**734-1723**
Phenolic	Rectangular, TC treated	Angled	50	**734-1726**
Vented	Rectangular, TC treated, with barcode	Angled	84	**734-1733**
Vented	Rectangular, CellBIND® surface, with barcode	Angled	84	**734-1214**
Vented	Rectangular, non-treated	Angled	50	**734-2275**
225 cm² growth area flasks				
Phenolic	Rectangular, TC treated	Canted	24	**734-1519**
Vented	Rectangular, TC treated	Canted	24	**734-1520**
Vented	Traditional, CellBIND® surface	Angled	25	**734-0094**
Plug seal	Traditional, TC treated	Angled	25	**734-1724**
Vented	Traditional, TC treated	Angled	25	**734-1725**

STERILE

Cell culture flasks, Falcon®
Corning

PS, tissue culture-treated, sterile, non-pyrogenic

Vacuum-gas plasma tissue culture treatment ensures consistent cell attachment, spreading and growth.

- Easy to read printed volumetric graduations, and writing patch
- Vented caps incorporate a 0,2 µm hydrophobic membrane
- Phenolic caps contain non toxic liners
- Convenient, peel-open, medical-style packaging ensures flask sterility is maintained

Capacity (ml)	Cap	Growth area (cm²)	Neck	Pk	Cat. No.
25	Vented	12,5	canted	100	**734-0043**
25	Plug seal	12,5	canted	100	**734-0010**
50	Vented	25	canted	100	**734-0044**
50	Plug seal	25	canted	200	**734-0009**
70	Vented	25	canted	100	**734-0045**
70	Plug seal	25	canted	200	**734-0031**
250	Vented	75	straight	100	**734-0046**

Continued on next page

Continued from previous page

Capacity (ml)	Cap	Growth area (cm²)	Neck	Pk	Cat. No.
250	Plug seal	75	straight	100	**734-0012**
250	Vented	75	canted	60	**734-0050**
250	Plug seal	75	canted	60	**734-0049**
750	Vented	175	straight	40	**734-0047**
750	Vented	175*	straight	40	**734-0964**
750	Plug seal	175	straight	40	**734-0014**
600	Vented	150	canted	40	**734-0267**
600	Plug seal	150	canted	40	**734-0266**
800	Vented	225	canted	30	**734-0957**
800	Plug seal	225	canted	30	**734-1031**

Description	Pk	Cat. No.
Vented caps for Falcon® flasks		
Vented caps for 25 cm² flasks	100	**734-1066**
Vented caps for 75 cm² flasks	100	**734-1067**
Vented caps for 175 cm² flasks	50	**734-1068**

* Barcoded (robotics/automation compatible)
Note: Culture area and capacity are nominal

Cell culture flasks, Corning® Primaria™
Corning

PS, tissue culture-treated, sterile, non-pyrogenic

The complex surface on Corning® Primaria™ products is homogeneous and stable and is used to improve attachment and differentiation of a variety of cell types. The surface chemistry of Corning® Primaria™ products is confirmed by Electron Scanning for Chemical Analysis (ESCA).

- Nitrogen-containing tissue culture surface chemistry improves attachment, spreading and growth for many primary cells or cell lines
- Vented caps incorporate a 0,2 µm hydrophobic membrane
- Optically clear and no special storage required
- Convenient, peel-open packaging

Capacity (ml)	Cap	Growth area (cm²)	Neck	Pk	Cat. No.
50	Vented	25	Canted	100	**734-0073**
250	Vented	75	Straight	100	**734-0074**
50	Plug seal	25	Canted	200	**734-0075**
250	Plug seal	75	Straight	100	**734-0076**

Note: Growth area and capacity are nominal

Cell culture flasks, EasYFlasks™, Nunclon™Δ
Thermo Scientific

PS, sterile

Designed to allow full access to the growth surface.

- Flask is opened or closed with ⅓ turn of the cap
- "Y" Mark caps allow visual verification of vent position, even when stacked in incubators
- Volume graduations on both sides of the flask
- Angled neck facilitates easy access
- Nunclon™Δ certified surface treatment for optimal cell growth and attachment

Cap	Growth area (cm²)	Neck	Recommended working volume (ml)	Version	Pk	Cat. No.
Nunclon Delta-treated						
Vent/close	25	Angled	7	Nunclon Delta-treated	200	**734-2063**
Filter	25	Angled	7	Nunclon Delta-treated	200	**734-2064**
Vent/close	75	Angled	30	Nunclon Delta-treated	100	**734-2065**
Filter	75	Angled	30	Nunclon Delta-treated	100	**734-2066**
Filter	175	Angled	55	Nunclon Delta-treated	30	**734-2167**
Vent/close	175	Angled	55	Nunclon Delta-treated	30	**734-2168**
Vent/close	225	Angled	70	Nunclon Delta-treated	30	**734-1337**
Filter	225	Angled	70	Nunclon Delta-treated	30	**734-1338**

Continued on next page

Continued from previous page

Cap	Growth area (cm²)	Neck	Recommended working volume (ml)	Version	Pk	Cat. No.
Poly-D-Lysine or Collagen I coated						
Filter	25	angled	7	Poly-D-Lysine coated	60	**734-2281**
Filter	75	angled	25	Poly-D-Lysine coated	30	**734-2282**
Filter	175	angled	55	Poly-D-Lysine coated	30	**734-2283**
Filter	25	angled	7	Collagen I coated	60	**734-2284**
Filter	75	angled	25	Collagen I coated	30	**734-2285**
Filter	175	angeld	55	Collagen I coated	30	**734-2286**

Cell culture flasks, Nunclon™Δ
Thermo Scientific

PS, sterile

Cell culture flasks with surface areas from 25 to 500 cm², with filter or vent/close caps and straight or angled neck.

- Standard flasks have short, wide necks for easy access
- TripleFlasks have the same external dimensions as a standard 175 cm² flask, but have three parallel growth surfaces providing a total culture area of 500 cm², making them ideal for scale-up
- Excellent optical quality and individually leak-tested
- Nunclon™Δ certified surface treatment for optimal cell growth and attachment

Cap	Growth area (cm²)	Neck	Recommended working volume (ml)	Pk	Cat. No.
Standard flasks					
Filter	25	Angled	7	160	**734-2004**
Vent/close	80	Straight	30	50	**734-2046**
Vent/close	175	Straight	68	32	**734-2067**
Vent/close	25	Angled	7	160	**734-2081**
Filter	175	Straight	68	32	**734-2129**
Filter	80	Straight	30	50	**734-2131**
Filter	175	straight	68	32	**734-1340**
Triple flasks					
Vent/close	500	Straight	200	32	**734-2000**
Filter	500	Straight	200	32	**734-2001**

Cell scrapers

VWR COLLECTION

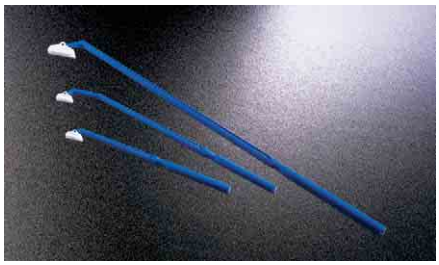
Cell scrapers and lifters

Specifically designed to make collecting of cells easier and more effective. Available with a choice of blade positions - scraper for use in flasks, or lifter for use in harvesting cells (especially stem cells) in dishes.

- Cross-ribbed handle in ABS provides a greater rigidity and ensures a better control while scraping cells
- Thin, flexible TPE blade prevents damage to cells
- Individually wrapped
- Sterilised by gamma irradiation
- Non pyrogenic

Description	Total length (mm)	Pk	Cat. No.
Cell scraper, blade width 20 mm	250	100	**734-2602**
Cell lifter, blade width 20 mm	250	100	**734-2603**
Cell scraper, blade width 30 mm	390	100	**734-2604**
Cell lifter, blade width 30 mm	390	100	**734-2605**

Cell scrapers, Falcon®
Corning



PS handle, TPE blade

Designed to provide maximum accessibility to the growth surfaces of a variety of culture vessels.

- Cross-ribbed PS handle provides greater rigidity, to ensure better control while scraping cells
- Highly compliant TPE blade pivots to provide multiple angles to remove cells from the entire growth surface

Description	Total length (mm)	Pk	Cat. No.
Cell scraper for use with 12.5 - 25 cm^2 vessels, 18 mm blade	180	100	**734-0385**
Cell scraper for use with 75 cm^2 vessels, 18 mm blade	250	100	**734-0386**
Cell scraper for use with 75 cm^2 vessels, 30 mm blade	250	100	**734-1111**
Cell scraper for use with 150 - 175 cm^2 vessels, 30 mm blade	400	100	**734-0387**

Cell scrapers and cell lifters
Corning

Useful for the manual harvesting of cells, scrapers are designed for use in flasks and cell lifters for use in harvesting cells (especially stem cells) in dishes.

- Blade design minimises cell damage and ensures even contact with the growth surface
- Individually wrapped
- Sterilised by gamma radiation
- Certified non-pyrogenic

Description	Total length (mm)	Pk	Cat. No.
Cell lifter, 19 mm blade, 180 mm handle	180	100	**734-1526**
Small cell scraper, 18 mm blade, 250 mm handle	250	100	**734-1527**
Large cell scraper, 30 mm blade, 390 mm handle	390	100	**734-1528**

Flasks - Erlenmeyer

Erlenmeyer flasks
Corning

Optically clear PC

Corning® baffled and plain Erlenmeyer flasks are ideal for shaker culture applications and storage.

- Baffled or plain bottom options in all sizes (125 ml to 3 l)
- Moulded-in graduations for accuracy
- Vent cap option for continuous gas exchange while ensuring sterility and preventing leakage
- Individually packaged and radiation sterilised for ease of use
- Certified non-pyrogenic

Continued on next page

Continued from previous page

Capacity	Cap	Neck	Pk	Cat. No.
Baffled bottom Erlenmeyer flasks				
125	Vented	Ø 26 mm	50	**734-4201**
125	Plug seal	Ø 26 mm	50	**734-4200**
250	Vented	Ø 31 mm	50	**734-4203**
250	Plug seal	Ø 31 mm	50	**734-4202**
500	Vented	Ø 43 mm	25	**734-4197**
500	Plug seal	Ø 43 mm	25	**734-4204**
1000	Vented	Ø 43 mm	25	**734-4199**
1000	Plug seal	Ø 43 mm	25	**734-4198**
2000	Vented	Ø 48 mm	6	**734-1905**
3000 ml (Fernbach)	Vented	Ø 70 mm	4	**734-1903**
Plain bottom Erlenmeyer flasks				
125	Vented	Ø 26 mm	50	**734-1885**
125	Plug seal	Ø 26 mm	50	**734-1832**
250	Vented	Ø 31 mm	50	**734-1886**
250	Plug seal	Ø 31 mm	50	**734-1820**
500	Vented	Ø 43 mm	25	**734-1887**
500	Plug seal	Ø 43 mm	25	**734-1833**
1000	Vented	Ø 43 mm	25	**734-1889**
1000	Plug seal	Ø 43 mm	25	**734-1888**
2000	Vented	Ø 48 mm	6	**734-1904**
3000 ml (Fernbach)	Vented	Ø 70 mm	4	**734-1902**

Description	Pk	Cat. No.
Aseptic transfer caps for Erlenmeyer flasks		
43 mm aseptic transfer cap for 1 l flask, 1/4" diptube, 0.2 µm vent, male PC connector	5	**734-4210**
43 mm aseptic transfer cap for 1 l flask, 1/8" diptube, 0.2 µm vent, male luer lock	5	**734-4209**
48 mm aseptic transfer cap for 2 l flask, 1/4" diptube, 0.2 µm vent, male PC connector	6	**734-4212**
48 mm aseptic transfer cap for 2 l flask, 1/8" diptube, 0.2 µm vent, male luer lock	6	**734-4211**
70 mm aseptic transfer cap for 3 l flask, 1/4" diptube, 0.2 µm vent, male PC connector	4	**734-4214**
70 mm aseptic transfer cap for 3 l flask, 1/8" diptube, 0.2 µm vent, male luer lock	4	**734-4213**
Replacement erlenmeyer flask caps		
Vent cap, 43 mm, for 500 ml and 1 l flask (made to order only, 5 case minimum)	50	**392-0292**
Flat cap, 48 mm, for 2 l flask	24	**734-4195**
Vent cap, 48 mm, for 2 l flask	24	**734-1215**
Flat cap, 70 mm, for 3 l flask	24	**734-4194**
Vent cap, 70 mm, for 3 l flask	24	**734-1216**

STERILE

Erlenmeyer culture flasks with screw caps, Nalgene®
Thermo Scientific

Clear PETG, with flat or baffled bottom

Sterile, disposable culture flasks reduce the risk of cross-contamination. Ideal for shaker and suspension cultures, and for preparing or storing media. Moulded-in graduations indicate approximate contents.

- Available with either spill-proof HDPE screw cap or vented screw cap with membrane
- Packaged individually for easy storage and handling
- Reduced risk of cross-contamination

Description	Cap	Pk	Cat. No.
Flat bottom flask, 2800 ml	Standard screw cap	4	**214-7107**
Baffled bottom flask, 2800 ml	Standard screw cap	4	**214-7108**
Flat bottom flask, 2800 ml	Vented closure with PTFE membrane	4	**214-7109**
Baffled bottom flask, 2800 ml	Vented closure with PTFE membrane	4	**214-7110**

Erlenmeyer flasks, disposable, with vented screw cap, Nalgene®
Thermo Scientific

PETG, crystal clear with blue HDPE vented screw cap, flat or baffled bottom

Ideal for shaker and suspension cell culture, media preparation or storage. HDPE closure has a hydrophobic 0,2 µm PTFE membrane that allows sterile gas exchange.

- Sterile disposable flasks reduce the chance for cross contamination
- Moulded-in graduations
- Flasks offer a five year shelf life, a 10^{-6} SAL, are non-pyrogenic and non-cytotoxic

Packaging: Individually packaged for easy storage and handling.

Capacity (ml)	Thread	Pk	Cat. No.
Flat bottom			
125	38-430	24	**214-7206**
250	38-430	12	**214-7207**
500	45-430	12	**214-7208**
1000	45-430	6	**214-7209**
2000	45-430	4	**214-7210**
Baffled bottom			
125	38-430	24	**214-7211**
250	38-430	12	**214-7212**
500	45-430	12	**214-7213**
1000	45-430	6	**214-7214**
2000	45-430	4	**214-7215**

Erlenmeyer flasks, disposable, with screw cap, Nalgene®
Thermo Scientific

PETG, crystal clear, with HDPE screw cap

Sterile, disposable Erlenmeyer flasks reduce the risk of cross-contamination. Ideal for shakers and suspension cultures, and for creating or storing media. Raised graduations for approximate reading of the contents.

- Spill-proof HDPE screw cap closure can be opened partially for venting by twisting a quarter turn
- Packaged individually for easy storage and handling
- Reduced risk of cross-contamination

Capacity (ml)	Thread	Pk	Cat. No.
125	38-430	24	**214-1925**
250	38-430	12	**214-0137**
500	45-430	12	**214-0138**
1000	45-430	6	**214-1926**
2000	45-430	4	**214-0139**

Erlenmeyer flasks, baffled, disposable, with screw cap, Nalgene®
Thermo Scientific

PETG, crystal clear, with HDPE screw cap

Sterile, disposable baffled Erlenmeyer flasks reduce the risk of cross-contamination. Ideal for shakers and suspension cultures, and for creating or storing media. Raised graduations for approximate reading of the contents.

- Spill-proof HDPE screw cap closure can be opened partially for venting by twisting a quarter turn
- Packaged individually for easy storage and handling
- Reduced risk of cross-contamination

Capacity (ml)	Thread	Pk	Cat. No.
125	38-430	24	**214-1927**
250	38-430	12	**214-0140**
500	45-430	12	**214-0141**
1000	45-430	6	**214-1928**
2000	45-430	4	**214-0142**

Dishes - Treated

VWR COLLECTION

STERILE

SELECTED FOR YOU

Cell culture dishes, Standard Line

Clear PS, sterile and certified non pyrogenic

VWR Collection dishes are vacuum gas plasma treated for consistent cell attachment and growth. Dishes are optically clear, making them suitable for microscopy.

- Flat bottom and uniform wall thickness ensure dishes are distortion-free
- Stacking rings for easier stacking and handling
- 60, 70 and 100 mm dishes have a gripping ring incorporated in the design
- Every inner bag is printed with a batch number for traceability

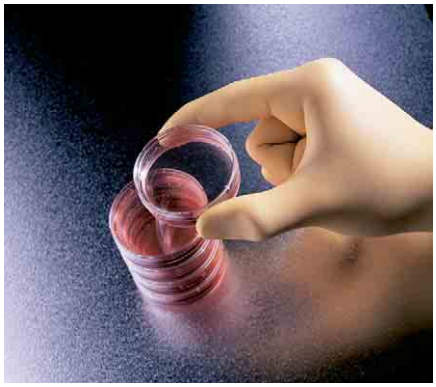
Manufactured in 100 000 grade cleanroom environment.

Packaging: Packed in resealable self-standing bags allowing dishes to remain upright, lowering the risk of contamination.

Description	Ø (mm)	Height (mm)	Growth area (cm²)	Packed	Pk	Cat. No.
Cell culture dish	35	12	8,5	10/bag	960	**734-2317**
Cell culture dish with gripping ring	60	18	21,2	10/bag	600	**734-2318**
Cell culture dish with gripping ring	70	15	36,3	10/bag	600	**734-2319**
Cell culture dish	90	17	55,0	10/bag	500	**734-2320**
Cell culture dish with gripping ring	100	22	60,8	10/bag	300	**734-2321**
Cell culture dish	150	22	143,0	1/bag	120	**734-2322**

Cell culture dishes, Corning® Primaria™

Corning



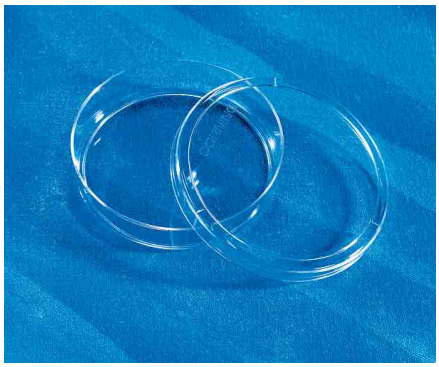
PS, sterile, with lid

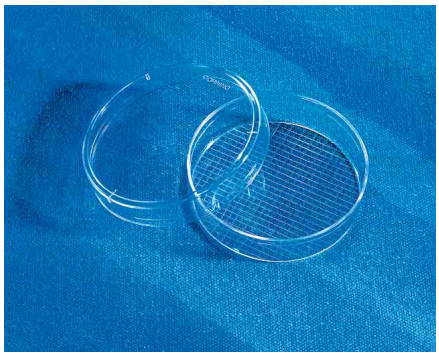
The gases used to manufacture Corning® Primaria™ contain both oxygen and ammonia, resulting in the incorporation in the surface of a variety of nitrogen-containing functional groups in addition to the negatively charged oxygen containing groups found on traditional tissue culture treated surfaces. The incorporation of nitrogen containing cations has been correlated to attachment and spreading of primary endothelial cells in a clonal cell-growth assay. The complex surface on Corning® Primaria™ products is homogeneous and stable and is used to improve attachment and differentiation of a variety of cell types. The surface chemistry of Corning® Primaria™ products is confirmed by Electron Scanning for Chemical Analysis (ESCA).

- Unique, nitrogen-containing tissue culture surface chemistry improves attachment, spreading and growth for many primary cells or cell lines
- Optically clear and no special storage required
- Convenient, peel open, medical-style packaging

Description	Ø (mm)	Height (mm)	Growth area (cm²)	Recommended working volume (ml)	Pk	Cat. No.
Culture dish, Corning® Primaria™ Easy-Grip dish	35	10	11,8	2,5 - 3,0	200	**734-0070**
Culture dish, Corning® Primaria™ standard dish	60	15	21,3	6,0 - 7,0	200	**734-0071**
Culture dish, Corning® Primaria™ standard dish	100	20	58,9	16,0 - 17,5	200	**734-0072**

Cell culture dishes, treated
Corning





Optically clear PS

Available with a choice of treated surface. Corning® CellBIND® surface increases surface wetability for more even and consistent cell attachment. Ultra-low attachment dishes feature a covalently bound hydrogel layer that minimises cell attachment, protein absorption and cellular activation.

- With stacking beads to aid handling
- Supplied with vents to provide consistent gas exchange
- Sterilised by gamma radiation
- Certified non-pyrogenic

Description	Ø (mm)	Height (mm)	Growth area (cm²)	Recommended working volume (ml)	Pk	Cat. No.
Dish, CellBIND® surface	35	10	8,0	1,8 - 2,7	210	**734-4055**
Dish, CellBIND® surface	60	15	21,0	4,2 - 6,3	126	**734-4056**
Dish, CellBIND® surface	100	20	55,0	11,0 - 16,5	40	**734-4057**
Dish, TC treated surface	35	10	8,0	1,8 - 2,7	500	**734-1698**
Dish, TC treated surface	60	15	21,0	4,2 - 6,3	500	**734-1699**
Dish, TC treated surface, unvented with 2 mm grid	60	15	21,0	4,2 - 6,3	500	**734-1703**
Dish, TC treated surface	100	20	55,0	11,0 - 16,5	500	**734-1815**
Dish, TC treated surface, in 6-pack carriers	100	20	55,0	11,0 - 16,5	480	**734-1705**
Dish, TC treated surface	150	25	148,0	30,4 - 45,6	60	**734-1711**
Dish, ultra-low attachment surface	60	15	21,0	4,2 - 6,3	20	**734-0884**
Dish, ultra-low attachment surface	100	20	55,0	11,0 - 16,5	20	**734-0885**

Bioassay dish, Nunclon™Δ
Thermo Scientific

PS, sterile, with lid

Dish is tissue culture-treated.

- Optically clear and uniform surface suitable for microscopy
- Nunclon™Δ certified

Description	Recommended working volume (ml)	Growth area (cm²)	W×D×H (mm)	Pk	Cat. No.
Bioassay dish, Nunclon™Δ, PS without grid or air vent	135	500	245×245×25	16	**734-2096**

Cell culture dishes, Nunc™
Thermo Scientific

PS, (except 734-2113, made of Permanox™), sterile, with lid

A large range of dishes, which have been tissue culture-treated.

- Optically clear and uniform surface suitable for microscopy
- 60 mm and 40 mm dishes available with grids for cloning or determination of plating efficiency
- Nunclon™Δ certified surface treatment

Description	Ø (mm)	Height (mm)	Growth area (cm²)	Recommended working volume (ml)	Pk	Cat. No.
Culture dish, unvented, without grid	35	10	8,8	3,0	500	**734-2041**
Culture dish, vented without grid	35	10	8,8	3,0	500	**734-2045**
Culture dish, vented with grid	35	10	8,8	3,0	500	**734-2114**
Culture dish, unvented, without grid	60	15	21,5	5,0	400	**734-2042**
Culture dish, vented, without grid	60	15	21,5	5,0	400	**734-2040**
Culture dish, vented with grid	60	15	21,5	5,0	400	**734-2103**
Culture dish, vented without grid	60	15	20,8	5,0	500	**734-2113**
Culture dish, unvented with grid	100	20	56,7	12,5	480	**734-2112**
Culture dish, vented without grid	100	15	56,7	12,5	150	**734-2043**
Culture dish, vented, without grid	150	20	145,0	35,0	80	**734-1403**
Culture dish, vented without grid	150	20	150,0	35,0	120	**734-1189**

Dishes - Non-treated

BioAssay dishes, 245 mm square
Corning

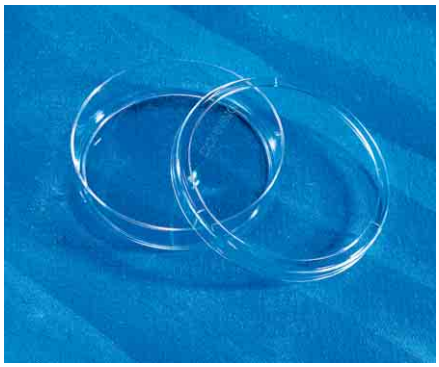
PS, non treated, with lid

Designed with a stacking bead so that they will stack securely without slipping.

- Compatible with automated colony picking instruments
- Certified non-pyrogenic

Description	Recommended working volume (ml)	Growth area (cm²)	W×D×H (mm)	Pk	Cat. No.
BioAssay dish, square, without handles, internal height 18 mm	100 - 150	500	245×245×25	16	**734-1728**

Cell culture dishes, untreated
Corning



Optically clear PS

For applications where cell attachment is not desired.

- With stacking beads to aid handling
- Supplied with vents to provide consistent gas exchange
- Sterilised by gamma radiation
- Certified non-pyrogenic

Description	Ø (mm)	Growth area (cm²)	Recommended working volume (ml)	Pk	Cat. No.
Cell culture dish, untreated	35	9,0	1,8 - 2,7	500	**734-1707**
Cell culture dish, untreated	60	21,0	4,2 - 6,3	500	**734-1708**
Cell culture dish, untreated	100	55,0	11,0 - 16,5	500	**734-1709**
Cell culture dish, untreated	150	152,0	30,4 - 45,6	60	**734-1710**

Cell culture dishes, non treated, for suspension culture, Nunc™
Thermo Scientific

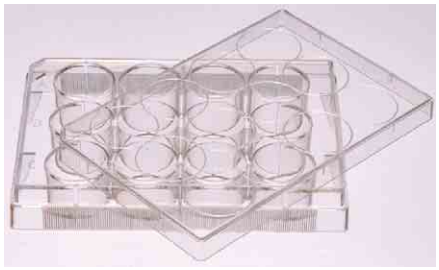
PS, with lid, sterile

Non treated for suspension culture. Optically clear and suitable for microscopy.

Description	Ø (mm)	Height (mm)	Growth area (cm²)	Recommended working volume (ml)	Pk	Cat. No.
Cell culture dish, non treated, vented, with grid, sterile	60	15	21,5	5,0	400	**734-2374**
Cell culture dish, non treated, vented, without grid, sterile	35	10	8,8	3,0	500	**734-2109**

Multiwell plates - Treated

Multiwell cell culture plates, Standard Line



Clear PS, sterile and certified non pyrogenic

VWR Collection multiwell plates are vacuum gas plasma treated for consistent cell attachment and growth.

- Well volume uniformity ensures uniform growth surface area exposure
- Raised rims on wells and condensation rings on the lid reduce evaporation and minimise edge effects
- Single position lid reduces misplacement and the risk of contamination
- Wells with alphanumeric code for easy identification

Manufactured in 100 000 grade cleanroom environment.

Packaging: Individually wrapped in peel-to-open paper/plastic blister packs.

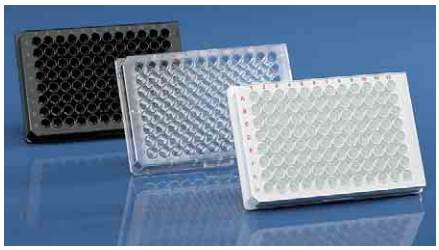
Continued on next page

Continued from previous page

No. of wells	Culture area (cm²)	Recommended working volume (ml)	Well volume (ml)	Pk	Cat. No.
6	9,6	1,90 - 2,90	17,0	100	**734-2323**
12	3,85	0,76 - 1,14	6,80	100	**734-2324**
24	1,93	0,38 - 0,57	3,50	100	**734-2325**
48	0,84	0,19 - 0,29	1,55	100	**734-2326**
96 F	0,33	0,075 - 0,20	0,39	100	**734-2327**
96 U	0,32	0,075 - 0,20	0,32	100	**734-2328**

Recommended working volume (ml) = per well

96-well microplates for cell culture, BRANDplates®
Brand



PS, solid or with transparent base

Plates are available with different well shapes (round U-bottom, conical V-bottom, flat F-bottom or C flat bottom with curved edges), in different colours, and with a choice of cell culture treated surfaces.

cellGrade™

The standard surface for cultivation of adherent cell lines. Chemical groups on the surface of the plate bind to serum compounds, stimulating the growth of immobilised cells.

cellGrade™ plus

This surface has a protein like structure. Cultivation of cells in serum reduced media is possible. cellGrade™ plus surface is suitable for the cultivation of more fastidious cell lines.

cellGrade™ premium

This surface is a poly-D-lysine equivalent. With the optimised surface characteristics, the most fastidious cell lines can be cultivated. Cells show growth comparable to poly-D-lysine surfaces.

inertGrade™

Surface inhibits cell binding. Especially suited for the cultivation of cells when adhesion is not desired, for example when working with cell suspensions or stem cells.

- All BRANDplates® are alphanumerically labelled, stackable and compatible with most standard microplate readers and washers
- Standard 96-well plates have coloured alphanumeric code identifying surface type (cell culture treated orange, immuno treated blue, non-treated grey)
- White plates provide maximum reflection and minimum crosstalk during luminescence measurements; black plates provide minimum backlight scatter during fluorescence analyses

BRANDplates® are non cytotoxic according to ISO 10993-5, free of endotoxins (<0,01 EU/ml), and free of DNA, DNase and RNase. Sterile products comply with ISO 11137 and AAMI guidelines.

Description	Colour	Culture area (cm²)	Well volume	Sterile	Pk	Cat. No.
cellGrade™						
Standard plate with U-bottom	Clear	0,32	330 µl	+	50	**735-2097**
Standard plate with V-bottom	Clear	0,33	360 µl	+	50	**735-2098**
Standard plate with F-bottom	Clear	0,32	350 µl	+	50	**735-2099**
Standard plate with C-bottom	Clear	0,32	350 µl	+	50	**735-2100**
Standard plate with F-bottom	White	0,32	350 µl	+	50	**735-2101**
Standard plate with F-bottom	Black	0,25	350 µl	+	50	**735-2102**
Transparent base with F-bottom	White/Clear	0,31	330 µl	+	50	**735-2103**
Transparent base with F-bottom	Black/Clear	0,31	330 µl	+	50	**735-2104**
cellGrade™ plus						
Standard plate with F-bottom	Clear	0,32	350 µl	+	50	**735-2116**
Standard plate with F-bottom	White	0,32	350 µl	+	50	**735-2117**
Standard plate with F-bottom	Black	0,32	350 µl	+	50	**735-2118**
Transparent base with F-bottom	White/Clear	0,31	330 µl	+	50	**735-2119**
Transparent base with F-bottom	Black/Clear	0,31	330 µl	+	50	**735-2120**
cellGrade™ premium						
Standard plate with F-bottom	Clear	0,32	350 µl	+	50	**735-2124**
Standard plate with F-bottom	White	0,32	350 µl	+	50	**735-2125**
Standard plate with F-bottom	Black	0,32	350 µl	+	50	**735-2126**
Transparent base with F-bottom	White/Clear	0,31	330 µl	+	50	**735-2127**
Transparent base with F-bottom	Black/Clear	0,31	330 µl	+	50	**735-2128**
inertGrade™						
Standard plate with U-bottom	Clear	0,32	330 µl	+	40	**735-2082**
Standard plate with F-bottom	Clear	0,32	350 µl	+	40	**735-2083**
Standard plate with U-bottom	White	0,32	330 µl	+	40	**735-2084**
Standard plate with F-bottom	White	0,32	350 µl	+	40	**735-2085**
Standard plate with C-bottom	White	0,25	350 µl	+	40	**735-2086**
Standard plate with U-bottom	Black	0,32	330 µl	+	40	**735-2087**
Standard plate with F-bottom	Black	0,32	350 µl	+	40	**735-2088**
Standard plate with C-bottom	Black	0,25	350 µl	+	40	**735-2089**
Transparent base with F-bottom	White/Clear	0,31	330 µl	+	40	**735-2090**
Transparent base with F-bottom	Black/Clear	0,31	330 µl	+	40	**735-2091**

Multiwell cell culture plates, TC-treated, Falcon®
Corning

PS, sterile, non-pyrogenic

All tissue culture treatments render polystyrene hydrophilic and result in the incorporation of a variety of anionic functional groups that support cell culture. To ensure reproducible results and conditions, all Falcon® tissue culture treatment is performed in a vacuum chamber.

Corning® Primaria™ tissue culture treatment additionally incorporates nitrogen-containing functional groups that have been shown to improve attachment and spreading of some cell types.

- Labyrinth lid, condensation rings, and deep well design control contamination, reduce evaporation, and minimise edge effects
- Reliable vacuum-gas plasma tissue culture treatment provides well-to-well and plate-to-plate consistency
- Convenient, peel-open packaging
- Individual and Ready-Stack (RS) trays are PET (Code 1) and recyclable

Colour: Clear

Description	Pk	Cat. No.
6-well (flat-bottom) with lid		
Standard TC-treated	50	**734-0019**
Standard TC-treated	36	**734-0054**
Corning® Primaria™ TC-treated	50	**734-0077**
Standard TC-treated	60	**736-2025**
12-well (flat-bottom) with lid		
Standard TC-treated	50	**391-0006**
Standard TC-treated	36	**734-0055**
24-well (flat-bottom) with lid		
Standard TC-treated	50	**734-0020**
Standard TC-treated	36	**734-0056**
Corning® Primaria™ TC-treated	50	**734-0078**
Standard TC-treated	60	**736-2026**
48-well (flat-bottom) with lid		
Standard TC-treated	50	**734-0028**
Standard TC-treated	36	**734-0058**
96-well (flat-bottom) with lid		
Standard TC-treated	50	**734-0023**
Standard TC-treated	50	**734-0025**
Corning® Primaria™ TC-treated	50	**734-0079**
Standard TC-treated	100	**734-1376**
Standard TC-treated	84	**736-2027**
96-well (round-bottom) with lid		
Standard TC-treated	50	**734-0027**
Standard TC-treated	50	**734-0057**
Accessories		
Plate lid, PS, for 384-well, 96-well black, and Falcon® Optilux microplates, non sterile	50	**736-2042**

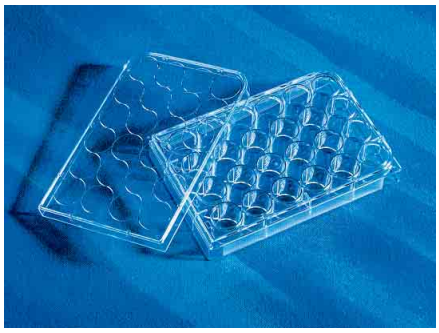
96-well microplates, TC-treated, Falcon®
Corning

PS, TC-treated, flat bottom, sterile, with lid

Falcon® 96-well microplates are available in a variety of configurations and surface chemistries to meet a wide range of applications with fluorescence, luminescence, radiometric or colorimetric endpoints.

Description	Pk	Cat. No.
TC-treated	50	**734-0396**
TC-treated	32	**732-2195**

Multiple well cell culture plates, Costar®
Corning



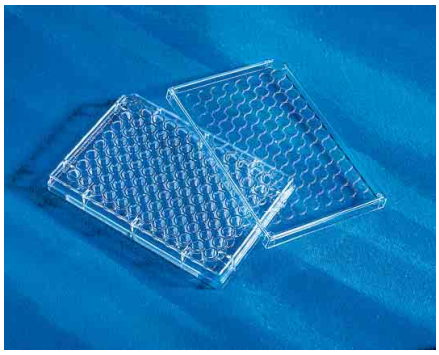
Clear PS, flat bottom, with lid

Available with a choice of surface treatments.

- Lids with condensation rings to reduce contamination
- Uniform footprint for ease of stacking
- Individual alphanumeric codes for well identification
- Sterilised by gamma radiation
- Certified non-pyrogenic

Description	Colour	Packed	Pk	Cat. No.
6-well plates, Corning® CellBIND® surface	Clear	5/bag	50	**734-1210**
12-well plates, Corning® CellBIND® surface	Clear	5/bag	50	**734-1211**
24-well plates, Corning® CellBIND® surface	Clear	5/bag	50	**734-1212**
48-well plates, Corning® CellBIND® surface	Clear	5/bag	50	**734-4067**
6-well plates, Ultra-Low Attachment surface, individually wrapped	Clear	1/bag	24	**734-1582**
24-well plates, Ultra-Low Attachment surface, individually wrapped	Clear	1/bag	24	**734-1584**
6-well plates, TC treated	Clear	5/bag	100	**734-1596**
12-well plates, TC treated	Clear	5/bag	100	**734-1597**
12-well plates, TC treated, individually wrapped	Clear	1/bag	50	**734-1598**
6-well plates, TC treated, individually wrapped	Clear	1/bag	50	**734-1599**
24-well plates, TC treated, individually wrapped	Clear	1/bag	100	**734-1604**
24-well plates, TC treated, individually wrapped	Clear	1/bag	50	**734-1605**
24-well plates, TC treated	Clear	5/bag	100	**734-1606**
48-well plates, TC treated, individually wrapped	Clear	1/bag	100	**734-1607**
6-well plates, non treated	Clear	5/bag	100	**392-0213**
12-well plates, non treated	Clear	5/bag	100	**392-0214**
24-well plates, non treated	Clear	5/bag	100	**392-0215**

Cell culture plates, 96-well
Corning



PS, clear, with lid

- CellBIND® surface increases wetability for more even and consistent cell attachment
- Ultra-Low Attachment plates feature a covalently bound hydrogel layer that minimises cell attachment, protein absorption and cellular activation
- Sterilised by gamma irradiation
- Certified non-pyrogenic

Recommended working volume: 75 - 200 µl

Description	Culture area (cm^2)	Well volume (µl)	Sterile	Packed	Pk	Cat. No.
Standard plate, flat bottom, CellBIND® surface	0,32	360	+	5/bag	50	**734-4058**
Standard plate, flat bottom, Ultra-Low Attachment, individually wrapped	0,32	360	+	1/bag	24	**734-1585**
Standard plate, flat bottom, TC-treated, with low evaporation lid	0,32	360	+	5/bag	50	**734-1789**
Standard plate, flat bottom, TC-treated, with low evaporation lid, individually wrapped	0,32	360	+	1/bag	50	**734-1793**
Standard plate, flat bottom, TC-treated, individually wrapped	0,32	360	+	1/bag	50	**734-1794**
Standard plate, flat bottom, TC-treated, individually wrapped	0,32	360	+	1/bag	100	**734-1796**
Standard plate, flat bottom, TC-treated	0,32	360	+	10/bag	50	**734-1799**

Cell culture plates, Nunc™ Multidish
Thermo Scientific

PS, sterile, with lid

Useful in all areas of cell culture, including scale up and cloning.

- Raised well rims lower the risk of cross contamination
- Flat bottom wells allow optimum optical quality
- Nunclon™Δ certified surface treatment

Description	Culture area (cm^2)	Recommended working volume (ml)	Packed	Pk	Cat. No.
4-well multidish, 66×66 mm	1,9	1,0	4/bag	120	**734-2176**
4-well multidish, 128×86 mm	21,8	5,0	10/bag	100	**734-2372**
6-well multidish, 128×86 mm	9,6	3,0	1/bag	75	**391-8036**
6-well multidish, 128×86 mm	9,6	3,0	5/bag	85	**734-0991**
8-well multidish, 128×86 mm	10,5	3,0	10/bag	100	**734-2373**
12-well multidish, 128×86 mm	3,5	2,0	1/bag	75	**734-2156**
24-well multidish, 128×86 mm	1,9	1,0	1/bag	75	**734-0992**
24-well multidish, 128×86 mm	1,9	1,0	5/bag	85	**734-0993**
48-well multidish, 128×86 mm	1,1	0,5	1/bag	75	**734-2157**
48-well multidish, 128×86 mm	1,1	0,5	5/bag	85	**734-1147**

Clear polystyrene microplates, 384-well
Corning

PS, flat bottom

- Total well volume of 112 µl; working well volume of 20 to 80 µl
- Cell culture plates sterilised by gamma radiation and certified non pyrogenic
- Universal optics NBS™ plate manufactured using an advanced polymer with high clarity and improved chemical resistance
- Lids supplied with sterile plates, other lids can be ordered separately

Description	Colour	Sterile	Pk	Cat. No.
Standard plate with lid, TC treated	Clear	+	100	**732-5538**

Multiwell plates - Non-treated

96-well microplates, non-treated, Falcon®
Corning

PS, non-treated, round bottom, without lid

Falcon® 96-well microplates are available in a variety of configurations and surface chemistries to meet a wide range of applications with fluorescence, luminescence, radiometric or colorimetric endpoints.

Description	Pk	Cat. No.
Non treated	50	**734-0080**

Multiwell cell culture plates, non-treated, Falcon®
Corning

PS, sterile, non-pyrogenic

Non-treated plates have a hydrophobic surface and show reduced cell attachment.

Colour: Clear

Description	Pk	Cat. No.
6-well (flat-bottom) with lid		
Non treated	50	**734-0948**
12-well (flat-bottom) with lid		
Non treated	50	**734-0947**
24-well (flat-bottom) with lid		
Non treated	50	**734-0949**
48-well (flat-bottom) with lid		
Non treated	50	**734-0956**
96-well (flat-bottom) with lid		
Non treated	50	**734-0954**
96-well (round-bottom) with lid		
Non treated	50	**734-0955**
Accessories		
Plate lid, PS, for 384-well, 96-well black, and Falcon® Optilux microplates, non sterile	50	**736-2042**

STERILE

Multidishes, non treated, Nunc™
Thermo Scientific

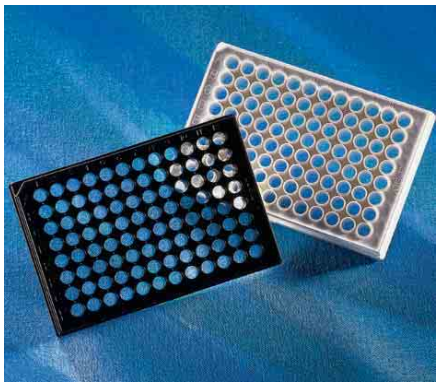
PS, non treated, with lid, sterile

- Raised well rims to lower risk of cross contamination
- Excellent optical quality
- Non pyrogenic

Description	Recommended working volume (ml)	Packed	Pk	Cat. No.
24-well Multidish	1,0	Individually wrapped	75	**734-0994**
12-well Multidish	2,0	Individually wrapped	75	**735-0223**
6-well Multidish	3,0	Individually wrapped	75	**735-0224**
48-well Multidish	0,5	Individually wrapped	75	**735-0225**
4-well Multidish	1,0	4/bag	120	**734-2375**

Microplates - Treated

Cell culture plates, 96-well, for fluorescent and luminescent applications
Corning



PS

- Black plates are designed to lower background in fluorescent assays and reduce cross-talk
- White plates are designed for luminescent assays
- Treated for optimal cell attachment
- Sterilised by gamma irradiation
- Certified non-pyrogenic

Description	Pk	Cat. No.
Solid white plate, TC treated, without lid	100	**734-1549**
Black plate with clear bottom, TC treated, individually wrapped	48	**734-1609**
White plate with clear bottom, TC treated, individually wrapped	48	**734-1610**
White plate with clear bottom, TC treated	100	**734-1660**
Black plate with clear bottom, TC treated	100	**734-1661**
Solid black plate, TC treated	100	**734-1664**
Solid white plate, TC treated	100	**734-1665**

Microplates, 96-well, Half Area
Corning

PS, flat bottom

Low volume microplates available with solid or clear flat bottom.

Recommended working volume: 25 to 125 µl

Description	Well volume (µl)	Sterile	Packed	Pk	Cat. No.
96-well solid black and white microplates					
Solid black Half Area 96-well microplates, TC treated, with lid	190	+	25/bag	100	**734-4153**
Solid white Half Area 96-well microplates, TC treated, with lid	190	+	25/bag	100	**734-1623**
96-well clear bottom black and white microplates					
Black with clear bottom Half Area 96-well microplates, TC treated, with lid	190	+	5/bag	25	**734-4123**
Black with clear bottom Half Area 96-well microplates, TC treated, with lid	190	+	25/bag	100	**734-4156**
Black with clear bottom Half Area 96-well microplates, TC treated, without lid	190	+	25/bag	100	**734-4161**
White with clear bottom Half Area 96-well microplates, TC treated, with lid	190	+	25/bag	100	**734-4159**

Microplates, 96-well, special optics
Corning

PS, black with clear bottom, TC treated, sterile, without lid

Ultra thin, optically clear flat well bottom permits direct microscopic viewing, resulting in lower background fluorescent and enabling readings down to 340 nm.

- Opaque walls to prevent well-to-well crosstalk
- Can be used for both top and bottom reading instruments
- Round wells with flat bottom, total well volume 360 µl
- Sterilised by gamma irradiation and certified non pyrogenic

Description	Colour	Recommended working volume	No. of wells	Sterile	Packed	Pk	Cat. No.
Black upper structure with optically clear base	Black/Clear	75 - 200 µl	96	+	5/bag	25	**734-4122**

384-well (HTS) microplates for cell culture, BRANDplates®
Brand

PS, solid or with transparent base

These flat bottom plates are available in different colours, and with standard or transparent base formats.

cellGrade™

The standard surface for cultivation of adherent cell lines. Chemical groups on the surface of the plate bind to serum compounds, stimulating the growth of immobilised cells.

cellGrade™ plus

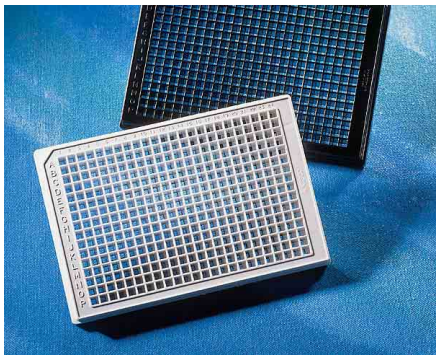
This surface has a protein like structure. Cultivation of cells in serum reduced media is possible. cellGrade™ plus surface is suitable for the cultivation of more fastidious cell lines.

cellGrade™ premium

This surface is a poly-D-lysine equivalent. With the optimised surface characteristics, the most fastidious cell lines can be cultivated. Cells show growth comparable to poly-D-lysine surfaces.

Description	Colour	Culture area (cm^2)	Well volume (µl)	Sterile	Pk	Cat. No.
cellGrade™						
Standard plate with F-bottom	Clear	0,12	100	+	50	**735-2105**
Standard plate with F-bottom	White	0,12	100	+	50	**735-2106**
Standard plate with F-bottom	Black	0,12	100	+	50	**735-2107**
Transparent base with F-bottom	White/Clear	0,13	120	+	50	**735-2111**
Transparent base with F-bottom	Black/Clear	0,13	120	+	50	**735-2112**
cellGrade™ plus						
Standard plate with F-bottom	Transparent	0,12	100	+	50	**735-2121**
Transparent base with F-bottom	White/Clear	0,13	120	+	50	**735-2122**
Transparent base with F-bottom	Black/Clear	0,13	120	+	50	**735-2123**
cellGrade™ premium						
Standard plate with F-bottom	Transparent	0,12	100	+	50	**735-2129**
Transparent base with F-bottom	White/Clear	0,13	120	+	50	**735-2130**
Transparent base with F-bottom	Black/Clear	0,13	120	+	50	**735-2131**

Clear bottom, black and white, polystyrene microplates, 384-well
Corning

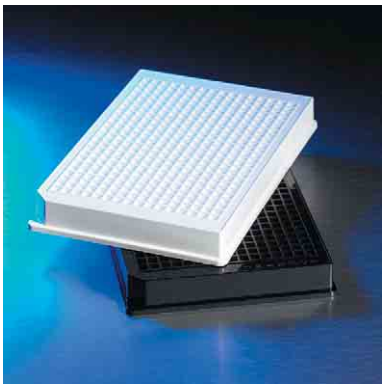


PS, flat bottom

Suitable for fluorescent and luminescent assays using either top or bottom detection plate readers.

Description	Colour	Well volume (µl)	Sterile	Pk	Cat. No.
Standard plate, CellBIND® surface, with lid	Black/Clear	112	+	50	**736-0203**
Standard plate, TC treated, with lid	White/Clear	112	+	100	**734-1635**
Standard plate, TC treated, with lid	Black/Clear	112	+	100	**734-1640**
Black optical imaging plate with clear bottom, TC treated, with lid	Black/Clear	112	+	100	**734-1200**
Low volume, TC treated, with lid	Black/Clear	50	+	50	**734-4087**

Solid black and white polystyrene microplates, 384-well
Corning



PS

Designed to reduce well-to-well crosstalk during fluorescent and luminescent assays.

Description	Colour	No. of wells	Sterile	Pk	Cat. No.
Low volume with lid, flat bottom, TC treated	Black	384	+	50	**734-4145**
Low volume with lid, flat bottom, TC treated	White	384	+	50	**734-4149**
Standard plate with lid, flat well bottom, TC treated	White	384	+	50	**734-4104**
Standard plate with lid, flat well bottom, TC treated	Black	384	+	50	**734-4105**

MiniTrays, Nunclon™Δ
Thermo Scientific

PS, with lid, sterile

External L×W: 84×59 mm

Description	Colour	Recommended working volume (µl)	Pk	Cat. No.
MiniTray, 72-well, conical well shape	Clear	8	150	**734-2005**
MiniTray 60-well, conical well shape	Clear	8	150	**734-2079**

Microplates - Non-treated

Multiwell cell culture plates, non-treated, Falcon®
Corning

PS, sterile, non-pyrogenic

Non-treated plates have a hydrophobic surface and show reduced cell attachment.

Colour: Clear

Description	Pk	Cat. No.
6-well (flat-bottom) with lid		
Non treated	50	**734-0948**
12-well (flat-bottom) with lid		
Non treated	50	**734-0947**
24-well (flat-bottom) with lid		
Non treated	50	**734-0949**
48-well (flat-bottom) with lid		
Non treated	50	**734-0956**
96-well (flat-bottom) with lid		
Non treated	50	**734-0954**
96-well (round-bottom) with lid		
Non treated	50	**734-0955**
Accessories		
Plate lid, PS, for 384-well, 96-well black, and Falcon® Optilux microplates, non sterile	50	**736-2042**

384-well microplates, clear bottom, Falcon® Optilux

Corning

PS, tissue culture-treated, sterile, with lid

These flat-bottom 120 µl microplates are suitable for a wide variety of applications, including high throughput screening.

- Standard microplate footprint meets SBS specification
- Rounded square well geometry reduces wicking
- Tissue culture-treated for optimum cell attachment and growth

Description	Pk	Cat. No.
Black/clear 384-well plates	50	**736-2044**
White/clear 384-well plates	50	**736-2045**

Description	Colour	Pk	Cat. No.
Accessories			
Plate lid, PS, for 384-well, 96-well black, and Falcon® Optilux microplates, non sterile	Transparent	50	**736-2042**

Inserts

Insert System, BRAND*plates*®
Brand

PS, sterile

The BRAND*plates*® Insert System* includes two different cell culture plates (standard 24-well plate and a special 6-well model) and two types of cell culture inserts (inserts with or without the inlet opening system), which can also be used in combination.

These systems can be used in a wide variety of applications. The standard model can be used in such applications as co-culture, secretion studies, and chemotaxis tests, and the special model finds application in the automated in vitro preparation of human tissues (3D tissue culture).

BRAND*plates*® microplates

The 24-well standard plate includes 24 individually fillable wells that can be fitted with strips of four inserts and/or individual inserts. The 6-well special model features four wells that are all connected as one large, elongated well. This well can be fitted with a strip of 4 inserts so that all four of the inserts in the strip can be supplied with medium at the same time.

- Innovative, specially designed wells with side feeding ports
- Manufactured according to the requirements in ANSI/SLAS Standards 1 and 4
- Sterile according to ISO 11 137 and AAMI Guidelines, SAL 10^{-6}
- Non-cytotoxic according to ISO 10 993-5, endotoxins-free (< 0,01 EU/ml), free from DNA, DNase, and RNase

BRAND*plates*® insert strips

Cell culture insert strips are available either smooth-walled or with inlet channels (Inlet Opening System).

Smooth-walled inserts are designed for standard applications such as secretion studies, co-culture, migration studies, chemotaxis tests, etc. Cell culture inserts with special inlet channels are for the automated *in vitro* preparation of human tissues. The Inlet Opening System enables rapid, consistent changing of media, from submersion culture to air-lift culture. The special inlet channels enable adjustment of the medium level without damage to the skin model.

- Track-etched PC and PET membranes
- Hanging inserts
- Secure positioning in the plates due to guide grooves
- Sterile according to ISO 11 137 and AAMI Guidelines, SAL 10^{-6}
- Non-cytotoxic according to ISO 10 993-5, endotoxins-free (< 0,01 EU/ml), free from DNA, DNase, and RNase

BRAND*plates*® Insert System

Insert strips and plates are also available as a complete system (6-well plates filled with 6 insert strips).

Description	Pore size	Packed	Pk	Cat. No.
BRAND*plates*® microplates				
Standard 24-well plate, cellGrade™ plus surface	-	Individually packed, with lids	10	**732-1650**
Standard 24-well plate, pureGrade™ S surface	-	Individually packed, with lid	10	**732-1649**
6-well plate, cellGrade™ plus surface	-	Individually packed, with lids	10	**732-1685**
6-well plate, pureGrade™ S surface	-	Individually packed, with lids	10	**732-1684**
BRAND*plates*® insert strips, PC membrane				
Insert strips, smooth-walled, cellGrade™ plus surface, 4-insert strips (divisible)	0,4 µm	12 strips (individually packed)	12	**732-1651**
Insert strips, smooth-walled, cellGrade™ plus surface, 4-insert strips (divisible)	1 µm	12 strips (individually packed)	12	**732-1652**
Insert strips, smooth-walled, cellGrade™ plus surface, 4-insert strips (divisible)	3 µm	12 strips (individually packed)	12	**732-1653**
Insert strips, smooth-walled, cellGrade™ plus surface, 4-insert strips (divisible)	8 µm	12 strips (individually packed)	12	**732-1654**
Insert strips, with inset opening system, cellGrade™ plus surface, 4-insert strips (divisible)	0,4 µm	12 strips (individually packed)	12	**732-1655**
Insert strips, with inset opening system, cellGrade™ plus surface, 4-insert strips (divisible)	1 µm	12 strips (individually packed)	12	**732-1656**
Insert strips, with inset opening system, cellGrade™ plus surface, 4-insert strips (divisible)	3 µm	12 strips (individually packed)	12	**732-1657**
Insert strips, with inset opening system, cellGrade™ plus surface, 4-insert strips (divisible)	8 µm	12 strips (individually packed)	12	**732-1658**

Continued on next page

Continued from previous page

Description	Pore size	Packed	Pk	Cat. No.
BRAND*plates*® insert strips, PET membrane				
Insert strips, smooth-walled, cellGrade™ plus surface, 4-insert strips (divisible)	0,4 µm	12 strips (individually packed)	12	**732-1659**
Insert strips, smooth-walled, cellGrade™ plus surface, 4-insert strips (divisible)	1 µm	12 strips (individually packed)	12	**732-1660**
Insert strips, smooth-walled, cellGrade™ plus surface, 4-insert strips (divisible)	3 µm	12 strips (individually packed)	12	**732-1661**
Insert strips, smooth-walled, cellGrade™ plus surface, 4-insert strips (divisible)	8 µm	12 strips (individually packed)	12	**732-1662**
Insert strips, with inset opening system, cellGrade™ plus surface, 4-insert strips (divisible)	0,4 µm	12 strips (individually packed)	12	**732-1663**
Insert strips, with inset opening system, cellGrade™ plus surface, 4-insert strips (divisible)	1 µm	12 strips (individually packed)	12	**732-1664**
Insert strips, with inset opening system, cellGrade™ plus surface, 4-insert strips (divisible)	3 µm	12 strips (individually packed)	12	**732-1665**
Insert strips, with inset opening system, cellGrade™ plus surface, 4-insert strips (divisible)	8 µm	12 strips (individually packed)	12	**732-1666**
BRAND*plates*® Insert System, PC membrane				
6-well plate filled with 6 smooth-walled insert strips, cellGrade™ surface, inc. lid with condensation rings	0,4 µm	5 plates (30 insert strips)	5	**732-1676**
6-well plate filled with 6 smooth-walled insert strips, cellGrade™ surface, inc. lid with condensation rings	1 µm	5 plates (30 insert strips)	5	**732-1683**
6-well plate filled with 6 smooth-walled insert strips, cellGrade™ surface, inc. lid with condensation rings	3 µm	5 plates (30 insert strips)	5	**732-1668**
6-well plate filled with 6 smooth-walled insert strips, cellGrade™ surface, inc. lid with condensation rings	8 µm	5 plates (30 insert strips)	5	**732-1672**
6-well plate filled with 6 insert strips with inlet opening system, cellGrade™ surface, inc. lid with condensation rings	0,4 µm	5 plates (30 insert strips)	5	**732-1677**
6-well plate filled with 6 insert strips with inlet opening system, cellGrade™ surface, inc. lid with condensation rings	1 µm	5 plates (30 insert strips)	5	**732-1682**
6-well plate filled with 6 insert strips with inlet opening system, cellGrade™ surface, inc. lid with condensation rings	3 µm	5 plates (30 insert strips)	5	**732-1669**
6-well plate filled with 6 insert strips with inlet opening system, cellGrade™ surface, inc. lid with condensation rings	8 µm	5 plates (30 insert strips)	5	**732-1673**
BRAND*plates*® Insert System, PET membrane				
6-well plate filled with 6 smooth-walled insert strips, cellGrade™ surface, inc. lid with condensation rings	0,4 µm	5 plates (30 insert strips)	5	**732-1678**
6-well plate filled with 6 smooth-walled insert strips, cellGrade™ surface, inc. lid with condensation rings	1 µm	5 plates (30 insert strips)	5	**732-1681**
6-well plate filled with 6 smooth-walled insert strips, cellGrade™ surface, inc. lid with condensation rings	3 µm	5 plates (30 insert strips)	5	**732-1670**
6-well plate filled with 6 smooth-walled insert strips, cellGrade™ surface, inc. lid with condensation rings	8 µm	5 plates (30 insert strips)	5	**732-1674**
6-well plate filled with 6 insert strips with inlet opening system, cellGrade™ surface, inc. lid with condensation rings	0,4 µm	5 plates (30 insert strips)	5	**732-1679**
6-well plate filled with 6 insert strips with inlet opening system, cellGrade™ surface, inc. lid with condensation rings	1 µm	5 plates (30 insert strips)	5	**732-1680**
6-well plate filled with 6 insert strips with inlet opening system, cellGrade™ surface, inc. lid with condensation rings	3 µm	5 plates (30 insert strips)	5	**732-1671**
6-well plate filled with 6 insert strips with inlet opening system, cellGrade™ surface, inc. lid with condensation rings	8 µm	5 plates (30 insert strips)	5	**732-1675**

*co-developed with the Fraunhofer Society

Reconstruction of human epidermis using BRAND*plates*® Insert System

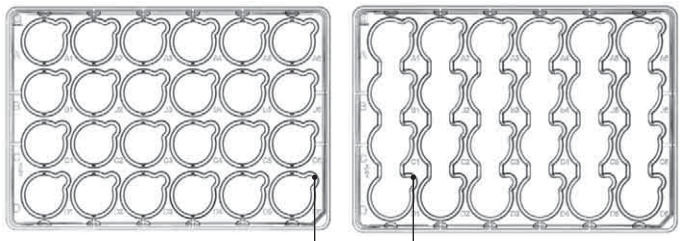
Author: Lena Schober, Andrea Traube; Fraunhofer
Fraunhofer-Institut für Produktionstechnik und Automatisierung IPA,
Nobelstraße 12, 70569 Stuttgart, Germany

In the past decade new cell and tissue culture technologies have been generated to follow the European legislative that restricts animal experiments to a minimum. Particularly, the improvement of culture conditions for reconstructed human full thickness skin and epidermis equivalents based on cell culture inserts, lead to a successful commercialisation of these models. Today, with the help of artificial human tissues pharmaceutical and cosmetic industry carry out tolerance, toxicology and irritation studies day by day. In spite of every progress made in terms of media compositions and supplements, set-up and handling of organotypic cultures still needs a lot of time and expertise.

Up to now, increased hands on time and human-induced variations in culture processes can cut the success in high throughput reconstruction of human tissue. To deplete sources of unintended process fluctuations and to ensure high quality and reproducibility of *in vitro* tissues, the Fraunhofer Society and BRAND GMBH + CO KG collaborated in the development of the BRAND*plates*® Insert System.

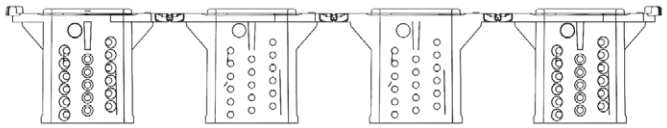
This 24-well platform is especially customised to meet all requirements for a totally automated handling of insert-based tissue cultures. The carrier plates are designed in a 24-well or in a modified 6-well shape according to requirements of ANSI/SLAS standards 1 and 4 (Figures a and b). The corresponding BRAND*plates*® Insert Strips consist of 4 inserts in a row (Figure c) and are hold in a fixed position at any time of automated handling.

6-well plate
- Use just one or two inserts per well to extend medium change interval
- For up to 4 inserts, medium in the well can be changed in one step



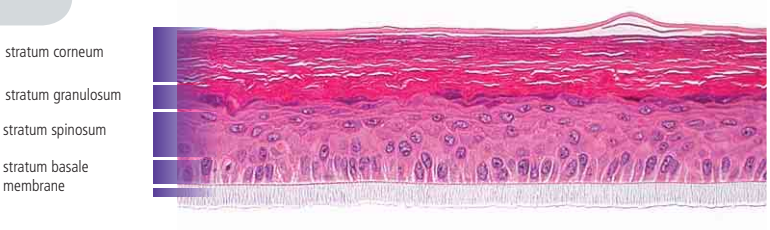
a) 24 well b) 6-well

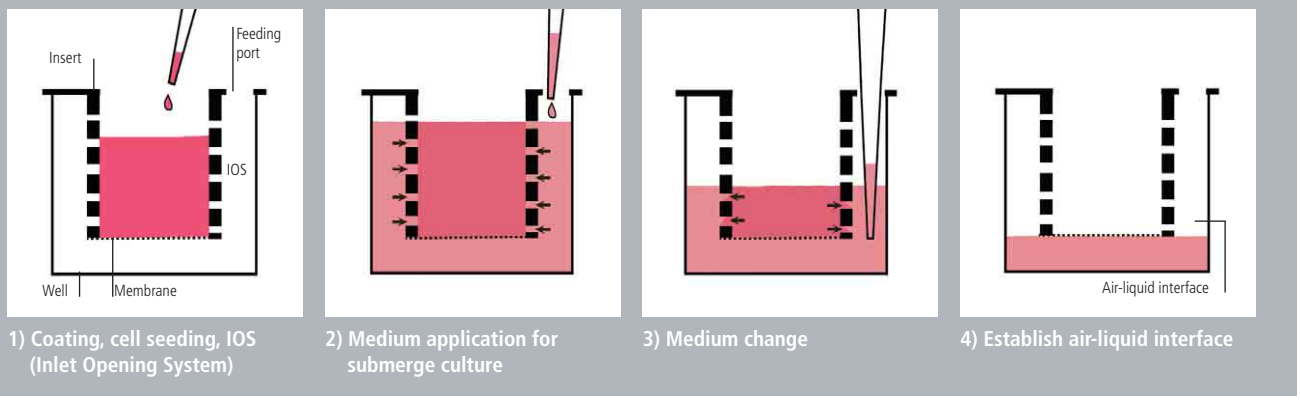
Inlet Opening System (IOS)
- No leaking during cell seeding or initial coating
- Simultaneous change of medium in the well and insert
- Set-up of air-liquid interface in one step
- Compatible with 24- and 6-well BRAND*plates*®



c) Insert strips with IOS

Representative reconstructed human epidermis cultivated in BRAND*plates*® Insert System





1) Coating, cell seeding, IOS (Inlet Opening System)

2) Medium application for submerge culture

3) Medium change

4) Establish air-liquid interface

BRAND*plates*® Inserts are available with the Inlet Opening System (patent pending, Figure c) which is dedicated to support the automated *in vitro* reconstruction of human skin. This peerless feature interconnects the medium of wells and inserts enabling the establishment of an air-liquid interface without entering the inserts with pipette tips. In addition to this increase in safety for cultures, the IOS reduces the number of pipetting steps needed to change medium within the two compartments.

Detailed instructions for producing human epidermis and full skin models at www.brand.de

BRAND*plates*® Insert Strips

Insert strips, smooth-walled or with inlet channels (Inlet Opening System*)
PS cellGrade™ plus surface, sterile. Strips of 4 inserts (divisible). Individually wrapped.

Description	Pore size (µm)	Pk	PC membrane Cat. No.	PET membrane Cat. No.
Smooth walled	0,4	12	732-1651	732-1659
With Inlet Opening System	0,4	12	732-1655	732-1663

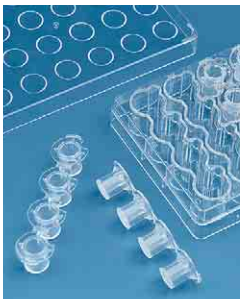
* Patent pending.

BRAND*plates*® Insert System

6-well plates filled with 6 insert strips
PS cellGrade™ plus surface, sterile. Insert strips, smooth walled or with inlet channels (Inlet Opening System*). Inclusive lid with condensation rings.

Description	Pore size (µm)	Pk	PC membrane Cat. No.	PET membrane Cat. No.
Smooth walled	0,4	5 (30 insert strips)	732-1676	732-1678
With Inlet Opening System	0,4	5 (30 insert strips)	732-1677	732-1679

* Patent pending.

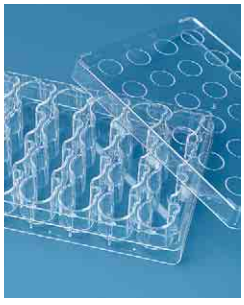


BRAND*plates*® Plates

Standard plates or 6-well plates
PS pureGrade™ S or cellGrade™ plus surface, sterile. Inclusive lid with condensation rings. Individually wrapped.

Description	Surface	Pk	Cat. No.
24-well standard plate	pureGrade™ S	10	732-1684
6-well plate	pureGrade™ S	10	732-1650
24-well standard plate	cellGrade™ plus	10	732-1685
6-well plate	cellGrade™ plus	10	732-1649

* Patent pending.



Cell culture inserts, Falcon®
Corning

PET membranes in PET housing, sterile

Falcon® cell culture inserts are track-etched, low-protein binding, PET membranes with a smooth surface and defined cylindrical pores that transverse the membrane. Available in a wide range of configurations (6-, 12- and 24-well) and a broad selection of pore sizes (0,4, 1,0, 3,0 and 8,0 µm). Larger pore-size membranes are most suitable for investigating chemotaxis, invasion and migration; transparent membranes for visualisation of cells by light microscopy; and high pore-density membranes for maximum diffusion when studying transport, secretion or drug uptake.

- Non-tissue culture treated insert housing prevents growth of cells on the inert walls
- Hanging design facilitates pipetting and allows for co-culture
- Suitable for use with Falcon® cell culture insert companion plates
- Supplied in individual blister packs

Description	Pk	Cat. No.
Transparent PET membrane, 0,4 µm pore size, $1,6\times10^6$ pores/cm^2		
Inserts for 6-well plates	48	**734-0032**
Inserts for 12-well plates	48	**734-0051**
Inserts for 24-well plates	48	**734-0036**
High density, translucent PET membrane, 0,4 µm pore size, $1,0\times10^8$ pores/cm^2		
Inserts for 6-well plates	48	**734-0061**
Inserts for 12-well plates	48	**734-0062**
Inserts for 24-well plates	48	**734-0063**
Transparent PET membrane, 1,0 µm pore size, $1,6\times10^6$ pores/cm^2		
Inserts for 6-well plates	48	**734-0040**
Inserts for 12-well plates	48	**734-0041**
Inserts for 24-well plates	48	**734-0042**
Transparent PET membrane, 3,0 µm pore size, $8,0\times10^5$ pores/cm^2		
Inserts for 6-well plates	48	**734-0033**
Inserts for 12-well plates	48	**734-0052**
Inserts for 24-well plates	48	**734-0037**
High density, translucent PET membrane, 3,0 µm pore size, $2,0\times10^6$ pores/cm^2		
Inserts for 6-well plates	48	**734-0034**
Inserts for 12-well plates	48	**734-0060**
Inserts for 24-well plates	48	**734-0397**
Transparent PET membrane, 8,0 µm pore size, 1×10^5 pores/cm^2		
Inserts for 6-well plates	48	**734-0035**
Inserts for 12-well plates	48	**734-0053**
Inserts for 24-well plates	48	**734-0038**

Cell culture insert companion plates, Falcon®
Corning

PS, tissue culture-treated, sterile, non-pyrogenic, with lid

Specifically designed for use with Falcon® or Corning® BioCoat™ cell culture inserts, so that evaporation and contamination due to improper lid fit is eliminated.

In the "Feeding Position" pipette access is improved for fluid handling on the basolateral side. In the "Incubation Position" cell culture inserts remain locked in position in their companion plate wells.

- Reagents can be added quickly and consistently for timed experiments
- Aspiration from the well is easier, reducing the risk of contamination
- Media cannot wick up between the insert and the well wall
- Low-evaporation lid reduces evaporation and contamination

Note: May be used with or without cell culture inserts

Description	Pk	Cat. No.
6-well companion plate	50	**734-0065**
6-well companion plate (deep well)	4	**734-1095**
12-well companion plate	50	**734-0066**
24-well companion plate	50	**734-0067**

HTS 24-well Multiwell Permeable Support System, Corning® FluoroBlok™
Corning

The Corning® FluoroBlok™ HTS 24-multiwell insert system contains an automation-friendly, 24-multiwell cell culture membrane insert suitable for both manual and robotic screening of cells or compounds.

The Corning® FluoroBlok™ insert system is made with an exclusive light-tight PET membrane that effectively blocks the transmission of light from 490 to 700 nm. Fluorescence from labelled cells or compounds present in the top chamber of the insert system is blocked from detection in the bottom chamber by the intervening membrane. Once fluorescently labelled cells or compounds pass through the membrane, they are no longer shielded from the light source and are easily detected with a fluorescence plate reader. The wide blocking range of the FluoroBlok™ membrane allows the flexibility to choose a variety of fluorophores for chemotaxis, cell migration, tumour cell or bacterial invasion, cell signalling, toxicity and permeability studies for oral bioavailability and absorption assays (Caco-2 cells).

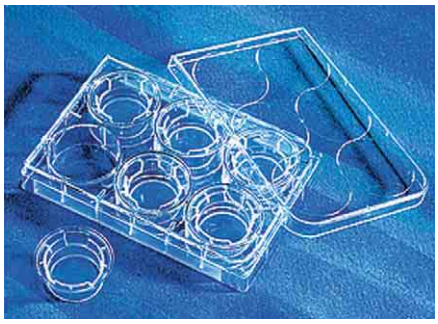
- Saves time and labour in chemotaxis, cell migration and invasion assays by automating assay detection with real-time fluorescence
- Rapid data collection without the need for plate washing or manual cell scraping and counting
- Chart migration of cells and molecules in real time without dismantling or destroying the insert
- Handle 24 inserts simultaneously, as all 24 inserts are part of a single unit that is compatible with Falcon® 24-well plates and feeder tray

Distance from membrane to bottom of well (mm)	2,0
Effective diameter of membrane (mm)	6,5
Effective growth area in 24-well plate (cm^2)	2,0
Effective growth area of membrane (cm^2)	0,3
Insert height (mm)	18
Pore density: 3 µm insert (pores/cm^2)	$8,0\times10^5$
Pore density: 8 µm insert (pores/cm^2)	$1,0\times10^5$
Suggested media volume in insert (µl)	300 - 500
Suggested media volume in well (µl)	1000 - 4000

Description	Pk	Cat. No.
Corning® FluoroBlok™ HTS 24 multiwell insert systems		
With 24-well plate and lid, 3 µm pore size	1	**734-0374**
With 24-well plate and lid, 3 µm pore size	5	**734-0375**
With 24-well plate and lid, 8 µm pore size	1	**734-0376**
With 24-well plate and lid, 8 µm pore size	5	**734-0377**
Corning® FluoroBlok™ cell culture inserts, sterile		
3 µm inserts for 24-well plates	48	**734-0370**
8 µm inserts for 24-well plates	48	**734-0371**

Cell culture inserts, Transwell®
Corning

12 mm PC Transwell® insert



24 mm PC Transwell®-Clear insert

Transwell® cell culture inserts are convenient, easy to use permeable support devices for the study of both anchorage-dependent and anchorage-independent cell lines. They are designed to produce a cell culture environment that closely resembles the *in vivo* state.

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

The polyester Transwell® membranes do not have as high a pore density as the polycarbonate Transwell® membranes, but have better optical clarity as a result.

- Allows polarised cells to feed basolaterally and thereby carry out metabolic activities in a more natural fashion
- Self-centred hanging design prevents medium wicking between the insert and outer well
- Permits access to the lower compartment through windows in the insert wall
- Suspended design allows for undamaged co-culturing of cells in the lower compartment
- Available in a range of pore sizes and different membranes to satisfy diverse experimental requirements

Continued on next page

Continued from previous page

Transwell® polycarbonate membrane inserts

- 10 µm thick translucent membrane
- Membrane pore sizes ranging from 0,4 µm to 8 µm diameters
- Treated for optimal cell attachment
- Supplied in multiple well plates
- Membrane must be stained for cell visibility

Transwell®-Clear polyester membrane inserts

- 10 µm thick transparent membrane
- Treated for optimal cell attachment
- Excellent visibility under phase contrast microscopy
- Supplied in multiple well plates

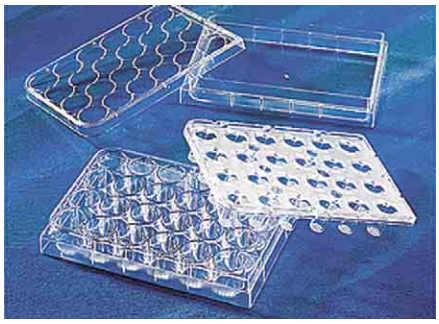
Transwell®-COL collagen coated membrane inserts

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

Description	Pore size (µm)	Culture area (cm^2)	Membrane	Membrane Ø (mm)	Pk	Cat. No.
Transwell® polycarbonate membrane inserts						
Transwell®	0,4	0,33	PC	6,5	48	**734-1568**
Transwell®	0,4	1,12	PC	12	48	**734-1563**
Transwell®	0,4	4,67	PC	24	24	**734-1567**
Transwell®	0,4	44	PC	75	12	**734-1571**
Transwell®	3,0	0,33	PC	6,5	48	**734-1570**
Transwell®	3,0	1,12	PC	12	48	**734-1564**
Transwell®	3,0	4,67	PC	24	24	**734-1569**
Transwell®	3,0	44	PC	75	12	**734-1572**
Transwell®	5,0	0,33	PC	6,5	48	**734-1573**
Transwell®	8,0	0,33	PC	6,5	48	**734-1574**
Transwell®	8,0	4,67	PC	24	24	**734-1576**
Transwell®-Clear polyester membrane inserts						
Transwell®-Clear	0,4	0,33	Polyester	6,5	48	**734-1581**
Transwell®-Clear	0,4	1,12	Polyester	12	48	**734-1579**
Transwell®-Clear	0,4	4,67	Polyester	24	24	**734-1577**
Transwell®-Clear	3,0	0,33	Polyester	6,5	48	**734-1583**
Transwell®-Clear	3,0	1,12	Polyester	12	48	**734-1580**
Transwell®-Clear	3,0	4,67	Polyester	24	24	**734-1578**
Transwell®-COL collagen coated membrane inserts						
Transwell®-COL	0,4	0,33	Collagen coated	6,5	24	**734-1594**
Transwell®-COL	0,4	1,12	Collagen coated	12	24	**734-1592**
Transwell®-COL	0,4	4,67	Collagen coated	24	24	**734-1590**
Transwell®-COL	3,0	0,33	Collagen coated	6,5	24	**734-1595**
Transwell®-COL	3,0	1,12	Collagen coated	12	24	**734-1593**
Transwell®-COL	3,0	4,67	Collagen coated	24	24	**734-1591**

Cell culture inserts, HTS Transwell® permeable supports and plates

Corning



HTS Transwell® permeable supports and plates are designed for automation and ease of handling.

HTS Transwell® 24-well permeable supports

The HTS Transwell® 24-well permeable support has an array of 24 wells with membrane inserts connected by a rigid, robotics-friendly tray that enables all 24 Transwell® supports to be handed in a single unit.

- Choice of either PC membrane with 0,4 µm or 3,0 µm pore size, or polyester (PET) membrane with 0,4 µm pore size
- Treated for optimal cell attachment
- Individual pack has 2 HTS Transwell®-24 units loaded into two open reservoir trays and two individually wrapped 24-well plates
- Bulk pack has 12 HTS Transwell®-24 units loaded into 24-well plates only, reservoirs may be purchased separately

HTS Transwell® 96-well permeable support systems and plates

The HTS Transwell® 96-well permeable support has an array of 96 wells with membrane inserts connected by a rigid, robotics-friendly tray that enables all 96 inserts to be handled as a single unit.

- Choice of either polyester (PET) membrane (1,0 µm or 8,0 µm pore sizes) or PC membrane (0,4 µm, 3,0 µm or 5,0 µm pore sizes)
- Large apical and basolateral access ports allow efficient media sampling and facilitate automated or manual access
- Optimised for automation, with multichannel feeder ports, improved gripping surface, and standard barcodes
- Reservoir plate allows for simultaneous feeding of 96 wells and comes with a removable media stabiliser to reduce the risk of spills during handling
- Receiver plate isolates each well to enable 96 individual assays

Packaging information: The HTS Transwell®-96 systems (0,4 µm PC and 1,0 µm PET) are packaged with the 96-well insert plate in a reservoir plate and includes the 96-well receiver plate with lid. The HTS Transwell®-96 well plates (3.0 µm and 5.0 µm PC, 8.0 µm PET) are packaged with the 96-well insert plate in the 96-well receiver plate with lid. Reservoir plates may be purchased separately.

Description	Pore size (µm)	Culture area (cm^2)	Membrane	Pk	Cat. No.
HTS Transwell® 24-well permeable supports					
HTS Transwell®-24, individual	0,4	0,33	PET	2	**734-4073**
HTS Transwell®-24, bulk	0,4	0,33	PET	12	**734-4072**
HTS Transwell®-24, individual	3,0	0,33	PC	2	**734-1561**
HTS Transwell®-24, bulk	3,0	0,33	PC	12	**734-1562**
HTS Transwell®-24, individual	0,4	0,33	PC	2	**734-1559**
HTS Transwell®-24, bulk	0,4	0,33	PC	12	**734-1560**
HTS Transwell® non treated reservoir	-	-	-	48	**734-1558**
HTS Transwell® 96-well permeable support systems and plates					
HTS Transwell®-96 system, reservoir and receiver plates with 2 lids	0,4	0,14	PC	1	**734-4075**
HTS Transwell®-96 system, reservoir and receiver plates with 2 lids	0,4	0,14	PC	5	**734-4083**
HTS Transwell®-96 system, reservoir and receiver plates with 2 lids	1,0	0,14	PET	1	**734-4074**
HTS Transwell®-96 system, reservoir and receiver plates with 2 lids	1,0	0,14	PET	5	**734-4084**
HTS Transwell®-96 well plate, receiver plate and lid, individual	3,0	0,14	PC	2	**734-4079**
HTS Transwell®-96 well plate, receiver plate and lid, bulk	3,0	0,14	PC	8	**734-4080**
HTS Transwell®-96 well plate, receiver plate and lid, individual	5,0	0,14	PC	2	**734-4082**
HTS Transwell®-96 well plate, receiver plate and lid, bulk	5,0	0,14	PC	8	**734-4081**
HTS Transwell®-96 well plate, receiver plate and lid, individual	8,0	0,14	PET	2	**734-4071**
HTS Transwell®-96 well plate, receiver plate and lid, bulk	8,0	0,14	PET	8	**734-4078**
HTS Transwell®-96 reservoir plate with lid, tissue culture treated	-	-	-	10	**734-4076**
HTS Transwell®-96 black receiver plate with lid, tissue culture treated	-	-	-	10	**734-4114**
HTS Transwell®-96 reservoir plate with removable media stabiliser and lid, not treated	-	-	-	10	**734-4077**
HTS Transwell®-96 white receiver plate with lid, tissue culture treated	-	-	-	10	**392-0322**

Cell culture inserts, Snapwell™

Corning

A modified Transwell® permeable support containing a 12 mm diameter membrane supported by a detachable ring. Once cells are grown to confluence on the Snapwell™ insert, the ring can be placed in a vertical or horizontal diffusion chamber. Packaged in six well plates.

Pore size (µm)	Culture area (cm^2)	Membrane	Pk	Cat. No.
0,4	1,12	PC	24	**734-1566**
0,4	1,12	Clear polyester	24	**734-1646**

Cell culture inserts, Costar® Netwell™
Corning

Polyester mesh bottoms attached to PS rings or housing

Netwell™ inserts are used as tissue carriers, supports and strainers of small organs, tissue slices or explants at the air-media interface.

- Handy carrier for immunocytochemical staining of tissue slices
- Provides coarse filtration of tissue homogenates, cell suspensions and microcarriers
- Available in two mesh sizes and diameters
- Supplied sterile and pre-loaded in 6- or 12-well plates
- 24 mm Netwell inserts fit in Corning® 50 ml plastic centrifuge tubes

Description	Packed	Pk	Cat. No.
Membrane Ø 15 mm, mesh size 74 µm	12/plate	48	**734-1586**
Membrane Ø 15 mm, mesh size 500 µm	12/plate	48	**734-1587**
Membrane Ø 24 mm, mesh size 74 µm	6/plate	48	**734-1588**
Membrane Ø 24 mm, mesh size 500 µm	6/plate	48	**734-1589**

Slides - Chamber slides

Chamber slides, Falcon® CultureSlides for *in situ* analysis
Corning

Soda lime glass slide; PS vessel, lid and tool

Falcon® CultureSlides allow cells to be cultured and then analysed on a glass microscope slide. Cells are grown in a plastic chamber attached to a specially prepared microscope slide. Cells can be fixed and stained *in situ* without disruption of the cell monolayer.

- Chamber easily and safely removed using the disposable safety removal tool
- Pressure-sensitive, biocompatible, acrylic-adhesive gasket remains with the vessel after removal, not on the slide, facilitating further processing or placement of coverslips
- Blue hydrophobic border defines cell culture areas
- Wells numbered for easy identification
- Trays designed for incubator use

W×L: 25×75 mm with 1,2 mm bevelled edge

Description	Growth area (cm^2)	Recommended working volume (ml)	Pk	Cat. No.
CultureSlide, 4-well	1,7	0,7 - 1,25	24	**734-0088**
CultureSlide, 4-well	1,7	0,7 - 1,25	96	**734-0401**
CultureSlide, 8-well	0,7	0,3 - 0,5	24	**734-0089**
CultureSlide, 8-well	0,7	0,3 - 0,5	96	**734-0402**

Recommended working volume (ml) = per well

IVD STERILE

Chamber slides, Nunc™ Lab-Tek™
Thermo Scientific

PS medium chamber on glass or Permanox™ plastic slide, PS cover, sterile

For viral and mycoplasma testing, chromosome studies, toxicity tests and immunocytology. Permanox™ is a TC treated plastic surface with minimal fluorescence.

- Cells grow on a standard microscope slide
- No cell transfer needed prior to visualisation/staining
- Upper chamber can be removed when culturing is complete
- Suitable for use with fluorescent labels

Description	Growth area (cm²)	Recommended working volume (ml)	Pk	Cat. No.
Glass				
One chamber	9,4	2,5 - 4,5	16	**734-2119**
Two chambers	4,2	1,2 - 2,0	16	**734-2120**
Four chambers	1,8	0,5 - 0,9	16	**734-2121**
Eight chambers	0,8	0,2 - 0,4	16	**734-2122**
Sixteen chambers	0,4	0,1 - 0,2	16	**734-2127**
Permanox™				
Two chambers	4,2	1,2 - 2,0	16	**734-2124**
Four chambers	1,8	0,5 - 0,9	16	**734-2125**
Eight chambers	0,8	0,2 - 0,4	16	**734-2126**

Description	Pk	Cat. No.
Accessories		
Cover glasses for 16-well Lab-Tek™ chamber slides	55	**391-8055**
Cover glasses for Lab-Tek™ chamber slides	1.000	**734-2111**

IVD STERILE

Chamber slides, Nunc™ Lab-Tek™
Thermo Scientific

Borosilicate cover glass, PS medium chamber, sterile

These chamber slides are designed for confocal image analysis.

- For high power inverted microscopic viewing
- Medium chamber is not removable

Description	Growth area (cm²)	Recommended working volume (ml)	Pk	Cat. No.
One chamber	9,4	2,5 - 4,5	16	**734-2056**
Two chambers	4,2	1,2 - 2,0	16	**734-2058**
Four chambers	1,8	0,5 - 0,9	16	**734-2060**
Eight chambers	0,8	0,2 - 0,4	16	**734-2062**

IVD STERILE

Chamber slides, Nunc™ Lab-Tek™ II
Thermo Scientific

Borosilicate cover glass, PS medium chamber, sterile

For use with 1, 2, 4 and 8-well configuration Nunc™ Lab-Tek™ II chamber slides.

- Excellent for confocal image analysis
- Optimal for high power inverted microscope viewing
- Chambered coverglass medium chamber is not removable

Description	Growth area (cm²)	Recommended working volume (ml)	Pk	Cat. No.
One chamber	8,6	2,0 - 4,5	16	**734-2055**
Two chambers	4,0	1,0 - 2,0	16	**734-2057**
Four chambers	1,7	0,5 - 1,0	16	**734-2059**
Eight chambers	0,7	0,2 - 0,5	16	**734-2061**

IVD STERILE

Chamber slides, Nunc™ Lab-Tek™ II CC2™
Thermo Scientific

Borosilicate coverglass, PS chamber, sterile

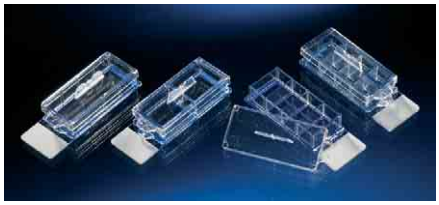
These chamber slides have a chemically coated growth surface on the glass slide which mimics polylysine, providing binding sites optimal for fastidious cells such as neurons.

- Growth surface remains stable without refrigeration
- Light blue frosted writing area for clear identification
- Slide separator to lift the medium chamber from the slide in in each pack

Description	Growth area (cm²)	Recommended working volume (ml)	Pk	Cat. No.
One chamber	8,6	2,0 - 4,5	16	**734-2051**
Two chambers	4,0	1,0 - 2,0	16	**734-2052**
Four chambers	1,7	0,5 - 1,0	16	**734-2053**
Eight chambers	0,7	0,2 - 0,5	16	**734-2054**

IVD STERILE

Chamber slides, Nunc™ Lab-Tek™ II
Thermo Scientific



PS medium chamber on glass slide, PS lid, sterile

For cell culture, viral and mycoplasma testing, chromosome studies, toxic tests and immunocytology.

- Removable medium chamber of 1, 2, 4 and 8-well configuration, attached to non-fluorescent glass microscope slide
- Rounded corners using biocompatible adhesive
- Inert hydrophobic well border printed on slide
- Superfrost™ printed writing area
- Treated to ensure excellent cell attachment and growth

Description	Growth area (cm²)	Recommended working volume (ml)	Pk	Cat. No.
One chamber	8,6	2,0 - 4,5	16	**734-2047**
Two chambers	4,0	1,0 - 2,0	16	**734-2048**
Four chambers	1,7	0,5 - 1,0	16	**734-2049**
Eight chambers	0,7	0,2 - 0,5	16	**734-2050**

Slides - Microscope slides

STERILE

Flasks on slides, Nunc™
Thermo Scientific

Glass (Flaskette), PS (SlideFlask), sterile

For cell culture on a microscope slide. For karyotyping of cells, single cell autoradiography, and single cell immuno-fluorescence.

- PS SlideFlask Nunclon™Δ certified
- SlideFlask is ultrasonically welded to the slide, and individually leak tested

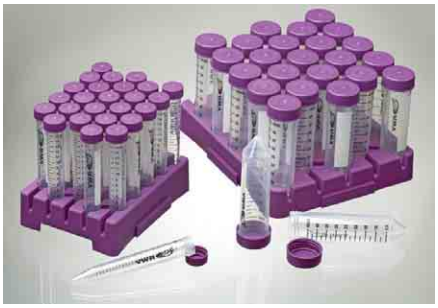
W×D (Flaskette): 20×52 mm; W×D (SlideFlask): 18×50 mm

Description	Growth area (cm²)	Recommended working volume (ml)	Pk	Cat. No.
SlideFlask, PS	9,0	2,5 - 5,0	50	**734-2107**
Flaskette, glass	10	2,5 - 5,0	16	**732-2609**

Description	Pk	Cat. No.
Accessories		
Cover glasses for Lab-Tek™ chamber slides	1.000	**734-2111**

Tubes

Centrifuge tubes, high performance



Clear PP, with purple HDPE flat screw or plug seal caps

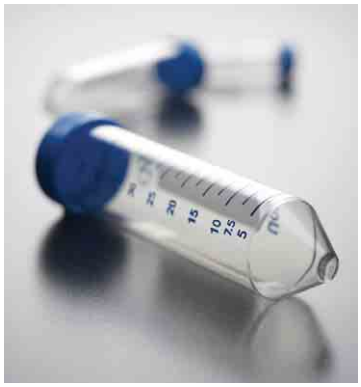
These disposable conical bottom and freestanding tubes are extremely versatile, and can be used for routine tasks as well as high speed centrifuging. Rack-packed tubes are packaged in freezable, recyclable, autoclavable racks. Tubes are sterilised by gamma irradiation (except freestanding tubes in bags or bulk). Tubes and caps are autoclavable and freezable.

- Certified non cytotoxic, nuclease-free and pyrogen-free
- Caps available in two styles: Flat screw caps with a smooth surface for additional labelling options, or plug seal caps for a secure seal when using shakers and horizontal incubators
- Easy to read black graduations and white writing area on the side for permanent coding
- Can be used for storing and freezing samples at temperatures down to –80 °C
- Can be centrifuged up to 12 500×g

Packaging: In bulk, in bags, or on plastic, autoclavable racks.

Capacity (ml)	Packed	Version	Type	Pk	Cat. No.
Conical bottom					
15	50/bag, 10 bags/case	Flat screw cap	Sterile	500	**525-0400**
15	25 tubes per rack, 2 racks/pack, 10 packs/case	Flat screw cap	Sterile	500	**525-0401**
15	50/bag, 10 bags/case	Plug seal cap	Sterile	500	**525-0449**
15	25 tubes per rack, 2 rack/pack, 10 packs/case	Plug seal cap	Sterile	500	**525-0450**
50	50/bag, 10 bags/case	Flat screw cap	Sterile	500	**525-0402**
50	25 tubes per rack, 1 rack/pack, 20 packs/case	Flat screw cap	Sterile	500	**525-0403**
50	50/bag, 10 bags/case	Plug seal cap	Sterile	500	**525-0447**
50	25 tubes per rack, 1 rack/pack, 20 packs/case	Plug seal cap	Sterile	500	**525-0448**
Freestanding					
50	50/bag, 10 bags/case	Plug seal cap	Non sterile	500	**525-0417**
50	bulk (tubes & caps in separate bags)	Plug seal cap	Non sterile	500	**525-0416**
50	50/bag, 10 bags/case	Plug seal cap	Sterile	500	**525-0418**

Centrifuge tubes, Falcon®
Corning



Conical bottom, sterile, graduated, with PE screw closure

- Meets bioanalytical grade requirements
- Pyrogen-free, non-cytotoxic

PP: Withstands forces up to 12000×g for 15 ml, 16000×g for 50 ml and 7500×g for 175 ml and 225 ml.
PS: Withstands forces up to 1800×g for 15 ml and 2000×g for 50 ml.

Capacity (ml)	Ø×L (mm)	Packed	Pk	Cat. No.
PP				
15	17×120	125 per bag	500	**734-0451**
15	17×120	50 per rack	500	**734-0452**
50	30×115	25 per bag	500	**734-0448**
50	30×115	25 per rack	500	**734-0453**
175	61×118	8 per bag	48	**734-0987**
225	61×137	8 per bag	48	**734-0449**
PS				
15	17×120	125 per bag	500	**734-0450**
15	17×120	50 per rack	500	**734-0454**

Description	Pk	Cat. No.
Accessories		
Cushions for 175 and 225 ml conical centrifuge tubes, non sterile	8	**734-0988**

Centrifuge tubes
Corning

Conical 15 ml

Conical 50 ml

Self-standing 50 ml

PP or PET with HDPE caps or without cap, sterile

The clear centrifuge tubes have traditional plug seal caps or advanced CentriStar™ caps, or no cap. The CentriStar™ cap with leakproof design has a easy-on/easy-off flat top and offers advanced ergonomics with its wider knurls and roll-over edge design for easier gripping.

- Black printed graduations and a large white marking spot
- Certified non-pyrogenic and DNase/RNase-free

Packaging: Bulk or in racks.

Ordering information: Foam racks and CentriStar™ caps available separately.

Capacity (ml)	Packed	RCF max. (×g)	Description	Type	Pk	Cat. No.
With plug seal cap						
15	50/rack	12000	-	Conical	500	**734-1812**
15	25/bag	3600	-	Conical	500	**734-1813**
15	50/rack	3600	-	Conical	500	**734-1814**
50	25/rack	15500	-	Conical	500	**734-1827**
50	25/bag	15500	-	Conical	500	**734-1828**
50	25/rack	3600	-	Conical	500	**734-1829**
15	25/bag	12000	-	Conical	500	**734-1862**
50	25/bag	3000	-	Skirted	500	**734-1872**
With CentriStar™ cap						
15	50/rack	12000	-	Conical	500	**734-1866**
15	25/bag	12000	-	Conical	500	**734-1867**
50	25/rack	15500	-	Conical	500	**734-1868**
50	25/bag	15500	-	Conical	500	**734-1869**
50	25/bag	3000	-	Skirted	500	**734-1876**
50	25/rack	15500	-	Conical	300	**525-3414**
Without cap						
15	25/bag	12000	-	Conical	500	**525-0477**
50	25/bag	12000	-	Conical	500	**525-0479**
CentriStar™ caps						
-	-	-	CentriStar™ cap for 15 ml tube, HDPE, orange, sterile	-	500	**525-0478**
-	-	-	CentriStar™ cap for 50 ml tube, HDPE, orange, sterile	-	500	**525-0480**

Description	Pk	Cat. No.
Racks		
Standard rack for 15 ml centrifuge tubes	20	**734-4193**
Standard rack for 50 ml centrifuge tubes	20	**525-3412**
Universal rack for 15 and 50 ml centrifuge tubes	20	**525-3413**

Cell strainers, Falcon®
Corning

An easy, ready-to-use way to consistently obtain a more uniform single-cell suspension. Made of a strong nylon mesh and available with 40, 70 or 100 µm pores that are evenly spaced for optimal performance in a variety of applications. A faster and easier alternative to gauze filtration in procedures involving dissociation of cells from either clumps or primary tissue.

- Moulded, colour-coded PP frame with tab enables easy handling
- Fits perfectly into a 50 ml Falcon® conical tube or other similarly sized tube
- Sterilised by gamma irradiation and conveniently available in individual, peel-open packaging
- Extended lip on strainer enables aseptic handling with forceps

Description	Pk	Cat. No.
Cell strainers, 40 µm pore size, blue frame	50	**734-0002**
Cell strainers, 70 µm pore size, white frame	50	**734-0003**
Cell strainers, 100 µm pore size, yellow frame	50	**734-0004**

Cell strainers for 1000 µl pipette tips, Flowmi™
Bel-Art Products

Flowmi™ cell strainers (pore size 40 µm) provide fast, efficient filtering of small volume samples (up to 1000 µl) and are unmatched at preserving sample volume.

- Decreases the potential for clogging of FLOW or FACS* instruments by effectively filtering cellular debris
- Flowmi™ fits most 1000 µl tips, including VWR brand, Axygen, Nichiryo and Eppendorf, and more
- Compact tray holds 50 Flowmi™ cell strainers ready for press and fit attachment to your tip
- Tray features a sliding cover for easy, one-handed use
- Packaged in a re-sealable bag to maintain sterility when used in a laminar flow hood

Note: Recommended for use with samples having a maximum concentration of 2×10^6 cells/ml.

Description	Pk	Cat. No.
Flowmi™ cell strainers for 1000 µl pipette tips, 40 µm pore size	50	**734-5950**

* FACS is a registered trademark of Becton-Dickinson Corporation

Round bottomed test tubes, Falcon®
Corning

For reliable containment of laboratory fluid samples.

PP tubes: For applications requiring greater thermal and chemical stability

PS tubes: For procedures requiring high optical clarity

- Widely used and referenced in laboratory protocols
- Dual-position snap caps with heavier gauge walls provide a secure, positive seal
- Specialised tube for flow cytometry applications
- Cell strainer cap tube has a 35 µm cell strainer mesh incorporated into cap

Capacity (ml)	Length (mm)	Ø ext. (mm)	Cap	Description	Material	Packed	Sterile	Pk	Cat. No.
5	75	12	without cap	-	PP	1000/pk	-	1.000	**391-0000**
5	75	12	without cap	-	PS	1000/pk	-	1.000	**734-0000**
5	75	12	without cap	-	PP	125/pk	+	1.000	**525-0123**
5	75	12	without cap	-	PS	125/pk	+	1.000	**734-0442**
5	75	12	Snap-cap	-	PP	25/pk	+	500	**734-0447**

Continued on next page

Continued from previous page

Capacity (ml)	Length (mm)	Ø ext. (mm)	Cap	Description	Material	Packed	Sterile	Pk	Cat. No.
5	75	12	Snap-cap	-	PS	25/pk	+	500	**734-0445**
5	75	12	Snap-cap	-	PS	125/pk	+	1.000	**734-0443**
5	75	12	Snap-cap	-	PS	individually wrapped	+	500	**734-0436**
5	75	12	Cell strainer cap	for flow cytometry	PS	25/pk	+	500	**734-0001**
8	100	13	screw cap	-	PS	125/pk	+	1.000	**734-0439**
14	100	17	without cap	-	PP	125/pk	+	1.000	**734-0985**
14	100	17	without cap	-	PS	125/pk	+	1.000	**734-0989**
14	100	17	Snap-cap	-	PS	125/pk	+	1.000	**525-0122**
14	100	17	Snap-cap	-	PP	25/pk	+	500	**734-0446**
14	100	17	Snap-cap	-	PS	25/pk	+	500	**734-0444**
14	100	17	Snap-cap	-	PP	individually wrapped	+	500	**734-0438**
16	125	16	screw cap	-	PS	125/pk	+	1.000	**734-0986**
16	125	16	screw cap	-	PS	individually wrapped	+	500	**734-0440**
19	150	16	screw cap	-	PS	individually wrapped	+	500	**734-0441**

Culture tubes
Corning

Optically clear PS

Culture tubes with threaded plug seal caps.

- TC treated tubes supplied racked
- Untreated tubes provided bulk packed
- Sterilised by gamma radiation
- Certified non-pyrogenic

Capacity (ml)	Description	Pk	Cat. No.
15	Culture tubes, untreated	500	**734-1697**
15	Culture tubes, TC treated	500	**734-1701**

Cell culture tubes, Nunclon™Δ
Thermo Scientific

PS with PE caps, sterile

Round bottom tubes with screw or push-on cap for standard cell culture, or flat-sided tubes for the culture of adherent cells.

- Flat side allows easy microscopy - a coverslip can be used in the tube
- Medium retained in the flat-sided tube in the horizontal position
- Excellent optical quality
- Certified surface treatment for optimal cell attachment and growth

Capacity (ml)	Description	Pk	Cat. No.
7	Round tubes with push-on cap	600	**734-2036**
7	Round tubes with screw cap	600	**734-2037**
3	Flat-sided tubes with screw cap	450	**734-2068**

Bioproduction - Flasks

Cell culture flasks, Nunclon™Δ
Thermo Scientific

PS, sterile

Cell culture flasks with surface areas from 25 to 500 cm^2, with filter or vent/close caps and straight or angled neck.

- Standard flasks have short, wide necks for easy access
- TripleFlasks have the same external dimensions as a standard 175 cm^2 flask, but have three parallel growth surfaces providing a total culture area of 500 cm^2, making them ideal for scale-up
- Excellent optical quality and individually leak-tested
- Nunclon™Δ certified surface treatment for optimal cell growth and attachment

Cap	Growth area (cm^2)	Neck	Recommended working volume (ml)	Pk	Cat. No.
Standard flasks					
Filter	25	Angled	7	160	**734-2004**
Vent/close	80	Straight	30	50	**734-2046**
Vent/close	175	Straight	68	32	**734-2067**
Vent/close	25	Angled	7	160	**734-2081**
Filter	175	Straight	68	32	**734-2129**
Filter	80	Straight	30	50	**734-2131**
Filter	175	straight	68	32	**734-1340**
Triple flasks					
Vent/close	500	Straight	200	32	**734-2000**
Filter	500	Straight	200	32	**734-2001**

Multi-layer cell culture flasks, Falcon® Multi-Flask
Corning

PS, tissue culture-treated, with membrane filter cap, non-pyrogenic

Cell culture treated Falcon® Multi-Flasks are available with 3 or 5 layers and cell growth surfaces 525 cm^2 or 875 cm^2. They provide greater surface area and cell yield than single layer T-flasks but with the same footprint and seeding densities, making it easy to scale-up existing protocols.

- Even distribution of the media across all layers, proven vacuum-gas tissue culture surface treatment and effective gas exchange all combine to provide an optimal cell culture environment
- Cells can be easily accessed by pipette
- Batch number printed on each individual flask for improved traceability
- Manufactured in compliance with cGMP standards

Cap	Culture area (cm^2)	Description	Pk	Cat. No.
Vented	525	Multi-Flask, 3-layer	12	**734-2456**
Vented	875	Multi-Flask, 5-layer	8	**734-2457**

Cell culture vessels, HYPERflask™ M
Corning

PS, sterile, with HDPE cap

The HYPERflask™ M flask is specifically designed for manual use. Each flask has a 1720 cm² cell growth area.

- Corning® CellBIND® Surface increases surface wetability for more even and consistent cell attachment
- Each flask is traceable by a serial number that can be read by eye or by a handheld bar code reader
- 10 layer design enables a 10-fold increase in cell yield over traditional 175 cm² flasks, increasing capacity and productivity
- Ergonomic cap, with smooth texture on the liner, requires less torque to seal cap to vessel
- Adapter grid design allows for faster filling and emptying, whilst reducing foam generation

Recommended media volume: 560 ml

Cap	Description	Growth area (cm²)	Neck	Packed	Pk	Cat. No.
Treated						
HDPE, flat top	HYPERflask™ M	1720	Straight	4 per bag, 4 per case	4	**734-1491**
HDPE, flat top	HYPERflask™ M	1720	Straight	1 per bag, 4 per case	4	**734-1492**
HDPE, flat top	HYPERflask™ M	1720	Straight	4 per bag, 24 per case	24	**734-1493**
Non-treated						
HDPE, flat top	HYPERflask™ M	1720	straight	4 per bag, 24 per case	24	**392-0310**

Bioproduction - Roller bottles

Roller bottles
Corning

Virgin PS, sterile

Roller bottles available with smooth or ribbed surface design for expanded culture area. All bottles are treated for optimal cell attachment. The Corning® CellBIND® surface enhances cell attachment under difficult conditions, such as reduced-serum or serum-free medium, resulting in higher cell yields. All bottles are graduated, unless otherwise stated.

- One piece seamless contruction
- All bottles have printed lot numbers to aid product traceability
- Sterilised by gamma radiation
- Certified non-pyrogenic
- Ribbed design provides twice the surface area with the same exterior dimensions

Note: Corning recommends 0.2 to 0.3 ml of medium per cm² of growth area, and setting roller rack speeds to provide 0.5 to 1.0 rpm.

Description	Growth area (cm²)	Ø ext.×H (mm)	Packed	Pk	Cat. No.
Roller bottles					
TC surface, plug seal cap, without graduations	490	111×173	2 per bag, 40 per case	40	**734-1702**
CellBIND® surface, Easy Grip cap	850	117×271	2 per bag, 40 per case	40	**734-0095**
TC surface, Easy Grip cap	850	117×271	2 per bag, 40 per case	40	**734-1720**
TC surface, Easy Grip Vent cap	850	117×271	2 per bag, 40 per case	40	**734-1730**
CellBIND® surface, Easy Grip Vent cap	850	117×271	2 per bag, 40 per case	40	**734-4190**

Continued on next page

Continued from previous page

Description	Growth area (cm²)	Ø ext.×H (mm)	Packed	Pk	Cat. No.
Roller bottles					
TC surface, Easy Grip cap	850	117×271	5 per bag, 40 per case	40	**392-0307**
TC surface, Easy Grip cap	850	117×271	22 per bag, 44 per case	44	**734-4189**
TC surface, Easy Grip cap	850	117×271	20 per bag, 20 per case	20	**734-1729**
CellBIND® surface, Easy Grip cap	850	117×271	22 per bag, 44 per case	44	**734-4191**
TC surface, Easy Grip cap	1750	117×528	10 per bag, 20 per case	20	**734-1714**
Expanded surface roller bottles					
TC surface, Easy Grip cap	1700	117×271	2 per bag, 40 per case	40	**734-1870**
TC surface, Easy Grip cap	1700	117×271	5 per bag, 40 per case	40	**392-0286**
CellBIND® surface, Easy Grip cap	1700	117×271	20 per bag, 20 per case	20	**734-0096**
TC surface, Easy Grip cap	1700	117×271	20 per bag, 20 per case	20	**734-1884**
TC surface, Easy Grip Vent cap	1700	117×271	20 per bag, 20 per case	20	**734-1898**

Description	Pk	Cat. No.
Caps for roller bottles		
Roller bottle caps, PE, Easy Grip, individually wrapped	100	**734-1859**
Roller bottle caps, PE, Easy Grip Vent, individually wrapped	300	**734-1883**

Roller Bottles, Nunc™ InVitro™
Thermo Scientific

PETG, sterile

For industrial scale production of vaccines, monoclonal antibodies or pharmaceuticals. Ideal for adherent cells.

- Quick-action ergonomic closure reduces wrist stain and increases productivity
- Wide range of sizes with surface areas from 1050 cm² to 4200 cm²
- Available in both Standard and the Expanded Surface, which enables increased cell growth and product yield without the need to purchase additional production equipment or increase labour
- Easy-to-read graduations for medium fills
- Lot number is printed on each bottle to maximise traceability

Description	Growth area (cm²)	Recommended working volume (ml)	Pk	Cat. No.
Standard (1.2X)	1050	100-500	20	**734-2392**
Standard (1.2X)	1050	100-500	20	**NUNC106020**
Standard PDL-coated, vented (1.2X)	1050	100-500	20	**734-2394**
Expanded surface (2X)	1700	200-600	20	**734-2396**
Standard long (1XL)	1800	200-1000	22	**734-2395**
Expanded surface (2.5X)	2100	200-600	20	**734-2397**
Expanded surface (2.5X)	2100	200-600	20	**734-2694**
Expanded surface (5X)	4200	400-1000	22	**734-2695**

Roller bottles, Nunc™ TufRol™
Thermo Scientific

PS, sterile

Nunc™ TufRol™ have been developed for applications such as the industrial scale production of vaccines, monoclonal antibodies and biotherapeutics, where reliability and reproducibility are essential.

- One-piece seamless design reduces possibility of leaking through a seam
- Shallow and deep indents allow for excellent manual and automated handling
- Proprietary manufacturing process allows for greater impact resistance
- Vertical expanded surfaces version facilitates emptying and reduces retention of product

Description	Growth area (cm²)	Packed	Pk	Cat. No.
Roller bottles, TufRol™, smooth surface, with easy on/off vented screw cap	850	2 per pack, 20 per case	20	**392-0335**
Roller bottles, TufRol™, smooth surface, with easy on/off non-vented screw cap	850	2 per pack, 20 per case	20	**392-0336**
Roller bottles, TufRol™, smooth surface, with easy on/off non-vented screw cap	850	2 per pack, 20 per case	20	**392-0337**
Roller bottles, TufRol™, smooth surface, with easy on/off non-vented screw cap	850	2 per pack, 20 per case (double bagged)	20	**392-0338**

Continued on next page

Continued from previous page

Description	Growth area (cm^2)	Packed	Pk	Cat. No.
Roller Bottles, TufRol™ EZ, smooth surface, shallow indent, with EZ twist vented cap	850	2 per pack, 20 per case	20	**392-0339**
Roller Bottles, TufRol™ EZ, smooth surface, deep indent, with EZ twist vented cap	850	2 per pack, 20 per case	20	**392-0340**
Roller Bottles, TufRol™ EZ, smooth surface, shallow indent, with EZ twist non-vented cap	850	2 per pack, 20 per case	20	**392-0341**
Roller Bottles, TufRol™ EZ, smooth surface, shallow indent, with EZ twist non-vented cap	850	2 per pack, 20 per case (double bagged)	20	**392-0342**
Roller Bottles, TufRol™ EZ, smooth surface, deep indent, with EZ twist non-vented cap	850	2 per pack, 20 per case	20	**392-0343**
Roller Bottles, TufRol™ EZ, smooth surface, deep indent, with EZ twist non-vented cap	850	2 per pack, 20 per case	20	**392-0344**
Roller Bottles, TufRol™ EZ, smooth surface, deep indent, with EZ twist non-vented cap	850	2 per pack, 20 per case (double bagged)	20	**392-0345**

Description	Pk	Cat. No.
Accessories		
Vented caps for TufRol™ roller bottles, HDPE, sterile	500	**392-0326**
Easy on/off caps for TufRol™ roller bottles, HDPE, sterile	500	**392-0327**

Caps for Nunc™ TufRol™ roller bottles
Thermo Scientific

Description	Pk	Cat. No.
Vented caps for TufRol™ roller bottles, HDPE, sterile	500	**392-0326**
Easy on/off caps for TufRol™ roller bottles, HDPE, sterile	500	**392-0327**

Media bottles, square, sterile, Nalgene®
Thermo Scientific

PETG bottle with HDPE screw closure

An inexpensive alternative to glass bottles for storage and transport of media, these heavy walled, square, media bottles are transparent and graduated.

- Leakproof closure, break-resistant and durable
- Reduced permeability to carbon dioxide and oxygen
- Bottles and closures are radiation sterilised and non-pyrogenic to eliminate costly washing, depyrogenation and autoclaving steps
- Heat-shrink band around closure and neck provides tamper-evident seal
- 2 l size has moulded in hand grips and a 53 mm white closure

Capacity (ml)	Height (mm)	Neck I-Ø (mm)	Thread	Pk	Cat. No.
30	63	14	20-415	96	**215-6700**
60	83	18	24-415	96	**391-7122**
125	108	28	38-430	48	**391-7123**
250	145	28	38-430	48	**391-7124**
500	178	28	38-430	24	**391-7125**
1000	219	28	38-430	24	**391-7126**
2000	271	39	53B	12	**391-7127**

Bioproduction - Spinner flasks

Spinner flasks, disposable
Corning

125 ml and 500 ml flasks

1 l and 3 l flasks with accessories

ISO 10993 compliant PS vessel, 1 l and 3 l impellers made of ISO 10993 compliant PP

These disposable spinner flasks are supplied ready-to-use with paddle and integrated magnet, eliminating the need for time-consuming assembly, or cleaning and reassembly. They are comparable to conventional glass spinner flasks for growth of suspension cell lines and any attachment-dependent cultures using microcarrier beads.

- Paddle size and height is optimised for each vessel size
- Each spinner flask system assures a clean, sterile unit - no risk of detergent residue or contamination
- Integrated magnet provides smooth, even rotation at required speeds on slow-speed stirrers
- Heat build-up in the vessel is reduced by means of a specially designed flange that raised the vessel off the stir-plate surface for the 125 ml and 500 ml flasks only

Capacity (ml)	Cap	Neck	No. of side arms	Recommended working volume (ml)	Ø×H (mm)	Description	Pk	Cat. No.
125	solid cap	centre neck 70 mm Ø, side arm neck thread GL 25	2	30-75	63,5×145	Flasks 125 ml with two solid caps on the side arms	12	**734-4049**
500	solid cap	centre neck 100 mm Ø, side arm neck thread GL 45	2	100-300	87,3× 203,2	Flasks 500 ml with two solid caps on the side arms	12	**734-4050**
1000	solid cap	side arm necks thread GL 45	2	300-1000	137×245	Flasks 1000 ml with two solid caps on the side arms	6	**734-4097**
3000	solid cap	side arm necks thread GL 45	2	1000-3000	188×259	Flasks 3000 ml with two solid caps on the side arms	4	**734-4099**
500	vented cap	centre neck 100 mm Ø, side arm neck thread GL 45	2	100-300	87,3× 203,2	with two solid caps on the side arms	12	**392-0309**
1000	vented cap	side arm necks thread GL 45	2	300-1000	137×245	with two solid caps on the side arms	6	**734-2289**
3000	vented cap	side arm necks thread GL 45	2	1000-3000	188×259	with two solid caps on the side arms	4	**734-2290**
1000	-	side arm necks thread GL 45	2	300-1000	137×245	Flasks 1000 ml, pre-assembled, with one solid cap and one aseptic transfer cap on side arms*	6	**734-4103**
3000	-	side arm necks thread GL 45	2	1000-3000	188×259	with one solid Cap and one aseptic transfer cap on side arms*	4	**392-0308**

Description	Pk	Cat. No.
Accessories for Corning spinner flasks		
Side arm aseptic transfer cap, dip tube with 0,2 µm vent, male luer lock, for 1000 ml spinner flask	2	**734-4098**
Side arm aseptic transfer cap, dip tube with 0,2 µm vent, male luer lock, for 3000 ml spinner flask	2	**734-4100**
Side arm aseptic transfer cap, dip tube with 0,2 µm vent, male luer lock, for 500 ml spinner flask	2	**734-4101**
Vent cap, 0,2 µm vent, for 500, 1000 and 3000 ml spinner flasks	4	**734-4102**

*with accessory attached

Spinner flasks, ProCulture®
Corning

Borosilicate glass with side arms, non sterile

- Baffles enhance aeration and agitation of flask contents
- Impeller design ensures optimal stirring
- Side arm design permit easy access of 25 and 50 ml pipettes

Capacity (ml)	Neck	No. of side arms	Pk	Cat. No.
ProCulture® Spinner flasks with angled side arms				
125	Centre neck 70 mm, side arm neck 32 mm	2	1	**734-1907**
15 000	Centre neck 100 mm, side arm neck 45 mm	2	1	**734-1908**
1000	Centre neck 100 mm, side arm neck 45 mm	2	1	**734-1909**
250	Centre neck 70 mm, side arm neck 32 mm	2	1	**734-1910**
36 000	Centre neck 100 mm, side arm neck 45 mm	2	1	**734-1911**
3000	Centre neck 100 mm, side arm neck 45 mm	2	1	**734-1912**
500	Centre neck 100 mm, side arm neck 45 mm	2	1	**734-1913**
6000	Centre neck 100 mm, side arm neck 45 mm	2	1	**734-1914**
8000	Centre neck 100 mm, side arm neck 45 mm	2	1	**734-1915**
15 000	Centre neck 120 mm, side arm neck 45 mm	2	1	**734-1916**
36 000	Centre neck 120 mm, side arm neck 45 mm	2	1	**734-1917**
3000	Centre neck 120 mm, side arm neck 45 mm	2	1	**734-1918**
6000	Centre neck 120 mm, side arm neck 45 mm	2	1	**734-1919**
8000	Centre neck 120 mm, side arm neck 45 mm	2	1	**734-1920**
15 000	Centre neck 140 mm, side arm neck 45 mm	2	1	**734-1921**
36 000	Centre neck 140 mm, side arm neck 45 mm	2	1	**734-1922**
3000	Centre neck 140 mm, side arm neck 45 mm	2	1	**734-1923**
6000	Centre neck 140 mm, side arm neck 45 mm	2	1	**734-1924**
8000	Centre neck 140 mm, side arm neck 45 mm	2	1	**734-1925**
ProCulture® Spinner flasks with vertical side arms				
15 000	Centre neck 100 mm, side arm neck 45 mm	4	1	**734-1926**
36 000	Centre neck 100 mm, side arm neck 45 mm	6	1	**734-1927**
8000	Centre neck 100 mm, side arm neck 45 mm	4	1	**734-1928**
15 000	Centre neck 120 mm, side arm neck 45 mm	4	1	**734-1929**
36 000	Centre neck 120 mm, side arm neck 45 mm	6	1	**734-1930**
8000	Centre neck 120 mm, side arm neck 45 mm	4	1	**734-1931**
15 000	Centre neck 140 mm, side arm neck 45 mm	4	1	**734-1932**
36 000	Centre neck 140 mm, side arm neck 45 mm	6	1	**734-1933**

Cell culture flasks, double side arm, Celstir®
Wheaton

Borosilicate glass flask, PTFE and glass impeller assembly, PTFE and silicone lined top cap

Double side arm Celstir® flasks are ideal for microcarrier and suspension cultures such as insect cells, hybridomas and adapted cell lines.

- Adjustable paddle blade impeller allows better mixing
- Impeller does not protrude through the top cap, thereby maximising incubator space and reducing the risk of contamination
- Addition of the bottom dimple to flasks 125 ml and larger improves circulation and reduces the accumulation of cells in the centre of the flask
- Flasks 500 ml or larger have a 45 mm side arm to be used as an air vent, media inlet or outlet, innoculation port, pH probe inlet, or other application

Capacity (ml)	Neck	Ø×H (mm)	Pk	Cat. No.
25	Centre neck 38 - 430, side arm 15 - 415	38×122	1	**734-3006**
50	Centre neck 38 - 430, side arm 15 - 415	38×141	1	**734-3007**
125	Centre neck 51 - 400, side arm 33 - 430	65×155	1	**734-3008**

Continued on next page

Continued from previous page

Capacity (ml)	Neck	Ø×H (mm)	Pk	Cat. No.
250	Centre neck 51 - 400, side arm 33 - 430	85×175	1	**734-3009**
500	Centre neck 100 - 400, side arm 45 mm	110×190	1	**734-3010**
1000	Centre neck 100 - 400, side arm 45 mm	130×250	1	**734-3011**
3000	Centre neck 100 - 400, side arm 45 mm	178×341	1	**734-3012**
6000	Centre neck 100 - 400, side arm 45 mm	258×404	1	**734-3013**
8000	Centre neck 100 - 400, side arm 45 mm	293×445	1	**734-3014**

Bioproduction - Cell factories

Cell culture chambers, Corning® CellSTACK®
Corning

PS, sterile

The Corning® CellSTACK® culture chambers are available in five sizes and with three different surface treatments.

- Two 26 mm diameter filling ports allow direct access to chamber bottom providing greater flexibility for sterile filling and emptying by pouring, pipetting or via tubing in a fully closed system
- Standard 33 mm threaded caps have 0,2 µm pore non-wettable membranes sealed directly to the caps to allow gas exchange while minimising the risk of contamination
- Optional 33 mm threaded caps are available with integrally sealed USP Class VI certified C-Flex® tubing to allow direct sterile transfer of media and cells via pumping or gravity feed
- Polystyrene construction provides excellent optical clarity and mechanical strength

TC treated surface

Uncharged polystyrene has an uncharged, hydrophobic surface to which cell attachment proteins bind poorly. This results in poor and uneven cell attachment and growth. Tissue culture (TC) treated polystyrene has a negatively charged, hydrophilic surface to which cell attachment proteins bind evenly. This provides a good surface for cell attachment and growth.

Corning® CellBIND® surface

The Corning® CellBIND® surface enhances cell attachment under difficult conditions, such as reduced-serum or serum-free medium, resulting in higher cell yields.

- More consistent cell attachment resulting in increased cell growth
- Adapts cells more quickly to reduced-serum or serum-free conditions
- Reduces premature cell detachment from confluent cultures
- May eliminate the need for tedious, time-consuming, low stability biological coatings
- Requires no refrigeration or special handling and is stable at room temperature

Ultra-Low Attachment surface

The Ultra-Low Attachment surface is a covalently bonded hydrogel surface that is hydrophilic and neutrally charged. It minimises cell attachment, protein absorptiom and enzyme activation. The surface is non-cytotoxic, biologically inert and non-degradable.

- Maintains cells in a suspended, unattached state
- Prevents stem cells from attachment-mediated differentiation
- Prevents anchorage-dependent cells from dividing
- Reduces binding of attachment and serum proteins to the substrate

Accessories

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

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

Type	Recommended working volume (ml)	Growth area (cm^2)	Pk	Cat. No.
TC treated surface				
1 chamber	125 - 190	636	8	**734-1038**
2 chambers	250 - 380	1272	5	**734-1039**
5 chambers	625 - 950	3180	2	**734-1197**
5 chambers	625 - 950	3180	8	**734-4061**
10 chambers	1250 - 1900	6360	2	**734-1040**
10 chambers	1250 - 1900	6360	6	**734-1041**
40 chambers	5000 - 7600	25440	2	**734-4052**
Corning® CellBIND® surface				
1 chamber	125 - 190	636	8	**734-1017**
2 chambers	250 - 380	1272	5	**734-1014**
5 chambers	625 - 950	3180	2	**734-4060**
10 chambers	1250 - 1900	6360	2	**734-1207**
10 chambers	1250 - 1900	6360	6	**734-1015**
40 chambers	5000 - 7600	25440	2	**734-1016**
Ultra-Low Attachment surface				
1 chamber	125 - 190	636	8	**734-4059**

Continued on next page

Continued from previous page

Description	Pk	Cat. No.
Accessories		
Solid cap, sterile	6	**734-4167**
Vent cap, 0.2 µm membrane, sterile	6	**734-4166**
Vent cap, 9.5 mm ID tubing, 7 cm length, Pall® Acro 50, PVDF filter, sterile	5	**734-1108**
Fill cap, 3.2 mm ID tubing, female luer lock with male luer plug, sterile	5	**734-1109**
Fill cap, 9.5 mm ID tubing and 7.94 mm barbed fitting, sterile	5	**734-1110**
Vent cap, 9.5 mm ID tubing, 7 cm length, Pall® Bacterial Air Vent, sterile	4	**734-1205**
Two vented overcaps and one solid overcap for the universal cap, sterile	100	**734-1208**
Fill cap, female MPC coupling, 6.4 mm ID barbed fitting with male end cap, sterile	4	**734-4062**
Fill cap, female MPC coupling, 9.5 mm ID barbed fitting with male end cap, sterile	4	**734-4063**
Stacking device, ABS, non sterile	5	**734-4064**
Fill cap, 6.4 mm ID tubing, 70 cm length, male MPC coupling with female end cap, sterile	4	**734-1209**
Fill cap, male MPC coupling, 6.4 mm ID barbed fitting with female end cap, sterile	4	**734-4066**
Fill cap, male MPC coupling, 9.5 mm ID barbed fitting with female end cap, sterile	4	**734-4068**

All caps are 33 mm threaded caps

Cell culture vessels, Corning® HYPERStack®

Corning

The Corning® HYPERStack® cell culture vessel is a closed system that allows fluid manipulations to occur through preassembled tubing sets. Two 3/8" ID tubing ports for filling and venting allow filling via bag assembly, sterile bottle connection or pumping. The attached vent filters are 0,2 µm pore, hydrophobic membranes that allow air displacement during filling while minimising the risk of contamination.

- Closed system approach - no open fluid manipulations Class VI certified C-FLEX® tubing for liquid handling manipulations
- Low particulate assembly method acceptable for cell therapy applications
- Corning proprietary gas-permeable film technology
- Corning® CellBIND® surface treatment for optimal cell attachment and performance
- Virgin polystyrene provides excellent optical clarity and mechanical strength
- Gamma sterilized to SAL 10^{-6} standard
- 100% leak tested prior to shipping

Cap	Description	Growth area (cm^2)	Recommended working volume (ml)	Packed	Pk	Cat. No.
PC, clear	36 layer, rectangular, sterile	18000	3900	1 per pack/2 per case	2	**734-2484**
HDPE, flat top	10 layer, rectangular, sterile, bar-coded	1720	560	4 per pack/24 per case	24	**734-4010**
PC, clear	12 layer, rectangular, sterile	6000	1300	1 per pack/4 per case	4	**734-2483**

Description	Pk	Cat. No.
Accessories		
Filling wedge, stainless steel	1	**734-2485**
Bottle stand, stainless steel	1	**734-2486**
Disposable tubing set, ADCF C-flex, sterile, length 457,2 mm, (I-Ø×O-Ø) 9,5×12,7 mm	2	**734-2487**
Disposable tubing set, MPC, 0,2 µm filter, (I-Ø×O-Ø) 9,5×12,7 mm	2	**734-2488**
Stacking tray, ABS, orange	5	**734-2489**
HYPERViewer™ device	1	**734-2490**
HYPERStack manipulator, stainless steel	1	**734-2491**
Roller bottle with easy grip cap, 850 cm2, PS, not treated, sterile	40	**734-2492**

STERILE

Cell culture chambers, Nunc™ cell factories

Thermo Scientific

PS, sterile

For the industrial scale production of, for example, vaccines, monoclonal antibodies or pharmaceuticals.

- Ideal for adherent cells, but can also be used for suspension cultures
- Growth kinetics are unaltered from laboratory scale culture
- Available in 1, 2, 10 and 40 tray versions for easy scale-up
- Low contamination risk
- Certified Nunclon™Δ surface treatment ensures excellent conditions for cell attachment and growth

Tray L×W: 335×205 mm

Continued on next page

Continued from previous page

Type	Recommended working volume (ml)	Growth area (cm²)	Pk	Cat. No.
1 level	200	632	8	732-2603
2 levels	400	1264	6	732-2606
4 levels	800	2528	10	734-2187
10 levels	2000	6320	2	734-2082
10 levels	2000	6320	6	734-2105
40 levels	8000	25280	2	734-2028

Description	Pk	Cat. No.
Accessories		
Start-up kit*, sterile	1 KIT	734-2106
Connector PTFE	10	734-2110
Gelman filter (1 µm), sterile	10	391-8339
Funnel, PS	6	392-0293
Filter adapter cap	20	392-0295
Cover caps	40	392-0303
Cover caps, white Tyvek	500	391-8119
PTFE connector with O-ring, autoclavable	2	734-2692

*Start-up kit includes: PC connector, air vent filter, white filter adapter cap, cover caps, tube clamp and silicone tubing.

Cell culture chambers, Nunc™ EasyFill™ cell factories
Thermo Scientific

PS, sterile

The EasyFill™ Cell Factory has one large and one small opening in each unit, which makes it versatile and easy to use. EasyFill™ Cell Factory bridges the gap between small scale research and large scale GMP production. It can be used as it is, without any accessories, or used with plug and play connections for rapid attachment of tubing and filters, significantly reducing contamination risk. EasyFill™ systems are available with one, two, four or ten growth chamber levels, providing surface areas ranging from 630 cm² to 6300 cm².

- Versatile – large opening facilitates the desire to pour media directly and small opening supports those that need a closed, aseptic system for filling and harvesting
- Bridges small scale process development with large scale production
- Easy to use and ready to use straight from the box, no accessories needed
- High yield and process efficiency
- Nunclon™Δ surface treatment to promote consistent performance for cell attachment and proliferation in serum free and serum containing media

W×L: 250×335 mm

Delivery information: Shipped sterile and ready to use, for single use applications.

Type	Recommended working volume (ml)	Growth area (cm²)	Pk	Cat. No.
1 level	200	632	6	734-2242
2 levels	400	1260	6	734-1443
4 levels	800	2520	4	734-1445
10 levels	2000	6300	2	734-1444

Description	Pk	Cat. No.
Accessories for Nunc™ EasyFill™ cell factories		
PC connector	10	390-0343
HDPE connector	10	216-0331
Cap filter	10	392-0294
Gelman filter (1 µm) with connector, sterile	2	390-0344
Air filter (0,2 µm) with connector, sterile	2	390-0345
Filter assembly, barbed cap, 1.0 µm filter	2	392-0329
Filter assembly, barbed cap, 0.22 µm filter	2	392-0330
Universal adapter cap	12	392-0328
Barbed cap, ¼" (6.35 mm)	12	392-0331
Barbed cap, ⅜" (9.525 mm)	12	392-0332
Filling tubing set	2	392-0333

Bioproduction - Bioreactors

Bioreactors, CELLine™
Wheaton

CELLine™ is a disposable, two-compartment bioreactor manufactured from optically clear virgin PS with a gas transfer bottom made of a moulded silicone membrane providing a 0,2 µm vent barrier. The compartments are separated by a 10 kDa semi-permeable cellulose acetate membrane and individually pressure tested for integrity. CELLine™ classic (CL) is ideal for laboratory scale applications using suspension cells or adherent cells in combination with microcarriers. The unit is optimised for cultivation of hybridomas and many other cell types (for example CHO, NSO, SF cells). CELLine™ adhere (AD) is specifically adapted to allow growth of anchorage-dependent cells (for example HEK, BHK, CHO cells). The CELLine™ AD bioreactor contains a woven PET matrix in the cell compartment providing an ideal surface for cell attachment.

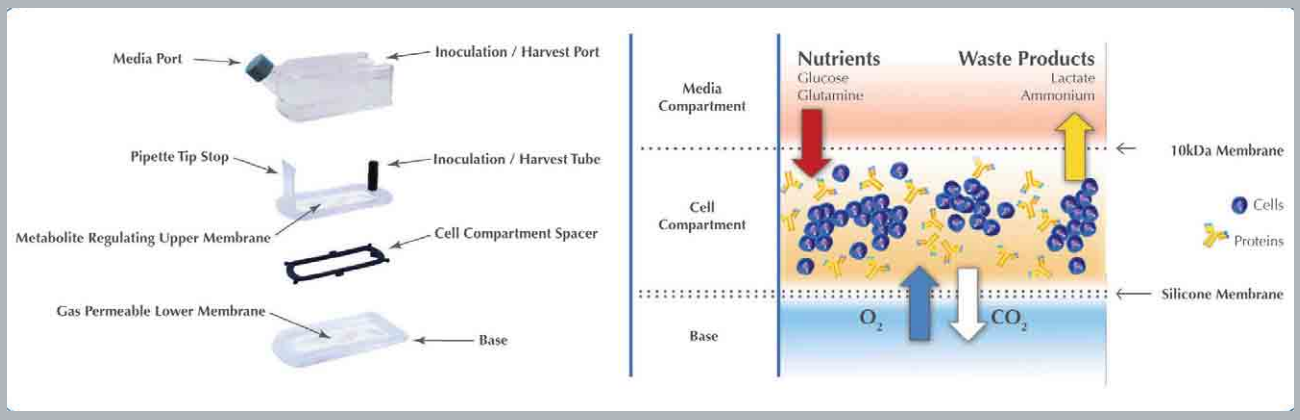
- Highly efficient with 50 - 100 times higher product concentrations compared to classic cell culture disposables
- As simple to use as a standard tissue culture flask
- Uses 90% less media supplements and requires less handling time than conventional flasks
- Easily stackable
- Packed individually in easy to open medical-grade blister packs, sterilised by gamma irradiation, and pyrogen-free

Model	CELLine™ CL 350	CELLine™ CL 1000	CELLine™ AD 1000
Cell compartment cap	24 mm PP cap with PE liner	28 mm PP cap with PE liner	
Culture volume (ml)	5	15	
LxWxH (mm)	190x95x62	275x120x80	
Media volume (ml)	350	1000	
Medium compartment cap	28 mm vented (0,2 µm) green PP cap with PP liner	38 mm vented (0,2 µm) white PP cap with PP liner	38 mm vented (0,2 µm), black PP cap with PP liner
Vertical and horizontal markings	50 - 350 ml	100 - 1000 ml	
Weight (g)	185	334	336

Description	Pk	Cat. No.
CeLLine™ CL350-1	1	**392-1000**
CeLLine™ CL350-5	5	**734-2632**
CeLLine™ CL1000-1	1	**392-1007**
CeLLine™ CL1000-3	3	**734-2631**
CeLLine™ AD 1000-1	1	**392-1008**
CeLLine™ AD 1000-3	3	**734-2633**

WHEATON Science International

Analysis of dialysed flask technology for antibody production



CELLINE™ BIOREACTOR FLASKS

Efficient and cost effective hybridoma culture is essential to small and large scale monoclonal antibody production for research purposes. This study evaluates multiple aspects of two existing production methods and the WHEATON CELLine bioreactor flasks, a dialysed cell culture flask method for culturing hybridoma cells. The flask separates the cell cultivation compartment from the cell culture media via a 10 kDa cut off limit membrane. This method allows for multiple harvests, longer run times and a super concentrated supernatant.

How do CELLine bioreactor flasks work?

More cells mean a higher yield of recombinant protein or antibody. Due to the gas permeable bottom membrane, the CELLine bioreactor flask can sustain 20 times more cells than a conventional T-Flask. More importantly, no mechanical devices are required for this proprietary high density culture method. In addition, the cells are also separated from the bulk media compartment, via a dialysis membrane. This allows for long-term bulk storage of media in the media compartment during operation, and a highly concentrated harvest from the cell compartment. Metabolites are freely exchanged between the two compartments, allowing the cells to grow in an optimal environment. Furthermore, a flask can be harvested multiple times, reducing the amount of consumables required by your lab.

Media compartment — the media compartment allows for bulk storage of cell culture growth medium. This reduces the media refreshing requirement significantly as the media compartment is fifty times the size of the cell compartment.

Metabolite regulating upper membrane — the upper dialysis membrane has a 10 kDa cut off limit. This regulates the flow of metabolites to and from the cell compartment and retains all proteins in the cell compartment.

Cell compartment — the cell compartment provides the ideal area to inoculate and achieve high density cultures. The compartment concentrates cells, their products and limits the requirement for any exogenous growth factors.

Gas permeable lower membrane — with static cultures, gas transfer rates can be the limiting factor in high density cultures.
The CELLine flask places the cells directly against the gas permeable membrane to achieve optimal levels of oxygen and carbon dioxide.

Experimental design

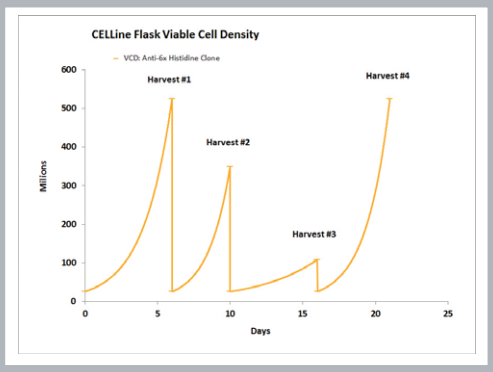
To determine the advantages of the dialysed flask technology, antibody production using an anti-6X histidine epitope tag secreting hybridoma cell line and an anti-AKT3 isoform secreting hybridoma cell line were examined. The current production methods for the anti-6X histidine epitope tag and anti-AKT3 isoform producing clones include an animal method (ascites) and a proprietary suspension culture method. The purified monoclonal antibodies were analysed by SDS-PAGE 4 - 20% under denatured conditions and characterised by Western Blot, direct ELISA titration and immunohistochemistry to assess performance. In this study, one flask was harvested approximately every five days for each antibody of interest. They were re-seeded and placed back into service until the desired amount of antibody was collected. At this point, the productivity of the CELLine bioreactor flask was compared to two current antibody production methods, ascites and a proprietary suspension culture. The functional activities of the antibodies produced via the three methods were compared.

Conclusion

Monoclonal anti-6X histidine epitope tag and anti-AKT3 isoform were affinity purified by protein A. SDS-PAGE analysis demonstrated that all antibody samples had purity higher than 95%. Western Blot analysis demonstrated no difference in antibody performance between the three production methods. The CELLine anti-histidine epitope tag could recognise specifically purified recombinant histidine tagged protein and cells lysates that contain expressed recombinant histidine tagged proteins. The CELLine anti-AKT3 isoform antibodies specifically recognised AKT3 isoform 3. Direct ELISA titration corroborated the Western Blot results (Figure 2A, 2B and 2C). Immunohistochemistry using the three antibodies on prostate cancer slides indicated a similar result
(Figure 3).

For more information on the experiment please visit Wheaton.com.

Viable Cell Density (VCD)



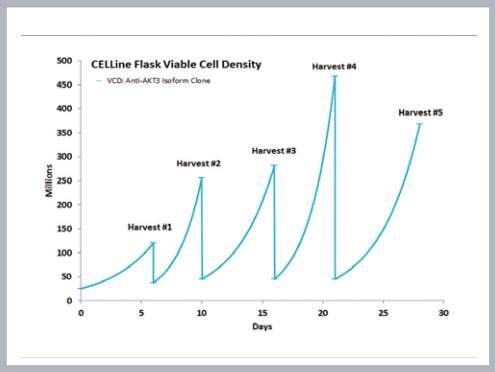
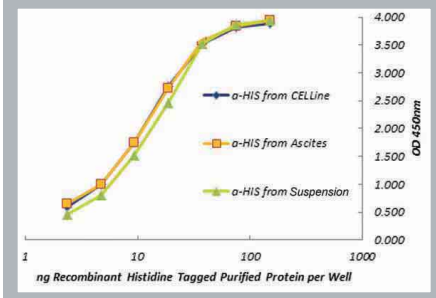
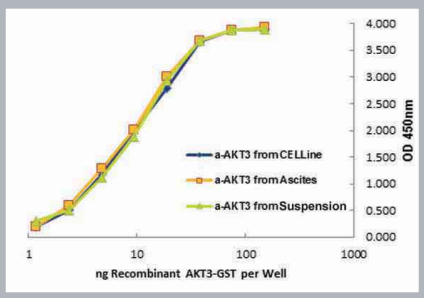


Figure 1A and 1B. The viable cell density (VCD) was measured each time a CELLine bioreactor flask was seeded and harvested. Figure 1A indicates the harvesting schedule and the cell concentrations for the anti-6x histidine producing hybridoma. Figure 1B indicates the harvesting schedule and the cell concentrations for the anti-AKT3 isoform producing hybridoma.

Direct ELISA





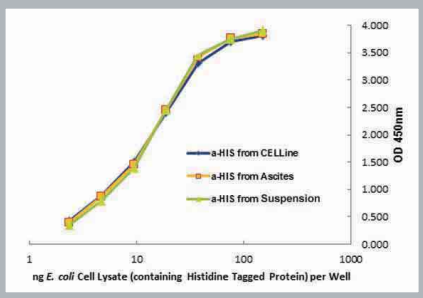
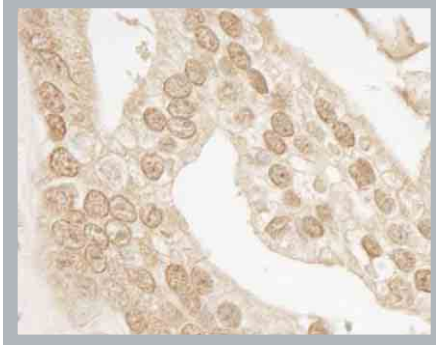
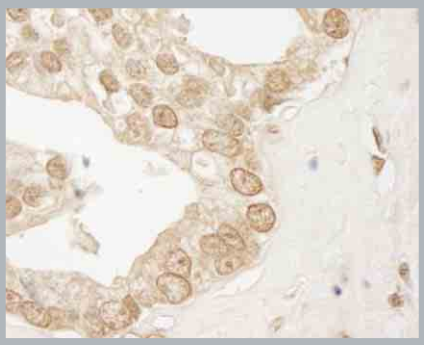


Figure 2. Samples of the antibodies were evaluated with a recombinant histidine purified protein, a recombinant AKT3-GST and a histidine tagged E. Coli lysate. As indicated by the titrations all samples exhibited similar sensitivity across multiple concentrations.

Immunohistochemistry





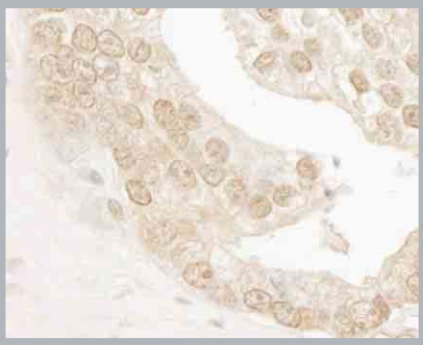


Figure 3. Detection of AKT expression in formalin-fixed, paraffin-embedded and sectioned human prostate cancer sections utilising monoclonal antibody produced using the WHEATON CELLline (A), suspension (B) or ascites (C) methods. Notice similar staining pattern and intensity between all three methods.

IVF

IVD

STERILE

Culture dishes for *in vitro* fertilisation, Falcon®
Corning

Crystal grade PS, sterile, with lid

Pre-tested and certified plasticware for *in vitro* fertilisation (IVF), designed for consistency and ease of use. These dishes have perfectly flat, optically clear surfaces for optimum manipulation and observation of ova and embryos. Lids are designed for aseptic manipulation and consistent venting to maintain humidification.

- Non-embryotoxic, non-pyrogenic and non-cytotoxic
- Tissue culture treated for a consistent hydrophilic surface
- Sterilised by gamma irradiation
- Packaged in peel-open, medical-style packaging
- Multi-unit bags have reseal tabs

Description	Ø (mm)	Height (mm)	Growth area (cm²)	Recommended working volume (ml)	Pk	Cat. No.
Culture dish, TC treated, IVF	60	15	21,3	6,0 - 7,0	500	**734-0068**
Culture dish, TC treated, IVF, centre-well	60	15	2,9	0,5 - 2,5	500	**734-0398**
Culture dish, IVF, low wall, non treated	50	9	19	-	100	**734-2406**

STERILE

Bioassay dish for *in vitro* fertilisation, Nunc™
Thermo Scientific

PS, sterile, flat bottom, with lid

These fully certified dishes are specifically intended for *in vitro* fertilisation (IVF) use.

- Full batch control of all components in the final product giving full traceability
- Unique certification, based on a 1-cell stage mouse embryo toxicity test, confirms sterility (SAL 106), non-pyrogenicity, and that the material has passed USP class VI requirements

Description	Growth area (cm²)	W×D×H (mm)	Pk	Cat. No.
Bioassay dish, Nunclon™Δ treated, 4 compartments	1,9	66×66×18	120	**734-1175**
Bioassay dish, non treated, 4 compartments	1,9	66×66×18	120	**734-2693**

STERILE

Culture dishes for *in vitro* fertilisation, Nunc™
Thermo Scientific

PS, sterile, flat bottom, with lid

These fully certified dishes are specifically intended for *in vitro* fertilisation (IVF) use.

- Full batch control of all components in the final product giving full traceability
- Unique certification, based on a 1-cell stage mouse embryo toxicity test, confirms sterility (SAL 106), non-pyrogenicity, and that the material has passed USP class VI requirements

Description	Ø (mm)	Height (mm)	Growth area (cm²)	Pk	Cat. No.
Culture dish, IVF, untreated	40	10	8,8	500	**391-0109**
Culture dish, IVF, untreated	60	15	21,5	400	**391-0108**
Culture dish, IVF, untreated	90	17	56,7	150	**391-0475**

IVF ICSI dishes, Nunc™
Thermo Scientific

Non treated surface, sterile (SAL 10^{-6}), with lid

These IVF ICSI dishes meet the exacting requirements of IVF testing, certification, and validation, providing consistently reliable, high quality results during fertilisation.

- Maintain optimal temperature with true flat bottom
- Low profile provides optimal angles during ICSI process
- Clearly see sample with super polished optical centre
- Increased safety with easy grip design
- Certificates of conformity available for every lot

Produced under ISO 13485 with full lot traceability

Description	Ø (mm)	Height (mm)	Packed	Pk	Cat. No.
IVF ICSI dish, non treated, with lid	35	10	Individually wrapped	120	**392-0323**

Cell culture tubes, Nunc™
Thermo Scientific

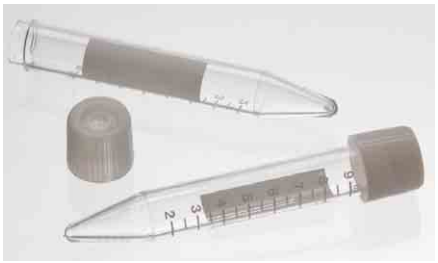
Highly certified tubes for critical cellular applications.

- Optimised gas exchange with dual position vent/close cap
- Off-gas volatile organic compounds easily with breathable packaging
- Certificates of conformity available for every lot
- Non-pyrogenic
- For research use only

Mouse Embryo Assay (MEA) tested. Produced under ISO 13485 with full lot traceability. USP Class VI tested. Certified.

Capacity (ml)	Description	Pk	Cat. No.
14	Round bottom tube, with dual position polyethylene cap, sterile	500	**392-0334**

IVF centrifuge tubes, Nunc™ InVitro™
Thermo Scientific



Nunc™ InVitro™ centrifuge tubes are rigorously tested, certified and validated for IVF, providing security, safety and reproducibility for valuable samples.

- Clear graduations for quick identification of sample volume
- Compatible with common centrifuge rotors

CE-marked Class II for IVF according to Medical Device Directive 93/42/EEC Certificate confirms: Sterility (SAL 10^{-6}, non pyrogenicity, USP Class VI test, and results from release tests (MEA and HSSA)

Capacity (ml)	Ø×L (mm)	Packed	RCF max. (×g)	Sterile	Description	Pk	Cat. No.
11	16×110	5/bag	3000	+	Centrifuge tubes, conical bottom	300	**734-2404**

IVF CryoTubes™, Nunc™
Thermo Scientific

PP tubes and caps, sterile

These CryoTubes™ meet the exacting requirements of IVF testing, certification and validation, providing consistently reliable, high-quality results during gamete and embryo storage.

- Extra safety for valuable samples with internally threaded caps and silicone gasket
- Large writing area for marking samples
- Certificates of conformity available for every lot
- CE-marked, FDA cleared and MEA tested
- Produced under ISO 13485 with full lot traceability

CE marked, according to Medical Devices Directive 93/42/EEC, based on a 1-cell stage mouse embryo toxicity test, sterility (SAL 10-6), USP Class VI test.

Capacity (ml)	Base	Ø ext.×H (mm)	Cap colour	Pk	Cat. No.
1,8	Round bottom, free standing with starfoot	12,5×49	Clear	1.800	**734-2405**

VWR®
We Enable Science

Complex problems require sophisticated solutions

For over 160 years, our customers have been challenged with finding the answers that help improve lives. Our mission is to identify product and service solutions, while eliminating process complexities to help labs and production facilities to work better and faster.

Through our global reach and knowledgeable teams, we proudly excel in delivering solutions that improve productivity, accelerate discovery and encourage innovation.

At VWR, we are focussed on your success because... **together, We Enable Science**

BIOCOATING

Pre-coated plasticware **174**

Corning® Synthemax® II Sc substrate as an ideal surface for human neural stem cell culture *181*

The Nunclon Sphera surface supports formation of three dimensional cancer spheroids in suspension *188*

Coatings **192**

Extracellular Matrices (ECM) **193**

Pre-coated plasticware

Poly-D-lysine cell culture flasks, Corning® BioCoat™
Corning

PS, coated with poly-D-lysine, sterile, non-pyrogenic

Poly-D-lysine (PDL) is a synthetic compound that enhances cell adhesion and protein absorption by altering surface charges on the culture substrate. Poly-lysine surface treatments support applications including attachment and spreading of a variety of cell lines; cell differentiation and neurite outgrowth; attachment of transfected cell lines; and survival of primary neurons in culture. As PDL is a synthetic molecule, it does not stimulate biological activity in the cells cultured on it, and it does not introduce impurities carried by natural polymers.

Capacity (ml)	Cap	Growth area (cm^2)	Neck	Pk	Cat. No.
70	Vented	25	Canted	50	**734-0311**
250	Vented	75	Canted	50	**734-0418**
600	Vented	150	Straight	40	**734-0312**
750	Vented	175	Straight	40	**734-0419**

Note: Growth area and capacity are nominal

Collagen I cell culture flasks, Corning® BioCoat™
Corning

PS coated with rat tail collagen type I, sterile, non-pyrogenic

The uniform application of collagen type I to the surface of tissue culture vessels has been found to improve cell attachment and increase proliferation rates for a variety of normal or transformed mammalian cell types.

Capacity (ml)	Cap	Growth area (cm^2)	Neck	Pk	Cat. No.
70	Vented	25	Canted	10	**734-0158**
70	Vented	25	Canted	50	**734-0289**
250	Vented	75	Canted	5	**734-0159**
250	Vented	75	Canted	50	**734-0290**
600	Vented	150	Straight	40	**734-0291**
750	Vented	175	Straight	5	**734-0161**
750	Vented	175	Straight	40	**734-0292**

Note: Growth area and capacity are nominal

Collagen IV cell culture flasks, Corning® BioCoat™
Corning

Collagen IV is a ubiquitous component of basement membranes. It plays a role in the regulation of cell growth, differentiation and adhesion, as well as tissue formation. Corning® BioCoat™ Collagen IV flasks are tissue culture vessels with a uniform application of mouse collagen type IV. These flasks are manufactured in a highly controlled environment and are rigorously tested to assure product consistency and performance.

Applications include promotion of cell attachment and spreading, cell differentiation and neurite outgrowth, increased proliferation of PC 12 cells, studies of effects of collagen IV on cell behaviour, cell adhesion assays, and serum-free or reduced serum culture.

Capacity (ml)	Cap	Culture area (cm^2)	Neck	Pk	Cat. No.
250	Plug seal	75	Canted	10	**734-0182**
750	Plug seal	175	Straight	5	**734-0185**
70	Plug seal	25	Canted	10	**734-0190**

Fibronectin cell culture flasks, Corning® BioCoat™
Corning



Fibronectin exists as a dimer in plasma and in multimeric form in the extracellular matrix and on cell surfaces. It promotes cell attachment, spreading, proliferation, and differentiation of many cell types, particularly fibroblasts and other mesenchymally-derived cells. Corning® BioCoat™ Fibronectin flasks are tissue culture vessels with a uniform application of human fibronectin. These flasks are manufactured in a highly controlled environment and are rigorously tested to assure product consistency and performance.

Applications include promotion of cell attachment and spreading, rapid expansion of cell populations, serum-free or reduced serum culture, cell adhesion assays, studies of the effects of fibronectin on cell behaviour, and improving survival of primary cells in culture.

Capacity (ml)	Cap	Culture area (cm^2)	Neck	Pk	Cat. No.
250	Plug seal	75	Canted	10	**734-0180**
750	Plug seal	175	Straight	5	**734-0184**
70	Plug seal	25	Canted	10	**734-0188**
600	Plug seal	150	Canted	5	**734-0247**

Laminin cell culture flasks, Corning® BioCoat™
Corning


Laminin, a major structural component of basement membranes, is a 900 kD glycoprotein composed of three polypeptide chains with a multidomain structure. Laminin has many varied funcitons that are mediated by binding to various components of the basement membrane (for example, collagen IV and heparan sulphate proteoglycan) and to cell surface receptors. Corning® BioCoat™ Laminin flasks, coated with mouse laminin, are manufactured in a highly controlled environment and rigorously tested to assure product consistency and performance.

Applications include promotion of cell attachment and spreading, induction of cell differentiation and neurite outgrowth, studies of effects of laminin on cell behaviour, and cell adhesion assays.

Capacity (ml)	Cap	Culture area (cm^2)	Neck	Pk	Cat. No.
250	Plug seal	75	Canted	10	**734-0181**
70 ml	Plug seal	25	Canted	10	**734-0189**

Gelatin cell culture flasks, Corning® BioCoat™
Corning

PS, coated with porcine gelatin, sterile, non-pyrogenic

Corning® BioCoat™ gelatin provides an attachment and growth promoting substrate for the culture of a variety of cell types. Gelatin is commonly used in the culture of normal and transfected cell types, including vascular endothelial, muscle, embryonic stem (ES) and F9 teratocarcinoma cells. Gelatin is a heterogeneous mixture of water soluble proteins derived through the hydrolysis of collagen. Applications include promotion of cell attachment and spreading of vascular endothelial cells (for instance, BME, BAEC, ES cells), C2C12 myoblasts and MM14 myoblasts; culture of normal and transfected F9 teratocarcinoma cells for gene expression studies; and culture of HUVEC for E-Selectin expression and VEGF induction.

- Gelatin substrate enhances the attachment of a variety of normal and transfected cell types
- Pre-treatment with gelatin eliminates time consuming preparation, saving time and money
- Lot-to-lot consistency ensures reproducible results

Capacity (ml)	Cap	Growth area (cm²)	Neck	Pk	Cat. No.
250	Vented	75	Canted	5	**734-0162**
250	Vented	75	Canted	50	**734-0293**

* Note: Culture area and capacity are nominal

Cell culture flasks, EasYFlasks™, Nunclon™Δ
Thermo Scientific

PS, sterile

Designed to allow full access to the growth surface.

- Flask is opened or closed with ⅓ turn of the cap
- "Y" Mark caps allow visual verification of vent position, even when stacked in incubators
- Volume graduations on both sides of the flask
- Angled neck facilitates easy access
- Nunclon™Δ certified surface treatment for optimal cell growth and attachment

Cap	Growth area (cm²)	Neck	Recommended working volume (ml)	Version	Pk	Cat. No.
Nunclon Delta-treated						
Vent/close	25	Angled	7	Nunclon Delta-treated	200	**734-2063**
Filter	25	Angled	7	Nunclon Delta-treated	200	**734-2064**
Vent/close	75	Angled	30	Nunclon Delta-treated	100	**734-2065**
Filter	75	Angled	30	Nunclon Delta-treated	100	**734-2066**
Filter	175	Angled	55	Nunclon Delta-treated	30	**734-2167**
Vent/close	175	Angled	55	Nunclon Delta-treated	30	**734-2168**
Vent/close	225	Angled	70	Nunclon Delta-treated	30	**734-1337**
Filter	225	Angled	70	Nunclon Delta-treated	30	**734-1338**
Poly-D-Lysine or Collagen I coated						
Filter	25	angled	7	Poly-D-Lysine coated	60	**734-2281**
Filter	75	angled	25	Poly-D-Lysine coated	30	**734-2282**
Filter	175	angled	55	Poly-D-Lysine coated	30	**734-2283**
Filter	25	angled	7	Collagen I coated	60	**734-2284**
Filter	75	angled	25	Collagen I coated	30	**734-2285**
Filter	175	angeld	55	Collagen I coated	30	**734-2286**

Cell culture flasks, Nunclon™ Sphera™
Thermo Scientific

The Nunclon™ Sphera™ culture surface allows cells to grow in suspension with virtually no cell attachment. The surface supports many different cell types and their ability to generate spheroids. Studies show that over time the spheroids grow in volume, indicating that the new surface enables consistent, repeatable cell growth.

The Nunclon™ Sphera™ surface minimises variability and supports the consistent formation of cancer spheroids that simulate the 3D structures of tumour growth, providing a better model system for studying tumour cell progression and efficacy of anticancer agents *in vitro*.

As an important milestone in the differentiation process, the Nunclon™ Sphera™ surface demonstrates superior quality for embryoid body (EB) formation of pluripotent stem cells with minimal spontaneous differentiation. The resultant cells are able to differentiate into all three germ layers.

- Optimises spheroid formation
- Supports the consistent formation of cancer spheroids that simulate the 3D structures of tumour growth
- Promotes formation of embryoid bodies (EB)

Growth area (cm^2)	Pk	Cat. No.
25	6	**392-0615**
75	4	**392-0616**

96-well T-cell activation plates, Corning® BioCoat™
Corning

Description	Pk	Cat. No.
T-cell activation 96-well assay plates, anti-mouse CD3	5	**734-1074**
T-cell activation 96-well assay plates, anti-human CD3	5	**734-1075**
T-cell activation 96-well assay plates, uncoated control	5	**734-1076**

Poly-L-lysine and poly-D-lysine cell culture plates, Corning® BioCoat™

Corning

PS, coated with poly-L-Lysine or poly-D-Lysine

Poly-D-lysine (PDL) and poly-L-lysine (PLL) are synthetic compounds that enhance cell adhesion and protein absorption by altering surface charges on the culture substrate. PDL and PLL surface treatments support applications including attachment and spreading of a variety of cell lines; cell differentiation and neurite outgrowth; attachment of transfected cell lines; and survival of primary neurons in culture. As PDL and PLL are synthetic molecules, they do not stimulate biological activity in the cells cultured on them, and they do not introduce impurities carried by natural polymers.

Description	Colour	Pk	Cat. No.
Corning® BioCoat™ poly-D-lysine			
6-well plate	Clear	5	**734-0120**
12-well plate	Clear	5	**734-0151**
12-well plate	Clear	50	**734-0286**
24-well plate	Clear	5	**734-0121**
48-well plate	Clear	5	**734-0174**
48-well plate	Clear	50	**734-0298**
96-well plate	Clear	5	**734-0146**
96-well plate	Clear	80	**734-1121**
96-well plate	White	5	**734-0237**
96-well plate	White	50	**734-0316**
96-well plate	White	80	**734-1122**
96-well plate	Black/Clear	5	**734-0245**
96-well plate	Black/Clear	50	**734-0317**
96-well plate	Black/Clear	80	**734-1123**
96-well plate	White/Clear	5	**734-0250**
96-well plate	White/Clear	50	**734-0321**
96-well plate	White/Clear	80	**734-1124**
384-well plate	Clear	5	**734-0259**
384-well plate	Clear	50	**734-0327**
384-well plate	White	5	**734-0258**
384-well plate	White	50	**734-0326**
384-well plate	Black/Clear	5	**734-0260**
384-well plate	Black/Clear	50	**734-0328**
384-well plate	Black/Clear	80	**734-1128**
384-well plate	White/Clear	5	**734-0257**
384-well plate	White/Clear	50	**734-0325**
Corning® BioCoat™ poly-L-lysine			
6-well plate	Clear	5	**734-0175**
6-well plate	Clear	50	**734-0299**
96-well plate	Clear	5	**734-0176**
96-well plate	Clear	50	**734-0300**

Collagen I cell culture plates, Corning® BioCoat™
Corning

PS coated with rat tail collagen type I

Collagen is an integral part of the framework that holds cells and tissues together and has been recognized as a useful matrix for improving cell culture. In vitro use of collagen can exert effects on the adhesion, morphology, growth, migration, and differentiation of a variety of cell types. Applications include promotion of cell attachment and spreading, rapid expansion of cell populations, serum-free or reduced serum culture, studies of the effects of collagen I on cell behaviour, improving survival of primary cell lines in culture, and cell adhesion assays.

- Uniform application of rat tail collagen type I for consistent performance
- Manufactured in a highly controlled environment, and rigorously tested to assure product consistency and performance

Description	Colour	Pk	Cat. No.
6-well plate	Clear	5	**734-0108**
6-well plate	Clear	50	**734-0274**
12-well plate	Clear	5	**734-0166**
12-well plate	Clear	50	**734-0295**
24-well plate	Clear	5	**734-0115**
24-well plate	Clear	50	**734-0277**
48-well plate	Clear	5	**734-0170**
48-well plate	Clear	50	**734-0296**
96-well plate	Clear	5	**734-0114**
96-well plate	Clear	50	**734-0276**
96-well plate	Clear	80	**734-1129**
96-well plate	White	5	**734-0179**
96-well plate	White	50	**734-0303**
96-well plate	White	80	**734-1130**
96-well plate	Black/Clear	5	**734-0248**
96-well plate	Black/Clear	50	**734-0319**
96-well plate	Black/Clear	80	**734-1131**
96-well plate	White/Clear	5	**734-0249**
96-well plate	White/Clear	50	**734-0320**
96-well plate	White/Clear	80	**734-1132**
384-well plate	Clear	5	**734-0263**
384-well plate	Clear	50	**734-0331**
384-well plate	White	5	**734-0262**
384-well plate	White	50	**734-0330**
384-well plate	White	80	**734-1134**
384-well plate	Black/Clear	5	**734-0264**
384-well plate	Black/Clear	50	**734-0332**
384-well plate	Black/Clear	80	**734-1136**
384-well plate	White/Clear	5	**734-0261**
384-well plate	White/Clear	50	**734-0329**
384-well plate	White/Clear	80	**734-1133**

Collagen IV coated plates, Corning® BioCoat™
Corning

Tissue culture-treated PS microplates with a uniform application of mouse collagen type IV.

Description	Colour	Culture area	No. of wells	Sterile	Packed	Pk	Cat. No.
6-well plates	Clear		6	-	5 plates	5	**734-0125**
24-well plates	Clear		24	-	5 plates	5	**734-0127**
96-well plates	Clear	0,32	96	-	5 plates	5	**734-0126**

Fibronectin cell culture plates, Corning® BioCoat™

Corning

PS, coated with fibronectin

Fibronectin-coated cell culture plates have a number of applications, including the promotion of cell attachment, proliferation and differentiation of a variety of cell types, particularly fibroblasts and other mesenchymally derived cells.

Description	Colour	Pk	Cat. No.
6-well plate	Transparent	5	**734-0110**
24-well plate	Transparent	5	**734-1316**
96-well plate	Transparent	5	**734-0116**

Multiple well cell culture plates, Synthemax™

Corning

The Corning® Synthemax™ surface is designed to mimic the natural environment of the cell, with extracellular matrix-derived cell adhesion promoting peptides.

The Corning® Synthemax™-R peptide acrylate surface creates a uniform active surface for stem cell attachment, growth and differentiation, especially in chemically defined media. The Corning® Synthemax™-T surface supports the expansion of stem cells in their undifferentiated state and enables directed differentiation into specialised cell types.

- Ready to use, uniformly coated surface
- Quality tested for lot-to-lot consistency
- Non reversible lids with condensation rings to reduce contamination
- Sterilised by gamma irradiation and individually wrapped

Description	Colour	Culture area (cm^2)	Recommended working volume (ml)	Well volume (ml)	Pk	Cat. No.
6-well plate, Synthemax™-T surface	Clear	ca. 9,5	1,9 - 2,9	16,8	12	**734-2690**
6-well plate, Synthemax™-R surface	Clear	ca. 9,5	1,9 - 2,9	16,8	2	**734-2361**
6-well plate, Synthemax™-R surface	Clear	ca. 9,5	1,9 - 2,9	16,8	12	**734-2691**

Corning® Synthemax® II SC Substrate as an ideal surface for human neural stem cell culture

INTRODUCTION

Neural stem cells (NSC) are multipotent, self-renewing cells that have the ability to differentiate into multiple cell types found in the brain and spinal cord. These cells are of special interest for better understanding the central nervous system (CNS) as well as the investigation of potential therapies for CNS damage or various neurological disorders, such as Alzheimer's and Parkinson's. Culturing NSC adherently requires specialised coatings to maintain attachment and prevent spontaneous differentiation. These coatings can be expensive, contain undefined biological components, and have lot to lot variability. Corning Synthemax II-SC Substrate is a completely synthetic coating comprised of a proprietary peptide cross-linked to a unique matrix which allows the user to coat their preferred format of cultureware.

Synthemax II-SC can be used to maintain and expand human neural stem cells (hNSC) over multiple passages, without the loss of their multipotent state. This paper compared Corning's synthetic substrate to a commonly used biological NSC coating, poly-L-ornithine with laminin.

We looked at the ability of the surfaces to maintain undifferentiated neural stem cells over 5 passages while maintaining a consistent doubling time, expression of multipotency markers, and the ability to differentiate into astrocytes, oligodendrocytes and neurons.

METHODS AND MATERIALS

Coating and culture

Corning CellBIND® 6-well multiwell plates (Corning, Cat. No. 3335) were coated with either Synthemax II-SC or poly-L-ornithine with laminin prior to initiating cell culture.
For Synthemax II plates, 2 ml of a 0.025 mg/ml solution of Synthemax II (Corning, Cat. No. 3535XX1) was added to each well of the 6-well plate. Plates were allowed to incubate at room temperature for 2 hours prior to aspiration and use.

For poly-L-ornithine/laminin plates 2 ml of 20 µg/ml poly-L-ornithine (Sigma, Cat. No. P3655) was added to each well and incubated at 37 °C for 1 hour. After incubation, wells were rinsed with sterile water twice before adding 2 ml of 10 µg/ml of laminin (Sigma, Cat. No. L2020).
Plates were incubated at 37 °C for 2 hours, then rinsed with phosphate buffered saline (Corning, Cat. No. 21-031-cm) prior to use. Human neural stem cells (Invitrogen, Cat. No. N7800-100) were thawed into StemPro® NSC SFM (Invitrogen, Cat. No. A10500901) media following the protocol provided by the vendor. Cells were seeded onto 1 plate per surface at 4x104 cells/cm^2 in 2.5 ml of media per well. Media changes were performed every other day and cells were harvested on day 4 with StemPro® Accutase® (Invitrogen, Cat. No. A11105-01). Each plate was harvested and counted on the Vi-CELL (Beckman Coulter) by pooling 2 wells from each plate together to achieve 3 counts per surface. Once counted, the cells were used to re-seed a new plate of the same surface for continuous passage studies following the same seeding and culture protocol already described. The entire 5 passage study was repeated 3 independent times.

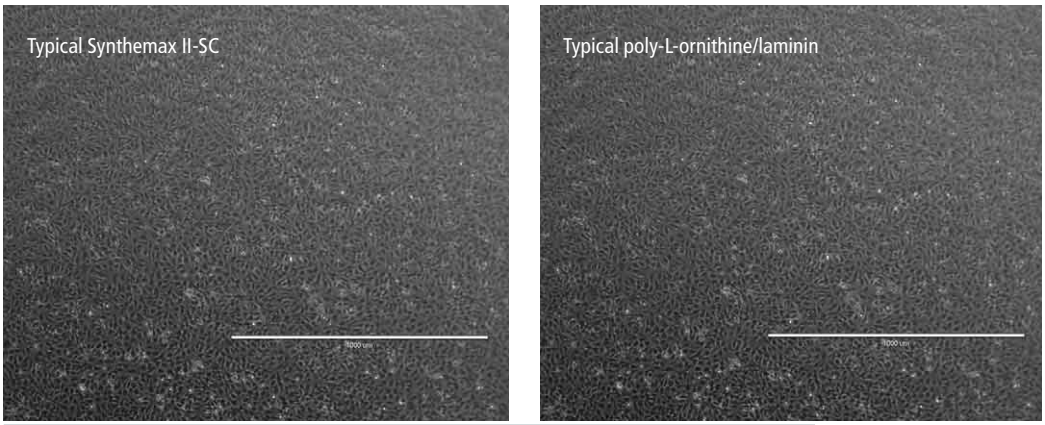


Figure 1. The 40x microphotographs show representative images of cell morphology and confluence on day 4 of culture. Cells appear similar regardless of which surface they are cultured on.

Multipotency assessment

At each passage, harvested neural stem cells were assessed for multipotency via immunocytochemistry. Cells were fixed by washing with PBS twice, fixing in 4% paraformaldehyde (Boston Bioproducts, Cat. No. BM-698) for 10 minutes at 4 °C. Cells were washed again and finally stored in PBS until ready to stain and assess via flow cytometry.

To demonstrate that there is no loss in multipotency over passages, fixed hNSCs at passage 1 and 5 were assessed for the expression of the hNSC markers Nestin and Sox2. Approximately 1x106 cells per sample were permeabilised with a 0.1% saponin (TCI, Cat. No. S0019) in HBSS (Corning, Cat. No. 21-023-cm) that contained 0.05% sodium azide (Fisher, Cat. No. ZS2271) by centrifuging at 200 xg for 7 minutes. The supernatant was then aspirated and replaced with 200 µl of fresh permeabilisation buffer. Finally, 10 µl of antibody or isotype control was added.
Samples were incubated at room temperature for 30 minutes, washed twice with HBSS and resuspended in 400 µl of HBSS to be analysed on the MACSQuant flow cytometer (Miltenyi Biotech).

Differentiation

Passage 5 cells were used to assess the potential of the NSCs to differentiate into astrocytes, oligodendrocytes, and neurons. For astrocyte differentiation, cells were seeded onto their respective surfaces at a concentration of 4x104 cells/cm^2 in Corning® CellBIND® Surface 24-well multiwell plates (Corning, Cat. No. 3337) in 1 ml of culture medium. Two days after seeding, the media was changed to glutaGRO™ DMEM (Corning, Cat. No.10-101-cv) supplemented with 1% N-2 supplement (Invitrogen, Cat. No. 17502-048) and 1% fetal bovine serum (Corning cellgro®, Cat. No. 35-010-cv).

The media was changed again 2 days later and the cells were assessed for marker expression 5 days after seeding. For oligodendrocyte differentiation, hNSCs were seeded using the same protocol as the astrocytes but the differentiation medium was Neurobasal media (Invitrogen, Cat. No. 21103-049) supplemented with 2% B-27 supplement (Invitrogen, Cat. No. 17504-044), 1x glutaMAX™ (Invitrogen, Cat. No. 35050-061), and 30 ng/ml of T3 supplement (Sigma, Cat. No. T5516) and the cells were assessed for marker expression 6 days after seeding.

For neuron differentiation, cells were seeded at 5.5x104 cells/ cm^2 in 1 ml of culture media on poly-L-ornithine/laminin coated plates only. Two days after seeding, the media was changed to Neurobasal media supplemented with 2% B-27 supplement and 1x glutaMAX. The media was changed again 2 days later and dcAMP (Sigma, Cat. No. D0627) was added to a final concentration of 1 mM. Neurons were assessed for marker expression 7 days after seeding. For cellular staining, cells were fixed then permeabilised and blocked with a 0.1% triton, 1% BSA, 5% FBS solution in HBSS for at least an hour at room temperature. After an hour, the buffer was removed and replaced with 200 µl per well of HBSS with 1% BSA. To the buffer 20 µl of conjugated antibody or isotype control was added to each well. One microlitre of 2 mg/ml hoechst stain was added to stain cell nuclei. Samples were stored at 4 °C for 40 minutes, then washed twice with HBSS and viewed using the Evos fl microscope (AMG).

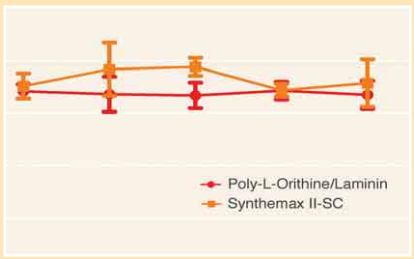


Figure 2. Average NSC doubling time for 5 passages on each surface..N=9 for each passage.

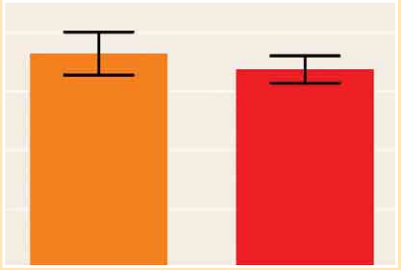


Figure 3. Average NSC doubling timeon each surface..N=45 for each passage.

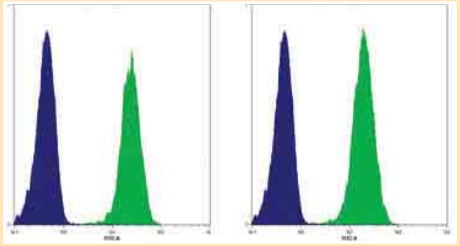


Figure 4. Representative Nestin expression from hNSCs cultured on Polyl-ornithine/ laminin and Synthemax II-SC.

CORNING

RESULTS AND DISCUSSION

In order to provide a xeno-free surface to support the growth of hNSCs, Corning's Synthemax II self-coat surface was evaluated for its ability to maintain undifferentiated human NSC's for five passages. Figure 1 shows typical NSC morphology and similar confluence between cells grown on poly-Lornithine/laminin as compared to the Synthemax II-SC surface on day 4 of culture. Throughout the 5 passage study, cells on Synthemax II maintained a consistent doubling time of 36 ±4 hours which is less than the vendor's suggested doubling time of 40 to 50 hours (Figures 2 and 3).

In order to confirm Synthemax II self-coat's ability to maintain undifferentiated NSC's over at least 5 passages, Nestin (Figures 4 and 5) and Sox2 (Figures 6 and 7) markers were used to assess multipotency via flow cytometry. The markers were chosen based on Invitrogen's recommendations and a literature search. The high expression of these markers confirms multipotency of the cells cultured for at least 5 passages on Synthemax® II-SC. Finally, to confirm that the NSCs cultured on Synthemax Self Coat II maintain their ability to differentiate into neurons, oligodendrocytes, and astrocytes, cells from passage 5 were reseeded and differentiated on poly-L-ornithine/laminin and Synthemax II-SC. Figure 8 confirms the ability of NSCs cultured for 5 passages on Synthemax II-SC to differentiate into the 3 cell types examined as well as the surface itself to support the differentiation of astrocytes and oligodendrocytes.

CONCLUSIONS

- For at least 5 passages, hNSCs grown on Corning Synthemax II-SC can maintain a consistent doubling time that is less than the published vendor's doubling time for these cells.
- Synthemax II-SC can maintain hNSCs that exhibit expression of multipotent stem cell specific markers Nestin and Sox2 for at least 5 passages.
- hNSCs cultured on Synthemax II-SC maintain their ability to differentiate into astrocytes, oligodendrocytes, and neurons.
- Synthemax II-SC surface can support differentiation of hNSCs into astrocytes and oligodendrocytes.

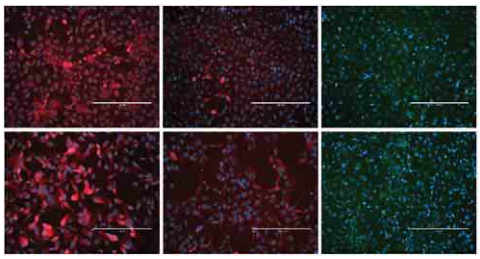


Figure 8. Representative 200x microphotographs of positively stained astrocytes (GLAST), oligodendrocytes (A2B5), and neurons (MAP2B) counterstained with hoechst that were derived from poly-L-ornithine/laminin or Synthemax II-SC passage 5 NSCs.

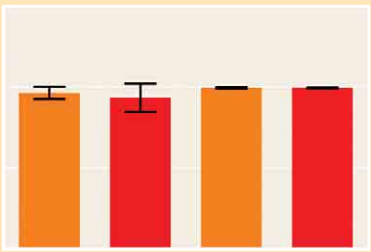


Figure 5. ANOVA with Newman-Keuls post test shows no statistical significance in Nestin expressionbetween passages or surfaces.N=3.

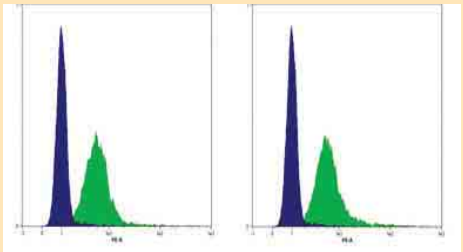


Figure 6. Representative Sox2 expression from hNSCs cultured on Polyl-ornithine/ laminin and Synthemax II-SC.

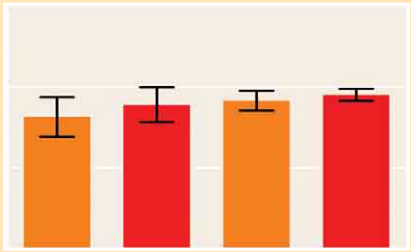


Figure 7. ANOVA with Newman-Keuls post test shows no statistical significance in Sox2 expression between passages or surfaces.N=3.

Laminin cell culture plates, Corning® BioCoat™

Corning

PS, coated with mouse laminin

Laminin, a major structural component of basement membranes, has many varied functions that are mediated by binding to various components of the basement membrane (for example, collagen IV) and to cell-surface receptors. Laminin-coated cell culture plates have a number of applications, including the promotion of cell adhesion, proliferation and differentiation of a variety of cell types, particularly neurons, epithelial cells, myocytes and myoblasts.

Description	Colour	Pk	Cat. No.
6-well plate	Transparent	5	**734-0112**
12-well plate	Transparent	5	**734-0168**
24-well plate	Transparent	5	**734-0118**
48-well plate	Transparent	5	**734-0172**
96-well plate	Transparent	5	**734-0117**

Gelatin cell culture plates, Corning® BioCoat™

Corning

PS coated with porcine gelatin

Corning® BioCoat™ gelatin provides an attachment and growth promoting substrate for the culture of a variety of cell types. Gelatin is commonly used in the culture of normal and transfected cell types, including vascular endothelial, muscle, embryonic stem (ES) and F9 teratocarcinoma cells. Gelatin is a heterogeneous mixture of water soluble proteins derived through the hydrolysis of collagen. Applications include promotion of cell attachment and spreading of vascular endothelial cells (for instance, BME, BAEC, ES cells), C2C12 myoblasts and MM14 myoblasts; culture of normal and transfected F9 teratocarcinoma cells for gene expression studies; and culture of HUVEC for E Selectin expression and VEGF induction.

- Gelatin substrate enhances the attachment of a variety of normal and transfected cell types
- Pre-treatment with gelatin eliminates time consuming preparation, saving time and money
- Lot-to-lot consistency ensures reproducible results

Description	Colour	Pk	Cat. No.
6-well plate	Transparent	50	**734-0322**
96-well plate	Transparent	50	**734-0420**

Plates, collagen I coated, Nunc™

Thermo Scientific

PS ready to use plates pre-coated with collagen I, with lid

- Consistent growth surface from each lot ensures guaranteed performance
- High quality surface promotes cell attachment, growth and differentiation in serum-free and serum-containing media
- Stable at room temperature

W×L: 128×86 mm

Description	Colour	Pk	Cat. No.
6-well multidish, flat bottom, PS	Clear	20	**735-0226**
96-well optical bottom plate, high flange design, PS with polymer film base	Black/Clear	20	**734-1183**
MicroWell™ plate, F96, high flange design, PS	Clear	20	**734-1185**
96-well optical bottom plate, high flange design, PS with polymer film base	White/Clear	20	**734-1187**
384-well optical bottom plate, pinchbar design, PS with polymer film base	Black/Clear	20	**734-1188**

Cell culture multidishes, Nunclon™ Sphera™

Thermo Scientific

The Nunclon™ Sphera™ culture surface allows cells to grow in suspension with virtually no cell attachment. The surface supports many different cell types and their ability to generate spheroids. Studies show that over time the spheroids grow in volume, indicating that the new surface enables consistent, repeatable cell growth.

The Nunclon™ Sphera™ surface minimises variability and supports the consistent formation of cancer spheroids that simulate the 3D structures of tumour growth, providing a better model system for studying tumour cell progression and efficacy of anticancer agents *in vitro*.

As an important milestone in the differentiation process, the Nunclon™ Sphera™ surface demonstrates superior quality for embryoid body (EB) formation of pluripotent stem cells with minimal spontaneous differentiation. The resultant cells are able to differentiate into all three germ layers.

- Optimises spheroid formation
- Supports the consistent formation of cancer spheroids that simulate the 3D structures of tumour growth
- Promotes formation of embryoid bodies (EB)

Continued on next page

Continued from previous page

Description	Culture area (cm^2)	Pk	Cat. No.
Multidish, 6-well, Nuclon™ Sphera™ treated surface	9,6	1	**392-0611**
Multidish, 12-well, Nuclon™ Sphera™ treated surface	3,8	1	**392-0610**
Multidish, 24-well, Nuclon™ Sphera™ treated surface	1,9	1	**392-0609**

Cell culture plates, Nunclon™ Sphera™
Thermo Scientific

The Nunclon™ Sphera™ culture surface allows cells to grow in suspension with virtually no cell attachment. The surface supports many different cell types and their ability to generate spheroids. Studies show that over time the spheroids grow in volume, indicating that the new surface enables consistent, repeatable cell growth.

The Nunclon™ Sphera™ surface minimises variability and supports the consistent formation of cancer spheroids that simulate the 3D structures of tumour growth, providing a better model system for studying tumour cell progression and efficacy of anticancer agents *in vitro*.

As an important milestone in the differentiation process, the Nunclon™ Sphera™ surface demonstrates superior quality for embryoid body (EB) formation of pluripotent stem cells with minimal spontaneous differentiation. The resultant cells are able to differentiate into all three germ layers.

- Optimises spheroid formation
- Supports the consistent formation of cancer spheroids that simulate the 3D structures of tumour growth
- Promotes formation of embryoid bodies (EB)

Description	Well volume (µl)	Pk	Cat. No.
Microwell 96-well plate, round bottom, Nunclon™ Sphera™ treated surface	300	1	**392-0607**
Microwell 96-well plate, flat bottom, Nunclon™ Sphera™ treated surface	400	1	**392-0608**

Control cell culture inserts, Corning® BioCoat™
Corning

Corning® BioCoat™ control cell culture inserts are Falcon® cell culture inserts, without ECM, packaged ready to use in Falcon® cell culture insert companion plates.

Description	Pore size (µm)	Membrane	Pk	Cat. No.
PET membrane inserts, 8,0 µm				
Control cell culture inserts in four 6-well companion plates	8,0	PET	24	**734-0219**
Control cell culture inserts in four 24-well companion plates	8,0	PET	24	**734-0221**

Collagen I and collagen IV cell culture inserts, Corning® BioCoat™
Corning

Falcon® cell culture inserts coated with collagen

Cell culture on permeable membranes permits diffusion of media components to both apical and basolateral cell surfaces similar to the in vivo process. Membranes with extracellular matrix (ECM) further improve in vitro cell culture systems by providing cells with a vital component of their microenvironment *in vivo*. Typical applications for Corning® BioCoat™ cell culture inserts include promotion of epithelial cell polarity; differentiation of a variety of cell types; transport and permeability studies; transendothelial migration, tumour cell invasion assays, *in vitro* toxicology; and co-culture studies.

Delivery information: Supplied packaged ready-to-use in Falcon® companion cell culture plates. Pack quantity refers to the total number of cell culture inserts supplied.

For further details about the full range of Corning® BioCoat™ cell culture inserts please contact your local VWR representative.

Description	Pk	Cat. No.
Corning® BioCoat™ collagen I cell culture inserts		
Two 24-well plates, 3,0 µm	24	**734-0196**

Cell culture inserts, fibronectin, Corning® BioCoat™ FluoroBlok™
Corning

Corning® BioCoat™ FluoroBlok™ fibronectin-coated cell culture inserts packaged ready to use in 24-well Falcon® companion plates.

- Convenient, individual inserts packaged in a one-piece, automation friendly 24-multiwell format
- Combined benefits of Falcon® inserts coated with HFN for enhanced cell attachment and growth
- Individual inserts contain a 3,0 µm pore size clear PET membrane

Description	Pore size (µm)	Membrane	Pk	Cat. No.
Individual 3,0 µm inserts, ready to use in 24-well plate	3,0	PET	24	**734-1053**

Chamber slides, Corning® BioCoat™ Poly-D-Lysine CultureSlides
Corning

Glass with PS lid, vessel and safety removal tool

These slides have a uniform application of poly-D-lysine.

Description	Pk	Cat. No.
Poly-D-Lysine CultureSlide, 4-well	12	**734-0220**
Poly-D-Lysine CultureSlide, 8-well	12	**734-0243**

Chamber slides, Corning® BioCoat™ Collagen I CultureSlides
Corning

Soda lime glass slide; PS vessel, lid and tool

Collagen is an integral part of the framework that holds cells and tissues together and has been recognised as a useful matrix for improving cell culture. *In vitro* use of collagen can exert effects on the adhesion, morphology, growth, migration, and differentiation of a variety of cell types.

Corning® BioCoat™ Collagen I CultureSlides allow cells to be cultured and analysed on a slide. Cells are grown in a plastic chamber attached to a prepared slide. Cells can be fixed and stained *in situ* without disruption of the cell monolayer.

- Chamber easily and safely removed using the disposable safety removal tool supplied
- Pressure-sensitive, biocompatible, acrylic-adhesive gasket remains with the vessel after removal, not on the slide, facilitating further processing or placement of coverslips
- Blue hydrophobic border defines cell culture areas
- Wells numbered for easy identification
- Trays designed for incubator use

W×L: 25×75 mm with 1,2 mm bevelled edge

Description	Growth area (cm^2)	Recommended working volume (ml)	Pk	Cat. No.
Collagen I CultureSlide, 4-well	1,7	0,7 - 1,25	12	**734-0206**
Collagen I CultureSlide, 8-well	0,7	0,3 - 0,5	12	**734-0241**

Chamber slides, Corning® BioCoat™ Fibronectin CultureSlides
Corning

Glass with PS vessel, lid and removal tool

These slides have a uniform application of human fibronectin. Different models with different numbers of wells are available.

Description	Pk	Cat. No.
Fibronectin CultureSlide, 4-well	12	**734-0208**
Fibronectin CultureSlide, 8-well	12	**734-0242**

Cell culture dishes, Nunclon™ Sphera™
Thermo Scientific

The Nunclon™ Sphera™ culture surface allows cells to grow in suspension with virtually no cell attachment. The surface supports many different cell types and their ability to generate spheroids. Studies show that over time the spheroids grow in volume, indicating that the new surface enables consistent, repeatable cell growth.

The Nunclon™ Sphera™ surface minimises variability and supports the consistent formation of cancer spheroids that simulate the 3D structures of tumour growth, providing a better model system for studying tumour cell progression and efficacy of anticancer agents *in vitro*.

As an important milestone in the differentiation process, the Nunclon™ Sphera™ surface demonstrates superior quality for embryoid body (EB) formation of pluripotent stem cells with minimal spontaneous differentiation. The resultant cells are able to differentiate into all three germ layers.

- Optimises spheroid formation
- Supports the consistent formation of cancer spheroids that simulate the 3D structures of tumour growth
- Promotes formation of embryoid bodies (EB)

Description	Ø (mm)	Growth area (cm^2)	Pk	Cat. No.
Cell culture dish, Nunclon™ Sphera™ treated surface	35	8,8	5	**392-0612**
Cell culture dish, Nunclon™ Sphera™ treated surface	60	221,5	5	**392-0613**
Cell culture dish, Nunclon™ Sphera™ treated surface	90	256,7	5	**392-0614**

The Nunclon Sphera surface supports formation of three dimensional cancer spheroids in suspension

Louise Gaarn, Tina Marwood, Robert Scott, Stephanie Carter, Joseph Granchelli, and Cindy Neeley

KEY WORDS

Nunclon Sphera, cancer spheroid, low cell binding, 3D cell culture

ABSTRACT

While monolayer cell culture has been used extensively to study many types of cancers in vitro, 3 dimensional (3D) cultures of cancer spheroids better simulate the in vivo environment and, therefore lead to a better understanding of tumor biology. Here we introduce a new cell culture surface, Thermo Scientific™ Nunclon™ Sphera, that supports the in vitro formation of cancer spheroids consistently. The Nunclon Sphera surface coating inhibits cell attachment to the culture dish by blocking the adsorption of extracellular matrix (ECM) proteins (e.g. Collagen I and Fibronectin) that usually mediate cell adhesion. This was further supported by results in low cell attachment of adherent cell lines (e.g. Vero, A549, and U937) to the Nunclon Sphera surface. The functionality of the surface was demonstrated by the formation of cancer spheroids of several commonly used cancer cell lines including HeLa, MCF-7, HepG2, Panc-1, Saos-2, and A549 on the Nunclon Sphera dishes. The integrity and consistency of the Nunclon Sphera surface was showcased by spheroid culture of a cancer stem cell line, P19.CL6. When seeded at relatively low cell seeding densities, P19.CL6 spheroids were able to grow in volume over time. The performance of Nunclon Sphera in promoting cancer spheroid formation was comparable to that of a similar product by a different manufacturer, whereas use of a non-treated Petri dish resulted in significant cell attachment and failed to support cancer spheroid formation.

INTRODUCTION

The study of cell biology ***in vitro*** via monolayer cell culture systems is not always an accurate representation of the complex environment these cells can experience ***in vivo***. Significant interaction that occurs between cells and with the extracellular matrix (ECM) is often not reflected in these simplified culture systems. Three dimensional (3D) cell culture systems better mimic complex interactions and are extremely useful in broad applications of cell biology. In human cancer biology, a 3D culture system can be used to form spheroid cell aggregates that simulate the 3D structure of tumor growth for the purpose of studying tumor cell progression and sensitivity to anticancer agents. However, variability in forming cancer spheroids has been a persistent problem that has been linked to changes in medium composition, volume, cell density, duration in culture, and most importantly the cellular interactions with the culture dish itself. More consistent results can be achieved using a high quality culture surface with very low binding characteristics. In this application note, we introduce a hydrophilic polymer coated surface, Thermo Scientific Nunclon Sphera, which minimizes surface variability and supports the formation of consistent cancer spheroids ***in vitro.***

MATERIALS AND METHODS

ECM Protein Non-specific Binding

Nunclon Sphera 96-well plates and Nunclon Delta (standard cell culture-treated) 96-well plates were coated with 100 µL/well of either 24 µg/mL FITC labeled Bovine Collagen Type I or 20 µg/mL of TAMRA labeled Fibronectin in DPBS. The plates were incubated for 24 hours at 2-8°C or 16 hours at room temperature, respectively. The solution was aspirated and plates were washed 3 times with 200 µL/well PBST (0.05% Tween 20 in PBS). The fluorescence intensity was read at Ex495/Em525 (Collagen) or Ex543/Em570 (Fibronectin) on a POWERSCAN MX (DS pharma).

Cell Adhesion

U937 cells underwent a differentiation step prior to adhesion studies. Briefly, U937 cells were cultured for 1 day in media containing phorbol 12-myristate 13-acetate (PMA) at concentration 10 ng/mL. Cells were then cultured for 2 more days in fresh media without PMA.
A similar protocol was used for cell adhesion assays for the differentiated U937 cell line and 2 other cell lines (VERO and A549). Briefly, cells were seeded onto 6-well multidishes at $1.5x10^5$

Thermo SCIENTIFIC

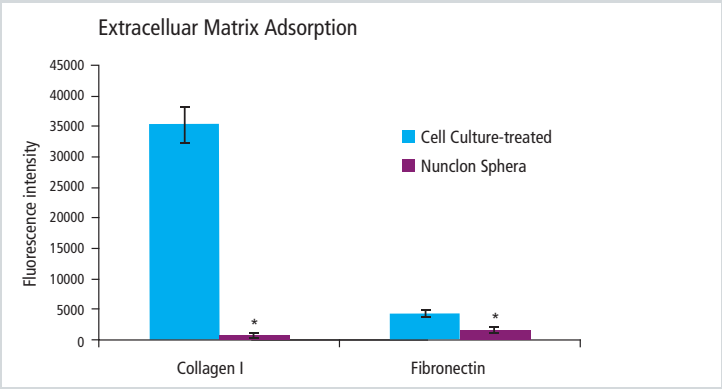


Figure 1. The adsorption of Collagen I and Fibronectin to the Nunclon Sphera surface is extremely low compared to the standard cell culture-treated surface (*, Student's T test, $p<0.01$).

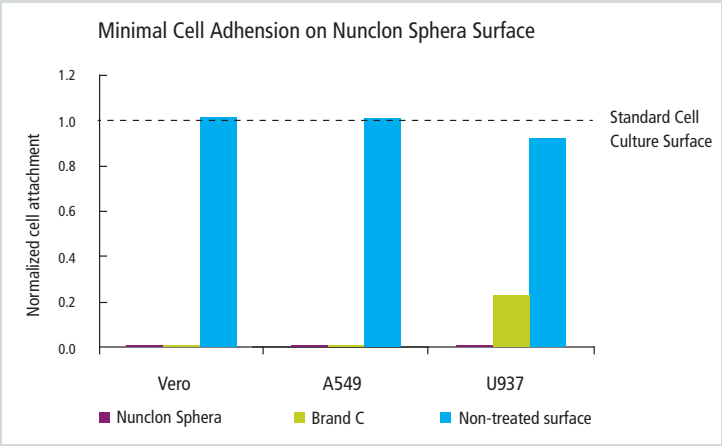


Figure 2. Cell adhesion is much lower in the Nunclon Sphera surface than in cell culture-treated and non-treated controls for all cell types tested. Nunclon Sphera also shows significantly lower adhesion than the Brand C surface with U937 cells.

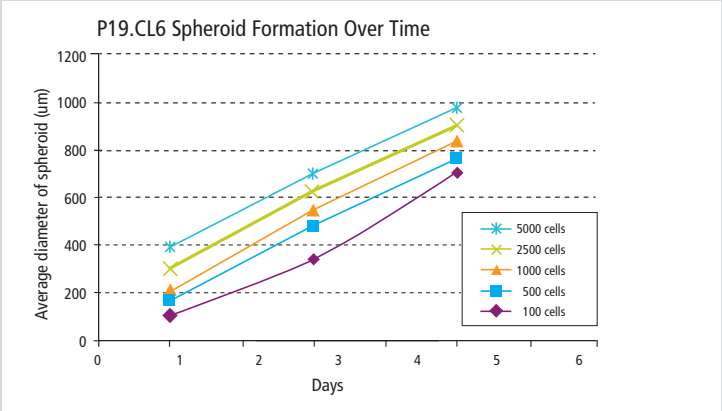


Figure 3. Cancer stem cell spheroids grow in size over time (average of 4 separate measurements) when cultured on the Nunclon Sphera surface at a rate associated with the initial seeding density.

cells/cm^2 (U937) or 4x10^4 cells/cm^2 (VERO and A549). After a 30 minute (U937) or 24 hour (VERO, A549) incubation at 37°C and 5% CO_2, culture dishes were washed and residual cells lysed with 2% Triton X-100 in phosphate buffered saline (DPBS). Dishes were incubated for another 30 minutes at 37°C before 100 µL of lysate was transferred to each well of a 96-well plate. An assay was performed using a commercial kit (Roche, 11644793001) to obtain the fluorescent intensity of the samples at 490 nm wavelength. Sample readings were compared to standards made with known quantity of cells to determine the amount of cell adhesion in the culture dishes. Results were normalized to the standard cell culture treated culture dishes.

Cancer Cell Line Cultivation

Cancer cell lines (HeLa, HepG2, A549, MCF-7, P19.CL6, Panc-1, and Saos-2) were maintained on the Nunclon Delta surface in the appropriate HyClone media containing 10-15% FBS (HyClone, SH3007103) at 37°C and 5% CO_2 before they were subjected to cancer spheroid formation in various low cell binding dishes.

Spheroid Formation

Cell lines HeLa, HepG2, A549, and MCF-7 were seeded into Nunclon Sphera and Brand C 6-well multidishes at a density of 2x10^4 cells/well (HeLa, HepG2, A549) or 4x10^4 cells/well (MCF-7) in the appropriate HyClone media containing 10% FBS (Hyclone, SH3007103). Untreated and cell culture-treated dishes were also seeded as controls. Cells were incubated at 37°C and 5% CO_2, and fresh media was added after 2-3 days. After 7 days cells were imaged, the size of spheres was measured, and the number of spheres and total cell count per well were determined.

To monitor the effect of the Nunclon Sphera coating on cancer spheroid growth, the P19. CL6 cancer stem cells were plated at density of 100, 500, 1,000, 2,500 and 5,000 cells/well in Nunclon Sphera 96 well U bottom plates. Cells were incubated for 5 days and spheroid size was measured by microscopic examination on days 1, 3, and 5.

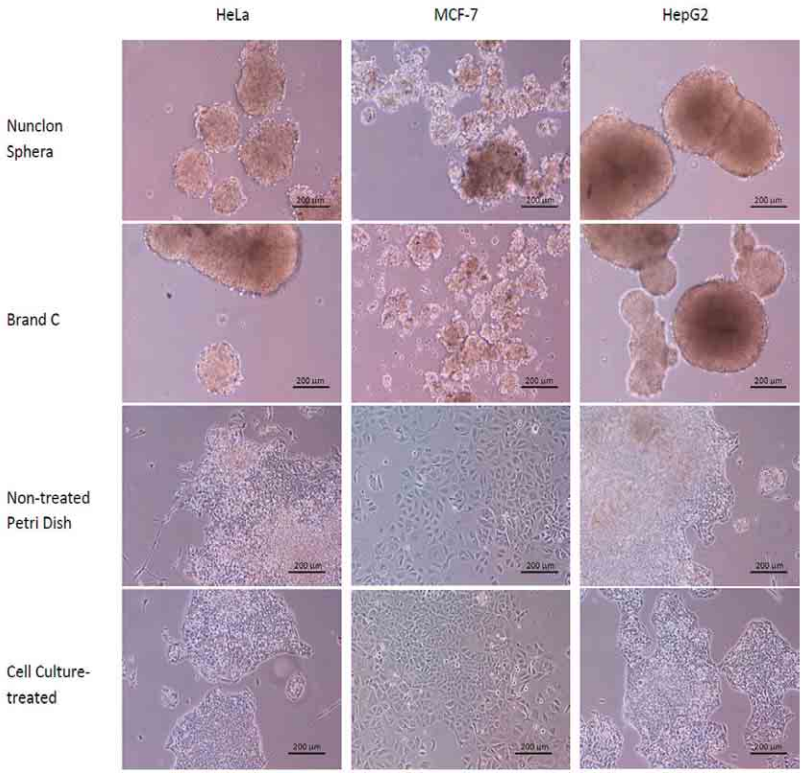


Figure 4. Nunclon Sphera effectively supports the formation of sizable cancer spheroids in culture. HeLa, MCF-7, and HepG2 cells were grown in Nunclon Sphera, Brand C, non-treated Petri, and standard cell culture-treated dishes.

RESULTS AND DISCUSSION

The adsorption of ECM to the Nunclon Sphera surface is extremely low

Common ECM proteins are known to mediate cell attachment to culture surfaces. In order for adherent cells to form spheroids in suspension, the culture vessel must encourage the aggregation of cells through cell-cell binding by preventing ECM binding to the plastic surface. In this study, both Collagen I and Fibronectin binding was minimal on the Nunclon Sphera surface. This is demonstrated through the extremely low fluorescence intensity following overnight incubation of solution with the ECM proteins (Figure 1). This suggests that unlike the standard cell culture-treated surface, the Nunclon Sphera surface has minimal binding interactions with the ECM, consequently discouraging the cells from attaching to the surface.

Surface adhesion of cells is extremely low on Nunclon Sphera

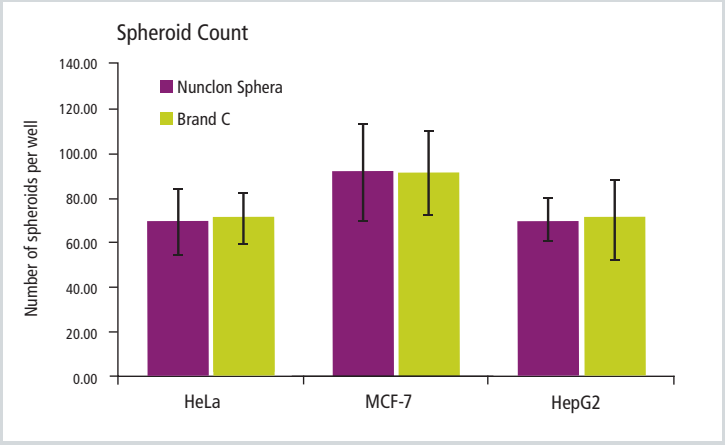
In order to verify that adherent cells show little attachment to the Nunclon Sphera surface, the quantity of adhered cells was assayed in cell culture dishes with either the Nunclon Sphera surface, a low cell binding surface by a different manufacturer (Brand C), or the non-treated polystyrene surface commonly used for non-adherent cell culture. A standard cell culture-treated surface was used as a positive control for cell adhesion. The Nunclon Sphera surface demonstrated virtually no cell adhesion for all cell lines tested whereas the Brand C attracted some differentiated U937 cells to the surface (Figure 2). The non-treated polystyrene surface showed significant cell adhesion, comparable to the cell culture-treated surface, presumably due to the presence of the serum and abundant ECM proteins in the culture system (Figure 2). While the non-treated polystyrene surface is unsuitable for spheroid culture, the Nunclon Sphera surface with the low adhesion properties demonstrates its feasibility in applications where preventing cells from binding to the culture dish are desired.

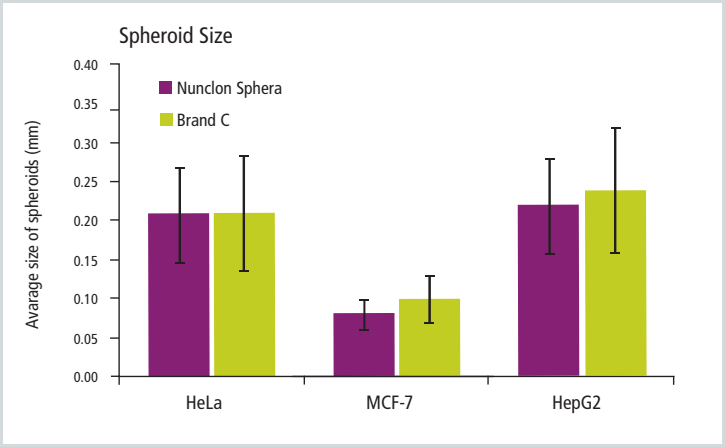
The Nunclon Sphera surface has no deleterious effects on cell growth

While cells do not adhere to the Nunclon Sphera, it is also critical to verify that the surface coating does not hamper the normal growth of the culture. To demonstrate cell growth, P19.CL6 mouse cancer stem cells were plated at 5 different densities on the Nunclon Sphera surface and spheroids were able to grow in size for 5 days. There was an approximate 6.5 fold increase in spheroid size at the lowest seeding density while there was only a 2.5 fold increase at the highest seeding density (Figure 3). These results suggest that the seeding density affects the growth rate of spheroids. Additionally, the spheroids of all initial seeding densities were able to grow in volume, indicating that the Nunclon Sphera polymer coating has no adverse effect on cell survival and proliferation.

The Nunclon Sphera surface supports spheroid formation and growth of multiple cancer cell lines

The key element for any low cell binding surface is its performance in forming and growing 3D spheroids in culture. To test this, several cancer cell lines were grown in dishes of various low cell binding surfaces, including the Nunclon Sphera surface, the Brand C surface by a different manufacturer, and the non-treated Petri dish. The standard cell culture-treated Nunclon Delta dish was used as a negative control for spheroid formation. The formation and growth of spheroids were assessed after a week of incubation. Microscopic examination demonstrated that the Nunclon Sphera surface consistently supported spheroid formation of all cancer cells, and the spheroids maintained healthy and normal morphology in culture (Figure 4). Brand C performed comparably to the Nunclon Sphera surface with the spheroids slightly less uniformed in size (Figure 4). Interestingly, the non-treated Petri dish, which is made of hydrophobic polystyrene and is routinely used for suspension cell culture, failed to support cancer spheroid growth resulting in significant cell attachment of all cancer cell lines tested (Figure 4). In addition to the HeLa, MCF-7, and HepG2 cells shown, similar results were





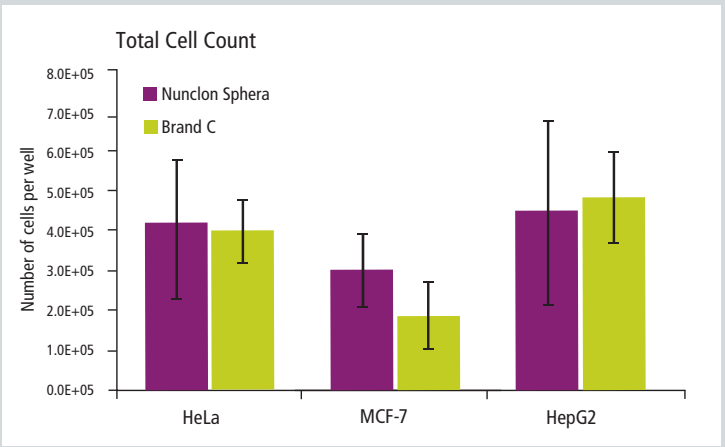


Figure 5. Nunclon Sphera performs as well as the Brand C in the number of spheroids formed, the size of spheroids grown, and the total number of cells grown per well.

obtained with Panc-1, Saos-2, and A549 cells (data not shown).

To quantify the performance of the surfaces, assessments were made for the number and size of the cancer spheroids, as well as the total number of cells in the well after a week of incubation. The Nunclon Sphera surface achieved similar results as the Brand C surface in all categories, with no significant differences in the number of spheroids, the size of the spheroids, or the total number of cells (Figure 5).

CONCLUSIONS

The Nunclon Sphera surface consistently demonstrates minimal ECM protein binding, extremely low cell attachment, and supports good formation and proliferation of spheroids across several commonly used cancer cell lines. These results indicate that the Nunclon Sphera surface is an excellent choice for 3D cancer spheroid culture.

- Minimal adsorption of ECM proteins and extremely low cell adherence highlight the low binding properties of the Nunclon Sphera surface.
- The Nunclon Sphera polymer coating has no adverse effects on cell survival and proliferation as demonstrated by cancer spheroids with low seeding density grown both in number and size over time.
- The Nunclon Sphera surface effectively supports the formation of spheroids by many different cancer cell lines, providing a consistent culture system for spheroid growth and aiding in 3D cancer cell modeling *in vitro*.

Description	Units per bag	Units per case	Cat. No.
Microwell 96U-Well Plate, Round Bottom, Well Volume 300 µL	1	8	392-0607
Microwell 96F-Well Plate, Flat Bottom, Well Volume 400 µL	1	8	392-0608
Multidish 24-Well, Culture Area 1.9 cm^2	1	7	392-0609
Multidish 12-Well, Culture Area 3.8 cm^2	1	7	392-0610
Multidish 6-Well, Culture Area 9.6 cm^2	1	7	392-0611
Dish 35 MM, Culture Area 8.8 cm^2	5	20	392-0612
Dish 60 MM, Culture Area 21.5 cm^2	5	20	392-0613
Dish 90 MM, Culture Area 56.7 cm^2	5	20	392-0614
T25 Cell Culture Flask, Culture Area 25 cm^2	6	18	392-0615
T75 Cell Culture Flask, Culture Area 75 cm^2	4	24	392-0616

Coatings

Collagen I
Corning

Collagen I is found in most tissues and organs, but is most plentiful in dermis, tendon, and bone. Used as a thin coating in cell and tissue culture, it is often used to enhance cell attachment and proliferation. When applied as a gel it can be used to promote expression of cell-specific morphology and function. Collagen I is commonly used to culture endothelial cells, hepatocytes, muscle cells, and a variety of other cell types. The HC formulation of rat tail collagen I is used for three dimensional applications requiring a sturdy gel that provides a maximal 3D support matrix (guidelines are included with product).

Quality control: All preparations are quality controlled by SDS-PAGE and tested and found negative for bacteria, fungi, and mycoplasma. Source material for human collagen I tested for hepatitis B antigen and HIV-1 antibody.

Description	Pk	Cat. No.
Collagen I, human	250 µG	**734-1084**
Collagen I, human	10 mg	**392-0319**
Collagen I, bovine	30 mg	**392-2502**
Collagen I, rat tail	100 mg	**734-1097**
Collagen I, high concentration, rat tail	100 mg	**734-1085**
Collagen I, rat tail (10×100 mg)	1 g	**734-1096**

Collagen II
Corning

Collagen II is the principal collagenous component of cartilage, intervertebral disc, and vitreous humour. Collagen II supports chondrocyte adhesion and may influence the differentiated phenotype of these cells. In culture, collagen II is used for attachment and differentiation of chondrocytes. It can also be used as an in vivo model in rats and mice for arthritis studies (injection of bovine collagen II induces arthritis).

Description	Pk	Cat. No.
Collagen II, bovine	5 mg	**734-1272**

Collagen III
Corning

Collagen III is found in several stromal connective tissues including the dermis of young organisms, human skin, and cornea. It can be used as a thin coating on tissue culture surfaces to promote cell attachment and to modulate cell behaviour.

Description	Pk	Cat. No.
Collagen III, human	250 µG	**734-0104**

Collagen IV
Corning

Collagen IV is a ubiquitous component of basement membranes, the sheet-like matrix that underlies epithelial and endothelial cells and surrounds muscle fat and nerve cells. It can be used as a thin coating on tissue culture surfaces to promote cell attachment and proliferation and to study its effects on cell behaviour.

Description	Pk	Cat. No.
Collagen IV, mouse	1 mg	**734-0099**
Collagen IV, human	250 µG	**734-0105**
Collagen IV, human	500 µG	**BDAA354261**
Collagen IV, mouse	10 mg	**734-0100**

Collagen V
Corning

Collagen V is found in whole placenta, amnion, chorion, and cornea. It can be used as a thin coating on tissue culture surfaces to study collagen V effects on cell behavior. Collagen V has been shown to inhibit endothelial cell proliferation selectively.

Description	Pk	Cat. No.
Collagen V, human	250 µG	**734-0106**

Fibronectin
Corning

Fibronectin (FN) is found in interstitial matrix and plasma. The principal function of fibronectin appears to be in cellular migration during wound healing and development. It can be used as a thin coating on tissue culture surfaces to promote attachment, spreading and proliferation of a variety of cell types.

Description	Pk	Cat. No.
Fibronectin, human	1 mg	**734-0085**
Fibronectin, human	5 mg	**734-0101**
Fibronectin, human, 5×5 mg	25 mg	**734-0103**

Laminin
Corning

Laminin, a major component of basement membranes, has numerous biological activities including promotion of cell adhesion, migration, growth, and differentiation, including neurite outgrowth. It can be used as a thin coating on tissue culture surfaces or as a soluble additive to culture medium. The Laminin/Entactin Complex, high concentration (HC) is a special formulation that has been developed for three-dimensional (3D) culture.

Description	Pk	Cat. No.
Laminin, mouse	1 mg	**734-1098**
Ultrapure laminin, mouse	1 mg	**734-1099**
Laminin/entactin complex, high concentration, mouse	10,5 mg	**734-1273**

Osteopontin
Corning

Osteopontin is found in a number of tissues, including bone, placenta, distal tubules of the kidney, and the central nervous system. Osteopontin is expressed in early bone development, at high levels at sites of bone remodelling, and has been implicated in the process of osteogenesis. Osteopontin is chemotactic for macrophages, smooth muscle cells, endothelial cells, and glial cells. In culture, osteopontin is used as an adhesive substrate for tumour cell lines and osteoclasts.

Description	Pk	Cat. No.
Osteopontin, human	50 µG	**BDAA354256**

Poly-D-Lysine
Corning

Poly-D-lysine (PDL) is a synthetic molecule used as a coating to enhance cell attachment to plastic and glass surfaces. It has been used to culture a wide variety of cell types, particularly neurons, glial cells, and transfected cells.

Description	Pk	Cat. No.
Poly-D-Lysine	20 mg	**734-1102**

Vitronectin
Corning

Vitronectin is also known as S-protein, serum spreading factor epibolin. Vitronectin and fibronectin are the two major adhesive proteins in plasma and serum. When used as coating on tissue culture surfaces, vitronectin is useful to promote cell attachment, spreading, proliferation, and differentiation normal and neoplastic cells, and to study cell migration.

Description	Pk	Cat. No.
Vitronectin	250 µG	**734-0098**

Extracellular Matrices (ECM)

Cell Recovery Solution
Corning

Corning® Cell Recovery Solution allows for the recovery of cells cultured on Corning® Matrigel® Basement Membrane Matrix for subsequent biochemical analysis. Corning® Cell Recovery Solution depolymerises Corning® Matrigel® Matrix gels without enzymatic digests and lengthy incubation periods at high temperatures. Cells are released without damage thereby avoiding biochemical changes during incubation and digestion of extracellular portions of cell-surface receptors and adhesion molecules.

Description	Pk	Cat. No.
Corning® Cell Recovery Solution	100 ml	**734-0107**

Dispase
Corning

Dispase is a bacillus-derived neutral metalloprotease that is recommended for recovering cell cultured on Corning® Matrigel® Basement Membrane Matrix. Dispase will yield a single cell suspension far more gently and effectively than trypsin, collagenase, or other proteolytic enzymes; it will not harm cells harvested for sub cultivation or bioassays. In addition, Dispase may be used for tissue dissociation. Dispase cleaves fibronectin, collagen IV, and to a lesser extent collagen I, but is does not cleave collagen V or laminin.

Description	Pk	Cat. No.
Dispase, 5000 caseinolytic units	100 ml	**734-1312**

Human Extracellular Matrix
Corning

Human extracellular matrix (ECM) is a chromatographically partially purified matrix extract derived from human placenta. It is comprised of laminin, collagen IV, and heparan sulphate proteogycan. Human ECM promotes attachment, spreading, mitosis, and differentiation of anchorage-dependent epithelial cells, particularly of human origin.

Description	Pk	Cat. No.
Human Extracellular Matrix	1 mg	**734-0097**

Matrigel® Basement Membrane Matrix
Corning

Corning® Matrigel® Basement Membrane Matrix is a solubilised basement membrane preparation extracted from the Engelbreth-Holm-Swarm (EHS) mouse sarcoma, a tumour rich in extracellular matrix proteins. Its major components are laminin, followed by collagen IV, entactin, and heparin sulphate proteoglycan. It also contains growth factors that occur naturally in the EHS tumour. At room temperature, Corning® Matrigel® Matrix polymerises to produce biologically active matrix material resembling the mammalian cellular basement matrix. Corning® Matrigel® Basement Membrane Matrix is effective for the attachment and differentiation of both normal and transformed anchorage dependent epithelial and other cell types. The growth factor reduced (GFR) product is useful where a more highly defined basement preparation is desired.

Description	Pk	Cat. No.
Corning® Matrigel® Basement Membrane Matrix	5 ml	**734-0270**
Corning® Matrigel® Basement Membrane Matrix	10 ml	**734-1100**
Corning® Matrigel® Basement Membrane Matrix (5×10 ml)	50 ml	**734-0271**
Corning® Matrigel® Basement Membrane Matrix, growth factor reduced (GFR)	5 ml	**734-0268**
Corning® Matrigel® Basement Membrane Matrix, growth factor reduced (GFR)	10 ml	**734-0269**

Matrigel® Matrix, high concentration (HC)
Corning

Corning® Matrigel® Matrix, high concentration (HC) is suited for *in vivo* applications where a high protein concentration augments growth of tumours. The high protein concentration also allows the Corning® Matrigel® matrix plug to maintain its integrity after subcutaneous injection into mice. This keeps the injected tumour cells and/or angiogenic compounds localised for *in situ* analysis and/or future excision. Applications include *in vivo* angiogenesis studies and augmentation of tumour growth in nude mice.

- Typical protein concentration 18 - 22 mg/ml
- Lot specific specification sheet supplied with each delivery
- Tested for the ability to promote neurite outgrowth of chick dorsal root ganglia cells and for the ability to gel quickly and maintain its form with culture medium for a period of 14 days at 37 °C
- Bacteria, fungi and mycoplasma free
- Endotoxin tested by LAL assay

Description	Pk	Cat. No.
Corning® Matrigel® Matrix, high concentration	10 ml	**734-0273**
Corning® Matrigel® Matrix, high concentration, phenol red free	10 ml	**734-1402**

Matrigel® Matrix, growth factor reduced, high concentration
Corning

Description	Pk	Cat. No.
Matrigel® Matrix, growth factor reduced, high concentration	10 ml	**734-1441**

Matrigel® Matrix, hESC-qualified
Corning

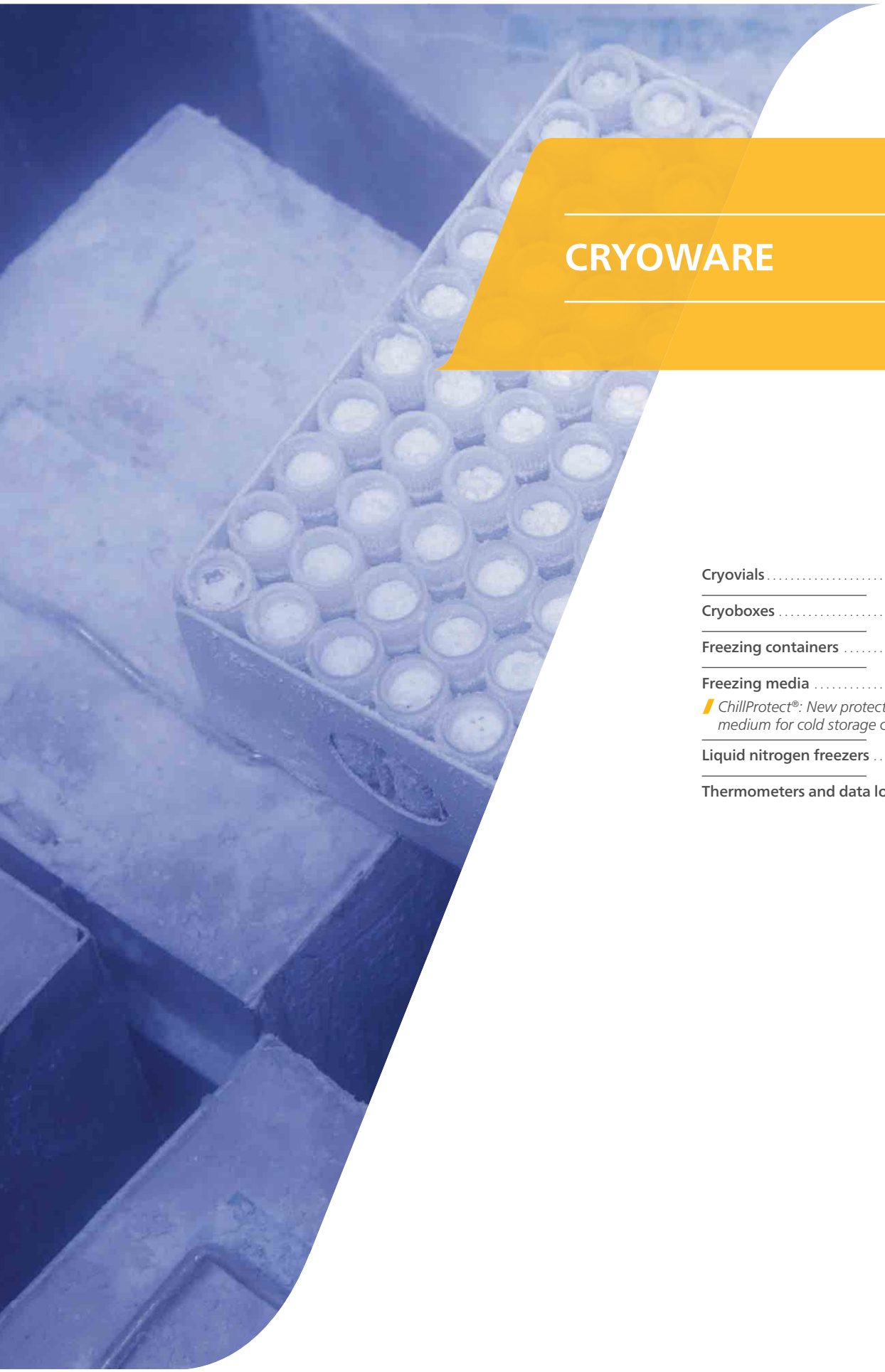
Qualified as mTeSR™1-compatible. No pre-screening required.

Description	Pk	Cat. No.
Matrigel® matrix, hESC-qualified	5 ml	**734-1440**

Matrigel® Matrix, phenol red-free
Corning

Corning® Matrigel® Matrix, phenol red-free is recommended for assays which require colour detection (i.e. fluorescence). Corning® Matrigel® Basement Membrane Matrix is effective for the attachment and differentiation of both normal and transformed anchorage dependent epithelioid and other cell types. These include neurons, Sertoli cells, chick lens, and vascular endothelial cells, and hepatocytes. Corning® Matrigel® will influence gene expression in adult rat hepatocytes as well as three dimensional culture in mouse and human mammary epithelial cells. It will support *in vivo* peripheral nerve regeneration, can be used for metabolism and toxicology studies,and is the basis for several types of tumour cell invasion assays. Corning® Matrigel® provides the substrate necessary for the study of angiogenesis both *in vitro* and *in vivo*. Corning® Matrigel® also supports *in vivo* propagation of human tumours in immunosupressed mice.

Description	Pk	Cat. No.
Corning® Matrigel® Basement Membrane Matrix, phenol red-free	10 ml	**734-0272**
Corning® Matrigel® Growth Factor Reduced (GFR) Basement Membrane Matrix, phenol red-free	10 ml	**734-1101**



CRYOWARE

Cryovials 196

Cryoboxes 200

Freezing containers 203

Freezing media 208

ChillProtect®: New protective medium for cold storage cells 210

Liquid nitrogen freezers 213

Thermometers and data loggers 214

Cryovials

Cryogenic vials

PP vial and closure, sterile

Designed for the storage of biological material, human or animal cells, at temperatures as low as -196 °C (but should be used only in the gas phase of liquid nitrogen).

- Certified RNase-, DNase-, pyrogen- and DNA-free
- With graduation and marking area

Round bottom vials can be centrifuged up to 17 000 ×g

Capacity (ml)	Base	Ø ext.×H (mm)	Pk	Cat. No.
With external thread and lip seal				
1,2	Self standing	12,5×41	1.000	**479-1219**
2,0	Round bottom	12,5×46	1.000	**479-1235**
2,0	Self standing	12,5×48	1.000	**479-1220**
5,0	Self standing	12,5×90	1.000	**479-1236**
With internal thread and silicone O-ring				
1,2	Self standing	12,5×41	1.000	**479-1261**
2,0	Round bottom	12,5×48	1.000	**479-1263**
2,0	Self standing	12,5×49	1.000	**479-1262**
4,0	Round bottom	12,5×70	1.000	**479-1265**
4,0	Self standing	12,5×72	1.000	**479-1264**
5,0	Round bottom	12,5×90	1.000	**479-1266**
With external thread, lip and red silicone O-ring				
1,2	Self standing	12,5×43	1.000	**479-1207**
2,0	Round bottom	12,5×48	1.000	**479-1209**
2,0	Self standing	12,5×49	1.000	**479-1208**
3,0	Self standing	12,5×72	1.000	**479-1210**
4,0	Self standing	12,5×76	1.000	**479-1217**
5,0	Self standing	12,5×93	1.000	**479-1218**
With internal thread and white silicone O-ring				
1,2	Self standing	12,5×41	1.000	**479-1254**
2,0	Round bottom	12,5×48	1.000	**479-1258**
2,0	Self standing	12,5×49	1.000	**479-1256**
4,0	Round bottom	12,5×70	1.000	**479-1255**
4,0	Self standing	12,5×72	1.000	**479-1260**
5,0	Round bottom	12,5×90	1.000	**479-1259**
5,0	Self standing	12,5×92	1.000	**479-1257**
With external thread and white silicone O-ring				
1,2	Self standing	12,5×43	1.000	**479-1238**
2,0	Round bottom	12,5×48	1.000	**479-1240**
2,0	Self standing	12,5×49	1.000	**479-1239**
3,0	Self standing	12,5×72	1.000	**479-1251**
4,0	Self standing	12,5×76	1.000	**479-1252**
5,0	Self standing	12,5×93	1.000	**479-1253**
10,0	Self standing	17,0×84	500	**479-1237**

Coloured Capinsert™ for cryogenic vials

PP

Inserts fit precisely into the cap of the cryogenic vial for colour identification.

Set: Assortment of white, blue, red, green and yellow (100 of each)

Colour	Pk	Cat. No.
Amber	500	**479-0809**
Blue	500	**479-0814**
Green	500	**479-0812**
Grey	500	**479-0808**
Lilac	500	**479-0807**
Orange	500	**479-0806**
Pink	500	**479-0804**
Red	500	**479-0813**
Set	500	**479-0810**
Violet	500	**479-0805**
White	500	**479-0815**
Yellow	500	**479-0811**

Cryogenic tubes, CryoTubes™, Nunc™
Thermo Scientific

PP tubes with PP screw cap and white writing area, sterile

Developed for storage of cell cultures, bacteria and other samples at extremely low temperatures. Suitable for use in freezers as well as in gaseous and liquid nitrogen*.

Non toxic, non pyrogenic, CE marked for IVD.

Conform to IATA regulations for the air transportation of biological samples.

*** Warning**

Do not use CryoTubes™ in the liquid phase of liquid nitrogen unless correctly sealed in Nunc CryoFlex™ tubing. Improper use may cause entrapment of liquefied nitrogen inside the vial and lead to pressure build up, resulting in possible explosion or biohazard release.

Capacity (ml)	Base	Ø ext.xH (mm)	Cap colour	Pk	Cat. No.
Internal thread with silicone O-ring					
1,0**	V	12,5x42	Clear	500	**479-6840**
1,0***	V	12,5x42	Clear	500	**479-6842**
1,8	U	12,5x48	Clear	500	**479-6837**
1,8**	U	12,5x49	Clear	450	**479-6841**
1,8***	U	12,5x49	Clear	450	**479-6843**
3,6	U	12,5x70	Clear	400	**479-6838**
3,6***	U	12,5x72	Clear	400	**479-6844**
4,5	U	12,5x92	Clear	300	**479-6839**
4,5***	U	12,5x92	Clear	300	**479-6845**
Internal thread with silicone O-ring, without caps, non sterile					
1,8	U	12,5x48		2.500	**479-6852**
3,6	U	12,5x70		1.500	**479-1159**
External thread					
1,0	U	12,4x30	Clear	500	**479-6816**
1,0***	V	12,5x41	Clear	500	**479-6846**
1,0* ***	V	12,5x41	Clear	500	**479-6849**
1,8	U	12,4x44	Clear	500	**479-6853**
1,8***	U	12,5x48	Clear	450	**479-6847**
1,8* ***	U	12,5x48	Clear	450	**479-6850**
4,5***	U	12,5x91	Clear	300	**479-6848**
4,5* ***	U	12,5x91	Clear	300	**479-6836**

* without writing area
** free standing
*** starfoot

Cryogenic vials, Nalgene®
Thermo Scientific

PPCO with HDPE screw cap, sterile

For storage in the vapour phase of liquid nitrogen.

- Self standing and easy to open with one hand
- With graduations and white marking area
- DNase- and RNase-free

Non pyrogenic and non cytotoxic.

CE certified (Directive 98/79/EC).

Capacity (ml)	Ø ext.xH (mm)	Pk	Cat. No.
Sterile, 25/bag			
1,2	13,5x38,1	500	**479-3221**
2,0	13,5x48,3	500	**479-3222**
5,0	13,5x92,0	250	**479-3223**
Sterile, bulk packed, assembled			
1,2	13,5x38,1	1.000	**479-0009**
2,0	13,5x48,3	1.000	**479-0010**

Storage tubes, 2D barcoded, Matrix®
Thermo Scientific

Permanently attached, laser-etched 2D barcodes on the bottom of each tube allow you to scan and decode tubes at once without removing them from the rack and allow data to be associated with each tube.

- The 8×12 format enables the filling of 8, 12 or 96 tubes at once
- Tubes come in latch racks for added security and protection of samples
- Built-in error correction ensures that barcodes will never be misread
- 100% quality control checks that every code is unique and readable
- Solid, one-piece construction enables storage down to cryogenic temperatures

Septum tubes

Virgin Class VI medical grade PP

Permanently installed DuraSeal® septa enable long-term storage needs at temperatures down to –150 °C.

- Autoclavable

Glass tubes

Ideal for applications requiring enhanced chemical resistance.

For samples in DMSO, chlorinated solvents and other harsh chemicals and applications where newly synthesised compounds need to be dried-down or lyophilised and subsequently resolubilised by hand or via automation.

Screw top tubes and caps

Virgin Class VI medical grade PP tubes and caps, silicone o-rings

Ideal for sample storage in virtually any laboratory condition, including the vapour phase of liquid nitrogen.

- Autoclavable without caps
- Temperature range from –180 to +121 °C

All tubes and trays are supplied free from DNA, RNAse, DNAse, endotoxins and cytotoxins. Tubes should be tested under individual laboratory conditions.

Description	Capacity (ml)	Base	Cap colour	Pk	Cat. No.
Septum tubes					
2D barcoded tubes, 10 latch racks of 96 tubes per case	0,5	V bottom		960	**479-1026**
2D barcoded tubes, 10 latch racks of 96 tubes per case, sterile	0,5	V bottom		960	**479-1027**
2D barcoded tubes, 10 latch racks of 96 tubes per case, with DuraSeal® septum inserted	0,5	V bottom		960	**479-1028**
2D barcoded tubes, 10 latch racks of 96 tubes per case, with DuraSeal® septum inserted, sterile	0,5	V bottom		960	**479-1029**
2D barcoded tubes, bulk, with DuraSeal® septum inserted, 1000 tubes per case	0,5	V bottom		960	**479-1056**
2D barcoded tubes, 10 latch racks of 96 tubes per case	0,75	V bottom		960	**479-1024**
2D barcoded tubes, 10 latch racks of 96 tubes per case, sterile	0,75	V bottom		960	**479-1025**
2D barcoded tubes, 10 latch racks of 96 tubes per case, with DuraSeal® septum inserted	0,75	V bottom		960	**479-1022**
2D barcoded tubes, bulk, 1000 tubes per case	0,75	V bottom		960	**479-1023**
2D barcoded tubes, 10 latch racks of 96 tubes per case	1,4	V bottom		960	**479-1062**
2D barcoded tubes, 10 latch racks of 96 tubes per case, sterile	1,4	V bottom		960	**479-1063**
2D barcoded tubes, 10 latch racks of 96 tubes per case, with DuraSeal® septum inserted	1,4	V bottom		960	**479-1065**
2D barcoded tubes, bulk, 960 tubes per case	1,4	V bottom		1.000	**479-1061**
2D barcoded tubes, TTP comPOUND code (small print), 10 latch racks of 96 tubes per case	1,4	Flat bottom		960	**479-1021**
2D barcoded tubes, with human readable code, 10 latch racks of 96 tubes per case	1,4	Flat bottom		960	**479-1016**
2D barcoded tubes, with human readable code, 10 latch racks of 96 tubes per case, sterile	1,4	Flat bottom		960	**479-1017**
2D barcoded tubes, with human readable code, 10 refill packs of 96 tubes per case	1,4	Flat bottom		960	**479-1020**
2D barcoded tubes, with human readable code, bulk, 1000 tubes per case	1,4	Flat bottom		1.000	**479-1015**
Glass tubes					
2D barcoded glass tubes, 5 latch racks of 96 tubes per case	1,0	Flat bottom		480	**479-1066**
Screw top tubes and caps					
2D barcoded screw cap tubes with caps and 1D match white patch, 5 racks of 96 tubes per case, sterile	0,5	V bottom	Colourless	480	**479-1050**
2D barcoded screw cap tubes with caps and white patch, 5 racks of 96 tubes per case, sterile	0,5	V bottom	Colourless	480	**479-1049**
2D barcoded screw cap tubes with caps, 5 racks of 96 tubes per case, sterile	0,5	V bottom	Blue	480	**479-1337**
2D barcoded screw cap tubes with caps, 5 racks of 96 tubes per case, sterile	0,5	V bottom	Colourless	480	**479-1042**
2D barcoded screw cap tubes with caps, 5 racks of 96 tubes per case, sterile	0,5	V bottom	Green	480	**479-1045**
2D barcoded screw cap tubes with caps, 5 racks of 96 tubes per case, sterile	0,5	V bottom	Purple	480	**479-1046**
2D barcoded screw cap tubes with caps, 5 racks of 96 tubes per case, sterile	0,5	V bottom	Red	480	**479-1047**
2D barcoded screw cap tubes with caps, 5 racks of 96 tubes per case, sterile	0,5	V bottom	White	480	**479-1048**
2D barcoded screw cap tubes with caps, 5 racks of 96 tubes per case, sterile	0,5	V bottom	Yellow	96	**479-1051**
2D barcoded screw cap tubes with caps, bulk, 10 bags of 48 tubes per case, sterile	0,5	V bottom	Colourless	480	**479-1040**
2D barcoded screw cap tubes with caps, bulk, 10 bags of 48 tubes per case, sterile	0,5	V bottom	Green	480	**479-1041**

Continued on next page

Continued from previous page

Description	Capacity (ml)	Base	Cap colour	Pk	Cat. No.
Screw top tubes and caps					
2D barcoded screw cap tubes without caps and 1D match white patch, 5 latch racks of 96 tubes per case, sterile	0,5	V bottom		480	**479-1055**
2D barcoded screw cap tubes without caps and white side patch, 5 latch racks of 96 tubes per case, sterile	0,5	V bottom		480	**479-1054**
2D barcoded screw cap tubes without caps, 5 latch racks of 96 tubes per case, sterile	0,5	V bottom		480	**479-1052**
Amber 2D barcoded screw cap tubes without caps, 5 racks of 96 tubes per case, sterile	0,5	V bottom		480	**479-1053**
2D barcoded screw cap tubes with caps and 1D match white patch, 5 latch racks of 96 tubes per case, sterile	1,0	V bottom	Colourless	480	**479-1035**
2D barcoded screw cap tubes with caps and white patch, 5 latch racks of 96 tubes per case, sterile	1,0	V bottom	Colourless	480	**479-1034**
2D barcoded screw cap tubes with caps, 5 latch racks of 96 tubes per case, sterile	1,0	V bottom	Colourless	480	**479-1031**
Amber 2D barcoded screw cap tubes with caps, 5 racks of 96 tubes per case, sterile	1,0	V bottom	Red	480	**479-1032**
2D barcoded screw cap tubes with caps, 5 racks of 96 tubes per case, sterile	1,0	V bottom	Purple	1	**479-1033**
2D barcoded screw cap tubes with caps, bulk, 10 bags of 48 tubes per case, sterile	1,0	V bottom	Colourless	480	**479-1030**
2D barcoded screw cap tubes without caps and 1D match white patch, 5 latch racks of 96 tubes per case, sterile	1,0	V bottom		480	**479-1039**
2D barcoded screw cap tubes without caps and white patch, 5 latch racks of 96 tubes per case, sterile	1,0	V bottom		480	**479-1038**
2D barcoded screw cap tubes without caps, 5 latch racks of 96 tubes per case, sterile	1,0	V bottom		480	**479-1036**
Amber 2D barcoded screw cap tubes without caps, 5 racks of 96 tubes per case, sterile	1,0	V bottom		480	**479-1037**
2D barcoded screw cap tubes with solid caps, 4 racks of 24 tubes per case, sterile	12	V bottom	Clear	96	**479-1059**
2D barcoded screw cap tubes with solid caps, bulk, 10 bags of 48 tubes per case, non sterile	12	V bottom	Clear	96	**479-1058**
2D barcoded screw cap tubes with solid caps, bulk, 10 bags of 48 tubes per case, sterile	12	V bottom	Clear	96	**479-1057**
2D barcoded screw cap tubes without caps, 4 racks of 24 tubes per case, sterile	12	V bottom		96	**479-1060**

Description	Colour	Pk	Cat. No.
Caps			
Caps for 0,5 ml and 1,0 ml screw top tubes	Colourless	500	**479-1338**
Inserts			
for 0,5 ml and 1,0 ml screw top tube caps	Blue	500	**479-1341**
for 0,5 ml and 1,0 ml screw top tube caps	Green	500	**479-1342**
for 0,5 ml and 1,0 ml screw top tube caps	Purple	500	**479-1344**
for 0,5 ml and 1,0 ml screw top tube caps	Red	500	**479-1339**
for 0,5 ml and 1,0 ml screw top tube caps	White	500	**479-1343**
for 0,5 ml and 1,0 ml screw top tube caps	Yellow	500	**479-1340**

IVD

Cryobank vials and Bank-It™, Nunc™
Thermo Scientific

Designed for low temperature storage of biological materials and automated handling.

The vials are clicked into the low profile microplate format rack to allow automatic manipulation and automated transport without the risk of losing samples. The cap is designed with a socket to allow automated manipulation through a click of the screwdriver (included) into the cap.

- DNase- and RNase-free
- Non toxic according to USP class VI test

Conform to IATA requirements for the transport of diagnostic specimens, UN packing instruction 602 and 650.

Cryobank vials have low protein adsorption surface for storage of cells and proteins, sterile.

Bank-It™ for low DNA adsorption surface for storage of DNA.

The 2D coded articles can be read by a suitable barcode reader.

Description	Capacity (ml)	Pk	Cat. No.
Cryobank vials, 2D coded, sterile, loose pack, blue cap	2,0	960	**479-1348**
Cryobank vials, 2D coded, sterile, loose pack, green cap	2,0	960	**479-1326**
Cryobank vials, 2D coded, sterile, loose pack, grey cap	2,0	960	**479-1346**
Cryobank vials, 2D coded, sterile, loose pack, natural cap	2,0	960	**479-1328**
Cryobank vials, 2D coded, sterile, loose pack, natural cap	5,0	528	**479-1330**
Cryobank vials, 2D coded, sterile, loose pack, red cap	2,0	960	**479-1327**
Cryobank vials, 2D coded, sterile, loose pack, yellow cap	2,0	960	**479-1347**
Cryobank vials, 2D coded, sterile, racked	0,5	960	**479-0588**

Continued on next page

Continued from previous page

Description	Capacity (ml)	Pk	Cat. No.
Cryobank vials, 2D coded, sterile, racked	1,0	960	479-0592
Cryobank vials, 2D coded, sterile, racked	2,0	480	479-1087
Cryobank vials, 2D coded, sterile, racked	5,0	480	479-1086
Cryobank vials, 2D coded, sterile, racked, blue cap	0,5	960	479-1077
Cryobank vials, 2D coded, sterile, racked, blue cap	1,0	960	479-1085
Cryobank vials, 2D coded, sterile, racked, green cap	0,5	960	479-1079
Cryobank vials, 2D coded, sterile, racked, green cap	1,0	960	479-1083
Cryobank vials, 2D coded, sterile, racked, red cap	0,5	960	479-1078
Cryobank vials, 2D coded, sterile, racked, red cap	1,0	960	479-1084
Cryobank vials, uncoded, sterile, loose pack	0,5	960	479-1081
Cryobank vials, uncoded, sterile, loose pack	1,0	960	479-1082
Cryobank vials, uncoded, sterile, loose pack, natural cap	2,0	960	479-1329
Cryobank vials, uncoded, sterile, loose pack, natural cap	5,0	528	479-1331
Cryobank vials, uncoded, sterile, racked	0,5	960	479-0589
Cryobank vials, uncoded, sterile, racked	1,0	960	479-0593
Cryobank vials, uncoded, sterile, racked	2,0	480	479-1089
Cryobank vials, uncoded, sterile, racked	5,0	480	479-1088
Cryobank vials, uncoded, sterile, racked (include black manual screwdriver)	0,5	192	479-0581
Bank-It™, 2D coded, racked (include black manual screwdriver)	0,5	960	479-0590
Bank-It™, 2D coded, racked (include black manual screwdriver)	1,0	960	479-0594
Bank-It™, uncoded, racked (include black manual screwdriver)	0,5	960	479-0591

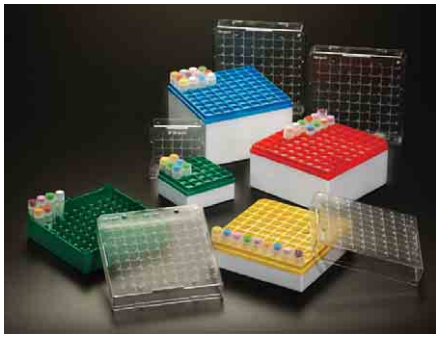
Description	Colour	For	Pk	Cat. No.
Accessories				
Cryobank/Bank-It™ caps	Blue		960	479-1076
Cryobank/Bank-It™ caps	Green		960	479-1074
Cryobank/Bank-It™ caps, irradiated	Natural		960	479-1073
Cryobank/Bank-It™ caps	Red		960	479-1075
Small black screwdriver			1	479-6854
Electric screwdriver, EU-plug			1	479-6855
Barcoded loose rack		Cryobank vials and Bank-It™	1	479-1080
Cardbord cryobox for 169 vials, with 13×13 compartments		Cryobank vials and Bank-It™	48	479-6857
Inserts with 13×13 compartments		Cryobank vials and Bank-It™	24	479-1345
Rack, 740 mm		Cryobank vials and Bank-It™	1	479-1070
Tube selection tool		Cryobank vials and Bank-It™	1	479-1072

Cryoboxes and racks

VWR COLLECTION

SELECTED FOR YOU

Cryoboxes



PC, autoclavable

Can be used from –190 to +121 °C.

- Transparent cover with numeric grid and key to prevent misalignment
- Coloured grid or base

W×D×H ext. (mm)	Compartments	Colour	Description	Pk	Cat. No.
76×76×52	5×5	Blue	Cryotubes 1 - 2 ml	8	479-0470
76×76×52	5×5	Green	Cryotubes 1 - 2 ml	8	479-0471
76×76×52	5×5	Red	Cryotubes 1 - 2 ml	8	479-0472
76×76×52	5×5	Yellow	Cryotubes 1 - 2 ml	8	479-0473
133×133×52	9×9	Blue	Cryotubes 1 - 2 ml	4	479-0474
133×133×52	9×9	Green	Cryotubes 1 - 2 ml	4	479-0475
133×133×52	9×9	Red	Cryotubes 1 - 2 ml	4	479-0476
133×133×52	9×9	Yellow	Cryotubes 1 - 2 ml	4	479-0477
133×133×95	9×9	Blue	Cryotubes 3 - 5 ml	5	479-0482
133×133×95	9×9	Green	Cryotubes 3 - 5 ml	5	479-0483
133×133×95	9×9	Red	Cryotubes 3 - 5 ml	5	479-0484
133×133×95	9×9	Yellow	Cryotubes 3 - 5 ml	5	479-0485
133×133×52	10×10	Blue	Cryotubes 1 - 2 ml	4	479-0486
133×133×52	10×10	Green	Cryotubes 1 - 2 ml	4	479-0487
133×133×52	10×10	Red	Cryotubes 1 - 2 ml	4	479-0488

Continued on next page

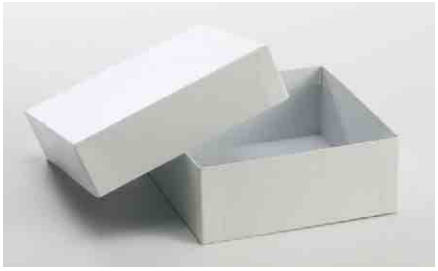
Continued from previous page

W×D×H ext. (mm)	Compartments	Colour	Description	Pk	Cat. No.
133×133×52	10×10	Yellow	Cryotubes 1 - 2 ml	4	**479-0489**
133×133×81	9×9	Blue	Cryotubes 3 - 4 ml	3	**479-0891**
133×133×81	9×9	Green	Cryotubes 3 - 4 ml	3	**479-0892**
133×133×81	9×9	Red	Cryotubes 3 - 4 ml	3	**479-0893**
133×133×81	9×9	Yellow	Cryotubes 3 - 4 ml	3	**479-0894**

VWR COLLECTION

SELECTED FOR YOU

Cryostorage boxes and dividers



Boxes and dividers are constructed from durable fibreboard with a protective, moisture-repellant coating. Liquid nitrogen (LN_2) freezer boxes feature slots for safe LN_2 drainage and reduced LN_2 consumption. Mechanical freezer boxes do not feature slots and cannot be used with LN_2.

Boxes with dividers feature a lid printed with a numbered grid for superior inventory control. Boxes without dividers can accommodate dividers (sold separately) for 16 to 100 places. Fibreboard dividers can fit in any 127x127 mm LN_2 cryogenic or mechanical freezer box.

W×D×H ext. (mm)	Compartments	Type	Pk	Cat. No.
Liquid nitrogen cryogenic freezer boxes with drain slots				
70×70×47,6	25	-	1	**478-0248**
127×125×47,6	100	-	1	**478-0247**
Mechanical cryogenic freezer boxes with or without dividers				
127×127×47,6	81	With dividers	1	**478-0249**
127×127×51	-	Without dividers	1	**478-0239**
127×127×73	-	Without dividers	1	**478-0240**
Fibreboard dividers				
125×125×25,4	16	-	12	**478-0252**
125×125×25,4	25	-	12	**478-0253**
125×125×25,4	49	-	1	**478-0243**
125×125×25,4	49	-	12	**478-0254**
125×125×25,4	64	-	1	**478-0244**
125×125×25,4	64	-	12	**478-0255**
125×125×25,4	81	-	1	**478-0245**
125×125×25,4	81	-	12	**478-0256**
125×125×25,4	100	-	1	**478-0246**
125×125×25,4	100	-	12	**478-0257**

VWR COLLECTION

SELECTED FOR YOU

Racks for cryoboxes

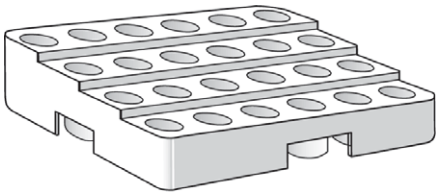
Cardboard

Economical, coated cardboard racks for upright freezers.

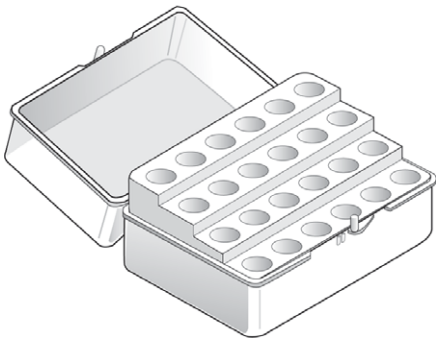
- Stable and long lasting
- Lightweight - the 20 compartment rack weighs 1,1 kg without boxes
- For cryoboxes 50 mm height

Compartments	W×D×H ext. (mm)	Pk	Cat. No.
Racks without cryoboxes			
16 (4×4)	562×139×225	1	**479-1169**
20 (5×4)	562×139×285	1	**479-0882**
24 (6×4)	562×139×331	1	**479-1171**
Racks with standard white cardboard cryoboxes with 9×9 cell dividers			
16 (4×4)	562×139×225	1	**479-1170**
20 (5×4)	562×139×285	1	**479-0883**
24 (6×4)	562×139×331	1	**479-1172**

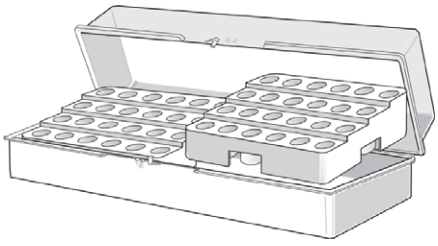
Racks and boxes for microcentrifuge tubes and cryogenic vials



479-0077



479-0076



479-0075

Recycled plastic, autoclavable

24- and 48-place microcentrifuge tube and cryovial storage system. For 1,5 ml and 2,0 ml tubes. Fully autoclavable (122 °C) and freezable (–90 °C).

- Racks fit into VWR pipette tip boxes
- Stackable racks that float, ideal for water baths
- Boxes with clear cover

No. of holes	Description	Pk	Cat. No.
48	Rack in hinged box with lid	5	**479-0075**
24	Rack in hinged box with lid	10	**479-0076**
24	Rack, without box	10	**479-0077**
-	Hinged box for 2×24 place racks, without racks	5	**479-0078**

Rack for cryogenic vials

PC, autoclavable

Withstands both cryogenic freezing and autoclaving.

- With numeric index of the holes
- Moulded tabs in the bottom of each well to secure vials in place for easier opening and closing
- Ribbed grips make handling with gloves easier

For (ml)	No. of holes	W×D×H (mm)	Pk	Cat. No.
(Ø 12,5 mm) 1 - 5	50 (5×10)	199×104×24,5	1	**211-0139**

Workstation racks for cryogenic vials

PP

A universal locking system locks the vials in each well, so you can easily unscrew them with one hand.

- Alphanumeric identification of each well
- Strong handles make it easy and safe to carry
- Supported by five anti-slip rubber feet, stackable

For (ml)	No. of holes	W×D×H (mm)	Pk	Cat. No.
1 - 5	50 (5×10)	205×103×26	4	**479-0803**

Freezing containers

VWR COLLECTION

SELECTED FOR YOU

Cryo 1 °C freezing container

Container PC, closure and vial holder HDPE, foam insert

Non mechanical device that uses isopropyl alcohol and a mechanical freezer to provide cooling rate of –1 °C per minute. Ideal for successful cell cryopreservation and recovery.

- Floating rigid insert prevents vials from contamination
- Withstands repeated use; labelled with step by step instructions
- Holds up to 18 cryogenic vials (1; 1,2; 1,5 and 2 ml)

Description	I-Ø×H (mm)	No. of holes	Pk	Cat. No.
Cryo 1 °C freezing container	86×117	18	1	**479-0640**

Freezing containers, Mr. Frosty, Nalgene®
Thermo Scientific

PC container with blue HDPE lid, white HDPE tube holder and foam insert

Ensures the critical, repeatable 1 °C/minute cooling rate, required for successful cell cryopreservation and recovery. Low cost, easy to use, requiring only isopropyl alcohol and mechanical freezer.

Labelled with detailed, step by step instructions.

For 12 cryogenic tubes of 3,6; 4,5 or 5,0 ml or 18 cryogenic tubes 1,0; 1,2; 1,5 or 2,0 ml.

Containers stack and if alcohol-filled, may be stored at room temperature, saving valuable freezer space.

Diameter: 117 mm

Closure size: 120 mm

For	Pk	Cat. No.
18 cryogenic tubes (1,0 - 2,0 ml)	1	**479-3200**
12 cryogenic tubes (3,6 ml)	1	**479-0966**
12 cryogenic tubes (4,5 - 5,0 ml)	1	**479-0967**

Freezing module, CoolCell®

Consistent –1 °C/min cell freezing without alcohol

Achieve a consistent –1 °C/min freeze rate without the use of any hazardous solvents with CoolCell®. The Solid State Core (SSC) and insulated design precisely balance heat removal during freezing to ensure repeatable, constant cooling all the way down to cryogenic storage temperature. Cleaner, greener, easier to use. Unlike alcohol coolers, no warming of nearby freezer samples. Transportable without cold hands when frozen.

- No alcohol
- Eliminate the expense and disposal of isopropanol
- Unbreakable even at cryogenic temperatures
- No stuck lids, no frozen fingers, no maintenance
- Fast recycle time

Description	For	Colour	Pk	Cat. No.
CoolCell	12 screw cap 1 ml and 2 ml cryovials	Purple	1	**479-0492**
CoolCell	30 screw cap 1 ml and 2 ml cryovials	Purple	1	**479-0987**
CoolCell	30 screw cap 1 ml and 2 ml cryovials	Green	1	**479-0988**
CoolCell	30 screw cap 1 ml and 2 ml cryovials	Orange	1	**479-0989**
CoolCell	30 screw cap 1 ml and 2 ml cryovials	Pink	1	**479-1157**
CoolCell	6 "serum" style injectable vials 10 ml	Purple	1	**479-1012**
CoolCell	12 "serum" style injectable vials 2 ml	Purple	1	**479-0991**
Replacement FTS30 Vial Module	-	—	10	**479-0992**

Freezing containers, CoolCell® LX

CoolCell LX and 5 ml LX cell freezing containers provide consistent, controlled-rate, highly reproducible ?1 °C per minute alcohol-free cell freezing when used in a ?80 °C freezer. With the elimination of alcohol, freezing results are highly reproducible. CoolCell containers are unbreakable, open easily when frozen, and are not cold to the touch when frozen. Enhanced design features include beveled junction between base and lid to allow quicker opening once frozen, numbered vial wells for easy sample identification, and exposed vial tops when container is open allowing for faster removal of vials for placement onto dry ice or liquid nitrogen.

CoolCell LX holds 12 each 1 or 2 ml vials and CoolCell 5 ml LX holds 12 each 3,5 to 5 ml vials. The unique materials and solid core design ensures no variability and equal or better post-thaw cell viability than alcohol-based cell freezing containers.

- No pre-cooling required
- No waiting between freeze cycles
- ?1 °C/minute freeze rate for all cells
- No on-going cost or maintenance

For	No. of holes	Type	Colour	Pk	Cat. No.
12 wells, 1 or 2 ml cryovials	12	CoolCell LX	Purple	1	**479-1178**
12 wells, 1 or 2 ml cryovials	12	CoolCell LX	Green	1	**479-1179**
12 wells, 1 or 2 ml cryovials	12	CoolCell LX	Orange	1	**479-1180**
12 wells, 1 or 2 ml cryovials	12	CoolCell LX	Pink	1	**479-1181**
12 wells, 3,5 - 5 ml cryovials	12	CoolCell 5 ml LX	Purple	1	**479-1182**

VWR COLLECTION

Labtop coolers

479-0642

–20 °C mini labtop cooler PC, non toxic gel

The –20 °C mini labtop cooler holds 12×0,5 or 1,5 ml microcentrifuge tubes at below –20 °C for over 1 hour. Ideal for bench top use or transport. Wire handle secures top while carrying. Filled with non toxic gel. Prior to use, place in –25 °C freezer for at least 24 hours, store at –25 °C between use.

–20 °C maxi labtop cooler PC, non toxic gel

The –20 °C maxi labtop cooler, holds 32×0,5 or 1,5 ml microcentrifuge tubes at below –20 °C for over 1 hour. Suitable for bench top use or transport. Wire handle secures top while carrying. Cooler and lid filled with non toxic gel. Store at –25 °C between use.

–20 °C labtop cooler PC, non toxic gel

The –20 °C labtop cooler maintains temperatures between –20 °C and –15 °C for up to four hours. Holds 20× 1,5 or 2,0 ml microcentrifuge tubes or cryovials. Inserts included hold 0,2 to 0,5 ml microcentrifuge tubes. Printed grid, keyed lid, locking handle, non skid feet. Store at –25 °C between use.

Description	No. of holes	Pk	Cat. No.
–20 °C mini labtop cooler	12	1	**479-0642**
–20 °C maxi labtop cooler	32	1	**479-0641**
–20 °C labtop cooler	20	1	**479-0643**

Labtop coolers, Nalgene®
Thermo Scientific

Labtop coolers –20 °C

PC, blue

Lower section filled with a non toxic gel, with handle.

471-0001: Will maintain a temperature below –15 °C for up to 2 hours.

Sixteen inserts included convert 1,5 ml holes to accept either 0,5 or 0,2 ml tubes.

Labtop coolers 0 °C

PC, green

Lower section filled with a non toxic gel, with handle.

479-3461: Will maintain a temperature below 1 °C for up to 5 hours, gel-filled white lid.

479-3460: Will maintain a temperature below 1 °C for up to 3,5 hours, non-filled clear lid.

471-0002/-0003: Will maintain a temperature below 1 °C for up to 3,5 hours, non-filled clear lid.

Sixteen inserts included convert 1,5 ml holes to accept either 0,5 or 0,2 ml tubes.

For (ml)	No. of holes	W×D×H (mm)	Pk	Cat. No.
Labtop coolers –20 °C				
0,2 - 2	3×4	151×108×125	1	**471-0000**
0,2 - 2	4×8	243×157×146	1	**471-0001**
Labtop coolers 0 °C				
Ø 12 - 13 mm	3×4	197×140×190	1	**471-0002**
Ø 16 - 17 mm	3×4	197×140×190	1	**471-0003**
0,2 - 2 ml	3×4	151×108×125	1	**479-3460**
0,2 - 2 ml	4×8	243×157×146	1	**479-3461**

VWR COLLECTION

SELECTED FOR YOU

Ice buckets, square, with lid

Polyurethane

Ideal for storing samples, these buckets maintain hot or cold temperatures of bottles, test tubes, solutions, and cultures. Suitable for use with dry ice, water ice, salt solution. For freezer storage only.

- Resistant to temperatures from –20 to +70 °C
- Extremely robust, leakproof, stackable, lightweight
- Available in four colours

Capacity (l)	W×D×H (mm)	Colour	Pk	Cat. No.
2,5	254×254×127	Black	1	**216-0443**
2,5	254×254×127	Blue	1	**216-0444**
2,5	254×254×127	Green	1	**216-0445**
2,5	254×254×127	Red	1	**216-0446**
4,5	254×254×178	Black	1	**216-0447**
4,5	254×254×178	Blue	1	**216-0448**
4,5	254×254×178	Green	1	**216-0449**
4,5	254×254×178	Red	1	**216-0458**

Cooling and thawing racks, CoolRack® systems

CoolRack® M90

CoolRack® CF45 + ThermalTray™

ThermalTray™ 479-0272

Consistent sample management from –150 °C to +100 °C

A modular system of racks and trays to warm or cool samples quickly and consistently. These items are also designed for use with the CoolBox™ systems for prolonged storage or transport of samples at fridge or freezer temperatures with an option for –78 °C when used with dry ice. Applications include enzyme reactions, FACS, RNA and protein isolation.

Continued on next page

Continued from previous page

CoolRack®

The CoolRack® provides consistent repeatable sample treatment when cooling, freezing and thawing. The thermo conductive tube racks transmit heat 300 times faster than water or ice providing efficient and exact control of sample temperature. All the tubes in the rack experience identical cooling or warming conditions and will remain at the same temperature as the source. The CoolRack® can be used with liquid nitrogen, dry ice, ice and water baths.

- Ideal for snap freezing, thawing or incubating
- Easy to organise and identify samples as labels remain dry and legible
- No more cross contamination issues from samples drowning or floating in the cooling media
- Range of racks to fit microcentrifuge tubes, cryotubes, 12×75 mm FACS tubes, PCR tubes and multiwell assay plates
- The PF (profile-fit) modules provide faster, safer, more consistent snap freezing than direct immersion into dry ice/EtOH

ThermalTray™

The ThermalTray™ provides a stable platform for supporting the CoolRack® modules in liquid temperature media (ice bath, water bath, LN_2) and conduct heat between the samples and the temperature source, whilst keeping the rack and samples dry, clean and stable.

- More than 10 hours cooling at 0 to 4 °C with one pan of ice
- 37 °C incubation in a water bath without sample immersion

Type	Description	Pk	Cat. No.
CoolRack®			
CoolRack® M6	Holder for 6 microcentrifuge tubes, 1,5/2 ml	1	**479-0962**
CoolRack® M6	Holder, green, for 6 microcentrifuge tubes, 1,5/2 ml	1	**479-0963**
CoolRack® M6	Holder, orange, for 6 microcentrifuge tubes, 1,5/2 ml	1	**479-0964**
CoolRack® M15	Holder for 15 microcentrifuge tubes, 1,5/2 ml	1	**479-0293**
CoolRack® M15	Holder, green, for 15 microcentrifuge tubes, 1,5/2 ml	1	**479-0943**
CoolRack® M15	Holder, orange, for 15 microcentrifuge tubes, 1,5/2 ml	1	**479-0944**
CoolRack® M15-PF	Holder with profile fit wells for 15 microcentrifuge tubes, 1,5/2 ml	1	**479-0295**
CoolRack® M30	Holder for 30 microcentrifuge tubes, 1,5/2 ml	1	**479-0276**
CoolRack® M30	Holder, green, for 30 microcentrifuge tubes, 1,5/2 ml	1	**479-0941**
CoolRack® M30	Holder, orange, for 30 microcentrifuge tubes, 1,5/2 ml	1	**479-0942**
CoolRack® M30-PF 500 µl	Holder with profile fit wells for 30 microcentrifuge tubes, 0,5 ml	1	**479-0493**
CoolRack® M30-PF	Holder with profile fit wells for 30 microcentrifuge tubes, 1,5/2 ml	1	**479-0296**
CoolRack® M90	Holder for 90 microcentrifuge tubes, 1,5/2 ml	1	**479-0275**
CoolRack® M961D	Holder with array index for 96 microcentrifuge tubes, 1,5/2 ml	1	**479-0277**
CoolRack® 96×0,5 ml	Holder for 0,5 ml 2D barcode tubes	1	**479-1298**
CoolRack® 96×1,0 ml	Holder for 1,0 ml 2D barcode tubes	1	**479-0954**
CoolRack® CF15	Holder for 15 cryo/FACS tubes (12×75 mm)	1	**479-0294**
CoolRack® CFT30	Thermo-conductive tube holder for 30 cryo/ FACS tubes (12×75 mm).	1	**479-0494**
CoolRack® CF45	Holder for 45 cryo/FACS tubes (12×75 mm)	1	**479-0278**
CoolRack® modules for tall tubes (requires extension collar eg BCISBCS-502-C)			
CoolRack® 15 ml	Holder for 9×15 ml centrifuge tubes	1	**479-0957**
CoolRack® 50 ml	Holder for 4×50 ml centrifuge tubes	1	**479-0958**
CoolRack® VS13	Holder for 9× blood tubes (13×75 mm)	1	**479-0961**
CoolRack® V13	Holder for 9× blood tubes (13×100 mm)	1	**479-0959**
CoolRack® V16	Holder for 9× blood tubes (16×100 mm)	1	**479-0960**
ThermalTray™			
ThermalTray HP	Platform high profile, 280×150×100 mm	1	**479-0272**
ThermalTray LP	Platform medium profile, 280×150×50 mm	1	**479-0273**
ThermalTray SLP	Platform low-profile for liquid nitrogen, 280×150×32 mm	1	**479-1332**

Description	Pk	Cat. No.
Accessories		
Surface protector, CoolMat for all ThermalTray™platforms, 280×137,6 mm	4	**479-0946**

Cooling workstation, CoolBox™ XT

CoolBox™ XT and 2XT provides over 16 hours of ice-free, power-free cooling to a variety of laboratory samples. The modular CoolBox XT and 2XT sample cooling stations allow you to design a workstation that perfectly fits your specific needs. To complete your CoolBox XT and 2XT workstation choose a CoolRack tube module or a CoolSink Plate module to fit your application. The internal patent-pending dual-phase XT Cooling Core provides the cooling source - no electricity or batteries are needed - making the unit very versatile and portable. Available in four colours.

Samples in tubes or plates stay a uniform 0,5 to 4 ºC for over 16 hours with the XT Cooling Core. For frozen samples, load the optional XT Freezing Core into the CoolBox XT base and samples will stay at -20 to 0 ºC for over 8 hours.

Extension collars for CoolBox XT workstations: Place between the base and original collar to extend the height of the ice-free workstation and enable the use of

Continued on next page

Continued from previous page

taller CoolRack sample tube modules and taller tubes, including 3, 4, and 5 ml cryovials in CoolRack CF modules, 15 ml and 50 ml centrifuge tubes in CoolRack 15 ml or CoolRack 50 ml modules and blood collection tubes in CoolRack V-series blood tube modules. Magnetized on both top and bottom for a secure connection to the base and original collar. Available in four colours and 2 sizes to fit all CoolBox XT and CoolBox 2XT workstations.

For	No. of holes	Type	Pk	Cat. No.
CoolBox XT and 2XT systems				
-	-	CoolBox XT system, purple	1	**216-0945**
-	-	CoolBox XT system, green	1	**216-0946**
-	-	CoolBox XT system, orange	1	**216-0947**
-	-	CoolBox XT system, pink	1	**216-0948**
-	-	CoolBox 2XT system, purple	1	**216-0949**
-	-	CoolBox 2XT system, green	1	**216-0950**
-	-	CoolBox 2XT system, orange	1	**216-0951**
-	-	CoolBox 2XT system, pink	1	**216-0952**
-	-	XT cooling core, 0,5 to 4 °C	1	**216-0953**
-	-	XT freezing core, -20 to 0 °C	1	**216-0954**
Automation-Friendly (AF) sample modules				
1,5 or 2 ml microfuge tubes, 15 wells and 48 wells for PCR strips	60	CoolRack XT	1	**216-0955**
0,2 ml PCR plate, strip, wells, tubes	96	CoolRack XT	1	**216-0956**
2 ml cryogenic vials or FACS tubes	24	CoolRack XT	1	**216-0957**
1,5 or 2ml microfuge tubes	24	CoolRack XT	1	**216-0958**
96-well flat bottom plate	1	CoolSink XT	1	**216-0959**
96-well round bottom plate	1	CoolSink XT	1	**216-0960**
384-well plate	1	CoolRack XT	1	**216-0961**
CoolBox XT and 2XT automation-friendly workstations				
one 96-well plate	-	CoolBox XT, workstation with one CoolRack XT PCR96, for PCR plate preparation	1	**216-0968**
6 strip wells and 12 microtubes (1,5 or 2,0 ml)	1	CoolBox XT, workstation with one CoolRack XT M-PCR, for PCR sample preparation in strip wells	1	**216-0970**
CoolRack XT PCR96 for PCR plate/ strip wells/tubes CoolRack XT M24 for 24 microtubes (1,5 or 2,0 ml)	1	CoolBox 2XT, double-capacity workstation with one CoolRack XT PCR96 and one CoolRack XT M24, for PCR sample preparation	1	**216-0971**
24 cryovials (1,0 or 2,0 ml)	1	CoolBox XT, workstation with one CoolRack XT CFT24, features "gripping" wells for one-hand tube manipulation, for tissue culture, snap-freezing	1	**216-0973**
24 microtubes (1,5 or 2,0ml)	-	CoolBox XT, workstation with one CoolRack XT M24, for enzyme storage, snap-freezing, DNA precipitation or other applications	1	**216-0974**

Description	Pk	Cat. No.
Extension collar for CoolBox™ XT and 2XT		
Extension collar for CoolBox XT	1	**479-1300**
Extension collar for CoolBox XT	1	**479-1301**
Extension collar for CoolBox XT	1	**479-1302**
Extension collar for CoolBox XT	1	**479-1299**
Extension collar for CoolBox 2XT	1	**479-1304**
Extension collar for CoolBox 2XT	1	**479-1305**
Extension collar for CoolBox 2XT	1	**479-1306**
Extension collar for CoolBox 2XT	1	**479-1303**

Cooling boxes, CoolBox™ 30 and Coolbox™ MP

Ice-free sample tube and plate cooling and freezing systems

CoolBox™ is an ice-free benchtop cooler for sample tubes and plates. Re-usable cooling or freezing cartridges keep the thermo-conductive CoolRack® tube holders and CoolSink® plate holders cold for hours. Samples stay cold (0.5 to 4.0 °C) or frozen (-20 to -10 °C) for up to 10 hours with +/-0.1 °C temperature variance between wells. Use for iceless cooling/freezing in applications such as PCR set up, enzymatic assays, cell culture, and others.

Pre-freeze cartridges in -20 °C freezer, place in CoolBox™, and place the CoolRack® or CoolSink® tube or plate holder on top. Use also with dry ice (instead of cartridges) for snap-freezing tissues, viruses or proteins. Versatile, compact, portable. Clean with bleach or alcohol.

- Constructed out of highly durable, non absorbent cross linked dense polyethylene foam
- Cooling and freezing cartridges are compact and can be frozen and stored in a freezer
- To extend cooling and freezing, replace spent cartridge in the CoolBox with a frozen one from the freezer
- Clean with aqueous detergents, alcohol, bleach or acid/base viricides
- Excellent resistance to fluid absorption, surface abrasion, and rust

CoolBox™ 30 base includes the base and lid, blue cooling cartridge, red stage for wet or dry ice, insulator pad, without CoolRack tube modules. Coolbox™ MP comes with base, lid and one blue cooling cartridge, without CoolRack plate modules. Additional cooling or freezing cartridges and modules are available separately.

Continued on next page

Continued from previous page

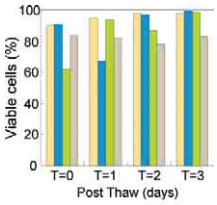
Description	For	Colour	Pk	Cat. No.
CoolBox™ 30 base without module				
CoolBox™ 30	Tube cooling	Purple	1	**479-0399**
CoolBox™ 30	Tube cooling	Green	1	**479-0928**
CoolBox™ 30	Tube cooling	Orange	1	**479-0927**
CoolBox™ 30	Tube cooling	Pink	1	**479-1296**
CoolBox™ 30 tube cooling system with module				
CoolBox™ 30 system with CoolRack® M30	1,5 - 2 ml microcentifuge tubes (30 wells)	Blue	1	**479-0469**
CoolBox™ 30 system with CoolRack® M-PF30	1,5 ml conical microcentrifuge tubes (30 profile fit wells)	Blue	1	**479-0490**
CoolBox™ 30 system with CoolRack® CFT30	1 ml or 2 ml cryogenic vials (30 wells)	Blue	1	**479-0965**
CoolBox™ MP base without module				
CoolBox™ MP	Microplate cooling	Purple	1	**479-0949**
CoolBox™ MP	Microplate cooling	Green	1	**479-0936**
CoolBox™ MP	Microplate cooling	Orange	1	**479-0935**
CoolBox™ MP	Microplate cooling	Pink	1	**479-1297**
CoolBox™ MP plate cooling system with module				
CoolBox™ MP system with CoolRack® XT PCR 96	One 96-well PCR plate, strip wells or 200 µl tubes	Blue	1	**479-0950**
CoolBox™ MP system with CoolRack® XT PCR 384	One 384-well PCR plate	Blue	1	**479-0951**
CoolBox™ MP system with CoolSink® XT 96F	One 96-well flat-bottom plate	Blue	1	**479-0952**
CoolBox™ MP system with CoolRack® XT 96U	One 96-well u-bottom plate	Blue	1	**479-0953**
Cartridges				
Freezing cartridge, reusable -12 °C	CoolBox™ 30	Green	3	**479-0467**
Cooling cartridge, reusable +2 °C	CoolBox™ 30	Blue	3	**479-0468**
Cooling cartridge, reusable +2 °C	CoolBox™ MP	Blue	1	**479-0956**

Description	Pk	Cat. No.
CoolRack®		
Holder for 30 microcentrifuge tubes, 1,5/2 ml	1	**479-0276**
Holder with profile fit wells for 30 microcentrifuge tubes, 1,5/2 ml	1	**479-0296**
Thermo-conductive tube holder for 30 cryo/ FACS tubes (12×75 mm).	1	**479-0494**

Freezing media

VWR AMRESCO CHEMICALS

Cryopreservation media, SeraFree™



Viability of post-thaw cultures of K562 cells. Cells frozen in AMRESCO SeraFree™ Cryopreservation Media (□) exhibited higher recovery than cells frozen in traditional RPMI freezing media containing DMSO and serum (□). Viability of cells recovering from cryopreservation in AMRESCO SeraFree™ Cryopreservation Media was comparable or better than that of cells in Competitors 1 (□) and 2 (□) serum-free freezing media. Viability was determined by standard trypan-blue exclusion assay.

SeraFree™ Cryopreservation Media is ready to use freezing media for cryopreservation of adherent or suspension cultured cells. The animal-free media composition eliminates batch-to-batch variability and is optimised for cell viability and cell growth after thawing. Suitable for use in environments that prohibit the use of animal-derived products.

- Sterile and endotoxin tested
- Ready to use, animal-free, RPMI- or DMEM-based media
- Optimises cell growth and cell viability after thawing
- Reduces potential for transmission of infectious diseases

Description	Pk	Cat. No.
Cryopreservation media, RPMI-based, SeraFree™	50 ml	**N655-50ML**
Cryopreservation media, RPMI-based, SeraFree™, 6×5 ml	30 ml	**N655-6X5ML**
Cryopreservation media, DMEM-based, SeraFree™	50 ml	**N676-50ML**

Freezing media, Biofreeze
Biochrom

Biofreeze is suitable for mammalian cells or to enable tissue reconstruction. It supersedes conventional freezing media because Biofreeze creates comparable cell viability after thawing. The function of DMSO is replaced by a less toxic anti-freezing agent.

- Contains no DMSO, which is toxic to cells
- Does not contain any substances of animal origin
- Free from genetically modified organisms

Description	Pk	Cat. No.
Biofreeze, freezing medium	25 ml	**392-0324**

VWR AMRESCO CHEMICALS

STERILE

Dimethyl sulphoxide (DMSO) for cell culture

Ultrapure DMSO for use in cell culture applications.

- Quality >99,9%
- Easy to use - each pack contains 5×10 ml tubes
- Sterile tested

Description	Pk	Cat. No.
Dimethyl sulphoxide (DMSO), >99,9% pure, 5×10 ml	5	**N182-5X10ML**

Dimethyl sulfoxide (DMSO), cell culture grade
AppliChem

Dimethyl sulfoxide (DMSO) is widely used for the freezing of cells in cell culture instead of glycerol. DMSO is added to prevent the formation of ice crystals during the freezing process, otherwise cells would be destroyed. DMSO is commonly used at the concentration of 10%.

Description	Pk	Cat. No.
DMSO, cell culture grade	50 ml	**A3672.0050**
DMSO, cell culture grade	100 ml	**A3672.0100**
DMSO, cell culture grade	250 ml	**A3672.0250**

Dimethyl sulfoxide (DMSO), sterile filtered (ampoules)
AppliChem

Description	Pk	Cat. No.
DMSO (ampoules), 5×5 ml	1 KIT	**A7248.0005**
DMSO (ampoules), 5×10 ml	1 KIT	**A7248.0010**

Protective media for cold storage of cells, ChillProtec®
Biochrom

Adherent cells, cell suspensions or small tissue pieces are able to remain intact after cold storage when kept in ChillProtec® media. The protective medium reduces cell damage caused by cold. Applications for ChillProtec® include longer use of primary cells, temporary storage of fresh clinical specimens until cell isolation, storage of isolated cells and independent fixing at the start of the experiment, transport and shipping of cells and tissues, and short-term storage of remaining cells.

Two variation of the medium are available. ChillProtec® plus contains a macromolecular substance that has an additional protective effect on different cell types. It is recommended that cells are tested in both types.

Description	Pk	Cat. No.
ChillProtec®, sterile filtered	500 ml	**F2285**
ChillProtec® Plus, sterile filtered	500 ml	**F2295**

ChillProtec®: New protective medium for cold storage of cells

Even primary cells remain intact after cold storage for longer periods of time

When kept in the new protective ChillProtec® medium, adherent cells, cell suspensions or small tissue pieces are able to remain intact after cold storage. Furthermore, cell functions are retained better than in alternative solutions. The new medium is ready for use, sterile, free of animal components, and completely chemically defined.

ChillProtec® is suitable for the cold storage of all cell types, including primary cells. Primary human hepatocytes, for example, remained intact at 2 to 8 °C for several days. In addition, ChillProtec® qualifies for the temporary storage of fresh clinical specimens until cell isolation. It is also suited for the short-term storage of remaining or isolated cells, as well as for the transport of cells and tissue. We offer two variations of ChillProtec®: ChillProtec® and ChillProtec® plus. The macromolecular substance that ChillProtec® plus contains has an additional protective effect on different cell types. You should therefore test cells using both versions.

OVERVIEW

ChillProtec® is a medium for the cold storage of adherent cells, cell suspensions or small tissue preparations. When kept in this protective medium, cells are able to remain intact after cold storage without any loss of functionality.

Cold (hypothermia) is a widely used protection principle for the storage and transport of cells. It slows down cell metabolism and reduces damaging processes caused by lack of oxygen or substrate. It is this cold, however, that causes damages within the cells. ChillProtec® prevents such damage, allowing for significantly longer periods of cold cell storage than seen with normally used liquids, such as cell culture media, physiological salt solutions or organ protection solutions.

GENERAL APPLICATIONS

ChillProtec® is a sterile and ready-to-use medium for the protection against cold.

In order to avoid frequent temperature fluctuations during cell storage, it is advisable to use a less frequently used refrigerator or a cold storage room.

During the transport of cells and tissue on ice, ice water should be used in order to prevent frost damages. If ice packs are used during transport, you should ensure that the ice packs do not have any direct contact with the cell culture flask or the vessel containing the tissue. During transport, cell culture flasks should be completely filled with ChillProtec®.

In case of longer transportation periods, check that the temperature is kept at 2 to 8 °C (range of tolerance: 0 to 10 °C), by means of a data logger, for example.

Figure 1: Application principle

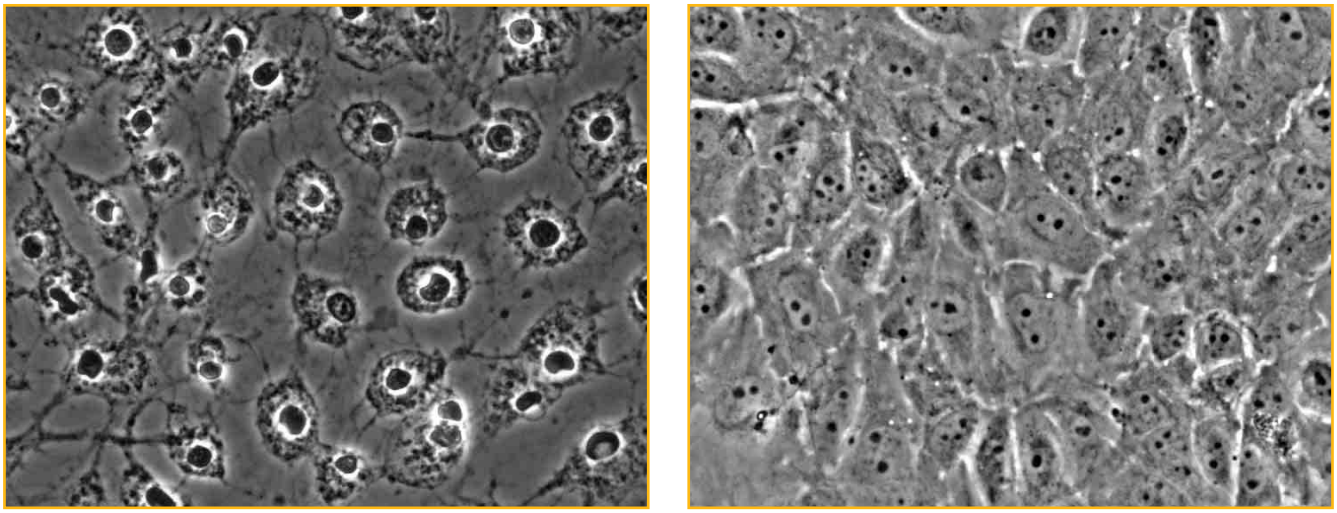


Figure 2: Porcine aortic endothelial cells that were stored in culture medium (left fFgure) and in ChillProtec® (right Figure) at 4 °C for seven days and then warmed at 37 °C for three hours

EXAMPLE: APPLICATION TO ADHERENT CELLS

When storing adherent cells, ChillProtec® should be warmed up to 15 to 20 °C immediately before application.

If possible, the cells should be in their logarithmic growth phase. Approximately 24 hours before cold storage, a complete medium change should be performed. For longer periods of cold storage, cell culture flasks are preferable.

1. Slightly warm up the protective medium at room temperature (RT) to reach 15 to 20 °C.

2. Prior to cold storage, wash the cells under a laminar flow with (warm) HBSS or PBS (two or three times); exhaust HBSS or PBS respectively.

3. Put the protective medium (15 to 20 °C) at the cells (use the same volume that is normally used when using cell culture medium; e.g. 5 ml for a 25 cm^2 flask, 15 - 20 ml for a 75 cm^2 flask, 2 ml per well of a 6 well plate). When finished, close the cell culture flasks. Cover gas permeable caps with Parafilm®. Store cell culture vessels in a refrigerator or a cold storage room (2 to 8 °C).

4. When using wells or cell culture dishes, use a cap and mask the margins with Parafilm® or adhesive tape (one strip along the entire opening or above all four lateral edges respectively). Store wells or cell culture dishes in a refrigerator or a cold storage room (2 to 8 °C).

5. At the end of the required period, take the cells out of the refrigerator/cold storage room and use the laminar flow to exhaust the protective medium.

6. Take normal cell culture medium (complete medium with serum and further additives normally required for the respective cell type) directly out of the refrigerator (approx. 2 to 8 °C) and apply it to the cells. Store the cells in an incubator.

7. Change the cell culture medium the following day; in case a larger number of cells have detached, replace the medium after 4 to 6 hours after warming up.

8. Split the cell culture 48 hours after warming up if possible, but not earlier than 24 hours

Cell suspensions and small tissue preparations, as well as adherent cells may be stored in ChillProtec®. The respective instruction can be found and downloaded at www.biochrom.de.

BIOCHROM AG

SUGGESTIONS ON HOW TO STORE CELLS IN CHILLPROTEC®

Compared to cell culture media, physiological salt solutions and organ protection solutions, ChillProtec® causes significantly less cell damage after cold storage of cells and tissue (cf. Table 1).

Cells and tissue tested with ChillProtec®
ChillProtec®
Aortic endothelial cells (primary, porcine)
Liver endothelial cells (cell line, rat)
Vero B4 (kidney epithelial cell line, monkey)
LLC-PK1 (kidney epithelial cell line, porcine)
Hepatocytes (primary, human), adherent
Hepatocytes (primary, human), suspension
Hepatocytes (primary, rat), adherent
Hepatocytes (primary, rat), suspension
Hepatocytes (primary, mouse)
Hepatocytes (primary, porcine)
HepG2 (hepatoma cell line, human)
A549 (lung epithelial cell line, human)
L929 (fibroblast cell line, mouse)
RIN-m5f (islet cell line, rat)
K-562 (myeloma cell line, human)
Muscle (diaphragm, mouse)

Table 1

As there are the two different versions of the protective medium, you should test both media. At the moment, comparative studies of ChillProtec® and ChillProtec® plus are available for a broad range of cells, recommending the use of the respective medium mentioned (cf. Table 2).

STORAGE PERIOD

The possible length of cold storage highly depends on the respective cell type and cultivation or the use of the cells respectively, varying between three days and more than two weeks (up to five weeks). Users should test the storage period for each cell type and each type of application.

ChillProtec® overview		
Parameter	**ChillProtec®**	**ChillProtec® plus**
Cat. No.	F 2285	F 2295
Pk	500 ml	500 ml
Storage (°C)	+2 to +8	
Raw material	Chemically defined, proprietary formulation	
Intended use	Cold storage of cells	
Note	For *in vitro* use only	

Cells tested with ChillProtec® and ChillProtec® plus	
ChillProtec®	**ChillProtec® plus**
Aortic endothelial cells (primary, porcine)	L929 (fibroblast cell line, mouse)
Vero B4 (kidney epithelial cell line, monkey)	Hepatocytes (primary, rat)
Hepatocytes (primary, human)	A549 (lung epithelial cell line, human)
Liver endothelial cells (cell line, rat)	RIN-m5f (islet cell line, rat)
Hepatocytes (primary, mouse)	
Hepatocytes (primary, porcine)	
HepG2 (hepatoma cell line, human)	

Table 2

Liquid nitrogen freezers

VWR COLLECTION

SELECTED FOR YOU

Box storage system, BSS series

The tanks of the BSS series offer various solutions for storage of vials or straws in liquid or gaseous phase. They provide extremely good temperature uniformity, even with as little as 2 cm liquid nitrogen remaining above the rack insulator (or 5 cm above the bottom of BSS-5100).

The tanks, manufactured from aluminium alloy with fibreglass / epoxy neck and a high vacuum multilayered super insulation limits the nitrogen evaporation.

- Extremely good temperature uniformity
- The lid can also be padlocked shut, except on model BSS-5100 (padlock not included)

Certification: CE - Medical.

Ordering information: Stainless steel racks for standard type boxes (25, 81 or 100 tubes) are included.
For BSS-5100: Pie shaped drawers (for cryo-tubes) or canisters (for goblets and straws) must be ordered separately.

Accessories

S70-controller: Temperature read out (1 point), automatic filling procedure (up to desired LN_2 level), visible and audible alarms (high / low temperature and level, and time out fill error), 1 potential-free contact (with programmable function) for external alarm.

The newly developed **S-170 controller** offers maximum sample security and many features: Automatic filling procedure, temperature measurement (via 2 probes), regulation of liquid nitrogen level, providing visual and audible alarms (low level alarm, low level fill, normal level stop fill, high level alarm), display of the position of the cover (open/closed), management of the "defog" function (for better visibility inside the vessel), RS485 interface enables complete management and control of the system via a PC (the software is included), 4 potential-free contacts for connection to an in-house alarm system or to a telephone dialing system (4 different alarm functions can be transferred).

Model	BSS-750	BSS-3000	BSS-4800	BSS-5100	BSS-6000
Capacity (l)	48,5	100	148	75	197
No. of canisters	30		48	54 drawers	60
No. of test tube racks	6				
Static holding time (days)	180	155	227	30	303
Weight, empty (kg)	20,5	45	56	37	62
Ø×H (mm)	500×707	680×748	680×920	480×915	680×1076

Description	Neck-Ø (mm)	Pk	Cat. No.
BSS-750	119	1	**478-0274**
BSS-3000	215	1	**478-0279**
BSS-4800	215	1	**478-0280**
BSS-5100	215	1	**478-0275**
BSS-6000	410	1	**478-0367**

Description	Pk	Cat. No.
Accessories		
Plastic canisters, (Ø×H: 70×660 mm); each canister can hold 5 goblets (not included), with goblet lifter	1	**478-0324**
S70 controller, with temperature and level monitoring and auto-fill function for BSS-750	1	**478-0329**
S70 controller, with temperature and level monitoring and auto-fill function for BSS-3000	1	**478-0330**
S70 controller, with temperature and level monitoring and auto-fill function for BSS-4800	1	**478-0331**
S70 controller, with temperature and level monitoring and auto-fill function for BSS-6000	1	**478-0332**
S170 controller for BSS-750, with temperature monitoring and auto-fill function	1	**478-0352**
S170 controller for BSS-3000, with temperature monitoring and auto-fill function	1	**478-0353**
S170 controller for BSS-4800, with temperature monitoring and auto-fill function	1	**478-0354**
S170 controller for BSS-6000, with temperature monitoring and auto-fill function	1	**478-0355**
S170 controller for BSS-5100, with temperature monitoring and auto-fill function	1	**478-0356**

Dewar flasks, Nalgene®
Thermo Scientific

HDPE flask and cover

Shatterproof flasks for short term storage of ice water, dry ice solvent and liquid nitrogen.

- Double walls filled with urethane foam

Withstand temperatures from -196 to +100 °C

Vented insulated cover

With carrying handle (except 10 l model)

Continued on next page

Continued from previous page

Model	4150-1000	4150-2000	4150-4000	4150-9000
Internal height (mm)	195	231	295	396
Overall height (mm)	251	282	353	470
Temperature range	-196...+100 °C			

Description	Neck-Ø (mm)	Pk	Cat. No.
Dewar flask 4150-1000	96	1	**478-5401**
Dewar flask 4150-2000	122	1	**478-5402**
Dewar flask 4150-4000	158	1	**478-5404**
Dewar flask 4150-9000	198	1	**478-5410**

Thermometers and data loggers

VWR COLLECTION

Dual-scale thermometers, Traceable®

Chemical resistant, waterproof sensor or non toxic glycol bottle probes

These dual thermometer monitor temperatures in refrigerator and freezer simultaneously or two refrigerator locations. Temperature-buffered bottle sensor eliminates transient temperature changes when refrigerator door is opened. Patented unit fulfils all CDC thermometer and vaccine thermometer requirements. They may be used in water baths, heating blocks, and incubators.

- Displays date and time
- Minimum/maximum temperature values
- High and low user-settable alarms (visual and audio)

Solution recognised as safe by the FDA.

Delivery information: Supplied with an individually serial-numbered Traceable® certificate indicating traceability to NIST, a stand, Velcro® and magnetic strips and wall mount, two AAA batteries for one year ‚always-on' monitoring replacement battery.

Range (°C)	Accuracy (°C)	Resolution (°C)	Probe	W×D×H (mm)	Pk	Cat. No.
–50…+70	±0,3	0,01	Two bottle probes	70×108×19	1	**620-1822**
–50…+70	±0,3	0,01	Bottle probe	70×108×19	1	**620-1823**
–50…+70	±0,3	0,01	Two waterproof sensors	70×108×19	1	**620-1827**

VWR COLLECTION

SELECTED FOR YOU

Ultra-accurate freezers thermometers, Traceable®

Choice of four platinum probes with PTFE cable

These high precision thermometers offer a choice of different probes. The bottle insulates from rapid temperature changes when door is opened. The stainless steel handle probe (Ø×L: 3,2×300 mm) with three-meter cable is waterproof and suitable for liquids, air/gas and semi solids, with adjustable holder and Velcro® tape.

- Minimum/maximum values for the last 24 hours (each hour) and the last seven or 30 days (each day)
- Time and date stamp key that shows the exact time and date for all minimum and maximum readings
- Alarm is settable in 0,1° increments and signals when temperature rises above/falls below set points

Traceability to standards provided by NIST.

Delivery information: Supplied with two AAA batteries, a platinum probe, a cable, a bench stand, a wall mount, a serial-numbered Traceable® certificate provided from an ISO 17025 calibration laboratory accredited by A2LA.

Range (°C)	Accuracy (°C)	Resolution (°C)	Probe	W×D×H (mm)	Pk	Cat. No.
–50…+70	±0,1	0,01	Non toxic glycol filled bottle	108×70×19	1	**620-1976**
–50…+70	±0,1	0,01	PTFE	108×70×19	1	**620-1977**
–99,99…+199,99	±0,1	0,01	Stainless steel handle	108×70×19	1	**620-1978**
–99,99…+199,99	±0,1	0,01	Stainless steel Bullet™	108×70×19	1	**620-1979**

VWR COLLECTION

2 year warranty

SELECTED FOR YOU

Calibratable ultra-accurate digital thermometers

These ready-to-use thermometers with probe are designed for quality management of the temperature with high accuracy. They can be used for general purpose applications in air, gas, liquid and solids measurements (depending on the probes type). They are suitable in pharma and biotech companies - production and labs, in the food industry - dairy products, fish, meat, healthcare - blood, government institutes and environment.

- Low-battery warning indicator
- Calibratable: Offset and slope input
- Minimum/maximum memory (620-1932; -1934 and -1935) and "HOLD" function
- Probe can be changed - Except 620-1929 and -1930
- Large choice of probes: PT 100, PT 1000 and Type K

Delivery information: Supplied with a nine volt battery, a calibration certificate and a transparent plastic case (model 630-1931 only).

Description	Range (°C)	Accuracy	Resolution (°C)	Probe	Pk	Cat. No.
Handheld digital thermometer, TD 111, with manually adjustable measuring range	–65…+1150	±0,05 % v. MW; ±0,2 % FS	1,0	Type K	1	**620-1931**
Recalibratable thermometer, TD 110, with automatically or manually adjustable measuring range	–199…+199	±0,1 % v. MW.	0,1	Fixed PT 1000, 3×100 mm, PTFE handle and 1 m PTFE cable	1	**620-1930**
Recalibratable thermometer, TD 130, with manually adjustable measuring range	–199…+199	±0,1 % v. MW.	0,1	PT 1000, 3×100 mm, 135 mm plastic handle and 1 m silicon cable	1	**620-1929**

Description	Range (°C)	Ø×L (mm)	Pk	Cat. No.
Ultra-accurate probes, Type K				
Universal flexible probe, TK 430, for quick response in air, liquids, very small surfaces, twisted pair of PTFE insulated thermowell wires and DIN-SMP connection	–65…+300	1×1000	1	**620-1941**
Ultra-accurate probes, PT 1000				
General purpose probe, PTZ 341, plastic handle, silicone cable (1 m) and gold plated jack connector	–70…+200	3×100	1	**620-1946**
Penetration probe for soft media, PTZ 101, plastic handle, silicone cable (1 m) and gold plated jack connector		3×100	1	**620-1947**
Surface probe for soft media, PTZ 201, plastic handle, silicone cable (1 m) and gold plated jack connection		3×100	1	**620-1948**

VWR COLLECTION

2 year warranty

SELECTED FOR YOU

Calibratable ultra-accurate digital thermometers

These ready-to-use thermometers with probe are designed for quality management of the temperature with high accuracy. They can be used for general purpose applications in air, gas, liquid and solids measurements (depending on the probes type). They are suitable in pharma and biotech companies - production and labs, in the food industry - dairy products, fish, meat, healthcare - blood, government institutes and environment.

- Low-battery warning indicator
- Calibratable: Offset and slope input
- Minimum/maximum memory and "HOLD" function
- Large choice of probes: PT 100, PT 1000 and Type K
- Temperature drift of 0,002 °C/K ie. accuracy of 0,06 °C at 37 °C

Delivery information: Supplied with a nine volt battery, a calibration certificate and a transport case.

Description	Model	Range (°C)	Accuracy (°C)	Resolution (°C)	Probe	Pk	Cat. No.
Handheld thermometer with plastic handle and probe (620-1946)	TD 121	–200…+850	≤0,03	0,01; 0,1	PT 100	1	**620-1932**
Handheld thermometer with probe (620-1941)	TD 141	–220…+1750	≤0,03 % v. MW.; ±0,05 % FS (Type K)	0,1; 1,0	J, K, N, S, T	1	**620-1934**
Dual-channel thermometer with flexible probe (620-1941)	TD 241	–220…+1750	≤0,03 % v. MW.; ±0,05 % FS (Type K)	0,1; 1,0	J, K, N, S, T	1	**620-1935**

Description	Range (°C)	Ø×L (mm)	Pk	Cat. No.
Ultra-accurate probes, Type K				
Universal flexible probe, TK 430, for quick response in air, liquids, very small surfaces, twisted pair of PTFE insulated thermowell wires and DIN-SMP connection	–65…+300	1×1000	1	**620-1941**
Ultra-accurate probes, PT 1000				
Immersion and air probe, PTX 341, plastic handle, PVC cable (1 m) and DIN connector	–50…+400	3×150	1	**620-1944**
Penetration probe, PTX 101, plastic handle, PVC cable (1 m) and DIN connection	–50…+400	3×150	1	**620-1945**
General purpose probe, PTZ 341, plastic handle, silicone cable (1 m) and gold plated jack connector	–70…+200	3×100	1	**620-1946**

Temperature loggers, EBI 300 and 310

Ebro

Temperature loggers

Probe, TPX 250

Wall mount

These temperature loggers with USB connection need no interface for programming or read-out. An automatic PDF report can be generated without any software. **EBI 300**: Related to HACCP/IFS issues or other perishable goods (EN 12830, ATP, VO(EG) 37/2005 compliant), transport of fresh, chilled and frozen products, monitoring of fridges and freezers. **EBI 310**: For pharmaceutical, medical or other perishable goods, transport of drugs, vaccines and blood products, temperature monitoring of dry ice (with TPX 250) and cryogenic (with TPX 220) shipments, validation of temperature during transport and storage.

- User friendly for waterproof applications
- LED display: Minimum and maximum values
- Two limits LED alarm - or five ranges for 620-1814

Conform with IP 65 - 620-1814 is CFR 21.

W×D×H: 80×34×14 mm

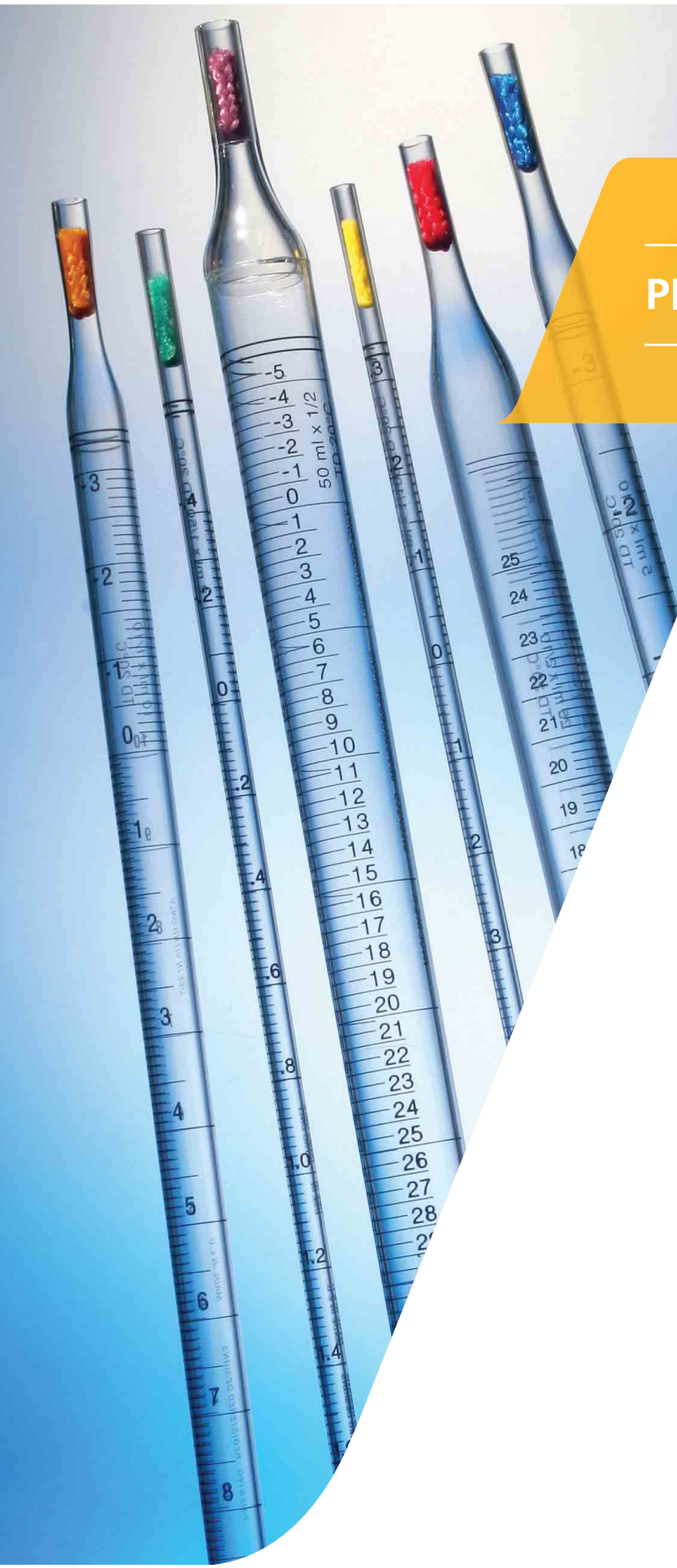
Weight: 35 g

Delivery information: Supplied with a battery for two years use.

Description	Range (°C)	Accuracy (°C)	Resolution (°C)	Memory	Pk	Cat. No.
USB data logger with NTC probe, EBI 300	–30…+60	±0,5 (–20…+40); ±0,8	0,1	40 000 values	1	**620-1815**
USB data logger with PT1000 probe, EBI 310	–30…+75	±0,2	0,1	120 000 values	1	**620-1814**

Description	Range (°C)	Memory	Pk	Cat. No.
Probes				
External NTC probe for EBI 300, Ø×L: 4×50 mm, TPC 300	–35…+75	40000 values	1	**620-1860**
External PT1000 probe for EBI 310, Ø×L: 5×50 mm, TPX 220	–200…+250	40000 values	1	**620-1861**
External PT1000 probe for EBI 310, TPX 250	–85…+50	40000 values	1	**620-1863**

Description	Pk	Cat. No.
Accessories		
Wall mount	1	**620-1859**



PIPETTING

Pipette aids 218

Serological pipettes 219

Pipette and pipette tips 222

Pipette aids

Pipette controller, Accurpette

For glass and plastic pipettes from 1 to 100 ml

The Accurpette pipette controller delivers efficient performance with a powerful but quiet motor to speed up large volume pipetting. The mode selection switch enables selection of high or low modes both allowing variable aspirate and dispense speeds (with blow out). In any mode setting the speed of suction and dispensing is controlled through the concave finger triggers, designed to provide a comfortable and positive grip and to require the minimum of effort. An additional gravity dispense mode is designed for use with 'To Deliver' (TD) pipettes. The Accurpette is now supplied with additional coloured nose cones to allow laboratory, application or user colour coding to minimise the risk of cross-contamination.

- Lightweight UV resistant body (180 g) and nose cones
- Fills a 25 ml pipette in under three seconds on its fastest setting
- Autoclavable silicone pipette holder
- Replaceable hydrophobic membrane filter protects the unit against liquid influx and protects samples against contamination
- Environmentally friendly rechargeable NiMH battery allow continuous usage for 4 hours; low battery light, rechargeable during use

Ordering information: Supplied with charger, two spare hydrophobic filters (1×0,45 µm, 1×0,2 µm), bench stand/wall bracket and a coloured nose cone set.

Description	Pk	Cat. No.
Pipette controller Accurpette, EU-charger	1	**612-4552**
Pipette controller Accurpette, UK-charger	1	**612-4553**

Description	Pk	Cat. No.
Accessories		
Replacement filter set 0,2 µm	5	**612-3681**
Replacement filter set 0,45 µm	5	**612-3678**
Replacement silicone pipette holder	1	**612-3679**

Pipette controller, accu-jet® pro
Brand

For glass and plastic pipettes from 0,1 to 200 ml

- Selection of gravity delivery or powered blow-out using one hand, infinitely adjustable motor speed and control of pipetting speed using pipetting buttons
- Intelligent electronic system prevents overloading
- Flashing LED indicates low battery
- Silently aspirates 50 ml in one go in just 10 seconds
- Operates for up to eight hours with 10 ml pipette
- Can be kept in the wall holder or placed on its back to keep the pipette away from work surfaces

Weight: 190 g

Ordering information: Supplied with a rechargeable NiMH battery, two lids for the battery compartment, wall holder, battery charger, two spare 0,2 µm membrane filters.

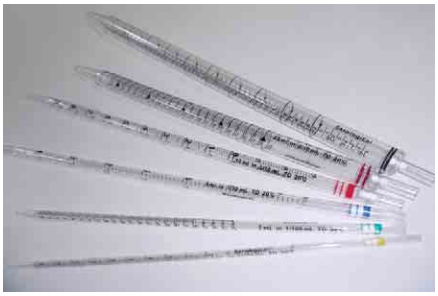
Description	Pk	Cat. No.
accu-jet® pro, dark blue, with battery charger for EU (230V/50 Hz)	1	**612-2625**
accu-jet® pro, magenta, with battery charger for EU (230V/50 Hz)	1	**612-2626**
accu-jet® pro, green, with battery charger for EU (230V/50 Hz)	1	**612-2627**
accu-jet® pro, royal blue, with battery charger for EU (230V/50 Hz)	1	**612-2628**
accu-jet® pro, dark blue, with battery charger for UK (230V/50 Hz)	1	**612-2881**
accu-jet® pro, magenta, with battery charger for UK (230V/50 Hz)	1	**612-2882**
accu-jet® pro, green, with battery charger for UK (230V/50 Hz)	1	**612-2883**
accu-jet® pro, royal blue, with battery charger for UK (230V/50 Hz)	1	**612-2884**

Description	Pk	Cat. No.
Accessories		
NiMH battery pack	1	**612-4843**
Membrane filter, 0,2 µm, non sterile, in bag	10	**612-1964**
Membrane filter, 0,2 µm, sterile, in blister pack	1	**612-1963**
Pipette adapter with non-return valve, silicone	1	**612-1962**
Wall support, grey	1	**612-1967**
Recharger for pipette controller, EU-plug, 100 - 240 V/50-60 Hz	1	**612-4753**

Serological pipettes

VWR COLLECTION

Serological pipettes, Standard Line



PS, graduated, sterile

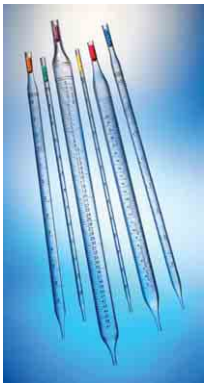
- Graduations are calibrated for accurate dispensing to within ±3%
- Colour-coded stripes for quick volume identification
- Non pyrogenic
- With cotton plug

Packaging: Individually wrapped in paper-plastic bags or bulk packed in bags.

Capacity (ml)	Division (ml)	Colour code	Packed	Pk	Cat. No.
Individually wrapped					
1	0,01	Yellow	Individual	1.000	**612-3707**
2	0,01	Green	Individual	800	**612-3704**
5	0,10	Blue	Individual	300	**612-3702**
10	0,10	Red	Individual	200	**612-3700**
25	0,20	Lilac	Individual	200	**612-3698**
50	1,00	Black	Individual	100	**612-3696**
Bulk packed					
1	0,01	Yellow	25/bag	1.000	**612-3705**
2	0,01	Green	25/bag	700	**612-3703**
5	0,10	Blue	25/bag	500	**612-3701**
10	0,10	Red	25/bag	350	**612-3699**
25	0,20	Lilac	25/bag	350	**612-3697**
50	1,00	Black	25/bag	250	**612-3695**

VWR COLLECTION

Serological pipettes



PS, crystal clear, graduated

Smooth, shiny, transparent pipettes with smooth ends and raised, bright, permanent graduations.

- Coloured top for easy identification
- With cotton plug
- Negative and double graduations: Ascending and descending (for 5, 10, 25 ml) unchangeable and very precise
- Integral construction, preventing any risk of leakage or retention at the weld seam, and shorter for improved ergonomics and greater comfort during use, particularly when working within a fume hood
- Non pyrogenic, non cytotoxic, non haemolytic

Packaging: Bulk or individually wrapped in paper/plastic peel-pack with ‚fibre-free' paper - no fibre in suspension while opening the wrap.

Ordering information: Supplied in stackable dispensing boxes.

Capacity (ml)	Division (ml)	Packed	Pk	Cat. No.
Sterile				
1	0,01	Single	500	**612-1240**
	0,01	25 per bag	1.000	**612-1271**
2	0,02	Single	500	**612-1243**
	0,02	25 per bag	1.000	**612-1274**
5	0,10	Single	250	**612-1245**
	0,10	25 per bag	375	**612-1276**
10	0,10	Single	200	**612-1248**
	0,10	25 per bag	250	**612-1279**
25	0,20	Single	100	**612-1270**
	0,20	10 per bag	100	**612-1600**
50	0,50	Single	100	**612-3982**
Non sterile				
1	0,01	Bulk	2.000	**612-1288**
2	0,02	Bulk	1.000	**612-1289**
5	0,10	Bulk	400	**612-1290**
10	0,10	Bulk	250	**612-1291**

Serological pipettes, Stripette®
Corning

PS, graduated, sterile

- Calibrated to deliver (TD, Ex)
- High performance anti-drip tips, colour-coded magnifier stripe and negative graduations
- Certified RNase-/DNase-free and non pyrogenic

Packaging: Four packaging options:
Bulk packaged in bags
Individually wrapped in plastic bags
Individually wrapped in paper-plastic bags
Individually wrapped in paper-plastic bags, triple bagged

Capacity (ml)	Division (ml)	Colour code	Packed	Pk	Cat. No.
Bulk packaged in bags					
1	0,01	Yellow	50/bag	1.000	**734-1687**
2	0,01	Green	50/bag	1.000	**734-1689**
5	0,10	Blue	50/bag	500	**734-1691**
10	0,10	Orange	50/bag	500	**734-1693**
25	0,20	Red	25/bag	200	**734-1695**
50	0,50	Lilac	25/bag	100	**734-1743**
Individually wrapped in plastic bags					
1	0,01	Yellow	100/bag	1.000	**734-1688**
1	0,01	Yellow	100/bag	200	**734-0488**
2	0,01	Green	100/bag	1.000	**734-1690**
5	0,10	Blue	50/bag	200	**734-1692**
10	0,10	Orange	50/bag	200	**734-1694**
10*	0,10	Orange	50/bag	200	**734-1742**
25	0,20	Red	50/bag	200	**734-1696**
50	0,50	Lilac	25/bag	100	**734-1744**
100	1,00	Turquoise	10/bag	100	**734-1734**
Individually wrapped in paper-plastic bags					
1	0,01	Yellow	50/bag	1.000	**734-1735**
2	0,01	Green	50/bag	1.000	**734-1736**
2 ml**	-	—	50/bag	500	**612-3720**
5	0,10	Blue	50/bag	200	**734-1737**
10	0,10	Orange	50/bag	200	**734-1738**
25	0,20	Red	25/bag	200	**734-1739**
50	0,50	Lilac	25/bag	100	**734-1740**
100	1,00	Turquoise	10/bag	100	**734-1741**
Individually wrapped in paper-plastic bags, triple bagged					
1	0,01	Yellow	50/bag	1.000	**612-5126**
2	0,01	Green	50/bag	1.000	**612-5127**
5	0,01	Blue	50/bag	200	**612-5128**
10	0,10	Orange	50/bag	200	**612-5123**
25	0,20	Red	25/bag	200	**612-5124**
50	0,50	Lilac	25/bag	100	**612-5125**
100	1,00	Turquoise	10/bag	100	**444-1019**

* With wide orifice for viscous materials
** Non plugged

Serological pipettes, Falcon®
Corning

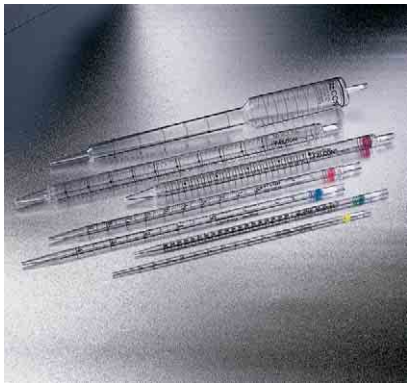
PS, graduated, sterile

- Coloured top with cotton plug and coloured packaging for easy identification
- Negative graduations for extra capacity and reverse graduations (except 1 ml)
- Non pyrogenic

Packaging: Individually wrapped in paper-peelable bags or bulk packaged in bags.

Capacity (ml)	Division (ml)	Packed	Pk	Cat. No.
Individually wrapped				
1	0,01	100 per box	1.000	**734-0340**
2	0,01	100 per box	1.000	**734-0336**
5	0,10	50 per bag	200	**734-0350**
10	0,10	50 per bag	200	**734-0352**
25	0,25	50 per bag	200	**734-0343**
25	0,50	50 per bag	200	**734-0347**
50	1,00	25 per bag	100	**734-0351**
100	1,00	5 per bag	50	**734-0355**
Bulk packaged				
1	0,01	25 per bag	1.000	**734-0335**
2	0,01	25 per bag	1.000	**734-0337**
5	0,10	25 per bag	500	**734-0344**
10	0,10	25 per bag	500	**734-0345**
25	0,25	20 per bag	200	**734-0338**

Serological pipettes, Falcon®, Corning® Advantage™
Corning



PS, graduated, sterile

- Coloured top with cotton plug and coloured packaging for easy identification
- Negative graduations for extra capacity and reverse graduations (except 1 ml)
- Non pyrogenic

Packaging: Individually wrapped in plastic-peelable bags, recyclable.

Capacity (ml)	Division (ml)	Packed	Pk	Cat. No.
1	0,01	100 per box	1.000	**734-0305**
2	0,01	100 per box	1.000	**734-0297**
5	0,10	50 per bag	200	**734-0313**
10	0,10	50 per bag	200	**734-0315**
25	0,25	50 per bag	200	**734-0307**
25	0,50	50 per bag	200	**734-0310**
50	1,00	25 per bag	100	**734-0314**

Serological pipettes, Nunc™
Thermo Scientific

PS, sterile

- Coloured top with cotton plug and coloured packaging for easy identification
- Convenient, black, extra graduations to full pipette volume
- Non pyrogenic

Capacity (ml)	Division (ml)	Colour code	Pk	Cat. No.
Individually wrapped in paper-peelable bags				
1	0,01	Black	1.000	**612-4220**
2	0,01	Black	500	**612-4221**
5	0,10	Blue	200	**612-4222**
10	0,10	Orange	200	**612-4223**
25	0,20	Green	200	**612-4224**
50	0,50	Purple	100	**612-4225**
Individually wrapped in plastic film				
1	0,01	Black	1.000	**734-2612**
2	0,01	Black	500	**734-2613**
5	0,10	Blue	200	**734-2614**
10	0,10	Orange	200	**734-2615**
25	0,20	Green	200	**734-2616**
50	0,50	Purple	100	**734-2617**

Pipettes and pipette tips

VWR COLLECTION

Single channel pipettes, mechanical, Ultra-High Performance (UHP)

Variable volume, fully autoclavable

The VWR Ultra-High Performance pipettes offer superior accuracy and precision, with unmatched and proven ergonomic design which is both lightweight and durable.

- Lowest plunger force tested
- Universal tip capability
- Automatic locking volume adjustment wheel
- Levered tip ejection and colour coded for volume identification
- Easy in-house calibration and maintenance

Ordering information: Starter Kit also available, including 4 single channel pipettes (0,5 - 10, 2 - 20, 20 - 200, 100 - 1000 µl).

Capacity (µl)	Accuracy (%)	Imprecision (%)	Pk	Cat. No.
0,1 - 2	±12,0 - ±1,5	<6,0 - <0,7	1	**613-1488**
0,5 - 10	±4,0 - ±0,5	<2,8 - <0,4	1	**613-1489**
2 - 20	±3,0 - ±0,8	<1,5 - <0,3	1	**613-1490**
5 - 50	±3,0 - ±0,8	<2,0 - <0,4	1	**613-1628**
10 - 100	±1,6 - ±0,8	<1,5 - <0,3	1	**613-1491**
20 - 200	±1,2 - ±0,6	<0,8 - <0,2	1	**613-1492**
100 - 1000	±0,9 - ±0,6	<0,6 - <0,2	1	**613-1493**

VWR COLLECTION

Pipette tips

All the tips are made of high quality 100% pure virgin medical grade PP. Made in the highest quality moulds, these tips can be used whenever the work demands a higher standard. Sterile products are tested for endotoxin (pyrogen) contamination and are certified to USP standards. Resins are pre-tested for metal contamination. Certificates are on file by lot number for all test results.

- A wider seal ensures that tips will seal easily and consistently without leaking
- Guaranteed free of detectable DNA, DNase/RNase, endotoxins and heavy metals
- Autoclavable

	Type	Capacity (µl)	Sterile	Packed	Pk	Cat. No.
Bulk						
	Bevel Point™, graduated	1 - 200	-	Bulk	10.000	**525-0144**
	Bevel Point™	100 - 1000	-	Bulk	1.000	**613-0340**
	UltraFine™, FlexTop™, extended	100 - 1250	-	Bulk	1.000	**613-0272**
	Macro, graduated (Gilson Pipetman)	1000 - 5000	-	Bulk	250	**613-0338**
	Macro, graduated (Sartorius/Eppendorf)	1000 - 5000	-	Bulk	250	**613-0339**
	Standard	5000 - 10000	-	Bulk	250	**613-0831**
Racked						
	UltraFine™, extended (10×96)	0,1 - 10	-	10 racks, 96 each	960	**613-0260**
	Bevel Point™, graduated (10×96)	0,5 - 10	-	10 racks, 96 each	960	**613-0255**
	Bevel Point™ (10×96)	1 - 200	-	10 racks, 96 each	960	**613-0241**
	Bevel Point™, graduated (6×96)	100 - 1000	-	6 racks, 96 each	576	**613-0344**
Racked, sterile						
	UltraFine™, graduated, siliconised (12×96)	0,1 - 10	+	12 racks, 96 each	1.152	**613-0337**
	Bevel Point™ (10×96)	1 - 200	+	10 racks, 96 each	960	**613-0242**
	Bevel Point™ (5×192)	1 - 200	+	5 racks, 192 each	960	**613-0238**
	Bevel Point™, graduated (10×96)	1 - 200	+	10 racks, 96 each	960	**613-0300**
	Bevel Point™ (6×96)	100 - 1000	+	6 racks, 96 each	576	**613-0342**

VWR COLLECTION

Pipette tips, refill, Next Generation

Tips made from pure resins, packaging made from renewable materials

The Next Generation pipette tip refill system is a revolution in pipette tip refills. It goes far beyond other reload systems to bring a complete refilling solution to the laboratory. With a simple lift, place and snap, the user can refill VWR and other brands of pipette tip racks with 17 different styles of tips.

Far beyond simple recycle coding, the Next Generation is a complete system designed with a low carbon footprint that includes the first ever use of bioplastic (non petroleum) compostable resin in pipette tip refills. Next Generation's small footprint extends to the package, with a reclosable box that helps maximise storage space in crowded laboratories.

- Easy to use refill system - new pipette tip racks, inserts and transfer cover prevent tip wobbling during refill and keeps tips clean
- 95% renewable materials - compostable tip base from organic non petroleum resin, carton made from 100% recycled fibres, soy-based vegetable ink
- Certified DNA-/RNase-/DNase-free

Packaging: Compact, reclosable packaging with reduced overall weight.

Type	Capacity (µl)	Sterile	Packed	Pk	Cat. No.
Graduated	0,1 - 10	-	6 racks, 96 each	576	**613-2104**
UltraFine™	0,1 - 10	-	13 racks, 96 each	1.248	**613-1646**
Extended, micro	0,1 - 10	-	14 racks, 96 each	1.344	**613-0735**
Extended, micro, Ultrafine™	0,1 - 10	-	5 racks, 96 each	480	**613-2105**
Rainin® LTS™ style	0,2 - 20	-	5 racks, 96 each	480	**613-2109**
Rainin® LTS™ style	0,2 - 20	-	11 racks, 96 each	1.056	**613-0721**
Rainin® LTS™ style	0,5 - 250	-	10 racks, 96 each	960	**613-0727**
Yellow	1 - 200	-	10 racks, 96 each	960	**613-0732**
Yellow	1 - 200	-	5 racks, 96 each	480	**613-2106**

Continued on next page

Continued from previous page

Type	Capacity (µl)	Sterile	Packed	Pk	Cat. No.
Standard	1 - 200	-	10 racks, 96 each	960	**613-0740**
Graduated	1 - 200	-	10 racks, 96 each	960	**613-0742**
Graduated	1 - 200	-	5 racks, 96 each	480	**613-2107**
Rainin® LTS™ style	1 - 200	-	5 racks, 96 each	480	**613-2110**
Wide orifice	1 - 200	-	10 racks, 96 each	960	**613-0731**
Ultrafine™	1 - 200	-	10 racks, 96 each	960	**613-0725**
Ultrafine™, FlexTop™	1 - 200	-	5 racks, 96 each	480	**613-2108**
Ultrafine™	1 - 250	-	10 racks, 96 each	960	**613-0744**
Ultrafine™	1 - 300	-	6 racks, 96 each	576	**613-0723**
Rainin® LTS™ style	100 - 1000	-	5 racks, 96 each	480	**613-0729**
Wide orifice	100 - 1250	-	5 racks, 96 each	480	**613-0737**
Ultrafine™	100 - 1250	-	5 racks, 96 each	480	**613-0738**

VWR COLLECTION

Filter tips

All the tips are made of high quality 100% pure virgin medical grade PP. Made in the highest quality moulds, these tips can be used whenever the work demands a higher standard. Sterile products are tested for endotoxin (pyrogen) contamination and certified to USP results. Resins are pre-tested for metal contamination. Certificates are on file by lot number for all test results.

- A wider seal ensures that tips will seal easily and consistently without leaking on old as well as new pipettes
- Guaranteed free of detectable DNA, DNase/RNase, endotoxins and heavy metals

	Type	Capacity (µl)	Sterile	Packed	Pk	Cat. No.
Racked, sterile						
	UltraFine™, extended	0,1 - 10	+	10 racks, 96 each	960	**732-0543**
	UltraFine™, graduated	0,1 - 10	+	12 racks, 96 each	1.152	**732-0516**
	Rainin LTS®	0,1 - 20	+	10 racks, 96 each	960	**732-0799**
	Bevel Point™ (10×96)	1 - 40	+	10 racks, 96 each	960	**732-0528**
	Standard	1 - 100	+	10 racks, 96 each	960	**732-1103**
	Bevel Point™, graduated	1 - 100	+	10 racks, 96 each	960	**732-1102**
	Rainin LTS®	1 - 200	+	10 racks, 96 each	960	**732-0800**
	UltraFine™	1 - 200	+	10 racks, 96 each	960	**732-0541**
	UltraFine™, extended	1 - 200	+	6 racks , 96 each	576	**732-0610**
	UltraFine™, extended	1 - 300	+	6 racks , 96 each	576	**732-0611**
	Rainin LTS®	100 - 1000	+	6 racks, 96 each	576	**732-0801**
	UltraFine™	100 - 1000	+	6 racks , 96 each	576	**732-0534**

VWR COLLECTION

Filter tips, ZAP™ Slik Low Retention

Transparent PP resins, with PE filter, sterile

Low retention tips offering unsurpassed fluid retention performance and proven aerosol blocking with the endotoxin-free, 10 micron porous hydrophobic filter. Ideal for PCR and DNA manipulation.

- Up to 10 times less fluid retention than standard tips
- Sample can be completely recovered without cutting into tip
- Lot certified purity (free from RNase/DNase, human DNA and endotoxin, non pyrogenic)

Type	Capacity (µl)	Sterile	Packed	Pk	Cat. No.
ZAP™ Slik, extended	10	+	10 racks, 96 each	960	**732-1487**
ZAP™ Slik	10	+	12 racks, 96 each	1.152	**732-1486**
ZAP™ Slik	20	+	10 racks, 96 each	960	**732-1488**
ZAP™ Slik	100	+	10 racks, 96 each	960	**732-2385**
ZAP™ Slik	200	+	10 racks, 96 each	960	**732-1489**
ZAP™ Slik	300	+	10 racks, 96 each	960	**732-1490**
ZAP™ Slik	1000	+	6 racks, 96 each	576	**732-1491**

Multi channel equaliser pipettes, electronic, E1-ClipTip®
Thermo Scientific

Variable volume, with adjustable tip spacing

These equaliser pipettes are ideal for quickly and efficiently performing sample transfers between virtually any tube, rack, microplate or horizontal gel box. Adjustable tip spacing allows the user to set the distance between tips by simply sliding the scale to expand or contract to the desired labware format.
With a light touch the innovative ClipTip technology 'clips' tips securely on the pipettor for a complete seal that will not loosen regardless of application pressure. Designed for optimum comfort and ease of use, the electronic tip ejection and index finger pipetting action allow the thumb to relax during pipetting. These devices also offer unified operation for multiple users and environments, with personalized user interface and password protection.

- Tip is locked and sealed in place until ejected — no dropped tips that waste valuable samples
- Two operating options for every application: Step based Matrix or Presets with settings for most common applications
- Ability to store up to 20 common protocols with a specific name and calibration in the Programs function
- Customisable protection from unintentional editing in the the My Pipette® function
- Personalised user interface and password protection ensure consistent operation among multiple users
- Service and calibration trackers remind users when the pipettor requires service or repair
- Li-Ion battery ensures long-lasting performance; unit may be recharged by a charging stand or a plug

Please note: ClipTip 384 and ClipTip 12,5 tips and compatible E1-ClipTip models do not have interlocking technology.

Supplied with universal power supply. Two-year extended warranty only available via web registration.

Pipettor	Tip spacing range	Liquid transfer capabilities	For use with
E1-ClipTip® Equaliser 6-Channel	9,0 - 19,8 mm	96-Microplates/Deepwell Blocks TO/FROM Test Tube Racks/ 24-Microplates	Standard ClipTip® tips
E1-ClipTip® Equaliser 8-Channel	9,0 - 14,2 mm	96-Microplates/Deepwell Blocks TO/FROM MCT Racks/ 48-Microplates	Standard ClipTip® tips
E1-ClipTip® Equaliser 384 8-Channel	4,5 - 14,2 mm	384-Microplate/PCR Plates/Agarose Gels TO/FROM 96/384-Microplates/Deepwell Blocks/MCT Racks	384 ClipTip® tips
E1-ClipTip® Equaliser 384 12-Channel	4,5 - 9,0 mm	384-Microplate/PCR Plates/Agarose Gels TO/FROM 96-Microplates/Deepwell Blocks	384 ClipTip® tips

Capacity (µl)	Division (µl)	Accuracy (%)	Imprecision (%)	Colour code	For pipette tips	Pk	Cat. No.
6-channel							
50 - 1250	1	±1,4 - ±4,0	≤0,6 - 1,5	Turquoise	ClipTip 1250	1	**613-6015**
8-channel							
2 - 125	0,1	±2,0 - ±8,0	≤0,6 - 4,0	Yellow	ClipTip 200	1	**613-6016**
10 - 300	0,1	±2,0 - ±5,0	≤0,6 - 2,0	Orange	ClipTip 300	1	**613-6017**
50 - 1250	1	±1,4 - ±4,0	≤0,6 - 1,5	Turquoise	ClipTip 1250	1	**613-6018**
0,5 - 12,5	0,01	±2,5 - ±12,0	≤1,6 - 12,0	Pink	ClipTip 384 12,5	1	**613-6019**
1 - 30	0,01	±2,0 - ±10,0	≤0,9 - 7,0	Purple	ClipTip 384 30	1	**613-6020**
2 - 125	0,1	±2,0 - ±8,0	≤0,6 - 4,0	Yellow	ClipTip 384 125	1	**613-6021**
12-channel							
0,5 - 12,5	0,01	±2,5 - ±12,0	≤1,6 - 12,0	Pink	ClipTip 384 12,5	1	**613-6022**
1 - 30	0,01	±2,0 - ±10,0	≤0,9 - 7,0	Purple	ClipTip 384 30	1	**613-6023**
2 - 125	0,1	±2,0 - ±8,0	≤0,6 - 4,0	Yellow	ClipTip 384 125	1	**613-6024**

IVD

Pipette tips, ClipTip®
Thermo Scientific

Racks

Reload stacks

Continued on next page

Continued from previous page

Sterile or non sterile

ClipTip® pipette tips provide security with a unique and innovative interlocking technology that ensures a complete seal on every channel with minimal tip attachment and ejection force.

- Pipette tips feature 'clips' that lock tips in place and forms a complete seal
- Every ClipTip® pipette tip utilizes low retention technology to enable maximium sample recovery
- Certified free of RNase, DNase, DNA, ATP and endotoxin contamination
- Each tip insert has ink-jetted lot and volume information; the convenient colour key makes it easy to match the colour of the F1-ClipTip® pipette plunger cap with the corresponding ClipTip® pipette tip rack insert
- Environmentally friendly reload system uses recycled components and 30% less plastic

Capacity (µl)	Length (mm)	Colour code	Sterile	Packed	Pk	Cat. No.
ClipTip 12,5						
0,5 - 12,5	30	Pink	-	10 racks, 96 each	960	**613-6031**
0,5 - 12,5	30	Pink	+	10 racks, 96 each	960	**613-6032**
0,5 - 12,5	30	Pink	-	10 racks, 384 each	3.840	**613-6025**
0,5 - 12,5	30	Pink	+	10 racks, 384 each	3.840	**613-6026**
ClipTip 50						
1 - 125	64	Yellow	-	10 racks, 384 each	3.840	**613-6029**
1 - 125	64	Yellow	+	10 racks, 384 each	3.840	**613-6030**
ClipTip 200						
10 - 200	56	Yellow	-	10 racks, 96 each	960	**613-2213**
10 - 200	56	Yellow	-	10 reload inserts, 96 each	960	**613-2215**
10 - 200	56	Yellow	+	10 racks, 96 each	960	**613-2214**
10 - 200	56	Yellow	+	10 reload inserts, 96 each	960	**613-2216**
ClipTip 1250						
100 - 1000	95	Blue	-	8 racks, 96 each	768	**613-2222**
100 - 1000	95	Blue	-	8 reload inserts, 96 each	768	**613-2224**
100 - 1000	95	Blue	+	8 racks, 96 each	768	**613-2223**
100 - 1000	95	Blue	+	8 reload inserts, 96 each	768	**613-2225**
ClipTip 1000						
50 - 1250	103	Turquoise	-	8 racks, 96 each	768	**613-6033**
50 - 1250	103	Turquoise	-	8 reload inserts, 96 each	768	**613-6035**
50 - 1250	103	Turquoise	+	8 racks, 96 each	768	**613-6034**
50 - 1250	103	Turquoise	+	8 reload inserts, 96 each	768	**613-6036**

Description	Pk	Cat. No.
Accessories		
Empty rack, medium, colour code yellow + orange	10	**613-2221**
Empty rack, large, colour code blue	8	**613-2226**

IVD

STERILE

Filter tips, ClipTip®
Thermo Scientific

ClipTip® filtered pipette tips provide security with a unique and innovative interlocking technology that ensures a complete seal on every channel with minimal tip attachment and ejection force.

- Pipette tips feature 'clips' that lock tips in place and forms a complete seal
- Every ClipTip® pipette tip utilizes low retention technology to enable maximium sample recovery
- Certified free of RNase, DNase, DNA, ATP and endotoxin contamination
- Environmentally responsible: ClipTip® reload system uses recycled components and 30% less plastic
- Each tip insert has ink-jetted lot and volume information; the convenient colour key makes it easy to match the colour of the F1-ClipTip® pipette plunger cap with the corresponding ClipTip® pipette tip rack insert

Capacity (µl)	Colour code	Length (mm)	Packed	Pk	Cat. No.
ClipTip 125					
1 - 125	Yellow	64	10 racks, 96 each	3.840	**732-5052**
ClipTip 200					
10 - 200	Yellow	56	10 racks, 96 each	960	**732-1622**
10 - 200	Yellow	56	10 reload inserts, 96 each	960	**732-1623**
ClipTip 1000					
100 - 1000	Blue	95	8 racks, 96 each	768	**732-1626**
100 - 1000	Blue	95	8 reload inserts, 96 each	768	**732-1627**
ClipTip 1250					
50 - 1250	Turquoise	103	8 racks, 96 each	768	**732-5054**
50 - 1250	Turquoise	103	8 reload inserts, 96 each	768	**732-5055**

INSTRUMENTS

CO_2 incubators 228

Laminar flow cabinets 231

Roller apparatus 236

Microscopes 237

pH Meters 248

Homogenisers 251

Centrifuges 254

Shakers 256

Quantitation 264

CO_2 incubators

CO_2 incubators with hot air sterilisation, CB Series
Binder



CO_2 incubators with a built in CO_2 sensor which can be sterilised. Units offer optimum growth conditions for cell cultures and meet demanding requirements for best possible cell growth and maximum sample safety. The ANTI.PLENUM DESIGN minimises surfaces due to the seamless, deep-drawn inner chamber without fixtures and featuring an integrated shelf support system. This reduces the risk of contamination, giving less surface area and fewer parts to clean manually and removes the running costs of consumables. Reliable decontamination is provided by the standard-compliant 180 °C hot air sterilisation routine which completely eliminates contaminants and ensures the inner chamber is completely sterilised.

Uniform growth conditions are provided by the VENTAIR™ jacket system, this ensures accurate temperatures, homogeneous temperature distribution and enables fast recovery times. It also minimises thermal degradation of the cell growth due to occasional door openings and the Permadry™ double pan humidication system ensures high humidity and condensate-free interior walls. Units can be stacked using stacking adaptor to save space, have a tightly-fitted inner glass door made of safety glass and 2-point door lock.

- Controller with colour LCD display for simultaneous display of all important parameters (temperature, CO_2 concentration, O_2 concentration, humidity) and push/rotary button for user-friendly input
- CO_2 introduction through Venturi gas mixing nozzle
- Electronic error self-diagnostic system with visual and acoustic alarms, as well as potential free contact for central monitoring
- Independent temperature safety device class 3.1 (DIN 12880) with visual and audible temperature alarm
- Ethernet interface for APT-COM™ DataControlSystem communication software
- Stable pH values due to short recovery times with drift-free infrared CO_2 measurement system

Delivery information: Supplied with perforated stainless steel shelves and Binder test certificate. Calibrations and validations possible. A wide range of options and accessories is available, including partitioned inner glass door and divided shelves), O_2 control, Ethernet interface, gas tank connection kit for CO_2 / O_2 / N_2, for details please visit www.vwr.com or contact your local VWR sales office.

Model	CB 60	CB 160	CB 220
Temperature range (°C)	Ambient +7...60		
Temperature fluctuation (time) (°C)	at 37 °C:±0,1		
Temperature variation (spatial) (°C)	at 37 °C:±0,3		at 37 °C:±0,4
Capacity (l)	53	150	210
Nominal power consumption (W)	1000	1300	1500

Type	W×D×H ext. (mm)	W×D×H int. (mm)	Pk	Cat. No.
CB 60	580×550×720	400×330×400	1	**390-1000**
CB 60, with O_2 control	580×550×720	400×330×400	1	**390-1003**
CB 60, with gastight glass door and partitioned shelves*	580×550×720	400×330×400	1	**390-1012**
CB 60, with O_2 control, with gastight glass door and partitioned shelves*	580×550×720	400×330×400	1	**390-1013**
CB 160	680×720×920	500×500×600	1	**390-1004**
CB 160, with O_2 control	680×720×920	500×500×600	1	**390-1005**
CB 160, with gastight glass door and partitioned shelves*	680×720×920	500×500×600	1	**390-1008**
CB 160, with O_2 control, with gastight glass door and partitioned shelves*	680×720×920	500×500×600	1	**390-1009**
CB 220	740×715×1070	560×500×750	1	**390-1006**
CB 220, with O_2 control	740×715×1070	560×500×750	1	**390-1007**
CB 220, with gastight glass door and partitioned shelves*	740×715×1070	560×500×750	1	**390-1014**
CB 220, with O_2 control, with gastight glass door and partitioned shelves*	740×715×1070	560×500×750	1	**390-1015**

Description	Pk	Cat. No.
Accessories		
Stacking frame, vibration-free, for CB 150/CB 160	1	**390-0812**
Stacking frame, vibration-free, for CB 210/CB 220	1	**390-0813**
Stacking adapter for C150/ CB 160	1	**390-0814**

Continued on next page

Continued from previous page

Description	Pk	Cat. No.
Accessories		
Base on castors for CB 150/ CB 160	1	**390-0815**
Base on castors for CB 210/ CB 220	1	**390-0816**
Stacking frame, vibration-free, for CB 210/CB 220	1	**390-0817**
Base on castors for CB 53/ CB 60	1	**390-0321**
Stacking adapter for CB 53/ CB 60	1	**390-0322**

* Units with a gas tight divided inner glass door and divided shelves: CB 60 has 2 shelf levels and 2 regular shelves, CB 160 has 2 shelf levels with 2 divided shelves and CB 220 units have 3 shelf levels with 3 divided shelves.

CO_2 incubators, INCOmed series

Memmert

These three standard units can be upgraded with six additional modules for optimal hygiene, comfort, documentation and programming. The Comfort module has two gas connections with quick release connectors and an automatic switch-over of gas cylinders. The electropolished interior of the Hygiene module is seamlessly welded by laser to ensure minimum contamination. The Communication module includes USB interface, "Celsius" standard software for programming and logging, ring log memory and printer interface. The CO_2 module has an extended CO_2 range from 0 to 20%. The Premium module includes the Comfort, Hygiene, Communication and CO_2 modules. The Humidity module enables active microprocesssor controlled humidification and dehumidification (40 - 97% RH). All models have a fully insulated stainless steel door with double locking and four point adjustment and an inner glass door with opening (8 mm Ø) to take gas samples. Units have microprocessor control for temperature and CO_2 with various alarm and status displays, built in water condensation control. Digital (LED) display for all set parameters and digital seven-day program timer with real time clock. All include various safety features including an independent adjustable temperature safety device class 3.1 with a visual alarm, saves the samples and the incubator, audible and visual alarm in case of over- or under-temperature, over or under CO_2, open door and empty gas cylinder.

- Uniform atmosphere and temperature distribution due to enclosed, non-turbulent ventilation system in chamber
- Hot air sterilisation at 160 °C, four hour programme
- Low contamination risk in the seamless, deep-drawn stainless steel inner chamber, which has additional door and rear heating to avoid condensation
- Multifunctional, digital microprocessor PID-controller
- Two class A PT100 sensors, independently monitoring and taking over the performance at the same temperature value

Ordering information: Supplied without grids or water dish, please order required stainless steel grids, perforated shelves or reinforced grids separately, details of grids can be found at vwr.com. Range of accessories and factory fitted options such as LED light modules, access ports and interior sockets are available on request. Please contact VWR for further details prior to ordering as these cannot be retro-fitted. Fresh water supply module: To be used in combination with humidity module only. Memmert INCOmed CO_2 incubators have a 3 year warranty period as standard. There is an optional additional 1 year extension to that 3 year period, giving 4 years in total.

Model	INC108med	INC153med	INC246med
Temperature range (°C)	Ambient +8...50		
Temperature fluctuation (time) (°C)	≤±0,1		
Temperature variation (spatial) (°C)	≤±0,3 at 37 °C		
Capacity (l)	108	153	246
Convection type	Direct heating		
External W×D×H (mm)	710×550×778	630×650×938	790×750×938
Nominal power consumption (W)	1000	1500	2000
Shelves supplied (max.)	0 (4)	0 (6)	
Internal W×D×H (mm)	560×400×480	480×500×640	640×600×640
Weight (kg)	70	80	110

Type	Pk	Cat. No.
INC108med standard	1	**390-0672**
INC153med standard	1	**390-0673**
INC246med standard	1	**390-0674**

Description	For	Pk	Cat. No.
Factory fitted modules and options			
Comfort module, 2 gas connections with quick release connectors, automatic switch over of gas cylinders	INCO108med	1	**390-0831**
Comfort module, 2 gas connections with quick release connectors, automatic switch over of gas cylinders	INCO153med	1	**390-0838**
Comfort module, 2 gas connections with quick release connectors, automatic switch over of gas cylinders	INCO246med	1	**390-0845**
Hygiene module, electropolished chamber, seamlessly laser welded	INCO108med	1	**390-0832**
Hygiene module, electropolished chamber, seamlessly laser welded	INCO153med	1	**390-0839**
Hygiene module, electropolished chamber, seamlessly laser welded	INCO246med	1	**390-0846**

Continued on next page

Continued from previous page

Description	For	Pk	Cat. No.
Factory fitted modules and options			
Communication module, USB interface, standard Celsius software for programming and documentation, ring memory and printer interface	INCO108med	1	**390-0833**
Communication module, USB interface, standard Celsius software for programming and documentation, ring memory and printer interface	INCO153med	1	**390-0840**
Communication module, USB interface, standard Celsius software for programming and documentation, ring memory and printer interface	INCO246med	1	**390-0847**
CO_2 module, extended CO_2 range from 0 to 20%	INCO108med	1	**390-0834**
CO_2 module, extended CO_2 range from 0 to 20%	INCO153med	1	**390-0841**
CO_2 module, extended CO_2 range from 0 to 20%	INCO246med	1	**390-0848**
Premium module, includes Comfort, Hygiene, Communication and CO_2 modules	INCO108med	1	**390-0835**
Premium module, includes Comfort, Hygiene, Communication and CO_2 modules	INCO153med	1	**390-0842**
Premium module, includes Comfort, Hygiene, Communication and CO_2 modules	INCO246med	1	**390-0849**
O_2 module, control of oxygen concentration by N2 inlet, O_2 adjustment range 1% up to 20%, setting accuracy 0,1%	INCO108med	1	**390-0836**
O_2 module, control of oxygen concentration by N2 inlet, O_2 adjustment range 1% up to 20%, setting accuracy 0,1%	INCO153med	1	**390-0843**
O_2 module, control of oxygen concentration by N2 inlet, O_2 adjustment range 1% up to 20%, setting accuracy 0,1%	INCO246med	1	**390-0850**
Humidity module 40-97% RH, microprocessor control, humidty produced by distilled water in an external tank	INCO108med	1	**390-0830**
Humidity module 40-97% RH, microprocessor control, humidty produced by distilled water in an external tank	INCO153med	1	**390-0837**
Humidity module 40-97% RH, microprocessor control, humidty produced by distilled water in an external tank	INCO246med	1	**390-0844**
Additional perforated stainless steel shelves for Memmert INCOmed CO_2 incubators			
Spare perforated stainless steel shelf (full width)	INC108med	1	**390-0819**
Spare perforated stainless steel shelf (full width)	INC153med	1	**390-0818**
Additional stainless steel grids for Memmert INCOmed CO_2 incubators			
Spare stainless steel grid	INC153med	1	**390-0829**
Spare Stainless Steel Water Dishes for Memmert INCOmed CO_2 Incubators			
Spare half width water dish	INC108med	1	**390-0824**
Spare half width water dish	INC153med	1	**390-0822**
Spare half width water dish	INC246med	1	**390-0823**
Subframes for Memmert INCOmed CO_2 incubators			
Subframe, height 622 mm	INC108med	1	**390-0825**
Subframe, height 622 mm	INC153med	1	**390-0820**
Subframe, height 622 mm	INC246med	1	**390-0826**
Subframe, height 130 mm, for holding 2 stacked incubators	INC108med	1	**390-0827**
Subframe, height 130 mm, for holding 2 stacked incubators	INC153med	1	**390-0821**
Subframe, height 130 mm, for holding 2 stacked incubators	INC246med	1	**390-0828**

For details of the range of shelves and grids, please visit www.vwr.com or contact your local VWR sales office.

CO_2-display monitoring of indoor air quality (IAQ)

The wall-mounted or bench-top CO_2 display evaluates the quality of air with a combined measurement of CO_2, humidity and temperature. The instrument can be configured directly with buttons and recorded data can be exported to a USB stick for analysis with the software package SW21. A high concentration of carbon dioxide can develop quickly when closed rooms with deficient ventilation are filled with people. The CO_2-display is suitable for monitoring of IAQ in laboratories, class- and meeting rooms, open-plan offices, shopping centers, fitness studios and ambulances.

- HYGROMER® IN-1 humidity sensor
- Adjustable, visual CO_2 indicator - CO_2 indicator for quick recognition of air quality
- Easy recalibrate and adjustment function for humidity and CO_2
- Large, easy-to-read display (date and time)
- USB access for data download

Delivery information: Supplied with a factory adjustment certificate, an adapter AC1214, screws and plugs for mounting and short instruction manual.

Accuracy	Memory	Pk	Cat. No.
±2,5 % RH; ±0,3 K / ±30 ppm +5 % of m.v.	18 000 values	1	**620-2757**

Description	Pk	Cat. No.
Standards		
Certified 35 % RH standards	5 Ampoul	**620-2224**
Certified 80 % RH standards	5 Ampoul	**620-2226**
Accessories		
Zero calibration kit	1 KIT	**620-2755**
Push-on calibration device, Ø: 14 - 15 mm, brass, nickel-plated for one probe incl. gasket with O-ring and thumb screw, ER-15	1	**620-2227**

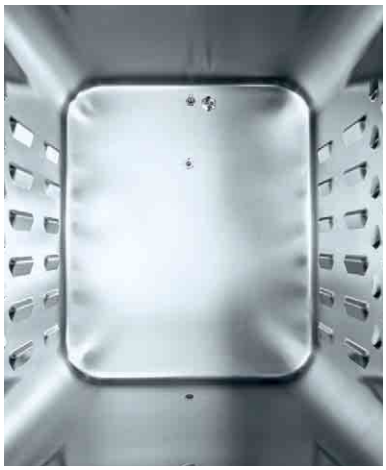
BINDER
Best conditions for your success

Cell Cultivation without Contamination

How to avoid incubator-caused contamination of cell cultures

Whitepaper by Dr. Jens Thielmann,
BINDER GmbH Tuttlingen

No other problem in cell culturing is as universal as microbial contamination. In order to avoid it, good sterile techniques and thorough culture handling are essential. Beyond that, the CO_2 incubator plays a key role because it provides optimal growth conditions not only for cell cultures but also for various unwanted microbes. Taking that into account, every high-quality incubator exhibits several features for contamination avoidance. However, a sensible decision for purchasing one or the other incubator takes more than just the addition of technical details. In fact, the complete systems and especially the anti-contamination concepts need to be compared and evaluated. It turns out that system complexity does not per se lead to higher safety. The incubator should rather enable optimal contamination avoidance without extensive hands-on time while keeping running costs low.



Less is more: inner chamber of BINDER CO_2 - incubators, is deep-drawn from one piece

Significance of contamination control for working with cell cultures

Microbial contaminations as caused by bacteria, fungi or viruses represent a major risk in cell culturing. Since contaminations do not necessarily overgrow the cultivated cells they may remain undetected for a long time. In extreme cases, a single germ may turn the research work of weeks or months worthless. There are countless paths for the introduction of contaminations: the use of cell lines, media, serum, or other reagents with undetected contaminations, airborne spores or improperly disinfected lab equipment, or accidentally introduced contamination by lab technicians. Since proof for the absence of germs involves complicated and tedious procedures, measures for contamination control must be established.

Considering the significant progress in the area of sensitive cell culture applications, such as tissue engineering and regenerative cell and tissue therapy, the hygiene requirements for CO_2 incubators have risen. Highest standards are thus applied to the perfection and reliability of the entire process chain with the CO_2 incubator playing a key role. For this reason, guidelines such as the Good Manufacturing Practice (GMP), the draft guideline for Good Cell Culture Practice (GCCP) as well as the European Human Tissue Directive, recommend the use of sterile disposables and/or sterilizable equipment for processing human cells and tissues. Sterile conditions must be guaranteed for those in vitro cell cultures throughout the entire cultivation period not only to reduce the risk of spreading contamination but, more importantly, to avoid life-threatening infections of patients.

Terminology: decontamination, disinfection, sterilization

Decontamination: The term is not clearly defined. It describes the removal of hazardous materials such as biological, chemical or radioactive contamination and does not imply any quantification of its effectiveness. Disinfection: In defined test scenarios it provides a reduction of certain test germs by five orders of magnitude. (i.e. 1 out of 100,000 test germs may survive disinfection.) Sterilization: Complete elimination or inactivation of viable microorganisms. (Remaining contamination risk of 1 to 1,000,000, i.e. one viable microorganism in a million sterilized units.)

Concerning the mechanisms and verification of the effectiveness of disinfection and sterilization methods, a multitude of different guidelines and standards exists worldwide, particularly for use in the pharmaceutical industry and in the clinical sector.

The pharmacopeias basically specify autoclave sterilization, hot air sterilization, ethylene oxide fumigation and sterile filtration as sterilization methods.

Measures to avoid incubator-caused contaminations in cell cultures

The requirement of sterile conditions around living cell cultures inside the CO_2 incubator represents a major technical challenge because the optimal growth conditions for cell cultures also favor unwanted microorganisms.

The following crucial aspects need to be considered for a coherent concept for contamination control:

- Suitability of the incubator chamber for frequent spray/wipedisinfections
- Complete inactivation of potential contaminants by means of a straight- forward, true sterilization processes
- Avoidance of interior fittings
- Condensation management to avoid breeding ground for germs in the incubator interior
- Prevention of the transfer of airborne germs

The manufacturers of CO_2 incubators have developed or adopted a variety of features for contamination control with more or less complex process flows.

Hot-air sterilization at temperatures of 160 - 180 °C is the only of the listed methods (Tab. 1) which is compliant with the standards for sterilizing medical devices. Evidence of successful inactivation of test germs pursuant to USP has been proven for hot air sterilization programs.

Decontamination on demand	Continuous contamination control
Dry heat at 160 – 180 °C	Minimized, seamles surfaces
Dry heat at 120 – 140 °C	Humidity limit control
Damp heat at 90 – 95 °C	Bactericidal surface properties
Hydrogen peroxide vapor gassing	HEPA air filtering
UV-C irradiation	UV-C irradiation

Tab. 1: Measures to minimize the contamination risk

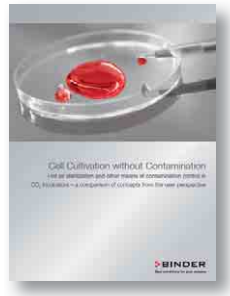
Process safety, effectiveness, and costs of different decontamination concepts

When it comes to contamination management, the end user's focus is clearly on process safety, effectiveness and cost awareness. The respective suitability of the described processes and features, combined to market-typical concepts (Tab. 2) of common CO_2 incubators, will be compared in the following.

	Decontamination on demand		Continuous decontamination	Contamination risk caused by		
				Fan	Air duct	Shelf rack
Concept 1	dr 180 °C	10 – 12 h	–	no	no	no
Concept 2	da 90 °C	25 h	–	yes	no	yes
Concept 3	dr 140 °C	12 – 14 h	HEPA Filter	yes	yes	yes
Concept 4	H_2O_2	3 h	UV irradiation, Cu	yes	yes	yes

Tab. 2: Contamination control concepts (dr = dry heat, da = damp heat)

Concept 1 is the only concept which features a true sterilization process. After running the automatic sterilization routine (~10 h), the incubator is essentially clear of any microorganisms. Further technical features for decontamination have been omitted by design, instead the contamination risk is being further reduced by minimizing contamination-prone surface area and hiding spots. A fan has also been avoided, leading to low air movement and making the HEPA air filter redundant. The complete concept does not comprise any consumables which keeps the running costs low.



Download the complete Whitepaper at www.vwr.com

Laminar flow cabinets

Biological safety cabinets, Class II, BioVanguard Green Line, standard
Telstar

BioVanguard Green line is a Class II cabinet range which offers simplicity, robustness and high reliability and ensures the highest level of protection for the operator, product and environment, minimising the hazards inherent with working with agents assigned to biosafety levels 1, 2 and 3. It is designed for microbiological research with biological agents (e.g. bacteria, viruses, etc) and allergens.

BioVanguard is equipped as standard with:
- epoxy coated exterior
- stainless steel interior
- stainless steel one piece or segmented worktop
- prefilter and drip tray
- 2× electrical sockets

The stainless steel worktop with V-shaped air slits provides superior safety by preventing blockages to the inflow and contamination of operator's sleeves. The front window is laminated safety glass and can be lifted completely, opening up the entire work area for easy cleaning and/or (un)loading large items.

- Easy to install, easy to operate, easy to clean, easy to decontaminate and low maintenance
- Microprocessor control with automatic compensation for filter clogging
- User friendly LCD control panel, positioned in an angle, showing the operator all relevant functions and alarm (visual and audible) at a glance
- Ergonomic epoxy coated aluminium arm rest contributes to comfortable working position of the operator
- Two independent blowers and anemometers to control chamber airflow and inlet/exhaust flow
- Exhaust and chamber HEPA filters H-14 of efficiency 99,995 % MPPS (99,999 % DOP)
- RS232 and RS485 connection

Available with manual or electrical windows.

BioVanguard series is designed and manufactured according to international biosafety standards EN12469: Class II, NSF49: Class II Type A2, JIS K 3800: Class II Type A2 and PIC's. The working area is classified as ISO 14644: Class 5 and GMP Annex 1: Class A.

Model	BioVanguard 3	BioVanguard 4	BioVanguard 5	BioVanguard 6
Average Air Velocity	0,36 m/s			
Lighting system (lux)	950	1150	800	1350
Noise level (dB(A))	52	51	52	54
Electrical connection	230 V/50 Hz			
Power rating (kW)	0,135	0,156	0,199	0,271
External W×D×H (mm)	1072×794×1602	1374×794×1602	1679×794×1602	1984×794×1602
Internal W×D×H (mm)	875×550×744	1180×550×744	1485×550×744	1790×550×744
Weight (kg)	200	215	275	300
Filter	Prefilter (EN 779): G3 Downflow HEPA filter (EN 1822): H14 Exhaust HEPA filter (EN 1822): H14			

Description	Pk	Cat. No.
With manual sliding windows		
Biological safety cabinet Class II A, 900 mm, BioVanguard 3, with manual sliding window	1	**135-1705**
Biological safety cabinet Class II A, 900 mm, BioVanguard 3, with manual sliding window and segmented worktop	1	**135-1707**
Biological safety cabinet Class II A, 900 mm, BioVanguard 3, with manual sliding window and package (UV, 1x gas, 1x vacuum)	1	**135-1706**
Biological safety cabinet Class II A, 900 mm, BioVanguard 3, with manual sliding window, package (UV, 1x gas, 1x vacuum) and segmented worktop	1	**135-1704**
Biological safety cabinet Class II A, 1200 mm, BioVanguard 4, with manual sliding window	1	**135-1692**
Biological safety cabinet Class II A, 1200 mm, BioVanguard 4, with manual sliding window and segmented worktop	1	**135-1711**
Biological safety cabinet Class II A, 1200 mm, BioVanguard 4, with manual sliding window and package (UV, 1x gas, 1x vacuum)	1	**135-1708**
Biological safety cabinet Class II A, 1200 mm, BioVanguard 4, with manual sliding window, package (UV, 1x gas, 1x vacuum) and segmented worktop	1	**135-1712**
Biological safety cabinet Class II A, 1500 mm, BioVanguard 5, with manual sliding window	1	**135-1715**
Biological safety cabinet Class II A, 1500 mm, BioVanguard 5, with manual sliding window and segmented worktop	1	**135-1719**
Biological safety cabinet Class II A, 1500 mm, BioVanguard 5, with manual sliding window and package (UV, 1x gas, 1x vacuum)	1	**135-1716**
Biological safety cabinet Class II A, 1500 mm, BioVanguard 5, with manual sliding window, package (UV, 1x gas, 1x vacuum) and segmented worktop	1	**135-1720**
Biological safety cabinet Class II A, 1800 mm, BioVanguard 6, with manual sliding window	1	**135-1723**
Biological safety cabinet Class II A, 1800 mm, BioVanguard 6, with manual sliding window and segmented worktop	1	**135-1727**
Biological safety cabinet Class II A, 1800 mm, BioVanguard 6, with manual sliding window and package (UV, 1x gas, 1x vacuum)	1	**135-1724**
Biological safety cabinet Class II A, 1800 mm, BioVanguard 6, with manual sliding window, package (UV, 1x gas, 1x vacuum) and segmented worktop	1	**135-1728**
With electrical sliding windows		
Biological safety cabinet Class II A, 1200 mm, BioVanguard 4, with electrical sliding window	1	**135-1709**
Biological safety cabinet Class II A, 1200 mm, BioVanguard 4, with electrical sliding window and segmented worktop	1	**135-1713**
Biological safety cabinet Class II A, 1200 mm, BioVanguard 4, with electrical sliding window and package (UV, 1x gas, 1x vacuum)	1	**135-1710**
Biological safety cabinet Class II A, 1200 mm, BioVanguard 4, with electrical sliding window, package (UV, 1x gas, 1x vacuum) and segmented worktop	1	**135-1714**
Biological safety cabinet Class II A, 1500 mm, BioVanguard 5, with electrical sliding window	1	**135-1717**
Biological safety cabinet Class II A, 1500 mm, BioVanguard 5, with electrical sliding window and segmented worktop	1	**135-1721**
Biological safety cabinet Class II A, 1500 mm, BioVanguard 5, with electrical sliding window and package (UV, 1x gas, 1x vacuum)	1	**135-1718**
Biological safety cabinet Class II A, 1500 mm, BioVanguard 5, with electrical sliding window, package (UV, 1x gas, 1x vacuum) and segmented worktop	1	**135-1722**
Biological safety cabinet Class II A, 1800 mm, BioVanguard 5, with electrical sliding window	1	**135-1725**
Biological safety cabinet Class II A, 1800 mm, BioVanguard 6, with electrical sliding window and segmented worktop	1	**135-1729**
Biological safety cabinet Class II A, 1800 mm, BioVanguard 6, with electrical sliding window, package (UV, 1x gas, 1x vacuum) and segmented worktop	1	**135-1730**
Biological safety cabinet Class II A, 1800 mm, BioVanguard 6, with electrical sliding window and package (UV, 1x gas, 1x vacuum)	1	**135-1726**

Biological safety cabinet, BioVanguard B, for cytotoxic (high risk) applications (cytotoxic medicines)
Telstar

BioVanguard Greenline B is a class II cabinet range which offers simplicity, robustness and high reliability and ensures ensures the highest level of protection for operator, product and environment, minimizing hazards inherent to working with agents assigned to biosafety levels 1, 2 and 3. It BioVanguard B is designed for high risk microbiological and high toxic applications, such as the production of cytotoxic medicines.

BioVanguard B is equipped with additional V-shaped HEPA filters underneath the work surface, which filter the inflow air and keep the internal construction of the cabinet free of contamination and therefore ensures the topmost safety for high risk applications.

BioVanguard B is standard equipped with:
- epoxy coated exterior
- stainless steel interior
- stainless steel piece worktop
- pre-filter and drip tray
- 2 × electrical socket

The work top in stainless steel with V-shaped air slits provides superior safety by preventing blocking the inflow and contamination of operator's sleeves. The front window is of laminated safety glass and can be hinged completely, opening the entire work area for easy cleaning and/or (un)loading large items.

- Easy to install, easy to operate, easy to clean, easy to decontaminate and low maintenance
- Microprocessor control with filter clogging automatic compensation
- User-friendly LCD control panel, positioned in an angle, showing the operator all relevant functions and alarm (visual and audible) at a glance
- Ergonomic epoxy coated aluminium arm rest contributes to comfortable working position of the operator
- Two independent blowers and anemometers to control chamber air flow and inlet/exhaust flow
- Exhaust and chamber HEPA filters H-14 of efficiency 99,995 % MPPS (99,999 % DOP)
- RS 232 and RS 485 connection

Available with manual or electrical windows.

BioVanguard Series is designed and manufactured according to international biosafety standards EN12469: Class II, NSF49: Class II Type A2, JIS K 3800: Class II Type A2 and PIC's. The working area is classified as ISO 14644: Class 5 and GMP Annex 1: Class A. BioVanguard B is also designed and manufactured according to DIN 12980: Class II.

Model	BioVanguard 4 B	BioVanguard 6 B
Average Air Velocity	0,36 m/s	
Lighting system (lux)	1150	1350
Noise level (dB(A))	54	58
Electrical connection	230 V/50 Hz	
Power rating (kW)	0,196	0,340
External W×D×H (mm)	1374×794×1602	1984×794×1602
Internal W×D×H (mm)	1180×550×744	1790×550×744
Weight (kg)	270	400
Filter	Pre-filter (EN 779): G3 Downflow HEPA filter (EN 1822): H14 Exhaust HEPA filter (EN 1822): H14 1 st HEPA filter (EN 1822)	

Description	Pk	Cat. No.
With manual sliding window		
Biological safety cabinet Class II A, 1200 mm, BioVanguard 4 B, with manual sliding window	1	**135-1865**
Biological safety cabinet Class II A, 1200 mm, BioVanguard 4 B, with manual sliding window and package (UV, 1x gas, 1x vacuum)	1	**135-1866**
Biological safety cabinet Class II A, 1800 mm, BioVanguard 6 B, with manual sliding window	1	**135-1869**
Biological safety cabinet Class II A, 1800 mm, BioVanguard 6 B, with manual sliding window and package (UV, 1x gas, 1x vacuum)	1	**135-1870**
With electrical sliding window		
Biological safety cabinet Class II A, 1200 mm, BioVanguard 4 B, with electrical sliding window	1	**135-1867**
Biological safety cabinet Class II A, 1200 mm, BioVanguard 4 B, with electrical sliding window and package (UV, 1x gas, 1x vacuum)	1	**135-1868**
Biological safety cabinet Class II A, 1800 mm, BioVanguard 6 B, with electrical sliding window	1	**135-1871**
Biological safety cabinet Class II A, 1800 mm, BioVanguard 6 B, with electrical sliding window and package (UV, 1x gas, 1x vacuum)	1	**135-1872**

Microbiology safety cabinets, Class II, Bio II Advance

Telstar

The Bio II Advance has been developed to maximise the convenience, comfort and safety for the user, the sample and the environment whilst minimising the cabinet dimensions. Bio II Advance achieves the best balance between external dimensions and useful working area: Only 759 mm in width and 1260 mm in height, the Bio II Advance provides a working volume of 340 dm^3. This range has been designed to provide the best biological Class II safety cabinet features available while offering practical ergonomics, silent working conditions, easy cleaning, less energy consumption and easy service and maintenance.

Bio II Advance Eco Mode puts the cabinet into stand by: The sample remains protected inside the cabinet while the user is performing other tasks, thereby saving energy decreasing the cabinet's heat and reducing the rate of filter clogging. This saves energy, reduces sound level and heat emission.

Innovative and unique 4F System (Fast, Friendly and eFFicient) is a Telstar patented system for filter replacement. Filters are easily accessible from the front of the cabinet and using a unique fast clamping/unclamping device the time required to replace the filters is reduced to five minutes.

The cabinets are made of a 304L stainless steel chamber with rounded angles and hardened security glass sides. The front window is anti-reflective with UV protection. It is fully sealed and prevents user exposure to escaped aggressive substances, the sample from ambient contamination and maintains cleanliness of the internal surface of the window.

- Innovative and original sliding window, designed to be easily adjusted at a 200 mm working aperture with only one hand
- Control panel with international colour code to indicate cabinet status; the main screen shows the level of filter clogging and the laminar speed flow
- Automatic control by microprocessor continuously guarantees the correct air speed thereby minimising power consumption and noise
- The front window allows complete and comfortable access to the working chamber, making cleaning easy and making it possible to enter large objects and accessories into the working chamber
- The working surface is divided into sections which allow cleaning and even sterilisation in an autoclave
- Very quiet, with a sound level of only 58 dB(A)

The Bio II Advance cabinets are independently tested and certified by TÜV Nord, the main certification body in Europe, to guarantee conformity to standard EN 12469 for Class II biological safety cabinets (30% exhaust, 70% recirculation unit). The Bio II Advance is specified for working with levels 1, 2 and 3 pathogenic agents. It also conforms to the main requirements NSF/ANSI 49 (Class II A2), JIS K3800, SFDA YY-0569 and AS2252.

Model	Bio II Advance 3	Bio II Advance 4	Bio II Advance 6
Exhaust air volume (m^3/h)	294	403	620
Lighting system (lux)	≥1000		
Noise level (dB(A))	57		
Power rating (kW)	1,5	1,6	2,3
External W×D×H (mm)	1049×759×1260	1354×759×1260	1964×759×1260
Internal W×D×H (mm)	954×605×587	1259×605×587	1869×605×587
Weight (kg)	180	200	280
Filter	HEPA H14 filters according to EN 1822: efficiency of 99,995% MPPS and 99,999 % DOP		

Description	Pk	Cat. No.
Bio II Advance 3	1	**135-1382**
Bio II Advance 4	1	**135-1372**
Bio II Advance 6	1	**135-1375**

Description	Pk	Cat. No.
Accessories		
Base frame, with castors, height 770 mm, for Bio II Advance 3	1	**135-1368**
Base frame, with castors, height 770 mm, for Bio II Advance 4	1	**135-1366**
Base frame, with castors, height 770 mm, for Bio II Advance 6	1	**135-1370**

Handheld airborne particle counters, MET One HHPC

Quickly check or validate ISO Class 5 (FED STD Class 100) or higher cleanrooms and controlled environments. The easy to read, high resolution display is fully configurable, showing only the required data in a clear large font. At only 680 g the slim design of MET One HHPC+ allows single-handed operation. Perfect for effortless troubleshooting of filter leaks in mini environments and workstations. Save analysis time with on-the-spot process profiling to pinpoint particle events. Download to Excel® via Ethernet using industry standard browsers (Internet Explorer®, Safari®, Firefox®, etc.). Plug a USB memory stick in the MET One HHPC+ to transfer your particle data direct to a PC. Plug it in like a camera, the data appears in Excel®. The handheld unit is fully charged and ready for use at all times. The cradle provides PC access to particle counting data via Ethernet or USB cable.

- Simple and fast
- Lightweight and comfortable
- Visual particle trending
- Easy data download

Delivery information: The systems are delivered with hard shell carrying case (optional for HHPC 2+), universal 110/240 V, 12 VDC power supply/charger, zero count inlet filter, zero count filter adapter, USB-A to MINI-B-5P cable 6' with ferrite. The HHPC 6+ is also delivered with charge and communications cradle, without ethernet cable.

Continued on next page

Continued from previous page

Model	MET One HHPC 2+, two channel (0,5 - 5 µm)	MET One HHPC 3+, three channel (0,3 - 10 µm)	MET One HHPC 3+, three channel (0,5 - 5 µm)	MET One HHPC 6+, six channel (0,3 - 10 µm)
Airflow rate	2,83 l/min, 0,5 µm/min	2,83 l/min, 0,3 µm/min	2,83 l/min, 0,5 µm/min	2,83 l/min, 0,3 µm/min
Material	Polycarbonate			
Power	110/240 V			
W×D×H (mm)	99×53×272			
Weight (kg)	0,68			

Description	Pk	Cat. No.
MET One HHPC 2+, two channel (0,5 - 5 µm)	1	**710-0980**
MET One HHPC 3+, three channel (0,3 - 10 µm)	1	**710-0979**
MET One HHPC 3+, three channel (0,5 - 5 µm)	1	**710-0981**
MET One HHPC 6+, six channel (0,3 - 10 µm)	1	**710-0982**

Description	Pk	Cat. No.
Accessories		
Hard shell carrying case	1	**710-0983**
Charge and communications cradle without cable	1	**710-0984**
Zero count filter adapter	1	**710-0985**
Universal 110/240 V, 12 VDC power supply charger	1	**705-0745**
USB-A to MINI-B-5P cable 6′ with ferrite	1	**705-0746**
CAT-5E 7′ ethernet cable	1	**705-0747**
CAT-5E 7′ ethernet cable, shielded grey	1	**705-0748**
User manual	1	**710-0986**
Zero count inlet filter	1	**661-0154**

Roller apparatus

Roller culture apparatus, R2P™ 2.0
Wheaton

The Wheaton R2P™ 2.0 roller culture apparatus is designed to allow for the development and growth of cultured cells from research to production quantities without having to change equipment and revalidate protocols. The R2P™ 2.0 system utilises computerised measurement of the actual bottle speed and allows networking for up to 255 units. Applications include: Viruses for vaccines or related studies; proteins, enzymes; antibodies; live cell assays.

Two deck configurations are available. Production spacing with 152 mm between decks maximises use of incubator space, whilst modular spacing with 181 mm betweem decks allows easier removal and replacement of bottles, reducing disruption to cells. Systems with five placement areas per deck allow use with an upright incubator, whilst eight place systems are designed for large scale production installations.

- Robust touch screen interface that is easy to view from a distance
- Readily recognised icons for intuitive navigation
- Digitally controlled maintenance-free motor accurate to 0,01 rpm
- Capable of remote interface and monitoring through SCADA systems
- Multiple decking and capacity configurations available for process flexibility

Delivery information: Other configurations are available as are retrofit kits to update old systems. Please contact your local VWR sales office for further details.

Model	392-0351	392-0352	392-0349	392-0350	392-0353	392-0354	392-0355	392-0356
Accuracy	0,01 rpm							
Bottle capacity	15 bottle positions		55 bottle positions		52 bottle positions		85 bottle positions	
Drive	Belt driven							
Electrical	230 VAC, 50/60 Hz, 35 W							
Interfaces	Modbus® and Wheaton protocols via ethernet and RS422							
Maximum Humidity	80% up to 31 °C							
Motor	Brushless DC							
Operating temperature range (°C)	10 - 40 °C							
Rotation	Direction: Clockwise, counter-clockwise and rocking; rotation alarm included							
Type	Bottom drive production spacing		Bottom drive modular spacing	Bottom drive production spacing	Top drive production spacing, fixed deck			
Weight	39 kg		99 kg		113 kg		159 kg	
W×D×H (mm)	790×630×650		790×630×1870		790×630×1900		1200×630×1900	

Description	Pk	Cat. No.
Production R2P™ 2.0 system with bottom drive, 152 mm deck spacing		
Base with 3 decks - 15 bottle positions, EU plug	1	**392-0351**
Base with 3 decks - 15 bottle positions, UK plug	1	**392-0352**
Base with 11 decks - 55 bottle positions, EU plug	1	**392-0349**
Base with 11 decks - 55 bottle positions, UK plug	1	**392-0350**

Continued on next page

Continued from previous page

Description	Pk	Cat. No.
Production R2P™ 2.0 system with top drive, 152 mm deck spacing		
Base with 11 decks - 52 bottle positions, EU plug	1	**392-0353**
Base with 11 decks - 52 bottle positions, UK plug	1	**392-0354**
Base with 11 decks - 85 bottle positions, EU plug	1	**392-0355**
Base with 11 decks - 85 bottle positions, UK plug	1	**392-0356**

Cell production roller apparatus, standard control system
Wheaton

This standard cell production roller culture apparatus allows flexibility for scale-up and production of monolayer cell cultures in standard roller bottles. The system consists of a base drive unit and five-position roller deck to which additional roller decks can be added. A powerful DC motor, with soft-start speed control, drives the bottles through a series of durable non slip belts. The all-position drive is a positive traction drive system for lightweight plastic bottles, in which each roller is individually driven.

- Accepts bottles from 108 to 121 mm in diameter and up to 550 mm in length
- Smooth ramping digitally controlled rotation, accurate to 0,1 rpm
- Maintenance-free precision brushless motor
- Bright LCD display for easy operation
- Multiple decking and capacity configurations available for process flexibility

Power: 230 V, 50/60 Hz, 35 W

Bottle speed: 0,25 to 5,3 rpm (110 mm bottle)

Warning: Not to be used in temperatures exceeding 40°C.

Supplied without vessels (available separately).

Model	392-0346	392-0347	392-0348
Accuracy	0,01 rpm		
Bottle capacity	15 bottle positions		
Drive	Belt driven		
Electrical	230 VAC, 50/60 Hz, 35 W		
Interfaces	Dry contact relay		
Maximum Humidity	80% up to 31 °C		
Motor	Brushless DC		
Operating temperature range (°C)	10 - 40 °C		
Rotation	Direction: Clockwise and counter-clockwise		
Type	Bottom drive modular spacing		
Weight	51 kg		
W×D×H (mm)	760×630×740		

Description	Pk	Cat. No.
Base with 3 decks - 15 bottle positions, EU plug	1	**392-0346**
Base with 3 decks - 15 bottle positions, UK plug	1	**392-0347**
Base with 3 decks - 15 bottle positions, CH plug	1	**392-0348**

Description	Pk	Cat. No.
Accessories		
5-position deck with all-position drive	1	**734-3062**

Microscopes

VWR COLLECTION

5 year warranty

SELECTED FOR YOU

Trinocular fluorescent microscopes, Visiscope®, 300 series

TL384-F

TL384-FL

Continued on next page

Continued from previous page

These educational and laboratory microscopes are designed for routine applications. The X-LED transmitted light is adjustable with manual brightness control.

- Interpupillary adjustment of 48 - 75 mm
- Dye-cast frame
- High stability and ergonomy
- Transmitted light observations

Please see Accessories under the VisiScope® 300 Series.

Model	TL384-F	TL384-FL
Type	Trinocular	
Contrasting technique	Fluorescence	
Head	30° inclined, 360° rotating	
Eyepiece	WF 10×/20	
Nosepiece	Quintuple, reversed	
Objectives	IOS plan-achromatic 4×, 10×, 20×, 40×, 100×	IOS E-plan-achromatic 4×, 10×, 20×, 40×, 50× (no cover slide)
Focusing system	Coaxial coarse and fine knobs	
Stage	Mechanical, 216×150 mm, X/Y movement 78×54 mm	
Condenser	Abbe N.A. 1,25 with centering system	
Illumination	Epi-fluorescence: HBO 100W high pressure mercury bulb	Epi-fluorescence: High-power white blue LED

Description	Pk	Cat. No.
Trinocular microscope, TL384-F	1	**630-1937**
Trinocular microscope, TL384-FL	1	**630-1938**

VWR COLLECTION

5 year warranty

SELECTED FOR YOU

Trinocular microscopes, VisiScope®, 800 series

TL824-BF

TL824-PH

These laboratory microscopes are specifically designed for research applications.

- Dye-cast frame
- High stability and ergonomy
- For transmitted light observation
- Interpupillary adjustment: 55 - 75 mm
- Plan achromatic IOS (Infinity Optical System) objectives

Model	TL824-BF	TL824-P
Type	Trinocular	
Contrasting technique	Brightfield	Phase contrast
Head	30° inclined, 360° rotating	
Eyepiece	WF 10×/22	
Nosepiece	Quintuple	
Objectives	IOS plan achromatic 4x, 10x, 40x, 60x and 100x	IOS plan achromatic 10×Ph, 20×Ph, 40×Ph and 100×Ph
Focusing system	Coaxial coarse and fine knobs	
Stage	Mechanical belt drive 175×145, X/Y movement: 76×52 mm	
Illumination	LED	

Description	Pk	Cat. No.
Trinocular microscope, TL824-BF	1	**630-1940**
Trinocular microscope, TL824-P	1	**630-1941**

Description	Contrasting technique	Magnification	Pk	Cat. No.
Eyepieces				
Eyepiece WF 10×/22			2	**630-1967**
Eyepiece micrometer WF 10×/22			1	**630-1968**
Eyepiece WF 15×/16			1	**630-1969**
Eyecups (one pair)			1	**630-1756**
Objectives for Visiscope® 800				
IOS plan achromatic	Brightfield	4×	1	**630-1970**
IOS plan achromatic	Brightfield	10×	1	**630-1971**
IOS plan achromatic	Brightfield	20×	1	**630-1972**

Continued on next page

Continued from previous page

Description	Contrasting technique	Magnification	Pk	Cat. No.
Objectives for Visiscope® 800				
IOS plan achromatic	Brightfield	40×	1	**630-1973**
IOS plan achromatic	Brightfield	60×	1	**630-1974**
IOS plan achromatic	Brightfield	100×	1	**630-1975**
IOS plan achromatic	Phase contrast	10×	1	**630-1976**
IOS plan achromatic	Phase contrast	20×	1	**630-1977**
IOS plan achromatic	Phase contrast	40×	1	**630-1978**
IOS plan achromatic	Phase contrast	100×	1	**630-1979**
Adapters				
Phototube adapter for digital camera			1	**630-1747**
Phototube adapter for SLR camera for VisiScope® 500			1	**630-1746**
CCD camera adapter for 1/3" sensor			1	**630-1748**
CCD camera adapter for 1/2" sensor			1	**630-1749**
Phototube adapter for APS-C sensor			1	**630-1645**
Accessories for VisiScope®, 800 series				
Micrometric slide, 76×26 mm, range 1 mm, division 0,01 mm			1	**630-1650**
Centering telescope for phase contrast			1	**630-1981**
Polarising filter set			1	**630-1982**
Lambda filter for polarising set			1	**630-1983**
Heating stage			1	**630-1980**

5 year warranty

Bino and trinocular microscopes, BA 210 and BA 310 Elite
Motic

The BA 210 Elite allows for high performance in the educational environments in life sciences and medical applications. The BA 310 Elite is designed for the routine work in the demanding applications of universities, clinics and any other life science or medical application requiring quality optical performance. This model's full Köhler configuration provide maximum illumination quality.

Delivery information: Supplied with a blue filter, 5 ml of immersion oil, a power cord, a cord hanger, a dust cover, an allen key, a thumb screw and a spare fuse. For details of the range of LED modules, please contact your local VWR sales office.

Model	BA 210-E		BA 310-E	
Type	Binocular	Trinocular	Binocular	Trinocular
Contrasting technique	Brightfield			
Head	30° inclined, 360° rotating			
Eyepiece	WF 10×/20 with diopter adjustment ±5			
Nosepiece	Quadruple, reversed		Quintuple, reversed	
Objectives	Plan achromatic 4×, 10×, 40×, 100×			
Focusing system	Coaxial coarse and fine knobs			
Stage	Mechanical with tension adjustment and sample holder, 150×150 mm, movement 80×30 mm		Mechanical with tension adjustment and sample holder, 180×170 mm, movement 80×55 mm	
Condenser	Abbe N.A. 0,90/1,25 with iris diaphragm and slider slot			
Illumination	Halogen 6V/30W interchangeable with LED module			

Description	Pk	Cat. No.
Binocular microscope, BA 210-E	1	**630-1827**
Trinocular microscope, BA 210-E	1	**630-1824**
Binocular microscope, BA 310-E	1	**630-1825**
Trinocular microscope, BA 310-E	1	**630-1826**

Description	Magnification	Pk	Cat. No.
Non cover glass objectives for BA 210-E and BA 310-E			
CCIS plan achromatique objective EC. WD: 4,45 mm	10×/0,25	1	**630-2133**
CCIS plan achromatique objective EC. WD: 1 mm	20×/0,45	1	**630-2134**
CCIS plan achromatique objective EC. WD: 0,55 mm, spring	40×/0,65	1	**630-2135**
CCIS plan achromatique objective EC. WD: 0,24 mm, spring, immersion oil	100×/1,25	1	**630-2136**

Continued on next page

Continued from previous page

Description	Magnification	Pk	Cat. No.
Adapters			
C-mount adapter, 0,5× for 1/2" chip sensors		1	**630-1503**
Accessories for BA210-E and BA310-E			
LED module 6V/3W 4500°K ±300°K		1	**630-2138**
LED module 6V/3W 6000°K ±300°K		1	**630-2140**
Epi-LED fluorescence attachment with standard FITC filter cube and 470 nm LED module		1	**630-1828**
EPI-LED fluorescence attachment with standard Auramine O filter cube and 455 nm LED module for the detection of malaria/tuberculosis (used with non cover glass objectives)		1	**630-1829**
EPI-LED fluorescence attachment with standard MB filter cube and 470 nm LED module		1	**630-1830**
Battery power supply for Epi-LED fluorescence attachments 9000mAH×6 batteries		1	**630-2137**

5 year warranty

Bino and trinocular microscopes, BA 410

Motic

Microscope, BA 410

Epi-fluorescence attachment

The BA 410 models provide enhanced contrast, better resolution, flatness field and a longer working distance. It can be equipped with an optional phase contrast, darkfield and epi-fluorescence attachments. This high quality multi task microscope is suitable for research use in teaching laboratories, hospitals, clinics and institutes.

- Large stage with hard anodised surface which is scratch and chemical resistant
- Exchangeable illumination: Halogen can be replaced by LED module
- EC-H plan achromatic objectives for true colour images
- Focusing system with 1 µm minimum increment
- Interpupillary distance from 48 to 75 mm
- Infinity corrected optical system

Compliant with RoHs, lead-free

Delivery information: Supplied with 4×, 10×, 40× and 100× objectives. 2×, 20× and 60× objectives can be purchased separately (contact your local VWR Sales Office for further details). The BA 210 and BA 310 phase contrast objectives (630-1388, 630-1389, 630-1390 and 630-1391) are also suitable for these microscopes.

Epi-fluorescence attachment

The attachment can easily be integrated into the BA 410, accommodating up to four filter cubes for fluorescence observation. The set includes three filter cassettes, slider format for cassette change, 100 W mercury XBE-HBO lamp house, mercury lamp socket, collector lens, lamp centring tool and power cord. Other filters are available on request.

Model	BA 410
Type	Trinocular
Head	Siedentopf, 30° inclined, 360° rotating, 20:80 light split
Eyepiece	WF 10×/22
Nosepiece	Sextuple
Objectives	Plan achromatic 4×, 10×, 40× (spring), 100× (spring, oil immersion)
Focusing system	Coaxial coarse and fine knobs
Stage	Mechanical, 175×145 mm surface, 80×53 mm movement, coaxial movement
Condenser	0,13/0,90 N.A. with iris diaphragm
Illumination	Halogen 6 V/30 W, Köhler

Description	Pk	Cat. No.
BA 410, trinocular	1	**630-1338**

Description	Pk	Cat. No.
Eyepieces		
Eyepiece WF 15×/16	1	**630-1456**
Filters		
DAPI and Hoechst fluorescence set (emitter D460/50m)	1	**630-1471**
FITC/RSGFP/Fluo 3/DIO acridine orange (+RNA) set (emitter D535/40m)	1	**630-1287**
TRITC (Rhodamine)/DiI/Cy3 set (emitter D605/55m)	1	**630-2132**
Texas Red/Cy3.5 set (emitter D630/60m)	1	**630-1289**
Cyan GFP set (emitter D480/40m)	1	**630-1291**
Cy5, Alexa Fluor 633, Alexa Fluor 647 set (emitter HQ700/75m)	1	**630-1290**
Bulbs		
Halogen bulb for epi-fluorescence illumination	1	**630-2044**
Halogen bulb	1	**630-1255**
LED module, 4500 K	1	**630-1320**
Adapters		
C-mount adapter, 0,5× for 1/2" chip sensors	1	**630-1503**

Continued on next page

Continued from previous page

Description	Pk	Cat. No.
Accessories for BA 410		
Complete epi-fluorescence attachment	1	**630-1175**
Simple darkfield slider, 10× to 40×	1	**630-1457**
Accessories for BA 210 and BA 310		
Phase contrast five-position BF, DF, PH1, PH2, PH3 turret condenser, for BA 310 only	1	**630-1458**

Trinocular inverted microscopes, Axio Vert.A1 FL-LED

Zeiss

The Axio Vert.A1 FL-LED is with such a large range of features meets the needs of the users. It has a four-position mount for LED modules for reflected light fluorescence.

- All standard contrast techniques as well as differential interference contrast to visualise the finest cells structures (optioneel)
- Optioneel: Contrast system iHMC, PlasDIC and DIC
- LED fluorescence, long life time of the light source, homogeneous illumination with full intensity
- No heating and cooling period required during operation of the LED fluorescence
- Ergonomic design to work comfortably in an upright position

Model	Axio Vert.A1 FL-LED
Type	Trinocular
Contrasting technique	Fluorescence
Eyepiece	WF 10×/23
Nosepiece	Quintuple

Description	Pk	Cat. No.
Axio Vert.A1 FL-LED, trinocular	1	**630-2152**

Other configurations are available on request, please contact your VWR local sales office.

VWR COLLECTION

5 year warranty

SELECTED FOR YOU

Trinocular inverted microscopes, VisiScope®, IT404, IT404-E and IT405-PH

These microscopes are equipped with a series of objectives for most standard applications of cell culture *in vivo*. The focusing and mechanical specimen stage controls are designed to allow fatigue free operation with the wrists resting on the work surface. The stage is fitted with a special glass insert to allow the operator to see the objectives for easy identification of the magnification selected.

- Every control is easy to reach
- Photo port and mechanical stage fitted as standard
- Ergonomic tilting eyepiece tube with side photo port (IT404-E only)
- Adjustable working distance from 72 mm to 150 mm (removable condenser)
- Innovative design, interchangeable inserts for specimen slides, Petri dishes and flasks

Ordering information: A cleaning and maintenance set, incl. lens tissue, cleaning solution and brush is available on request (630-2081). Supplied with a dust cover.

Note: Phase contrast objectives can also be used for brightfield techniques.

Model	IT404	IT404-E	IT405-PH
Head	30° inclined	*	30° inclined
Objectives	4×, 40×, Ph 10×, 20×		Ph 10×, 20×, 40×
Focusing system	Coaxial coarse and fine knobs		
Stage	250×230 mm, movement of 119×70 mm		
Condenser	Removable N.A. 0,30		
Illumination	LED		

Description	Pk	Cat. No.
Trinocular microscope, IT404	1	**630-1575**
Trinocular microscope with ergonomic head, IT404-E	1	**630-2079**
Trinocular microscope, IT405-PH	1	**630-2080**

Description	Contrasting technique	Magnification	Pk	Cat. No.
Eyepieces				
Eyepiece EWF 10×/22			1	**630-1759**
Eyepiece micrometer			1	**630-1760**
Objectives for VisiScope® IT 404/405				
Plan-achromatic IOS WD: 18 mm	Brightfield	4×/0,10	1	**630-1761**
Plan-achromatic IOS WD: 10 mm	Brightfield and phase contrast	10×/0,25	1	**630-1762**
Plan-achromatic IOS WD: 5,1 mm	Brightfield and phase contrast	20×/0,40	1	**630-1763**
Plan-achromatic IOS WD: 2,6 mm	Brightfield	40×/0,60	1	**630-1764**
Plan-achromatic IOS LWD	Brightfield and phase contrast	40×/0,60	1	**630-1765**
Adapters				
CMOS C-Mount camera adapter			1	**630-1768**
Phototube adapter for SLR full-frame cameras			1	**630-1767**

Continued on next page

Continued from previous page

Description	Contrasting technique	Magnification	Pk	Cat. No.
Accessories for VisiScope®, IT404/405				
Ergonomic trinocular head*			1	**630-1757**
Attachment for ergonomic trinocular head			1	**630-1758**
Phase ring 40×			1	**630-1766**
Dust cover			1	**630-1769**

* Tilting 0 to 30° eyepiece tube.

Bino and trinocular inverted microscopes, AE 2000

Motic

The AE 2000 microscopes are designed for professional observations and inspection ie. routine live cells applications, in both educational and high grade professional applications. The objectives Ph 10×, Ph 20× and optional Ph 40× use the same phase ring - No need to change the sliders position.

- Siedentopf type head 45º, 360º swiveling
- Automatic turn off after 15 minutes of non use
- Versatile illumination from halogen 6V/30W to LED
- Interpupillary distance from 48 to 75 mm
- Working distance of 72 mm or 184 mm when removing the condenser

Objectives compliant with RoHs, lead-free.

Delivery information: Phase contrast is available as an option. LED modules to be purchased separately.

Model	AE 2000	
Type	Binocular	Trinocular
Contrasting technique	Brightfield and phase contrast	
Head	45° inclined, 360° rotating	
Eyepiece	WF 10×/20 with diopter	
Nosepiece	Quadruple	
Objectives	Plan achromatic 4×, 40×, Ph 10×, Ph 20×	
Stage	200×239 mm, glass and metal stage inserts	
Condenser	0,30 N.A.	
Illumination	Halogen 6V/30W interchangeable with LED module	

Description	Pk	Cat. No.
AE 2000, binocular	1	**630-1316**
AE 2000, trinocular	1	**630-1317**

Description	Contrasting technique	Magnification	Pk	Cat. No.
Eyepieces				
Eyepiece WF 15×/16			1	**630-1456**
Objectives for AE 2000				
Plan achromatic. WD: 12,6 mm	Brightfield	4×/0,1	1	**630-1371**
Plan achromatic. WD: 16,8 mm	Brightfield	10×/0,25	1	**630-1369**
Plan achromatic WD: 4,7 mm	Brightfield	20×/0,3	1	**630-1367**
Plan achromatic LWD	Brightfield	40×/0,5	1	**630-1368**
Plan achromatic	Phase contrast	4×/0,1	1	**630-1370**
Plan achromatic	Phase contrast	10×/0,25	1	**630-1364**
Plan achromatic LWD	Phase contrast	20×/0,3	1	**630-1366**
Plan achromatic LWD	Phase contrast	40×/0,5	1	**630-1501**
Bulbs				
LED module, 4500 K			1	**630-1320**
LED module, 6000 K			1	**630-1319**
Filters				
Ground glass filter, 45 mm			1	**630-1383**
Neutral density filter, 45 mm			1	**630-1386**
Stages				
Auxiliary stages (2)			1	**630-1376**
Attachable mechanical stage, 128×86 mm			1	**630-1500**
Glass stage insert			1	**630-1377**
Metal stage insert			1	**630-1387**
Adapters				
C-mount adapter, 0,5× for 1/2" chip sensors			1	**630-1503**
C-mount adapter, 1,0×			1	**630-1502**
Accessories for AE 2000				
Holder for 35 mm Petri dishes			1	**630-1373**
Holder for 54 mm Petri dishes			1	**630-1374**
Holder for 65 mm Petri dishes			1	**630-1372**
Phase ring Ph0			1	**630-1380**

Continued on next page

Continued from previous page

Description	Contrasting technique	Magnification	Pk	Cat. No.
Accessories for AE 2000				
Phase ring Ph1			1	**630-1381**
Phase slider, three positions			1	**630-1385**
Condenser 0,30 N.A. WD: 72 mm			1	**630-1379**
Condenser 0,40 N.A. WD: 53 mm			1	**630-1378**

Bino and trinocular inverted microscopes, AE30 and AE31

Motic

AE30

AE31

Epi-fluorescence set

These microscopes combine innovative design and unrivalled versality for research live cell applications.

- Köhler illumination: Light split of 20:80 or 0:100 (630-0572)
- Working distance of 72 mm
- Centerable and height adjustable condenser

EF-INV epi-fluorescence attachment

Includes a filter cassette, mercury 100 W lamp, lamp housing, mercury lamp socket, collector lens, lamp centering tool, power cord. This is available to add to your AE30 or AE31 with a comprehensive range of filter blocks. Please enquire for details.

Delivery information: Supplied with blue, green interterence and ground glass filter, phase ring Ph1 and Ph3, centering telescope, centering keys, spare fuse and dust cover.

Model	AE30
Type	Binocular
Contrasting technique	Brightfield and phase contrast
Head	Siedentopf, 45° inclined
Eyepiece	WF 10×/22 with diopter
Nosepiece	Quintuple
Objectives	Plan achromatic 4×, Ph 10×, 20×, 40×
Focusing system	Coaxial coarse and fine knobs
Stage	200×260 mm, glass and metal stage inserts
Condenser	0,30 N.A. with interference filters
Illumination	Halogen 6V/30W, Köhler

Description	Pk	Cat. No.
AE30, binocular	1	**630-0456**

Description	Pk	Cat. No.
Epi-fluorescence attachment		
Epi-fluorescence attachment*	1	**630-1176**
Filters		
DAPI and Hoechst fluorescence set (emitter D460/50m)	1	**630-1471**
FITC/RSGFP/Fluo 3/DIO acridine orange (+RNA) set (emitter D535/40m)	1	**630-1287**
TRITC (Rhodamine)/Dil/Cy3 set (emitter D605/55m)	1	**630-2132**
Texas Red/Cy3.5 set (emitter D630/60m)	1	**630-1289**
Cyan GFP set (emitter D480/40m)	1	**630-1291**
Cy5, Alexa Fluor 633, Alexa Fluor 647 set (emitter HQ700/75m)	1	**630-1290**

* Does not include filter blocks.

Bino and trinocular inverted microscopes, Primo Vert

Zeiss

Primo Vert addresses routine and cutting-edge research laboratories which require compact and reliable microscopes for checking cells quickly and efficiently. Main applications include sterility checks, cell checks before protein, DNA or RNA preparation, screenings after donation of substances in pharmacology, cell types, cell lines in oncology, growing of cells to produce artificial tissues or organs, and documentation.

- Easy-to-use: Automatic On/Off function, universal phase contrast
- Long-term mechanical and optical stability
- Attractive industrial design

In addition, the Primo Vert Monitor:

- Multi-observation in training situations
- Adjustable monitor tilt (45° - 80°) for ergonomic and comfortable work
- Easy inspection of living cells without having to look through eyepieces
- Integrated digital camera, SD memory card slot, USB port for a convenient image storage by the push-to-save
- Remote control for the acquisition of images, remotely or through glass plates of flow boxes

Model	Kit 1	Kit 2	Kit 3	Kit 4	Kit 5	Kit 6	Kit 7	Kit 8	Kit 11
Type	Binocular	Trinocular	Binocular			Trinocular		Binocular with ergotube	Trinocular
Contrasting technique	Brightfield and phase contrast			Phase contrast		Brightfield and phase contrast			Brightfield, optionally phase contrast
Head	Siedentopf, 45° inclined			45° inclined				-	
Eyepiece	WF 10×/20							-	Screen
Nosepiece	Quadruple								Quadruple
Objectives	4×, Ph1 10×	Ph0 4×, Ph1 10×, LWD 20×, 40×	4×, Ph1 10×, LWD 20×, 40×	-		4×, Ph1 10×	4×, Ph 10×, LWD 20×, 40×		Plan achromatic Ph 10×, 20×, 40×
Focusing system	-			Coaxial coarse and fine knobs				-	
Stage	200×239 mm			200×239 mm with metal insert					
Condenser	0,30	0,40	0,30	-		0,30	0,40	0,30	0,3. WD of 72 mm
Illumination	Halogen 6V/30W or LED			Halogen 6V/30W				-	LED

Description	Pk	Cat. No.
Models without monitor		
Kit 1, binocular	1	**630-1224**
Kit 2, trinocular	1	**630-1226**
Kit 3, binocular	1	**630-1225**
Kit 4, binocular	1	**630-2145**
Kit 5, binocular	1	**630-2146**
Kit 6, trinocular	1	**630-2150**
Kit 7, trinocular	1	**630-2151**
Kit 8, binocular with ergotube	1	**630-2289**
Models with monitor and integrated digital camera - 5,0 MP		
Kit 11, trinocular	1	**630-1269**

Description	Pk	Cat. No.
Accessories for Primo Vert		
Object guide, 108×72 mm	1	**630-1504**
Universal mounting frame	1	**630-1401**

VWR COLLECTION

SELECTED FOR YOU

Digital cameras, VisiCam®

These cameras are colour CMOS units with USB 2.0 interface and a large image sensor for a large field of view. These features allow capture of high quality images and videos.

The VisiCam® analyser software provides most standard functions for image analysis in microscopy such as marking, counting, measuring, storage, auto/manual white balance and objectives calibration.

- Capture format: .JPG, .PNG, .TIF, .TGA, .PCX, .JP2, .JPC, .PGX, .RAS, .PNM
- Compatible with Windows® XP, Windows® Vista and Windows® 7

Supplied with a calibration slide, VisiCam® analysis software and drivers. For other applications, please contact your local VWR sales office.

Model	VisiCam® 1,3	VisiCam® 3,0	VisiCam® 5,0	VisiCam® 10
Max resolution	1,3 MPx	3,0 MPx	5,0 MPx	10 MPx
Sensor	⅓" colour CMOS	½" colour CMOS		

Description	Pk	Cat. No.
VisiCam® 1.3, 1,3 MPx	1	**630-1030**
VisiCam® 3.0, 3,0 MPx	1	**630-1031**
VisiCam® 5.0, 5,0 MPx	1	**630-1032**
VisiCam® 10, 10 MPx	1	**630-1484**

Description	Pk	Cat. No.
Accessories for VisiCam®		
Calibration slide	1	**630-1123**
CCTV lens, 16 mm	1	**630-1124**
CS-C mount adapter	1	**630-1122**
C-mount eyepiece adapter 0,5× and 30 mm ring	1	**630-1121**
C-mount adapter for Zeiss microscopes	1	**630-1490**
C-mount adapter for Olympus microscopes	1	**630-1489**
C-mount adapter for Leica microscopes	1	**630-1497**
C-mount adapter for Nikon microscopes	1	**630-1498**

2 year warranty

Digital cameras, Moticam series

Motic

Moticam 5

Moticam 1

Moticam 3

CMOS technology

The **Moticam 1 and 1SP** cameras are suitable for schools. They can be used with interactive white boards for integrated teaching. The live resolution along with the colour balance make these cameras a great tool for a first introduction to digital microscopy. **Moticam 2 and 3** are fast cameras providing high resolution live imaging up to 3,0 megapixels. They are designed for use in colleges and universities, as well as in clinics and veterinary centres. The **Moticam 5 and 10** offer high resolution live imaging and can be converted to professional format (300 dpi) for image capture. The viewing options allow the user to display a faster frame rate at full screen while still being able to capture an image at maximum resolution.

- C-mount connection for mounting on the photo port of any trinocular microscope
- C-mount (which is microscope specific) must be purchased separately
- Camera kit includes Ø 30 and 38 mm adapters to fit into the eyepiece tube if no photo port is available

Delivery information: Supplied with Image Plus Software (PC/Mac), eyepiece adapters (Ø 30 and 38 mm), calibration slide, USB cable, macro lens (which can be focused) and a macrotube for macro-specimens.

Continued on next page

Continued from previous page

Model	Live resolution	Optical calculation	Focusable lens
Moticam 1	800×600 pixels	1/4″	8 mm
Moticam 1SP	1,3 megapixels	1/3″	12 mm
Moticam 2	2,0 megapixels	1/3″	12 mm
Moticam 3	3,0 megapixels	1/2″	16 mm
Moticam 5	5,0 megapixels	1/2,5″	12 mm
Moticam 10	10 megapixels	1/2,5″	12 mm

Description	Pk	Cat. No.
Moticam 1, 800×600 pixels	1	**630-1517**
Moticam 1SP, 1,3 megapixels	1	**630-1520**
Moticam 2, 2,0 megapixels	1	**630-1518**
Moticam 3, 3,0 megapixels	1	**630-1519**
Moticam 5, 5,0 megapixels	1	**630-1515**
Moticam 10, 10,0 megapixels	1	**630-1513**

Description	Pk	Cat. No.
Gooseneck stand		
Stand for Moticam® cameras	1	**630-0162**

Digital cameras, Moticam 580 and 580 INT

Motic

The Moticam 580 and 580 INT are next generation HD digital cameras. They have the ability to display 1080p resolution images either on an HD monitor via an HDMI cable (Moticam 580) or via an integrated LCD monitor (Moticam 580 INT). They are suitable for educational, clinical, industrial and research use.

The Moticam INT 580 has been designed for easy integration with BA microscopes. The microscope's images can be shared on the screen in real time. 5 MP still or 1080p video images can be captured onto an SD card.

The Moticam 580 is an independent, multi output digital camera that can be connected to any microscope equipped with a trinocular eyepiece (microscope specific C-mount must be purchased separately) or, by using the supplied eyepiece adapters, it can be fitted to almost any binocular microscope.

- Outputs: HDMI, USB, RCA video
- CMOS / two sensors 1, 5″
- Total number of pixels 2592×1944 (capture)
- Active resolution (HDMI) 1080i (HD)
- Active resolution (USB) 800×600 pixels
- Capture format SD 5,0 MPx (2592×1944) map
- Video capture 1080p (full HD)
- Remote and Images Plus 2.0 software for PC and MAC, Direct Show and Twain Driver

The HD signal multiplies by 1080 the amount of detail in the digital image - up to five times compared to standard definition (SD) or analogue video.

Supplied with software, eyepiece adapters (Ø 30 and 38 mm), calibration slide, USB cable, RCA cable, HDMI cable, remote control, focusable macro lens and macro tube (for macro specimens). SD card and microscope specific C-Mount are not included and will need to be purchased separately.

Description	Pk	Cat. No.
Moticam 580, 5,0 MP on SD-card	1	**630-1516**
Moticam 580 INT, 5,0 MP, 800×600 via USB	1	**630-1848**

Description	Pk	Cat. No.
Gooseneck stand		
Stand for Moticam® cameras	1	**630-0162**

Digital cameras, Moticam PRO
Motic

CCD technology

The Moticam PRO 12-bit cameras offer high quality live imaging. They use exclusively Sony ICX sensors providing sustained quality readouts.

- Real-time image transfer: USB 2.0
- External power supply for the cooled versions
- Compatible with Windows XP, Vista, 7 and Mac OSX

630-1148 and 630-1139 models are cooled using a Peltier cooling device useful for epi-fluorescence analysis. Include Images Plus 2.0 standard and Images Advanced 3.2 software.

Description	Pk	Cat. No.
Moticam PRO 285B, cooled, 1,4 MP	1	**630-2034**
Moticam PRO 285A, non cooled, 1,4 MP	1	**630-2035**
Moticam PRO 252A, non cooled, 3,2 MP	1	**630-1140**
Moticam PRO 252B, cooled, 3,2 MP	1	**630-1148**
Moticam PRO 282A, non cooled, 5,0 MP	1	**630-1138**
Moticam PRO 282B, cooled, 5,0 MP	1	**630-1139**

Description	Pk	Cat. No.
Gooseneck stand		
Stand for Moticam® cameras	1	**630-0162**

Digital camera, Moticam X WiFi
Motic

The Moticam X is a high resolution streaming WiFi camera. By creating its own wireless network, simply log on, view, capture and edit live images from your microscopes via the MotiConnect app on your android or iPad tablet.

- Send streaming images to up to six WiFi enabled devices without the need for a router
- View live images without any cable connection on any WiFi computer using the Images Plus 2.0 software
- "All-in-One" box: Two variable diameter eyepiece adapters, calibration slide, macro-tube, USB power supply and software

Description	Pk	Cat. No.
Moticam X, 1,3 MP	1	**630-1840**

Description	Pk	Cat. No.
Gooseneck stand		
Stand for Moticam® cameras	1	**630-0162**

VWR COLLECTION

Tablet camera, VisiCam® TC 10

This tablet camera can capture, store, analyse and transmit every image. It can be used in chemistry, geology, electronic industry, research universities and production quality control. This stand-alone system can save space on your bench with a modern capture system.

- CMOS sensor camera
- Resolution of 5 megapixels (2592×1936)

Tablet

- Android operating system
- 25 cm LED display, 1024×768 pixels; multi point capacitive touch screen
- Memory: 8 GB, expandable through SD card
- Outputs: HDMI, mini USB - no need for computer
- Networking: WiFi and Bluetooth
- C-mount connection for mounting on the photo port of any trinocular microscope

Delivery information: Supplied with image analysis software.

Description	Pk	Cat. No.
Digital tablet camera, VisiCam® TC 10	1	**630-1858**

Description	Pk	Cat. No.
Cable		
HDMI cable (2 metres)	1	**630-1888**

pH Meters

pH/mV/°C meters, bench, Lab 850 / 860 / 870

SI Analytics

Lab 860

Wireless transmission of electrode identification data

High precision instruments for fast, reliable and precise results

pH meter Lab 850, starter model

- Plastic foil keypad, polyester, tactile response, and acoustic/optical alarm
- Precise calibration and measurement in shorter time
- Current calibration data can be recalculated
- Automatic calibration with up to 3 points and automatic buffer recognition among 16 selectable buffer sets for reliable measuring values at high level
- CalClock pH calibration system with monitoring and display of the probe condition and the calibration time switch

pH meter Lab 860, for demanding routine measurements

Same features as Lab 850, in addition:

- Storage of up to 800 data sets with time and manual/automatic identification
- Data transmission via USB slave or RS232
- GLP-conform calibration protocols

pH meter Lab 870, for chemical and pharmaceutical applications

Same features as Lab 850, in addition:

- Direct data transmission via USB slave or RS232, and no storage
- Automatic recognition of the new sensors with unique identification (e.g. BlueLine 14 pH ID - included in set) in order to use the correct calibration for the identified sensor and avoid errors in measurement
- GLP-conform calibration protocols

Ordering information: Sets include the meter, power supply, electrode stand, dust cover and BlueLine 14 pH electrode with integrated sensor (Blueline 14 pH ID for Lab 870 Set), and calibrations solutions (NIST).

For qualification, detailed documents and certificates are available for all instruments. Please ask for details.

Model	Lab 850
pH - range	–2...+19,999
pH - accuracy	±0,005 ±1 digit
pH - calibration	1, 2 or 3 point
mV - range	±999,9
mV - accuracy	±0,3 ±1 digit
Temperature range (°C)	–5...+120
Temperature accuracy (°C)	±1
Datalog - capacity	-
Display	LCD
Connections	DIN / BNC
Outputs	-
Compliance	

Description	Pk	Cat. No.
Lab 850 Set	1	**663-0086**

pH/mV/°C/ion meter, bench, SevenCompact™ S220

Mettler-Toledo

Intuitive, user friendly and powerful meter. Measures pH, ORP and ion concentration in various units. Ideal for a wide range of applications.

- User friendly operation, clear, well arranged colour display
- Menu guidance in 10 languages
- GLP-compliant
- Supports ISM® technology (Intelligent Sensor Management)

Ordering information: S220-Kit includes instrument, InLab® Expert Pro ISM®, guide to pH measurements and 2 buffer sachets for pH 4,01, 7,00, 9,21 and 10,00, electrode holder, protective cover, quick guide, declaration of conformity and test certificate.

S220-Bio supplied with the same items as for S220-Kit with the exception that the InLab® Routine Pro ISM® electrode replaces the InLab® Expert Pro ISM®.

S220-Univ supplied with the same items as for S220-Kit with the exception that the InLab® Versatile Pro electrode replaces the InLab® Expert Pro ISM®.

Model	S220
pH - range	–2,000...+20,000
pH - resolution	0,001 / 0,01 / 0,1
pH - accuracy	±0,002
pH - calibration	Max. 5 points with 8 pre-defined buffer groups and 1 user-defined buffer group
mV - range	±2000,0
mV - resolution	0,1 / 1
mV - accuracy	±0,2
ISE - range	0,000 - 10000,0 ppm
ISE - resolution	± last significant digit
ISE - accuracy	±0,5%
ISE - units	%, ppm, mg/l, mmol/l, mol/l, px
Temperature range (°C)	Manual: –30,0...+130,0 Automatic: –5,0...+130,0
Temperature resolution (°C)	0,1
Temperature accuracy (°C)	±0,1
Temperature compensation	Manual / Automatic
Datalog - capacity	1000 measurements
Display	TFT
Connections	BNC (pH sensor), Mini-DIN (stirrer), Cinch/RCA (NTC 30 kΩ or PT1000 temperature sensor), 2 mm reference
Outputs	RS232, USB-A, USA-B
W×D×H (mm)	204×174×74
Weight (kg)	0,89
Compliance	IP 54 / GLP

Description	Pk	Cat. No.
SevenCompact™ S220-Basic	1	**662-1378**

pH and ORP microelectrodes

SI Analytics

For small sample volumes in life science and pharmaceutical applications.

- Reliable and reproducable results
- Highest quality and long duration
- Accurate and highly precise
- Designed for small volumes and life science applications

Suitable temperature range: –5...+100 °C

Continued on next page

Continued from previous page

pH electrodes are equipped with A-type membrane glass. pH electrodes with integrated temperature measurement are using a PT1000 sensor.

For most accurate results, we recommend using the ProLab 3000 meter in combination with these electrodes.

Description	Type	Diaphr.	Ø×L (mm)	Connection	Pk	Cat. No.
pH/temperature microelectrode, Silamid® reference system, cylindrical membrane shape	A 157	Platinum	12/5×200 (70/130)	SMEK plug head	1	**662-6174**
pH/temperature microelectrode, Silamid® reference system, cylindrical membrane shape	A 157 1M-DIN-ID	Platinum	12/5×200 (70/130)	DIN + banana plug, 1m fixed cable	1	**662-1678**
pH/temperature microelectrode, Silamid® reference system, cylindrical membrane shape	A 157 1M-BNC-ID	Platinum	12/5×200 (70/130)	BNC + banana plug, 1m fixed cable	1	**662-1679**
pH microelectrode, Ag/AgCl reference system, cylindrical membrane shape	BlueLine 16 pH	Platinum	12/5×120 (40/80)	Plug head	1	**662-6135**
pH microelectrode, Iodine/Iodide reference system, cylindrical membrane shape	IL-MICRO-pH-A	Platinum	12/5×200 (70/130)	Screw plug head S7	1	**662-6095**
pH microelectrode, Iodine/Iodide reference system, cylindrical membrane shape	IL-MICRO-pH-A-DIN	Platinum	12/5×200 (70/130)	DIN plug, 1 m fixed cable	1	**662-6063**
pH microelectrode, Iodine/Iodide reference system, cylindrical membrane shape	IL-MICRO-pH-A-BNC	Platinum	12/5×200 (70/130)	BNC plug, 1 m fixed cable	1	**662-6096**
pH/temperature microelectrode, Iodine/Iodide reference system, cylindrical membrane shape	IL-MICRO-pHT-A-DIN-N	Platinum	12/6×200 (70/130)	DIN + banana plug, 1 m fixed cable	1	**662-6069**
pH/temperature microelectrode, Iodine/Iodide reference system, cylindrical membrane shape	IL-MICRO-pHT-A-BNC-N	Platinum	12/6×200 (70/130)	BNC + banana plug, 1 m fixed cable	1	**662-6070**
pH microelectrode, Silamid® reference system, spear membrane shape, tapper NS 7,5	N 5800 A	3× platinum	5×96	DIN plug, 1 m fixed cable	1	**662-1267**
pH microelectrode, Silamid® reference system, spear membrane shape, tapper NS 7,5	N 5800 BNC	3× platinum	5×96	BNC plug, 1 m fixed cable	1	**662-1675**
pH microelectrode, Silamid® reference system, sphere membrane shape, tapper NS 7,5	N 5900 A	Platinum	5×96	DIN plug, 1 m fixed cable	1	**662-0520**
pH microelectrode, Silamid® reference system, cylindrical membrane shape, tapper NS 7,5	N 6000 A	Platinum	3×96	DIN plug, 1 m fixed cable	1	**662-6109**
pH microelectrode, Silamid® reference system, cylindrical membrane shape, tapper NS 7,5	N 6000 BNC	Platinum	3×96	BNC plug, 1 m fixed cable	1	**662-1676**
pH microelectrode, Silamid® reference system, cylindrical membrane shape, tapper NS 7,5	N 6000 1M-DIN-ID	Platinum	3×96	DIN plug, 1m fixed cable	1	**662-1680**
pH microelectrode, Silamid® reference system, cylindrical membrane shape, tapper NS 7,5	N 6000 1M-BNC-ID	Platinum	3×96	BNC plug, 1m fixed cable	1	**662-1681**
pH microelectrode, Silamid® reference system, cylindrical membrane shape	N 6003	Ceramic	12/3×250 (70/180)	Plug head	1	**662-1673**
ORP microelectrode, Silamid® reference system, rod membrane shape, tapper NS 7,5	Pt 5900 A	Platinum	5×96	DIN plug, 1 m fixed cable	1	**662-1674**
ORP microelectrode, Silamid® reference system, rod membrane shape, tapper NS 7,5	Pt 5900 BNC	Platinum	5×96	BNC plug, 1m fixed cable	1	**662-1677**
ORP microelectrode, Silamid® reference system, rod membrane shape, tapper NS 7,5	Pt 5901	Platinum	5×160	Plug head	1	**662-1672**

pH electrodes, InLab® Micro
Mettler-Toledo

662-2863

662-2864

662-2866

With S7 connector

- ARGENTHAL™ reference system with silver-ion trap
- XEROLYT® EXTRA polymer electrolyte: high signal stability, very short response time and high chemical resistance (InLab® Semi-Micro)

pH range: 0 - 14 for InLab® Micro/Micro Pro/Semi-Micro-L; 0 - 12 for InLab® Semi-Micro
Material: Glass

Ordering information: Supplied with test certificate and without cable. Other electrodes on request.

Electrode	Applications
InLab® Semi-Micro / Semi-Micro-L	Highly saline solutions; cosmetics; pharmaceutical and biological samples
InLab® Micro / Micro Pro	Highly saline solutions; cosmetics; pharmaceutical and biological samples; dairy products; water-based paint and oily samples

Type	pH	Temp. (°C)	Material	Electrolyte	Diaphr.	Ø×L (mm)	Connection	Pk	Cat. No.
InLab® Micro	0 - 14	0...+80	Glass	3 mol/l KCl	Ceramic	3×60	S7	1	**662-2863**
InLab® Micro Pro	0 - 14	0...+100	Glass	3 mol/l KCl	Ceramic	5×130	MultiPin™	1	**662-2865**
InLab® Semi-Micro	0 - 12	0...+100	Glass	XEROLYT® EXTRA Polymer	Open junction	6×100	S7	1	**662-2864**
InLab® Semi-Micro-L	0 - 14	0...+100	Glass	3 mol/l KCl	Ceramic	6×230	S7	1	**662-2866**
InLab® Ultra-Micro	1 - 11	0...+80	Glass	FRISCOLYT-B®	Ceramic	3×40	S7	1	**662-1346**
InLab® Flex-Micro	0 - 14	0...+80	Plastic	3 mol/l KCl	PTFE	6×180	BNC	1	**662-1347**

Homogenisers

VWR COLLECTION

2 year warranty

SELECTED FOR YOU

Homogeniser, VDI 12

Handheld or stand model, volume range 0,1 to 100 ml

An ergonomic, lightweight, handheld homogeniser which is easy to handle. Ideal for RNA protein assays, DNA and RNA blot analysis, PCR work, wastewater extractions, tissue decomposition and suspensions. High shear homogenisation reduces sample process times 10-fold compared to conventional mixers.

- Motor accepts VWR dispersing elements as well as those from selected other manufacturers*
- Overload protection means motor shuts down if overload conditions arise, ensuring the motor is protected
- Quick release coupling enables dispersing elements to be changed quickly and easily

IP protection class according to DIN EN 60529: IP 30

Ordering information: Supplied without dispersing elements, please order required accessories separately.

Model	VDI 12
Max. viscosity (mPas)	5000
Motor rating (W)	125
Speed display	Scale
Speed range (min^{-1})	8000 - 30000
Volume H_2O (ml)	0,1 - 100
Weight (kg)	0,4
W×D×H (mm)	46×57×201

Description	Pk	Cat. No.
VDI 12 homogeniser, EU-plug	1	**431-0109**
VDI 12 homogeniser, UK-plug	1	**431-0124**
VDI 12 homogeniser, CH-plug	1	**431-0125**

Description	Type	For	Stator/rotor Ø (mm)	Volume (ml)	Pk	Cat. No.
Stainless steel rotor/stators						
Dispersing element S12N-5S	Sawtooth	VDI 12	6 / 3,5	0,1 - 5	1	**431-0110**
Dispersing element S12N-7S	Sawtooth	VDI 12	8 / 6,1	0,3 - 10	1	**431-0111**
Dispersing element S12N-12S	Sawtooth	VDI 12	12 / 8,5	2 - 250	1	**431-0112**
Accessories						
Bosshead clamp					1	**442-2043**
Plate stand, 242×355 mm, rod 10 mm Ø with height 370 mm. Max. load: 0,7 kg		VDI 12 / T 10 basic			1	**431-1006**

* For details of dispersing elements please contact VWR.

VWR COLLECTION

SELECTED FOR YOU

Mixer mill, Star Beater

A ball mill for disintregration of small sample volumes that can also be used to shake/mix microtubes and microplates. Wide range of applications in different scientific fields from geology to biotechnology.

- Easy to use - simple knob and keypad to control frequency and timer
- Easy to maintain - brushless DC motor
- Large range of grinding jars and tube holders to suit the sample requirements

Model	Star Beater
Grinding time setting (min)	5 seconds to 60 minutes
Max. sample volume (ml)	2×50
Power consumption (W)	200 VA
Speed display	LED
Vibrational frequency (Hz)	3 - 30
Weight (kg)	42
W×D×H (mm)	365×405×225

Description	Pk	Cat. No.
Mixer mill, Star Beater		
Star Beater	1	**412-0167**
Accessories		
Tube holder, PTFE for reaction vials, 12×0,2 ml tubes on each arm	1	**412-0181**
Tube holder, PTFE for reaction vials, 12×2 ml tubes on each arm	2	**412-0182**
Tube holder, PTFE for reaction vials, 6×2 ml tubes on each arm	2	**412-0183**
Tube holder, PTFE for reaction vials, 6×2 ml tubes (screw cap) on each arm	2	**412-0184**
Holder, PTFE, for up to 3 microplates or 1 deep well plates on each arm	2	**412-0185**
Dummy plate, PTFE, for replacing one microtitre plate in the rack	2	**412-0200**
Rack, PTFE, for 24x 1,5/2,0 ml tubes (with or without screw cap)	2	**412-0199**
Rack , PTFE, 50 ml with 5 places for conical tubes	2	**412-0212**
Set of spanners	1 SET	**412-0180**

Material	Nominal volume (ml)	Max. feed size (mm)	Pk	Cat. No.
Grinding jars				
Stainless steel	1,5	1	2	**412-0168**
Stainless steel	5	2	2	**412-0169**
Stainless steel	10	4	2	**412-0170**
Stainless steel	25	6	2	**412-0171**
Stainless steel	35	6	2	**412-0172**
Stainless steel	50	8	2	**412-0173**
Hardened steel	1,5	1	2	**412-0174**
Hardened steel	5	2	2	**412-0175**
Hardened steel	10	4	2	**412-0176**
Hardened steel	25	6	2	**412-0177**
Hardened steel	35	6	2	**412-0178**
Hardened steel	50	8	2	**412-0179**

Material	Ø (mm)	Pk	Cat. No.
Grinding balls			
Stainless steel	3	20	**412-0201**
Stainless steel	5	1	**412-0190**
Stainless steel	7	20	**412-0202**
Stainless steel	10	1	**412-0191**
Stainless steel	12	1	**412-0192**
Stainless steel	25	2	**412-0193**
Hardened steel	5	1	**412-0186**
Hardened steel	10	1	**412-0187**
Hardened steel	12	1	**412-0188**
Hardened steel	25	2	**412-0189**

Homogenisers, Precellys® 24 and Precellys® 24-Dual

Precellys® 24

The Precellys® 24 is a benchtop unit dedicated to grinding, lysis and homogenisation of biological samples. It is a fast and efficient solution for extracting DNA, RNA or proteins. Ideal for use with animal, vegetal tissues and micro-organisms, the high speed and specific motion allows the grinding of difficult samples such as bones, hair, corn, spores etc. The unit features an easy cleaning system with direct access to the sample holder and is compatible with normal cleaning solutions.

- Up to 24×2 ml sample tubes can be processed simultaneously; homogenisation is carried out in few seconds
- Flexible, only need to adapt protocols and grinding kits (glass, ceramic, metal beads) for hard or soft tissue
- High quality and reliable; specifically designed for use in an L3 laboratory under high throughput conditions - 50 to 100 runs per day
- Cross-contamination free with disposable sample tubes
- Optimal temperature process with the optional Cryolys temperature controller

Delivery information: Supplied with sample kit (2 tubes of each type of grinding kit), indented plate, toric joint, spare toric joint and power cords with either EU- and UK-plug.

Precellys®24-Dual

This model extends the Precellys® technology to include 0.5 ml and 7 ml lysing tubes, whilst delivering all the other features of the Precellys®24.

- Application flexibility 1 mg to 5 g
- Choice of up to 6×7 ml or 12×2 ml tubes with simple change of indented plate

Complies with FCC Part 15

Delivery information: Supplied with sample kit (2 tubes of each type of grinding kit), 2 indented plates, toric joint, spare toric joint and power cords with either EU- and UK-plug.

Cryolys cooling option

The Cryolys® is a patented cooling option that keeps temperature at approx. 4 °C during homogenisation using either liquid nitrogen or solid CO_2. It allows extraction of stable RNA and native-state proteins. Cryolys® is compatible with Precellys®24 and Precellys®24-Dual.

- Get higher yield, quality and functionality
- Prevent enzymes from becoming active
- Retain 100% active proteins

Requires a compressed air supply.

Model	Precellys®24	Precellys® 24-Dual
Motor rating (W)	1000	
No. of tubes	24×2 ml	6×7 ml or 12×2 ml
Speed range (min^{-1})	5000 - 6800 in increments of 100	5000 - 6500 in increments of 100
Time display	Backlit 2 line LCD	
Timer	5 - 90 s (in 5 second increments) option of 1 to 3 cycles	
Weight (kg)	29,8	
W×D×H (mm)	375×290×370	

Description	Pk	Cat. No.
Precellys®24, 100 - 230 V, 50 - 60 Hz	1	**432-3750**
Precellys® 24-Dual, 100 - 230 V, 50 - 60 Hz	1	**432-3757**

Description	For	Pk	Cat. No.
Grinding and lysing kits			
Cryolys® cooling option, EU-plug		1	**432-3756**
Cryolys® cooling option, UK-plug		1	**432-0178**
Grinding Kits			
Precellys 24 homogenising kit CKMIX, mixture of ceramic (zirconium oxide) beads, 50 preparations in 2 ml tubes	Soft tissues	1 KIT	**431-0170**
Precellys 24 homogenising kit CK14, 1.4 mm ceramic beads, 50 preparations in 0.5 ml tubes	Soft tissues	1 KIT	**432-3760**
Precellys 24 lysing kit VK05, 0.5 mm glass beads, 50 preparations in 0.5 ml tubes	Tough micro-organisms	1 KIT	**432-3761**
Precellys 24 homogenising kit CK28, ceramic beads, 50 preparations in 7 ml tubes	Hard tissues	1 KIT	**432-0160**
Precellys 24 homogenising kit CK14, 1.4 mm ceramic beads, 50 preparations in 2 ml tubes	Soft tissues	1 KIT	**432-3751**
Precellys 24 homogenising kit CK28, 2.8 mm ceramic beads, 50 preparations in 2 ml tubes	Hard tissues	1 KIT	**432-3752**
Precellys 24 homogenising kit CK28, 2.8 mm ceramic beads, 50 preparations in 2 ml reinforced tubes	Hard tissues	1 KIT	**432-0141**
Precellys 24 grinding kit MK28, 2.8 mm steel beads, 50 preparations in 2 ml tubes	Hard tissues	1 KIT	**432-3753**
Precellys 24 grinding kit MK28, 2.8 mm steel beads, 50 preparations in 2 ml reinforced tubes	Hard tissues	1 KIT	**432-0142**
Precellys 24 grinding kit SK38, a mix of glass and ceramic beads, 50 preparations in 2 ml tubes	Soil	1 KIT	**432-0140**
Precellys 24 lysing kit VK01, 0.1 mm glass beads, 50 preparations in 2 ml tubes	Micro-organisms	1 KIT	**432-3754**
Precellys 24 lysing kit VK05, 0.5 mm glass beads, 50 preparations in 2 ml tubes	Micro-organisms	1 KIT	**432-3755**

Continued on next page

Continued from previous page

Description	For	Pk	Cat. No.
Grinding Kits			
Precellys 24 grinding kit CK14/VK01, mix of ceramic beads, 50 preparations in 7 ml tubes	Soil	1 KIT	**432-0143**
Precellys 24 lysing kit VK01/VK05, mix of glass beads, 50 preparations in 7 ml tubes	Micro-organisms	1 KIT	**432-0144**
Precellys 24 homogenising kit CK01, 0.1 mm ceramic beads, 50 preparations in 7 ml tubes	Micro-organisms	1 KIT	**432-0145**
Accessories			
Dual white blocking plate, 2 ml		1 KIT	**432-0244**
Dual white blocking plate, 2 ml		1 KIT	**432-0245**
User maintenance kit Precellys® 24		1 KIT	**432-0246**
User maintenance kit Precellys® 24-Dual		1 KIT	**432-0247**
White comb		1	**432-0239**
Vacuum joint		1	**432-0240**
Containment seal		1	**432-0241**
Fuse		1	**432-0242**
Anti-rotation tubing kit		1	**432-0243**
Handle for lid		1	**432-0248**
Lid, containment		1	**432-0249**

Centrifuges

VWR COLLECTION

2 year warranty

SELECTED FOR YOU

Microcentrifuges, ventilated/refrigerated, Micro Star 17 / 17R

The Micro Star 17 and 17R microcentrifuges combine power, versatility and convenience in a safe, compact, easy to use laboratory instrument. Both the ventilated Micro Star 17 and the refrigerated Micro Star 17R are designed to accelerate your routine sample preparation process. The special biocontainment rotor lid for one click rotor opening and closing shortens retrieval time compared to screw on lids.

- Quiet and powerful performance up to 17 000 ×g
- 'Click' biocontainment rotor lid keeps the user and the samples safe
- Easy operation; intuitive controls and bright, easy to read displays

Ordering information: Supplied with 24-place rotor for 1,5/2,0 ml tubes and aerosol-tight rotor lid.

Model	Micro Star 17	Micro Star 17R
Temperature (°C)	-	–9...+40
Max. speed (min^{-1})	13300	
Max. RCF (×g)	17000	
Timer	1–99 min (in increments of 1 min) + Hold mode	
Noise level (dB(A))	<56	<50
W×D×H (mm)	225×243×352	330×295×445

Description	Pk	Cat. No.
Microcentrifuge, ventilated, Micro Star 17	1	**521-1646**
Microcentrifuge, refrigerated, Micro Star 17R	1	**521-1647**

VWR COLLECTION

2 year warranty

SELECTED FOR YOU

Centrifuges, bench top, ventilated/refrigerated, Mega Star 1.6/1.6R

These versatile centrifuges are ideal for a range of routine applications in pharmaceutical and biotechnology industries as well as for academic research. They offer good capacity and an ergonomic design which facilitates the work on the benchtop. The Mega Star centrifuges are available as a ventilated or a refrigerated version. The refrigerated version with the pre-cooling function is suitable for temperature sensitive sample processing with control between –10 °C and +40 °C.

- Auto-Lock® III rotor system: Tool-free rotor exchange system enables quick rotor exchange; with just the push of a button users can quickly change rotors and

Continued on next page

Continued from previous page

easily access the rotor chamber for cleaning
- Aerosol-tight ClickSeal® bucket sealing system: Glove friendly one-handed open/close capability, no need for screw caps and complicated clips
- SMARTSpin® technology optimising acceleration, braking and residual load imbalance for maximum safety, smooth runs and reproducible separations
- Time saving pulse function for short runs
- Intuitive controls and large, bright LED display facilitate operation and programming

TX-400 swing out rotor: This rotor is designed for a broad range of laboratory throughput needs. With a capacity of 4×400 ml, 76×5/7 ml blood tubes or up to 36×15 ml conical tubes in a single run, it provides the highest configuration flexibility on the market.

Ordering information: Supplied as complete packages, incl. centrifuge, TX-400 rotor, set of four round buckets, four ClickSeal® lids and two power cords (EU and UK plug). Adapters need to be ordered separately.
Centrifuges can be used with all rotors suitable for Megafuge 16/16R centrifuges. Additional rotors are available on request.

Model	Mega Star 1.6	Mega Star 1.6R
Max. capacity - swingout rotor	4×400 ml	
Max. speed - swingout rotor (min^{-1})	4700	
Max. RCF - swingout rotor (×g)	4149	
Temperature (°C)	-	–10...+40
Acceleration/braking ramps	9/10	
Motor	Brushless induction motor	
Control	Microprocessor	
Functions	Auto-Lock® III rotor locking system, ClickSeal® sealing system	Auto-Lock® III rotor locking system, pre-cooling and CFC-free refrigeration, ClickSeal® sealing system
Programmes	6 (direct access)	
Timer	9 h 99 min + continuous	
Anti-unbalance system	SMARTSpin®	
Display	Large, bright LED	
Languages	English, German, French, Spanish, Italian, Dutch and Russian	
Noise level (dB(A))	<61	<55
Power supply	230 V / 50 - 60 Hz	
Power consumption (W)	1010	1400
W×D×H (mm)	440×605×360	623×605×360
Weight (kg)	57,5 (centrifuge only)	91,5 (centrifuge only)

Description	Pk	Cat. No.
Ventilated benchtop centrifuge, Mega Star 1.6, package incl. TX-400 rotor, buckets and lids	1	**521-1749**
Refrigerated benchtop centrifuge, Mega Star 1.6R, package incl. TX-400 rotor, buckets and lids	1	**521-1750**

Description	Pk	Cat. No.
Adapters		
Adapter for 9×15 ml conical tubes, 16,5×121 mm for TX-400	4	**521-1418**
Adapter for 4×50 ml conical tubes, 29,5×116 mm for TX-400	4	**521-1419**

VWR COLLECTION

2 year warranty

SELECTED FOR YOU

Centrifuges, bench top, ventilated/refrigerated, Mega Star 3.0/3.0R

These versatile centrifuges are ideal for a range of routine applications in pharmaceutical and biotechnology industries as well as for academic research. They offer exceptional capacity and an ergonomic design which facilitates the work on the bench top. The Mega Star centrifuges are available as a ventilated or a refrigerated version. The refrigerated version with the pre-cooling function is suitable for temperature sensitive sample processing with control between –10 °C and +40 °C.

- Auto-Lock® III rotor system: Tool-free rotor exchange system enables quick rotor exchange; with just the push of a button users can quickly change rotors and easily access the rotor chamber for cleaning
- Aerosol-tight ClickSeal® bucket sealing system: Glove friendly one-handed open/close capability, no need for screw caps and complicated clips
- SMARTSpin® technology optimising acceleration, braking and residual load imbalance for maximum safety, smooth runs and reproducible separations
- Time saving pulse function for short runs
- Intuitive controls and large, bright LED display facilitate operation and programming

TX-750 swing out rotor: This high capacity (4×750 ml) rotor accelerates productivity with up to 196×5/7 ml blood tubes or 28×50 ml conical tubes in a single run.

Continued on next page

Continued from previous page

Ordering information: Supplied as complete packages, incl. centrifuge, TX-750 rotor, set of four round buckets, four ClickSeal® lids and two power cords (EU and UK plug). Adapters need to be ordered separately.
Centrifuges can be used with all rotors suitable for Megafuge 40/40 R centrifuges. Additional rotors are available on request.

Model	Mega Star 3.0	Mega Star 3.0R
Max. capacity - swingout rotor	4×750 ml	
Max. speed - swingout rotor (min^{-1})	4000	
Max. RCF - swingout rotor (×g)	3494	
Temperature (°C)	-	–10...+40
Acceleration/braking ramps	9/10	
Motor	Brushless induction motor	
Control	Microprocessor	
Functions	Auto-Lock® III rotor locking system, ClickSeal® sealing system	Auto-Lock® III rotor locking system, pre-cooling and CFC-free refrigeration, ClickSeal® sealing system
Programmes	6 (direct access)	
Timer	9 h 99 min + continuous	
Anti-unbalance system	SMARTSpin®	
Display	Large, bright LED	
Languages	English, German, French, Spanish, Italian, Dutch and Russian	
Noise level (dB(A))	<61	<57
Power supply	230 V / 50 - 60 Hz	
Power consumption (W)	1700	1950
W×D×H (mm)	565×670×360	745×670×360
Weight (kg)	86 (centrifuge only)	116 (centrifuge only)

Description	Pk	Cat. No.
Ventilated benchtop centrifuge, Mega Star 3.0, package incl. TX-750 rotor, buckets and lids	1	**521-1751**
Refrigerated benchtop centrifuge, Mega Star 3.0R, package incl. TX-750 rotor, buckets and lids	1	**521-1752**

Description	Pk	Cat. No.
Adapters		
Adapter for 7×50 ml conical tubes, 29,5×120 mm	4	**521-1409**
Adapter for 14×15 ml conical tubes, 17×122 mm	4	**521-1410**

Shakers

VWR COLLECTION

2 year warranty

SELECTED FOR YOU

Magnetic stirrers, Slow Speed series

The VWR Standard and Advanced Slow Speed stirrers are designed for growth of suspension and microcarrier cell cultures. Slow Speed stirrers work with cell culture flasks and other vessels designed for slow magnetic stirring. Ideal for use in cold rooms, incubators, or CO_2 incubators (–10 to +40 °C, maximum 80% relative humidity, non condensing environment). The low profile design means that it takes up minimal space and easily fits into fume hoods and most incubators. The spill-resistant housing channels fluids away from internal components and the cast iron base offers durability and added stability. 10 litre model features a glass filled nylon top plate, which has an easy to clean, reflective white surface. The 2 litre models has a durable aluminium top plate that will not crack or chip. Maximum vessel diameter is 150 mm (2 l model) or 250 mm (10 l model).

- Microprocessor control: Precisely regulates speed through the entire range; stirring function, with continuous duty motor and magnet, maintains set speed even under changing load or viscosity
- Adjustment knob: Basic speed control knob with dial markings from 1 to 10 (Standard series)
- LED display: Touch pad controls with easy to read, independent LED displays for speed and time; speed is adjustable in 1 rpm increments
- Timer (Advanced series) will display elapsed time (1 s to 160 hr) or, when programmed to user defined limit, will shut off unit and an audible alarm sounded when time reaches zero
- Speed ramping feature: Slowly increases speed for improved safety and enhanced coupling; avoids splashing, improves spin bar control and provides excellent low speed control; efficient drive motor eliminates heat transfer to sample

Delivery information: Supplied with a 234 cm detachable, 3-wire cord and plug.

Model	Standard Slow Speed 1	Advanced Slow Speed 1	Advanced Slow Speed
Max. stirring capacity H_2O (l)	2		10
Plate dimensions (mm)	178×178		279×318
Plate material	Aluminium		Glass-Filled Nylon
Power input (W)	14		
Speed range (min^{-1})	1 - 150		
Weight (kg)	4,0		6,6
W×D×H (mm)	216×307×102		279×432×102

Description	Pk	Cat. No.
Standard Slow Speed stirrer 1, 2 l, EU plug	1	**444-7121**
Standard Slow Speed stirrer 1, 2 l, UK plug	1	**444-7122**
Standard Slow Speed stirrer 1, 2 l, CH plug	1	**444-7123**
Advanced Slow Speed stirrer 1, 2 l, EU plug	1	**444-7124**

Continued on next page

Continued from previous page

Description	Pk	Cat. No.
Advanced Slow Speed stirrer 1, 2 l, UK plug	1	444-7125
Advanced Slow Speed stirrer 1, 2 l, CH plug	1	444-7126
Advanced Slow Speed stirrer, 10 l, EU plug	1	444-7127
Advanced Slow Speed stirrer, 10 l, UK plug	1	444-7128
Advanced Slow Speed stirrer, 10 l, CH plug	1	444-7129

Magnetic stirrer, bioMIX 1

2mag

Ultra-flat stirring systems for careful mixing of cell cultures. Suitable for culture flasks with spinning propeller and spinning ball systems. The hermetically closed stainless steel housing is water-, dust- and germ-proof. Operating temperatures up to 50 °C.

- Jerk-free mixing
- SoftStart for reliable and safe acceleration of the stirring bar
- Ten step power settings 10 - 100%
- QuickSet for setting of start and maximum speed
- Storage of last working status when turning off
- Digital display for speed and power settings
- Suitable for viscous culture media

IP protection class: IP 64

Model	bioMIX 1
Max. stirring capacity H_2O (ml)	5 - 5000
Plate dimensions (mm)	180×180
Plate material	Stainless steel
Power input (W)	6
Speed range (min^{-1})	5 - 250
Weight (kg)	4,0
W×D×H (mm)	180×230×38

Description	Pk	Cat. No.
bioMIX 1, CH-plug	1	442-0835
bioMIX 1, UK-plug	1	442-0836
bioMIX 1, EU-plug	1	442-0834

Multi-position magnetic stirrers, bioMIXdrive series

2mag

Stirring systems for careful mixing of cell cultures. Suitable for culture flasks with spinning propeller and spinning ball systems. The hermetically closed stainless steel housing is water-, germ- and dust-proof.

- Extremely slow with 100% jerk-free mixing
- Submersible in water baths
- Designed for long term operation in CO_2 incubator

IP protection class: IP 68

External control unit (must be ordered separately)

- SoftStart for reliable and safe acceleration of the stirring bar
- QuickSet for setting of start and maximum speed
- Storage of last working status when turning off
- Digital display for speed setting

IP protection class: IP 20

bioMIXcontrol and bioMIXcontrol S

Control units for connecting one bioMIXdrive 1, 2, 3 or 4 stirrers. Power setting in ten steps. bioMIXcontrol S is stackable.

bioMIXcontrol MS4

Control unit for connecting four bioMIXdrive 1 stirrers. Individual and independent speed setting for each connection.

Continued on next page

Continued from previous page

Model	bioMIXdrive 1	bioMIXdrive 2	bioMIXdrive 3	bioMIXdrive 4
Max. stirring capacity per stirrer H_2O (ml)	5 - 5000			
No. of stirring positions	1	2; 140 mm between each	3; 140 mm between each	4; 140 mm between each
Plate dimensions (mm)	180×180	130×270	130×410	270×270
Plate material	Stainless steel			
Power input (W)	6	2×6	3×6	4×6
Weight (kg)	2,3	2,5	3,5	4,7
W×D×H (mm)	180×180×38	130×270×38	130×410×38	270×270×38

Model	bioMIXcontrol	bioMIXcontrol S	bioMIXcontrol MS4
Power input (W)	4 - 40 (10 steps)		6 (per connection)
Speed range (min^{-1})	5 - 250		
Weight (kg)	1,3	1,9	2,5
W×D×H (mm)	200×155×38	215×120×50	200×155×38

Description	Pk	Cat. No.
bioMIXdrive 1	1	**442-0789**
bioMIXdrive 2	1	**442-0790**
bioMIXdrive 3	1	**442-0791**
bioMIXdrive 4	1	**442-0792**

Description	Pk	Cat. No.
Control units		
bioMIXcontrol, CH-plug	1	**442-0775**
bioMIXcontrol, UK-plug	1	**442-0776**
bioMIXcontrol, EU-plug	1	**442-0774**
bioMIXcontrol S, CH-plug	1	**442-0778**
bioMIXcontrol S, UK-plug	1	**442-0779**
bioMIXcontrol S, EU-plug	1	**442-0777**
bioMIXcontrol MS4, CH-plug	1	**442-0781**
bioMIXcontrol MS4, UK-plug	1	**442-0782**
bioMIXcontrol MS4, EU-plug	1	**442-0780**

VWR COLLECTION

2 year warranty

SELECTED FOR YOU

Orbital mini shaker

General purpose shaker with microprocessor control which is ideal for a range of mixing applications. Variable speed control provides consistent, uniform shaking action. The speed is adjustable in 10 min^{-1} increments up to 500 min^{-1}, and increments of 25 min^{-1} up to 900 min^{-1} and the ramping feature slowly increases speed to the set point for added safety.

- Two independent LED displays show speed and time
- Integral timer, 1 s to 160 h, shows elapsed time or counts down and enables automatic switch-off and audible alarm when program is complete
- Range of interchangeable attachments
- Can be used at –10 to +60 °C (80% relative humidity), in an incubator, dry CO_2 incubator or cold room

Supplied with perforated tray, non-slip rubber mat but without attachments, accessories must be ordered separately.

Model	Orbital mini shaker
Max. load (kg)	4
Orbit (mm)	3
Power (W)	25
Shaking motion	Orbital
Speed (min^{-1})	100 - 900
Speed accuracy (%)	±2
Weight (kg)	10
W×D×H (mm)	280×430×100

Description	Pk	Cat. No.
Orbital mini shaker, EU-plug	1	**444-0268**
Orbital mini shaker, CH-plug	1	**444-0269**
Orbital mini shaker, UK-plug	1	**444-7093**

Continued on next page

Continued from previous page

Description	For	Pk	Cat. No.
Accessories			
Stainless steel dilution cap tray, W×D 175×254 mm	24×28 mm dilution vials	1	**444-0514**
Microtube rack, PVC coated steel	1,5/2,0 ml tubes, holds 70 tubes	1	**444-0276**
Test tube rack, PVC coated steel	10 - 13 mm Ø tubes, holds 63 tubes	1	**444-0278**
Test tube rack, PVC coated steel	14 - 16 mm Ø tubes, holds 48 tubes	1	**444-0279**
Test tube rack, PVC coated steel	18 - 20 mm Ø tubes, holds 35 tubes	1	**444-0280**
Test tube rack, PVC coated steel	22 - 25 mm Ø tubes, holds 24 tubes	1	**444-0281**
Centrifuge tube rack, PVC coated steel	15 ml tubes, holds 35 tubes	1	**444-0283**
Centrifuge tube rack, PVC coated steel	50 ml tubes, holds 12 tubes	1	**444-0284**
Flask clamps, stainless steel	10 ml	1	**444-7040**
Flask clamps, stainless steel	25 ml	1	**444-7041**
Flask clamps, stainless steel	50 ml	1	**444-7042**
Flask clamps, stainless steel	125 ml	1	**444-7043**
Flask clamps, stainless steel	250 ml	1	**444-7044**
Flask clamps, stainless steel	500 ml	1	**444-7045**
Clamps for media bottles, stainless steel	500 ml	1	**444-7035**
Universal harness, attaches to tray to secure low profile plates	-	1	**444-0277**
Roller bar platform, which has 2 adjustable cushioned rollers to hold glassware securely, 297×218 mm, bar size 218 mm	-	1	**444-0282**
Spare single roller bar, 220 mm	Mounting on roller bar platform 444-0282	1	**444-0565**

Note: Shaker accommodates a maximum of 2 of the racks detailed and 35×10, 20×25, 15×50, 12×125, 6×250 or 4×500 ml flasks and 3×500 ml media bottles.

VWR COLLECTION

2 year warranty

SELECTED FOR YOU

Incubating orbital mini shaker

Incubating mini shaker with microprocessor control which is ideal for bacterial suspensions, hybridisations, staining and de-staining, metabolism studies and cell culturing. Variable speed control provides consistent, uniform shaking action. The speed is adjustable in 10 min^{-1} increments up to 500 min^{-1}, and increments of 25 min^{-1} up to 900 min^{-1} and the ramping feature slowly increases speed to the set point for added safety. The platform accommodates up to 5×250 ml Erlenmeyer flasks or vessels up to 130 mm tall.

- Three independent LED displays show speed, temperature and time
- Integral timer, 1 s to 160 h, shows elapsed time or counts down, and enables automatic switch-off and audible alarm when program is complete
- Microprocessor PID temperature controller maintains precise temperature from ambient +5 to +65 °C, adjustable in 1 °C increments
- Range of interchangeable attachments
- Lexan® PC lid enables samples to be viewed, without altering internal temperature

Ordering information: Supplied with perforated tray but without attachments, accessories must be ordered separately.

Model	Incubating orbital mini shaker
Max. load (kg)	4
Orbit (mm)	3
Shaking motion	Orbital
Speed (min^{-1})	100 - 900
Speed accuracy (%)	±2
Temperature range (°C)	Ambient +5...65
Uniformity at 37 °C (°C)	±0,5
Weight (kg)	12,5
W×D×H (mm)	280×430×270

Description	Pk	Cat. No.
Incubating orbital mini shaker, EU-plug	1	**444-0274**
Incubating orbital mini shaker, CH-plug	1	**444-0275**
Incubating orbital mini shaker, UK-plug	1	**444-7083**

Description	For	Pk	Cat. No.
Accessories			
Microtube rack, PVC coated steel	1,5/2,0 ml tubes, holds 70 tubes	1	**444-0276**
Test tube rack, PVC coated steel	10 - 13 mm Ø tubes, holds 63 tubes	1	**444-0278**
Test tube rack, PVC coated steel	14 - 16 mm Ø tubes, holds 48 tubes	1	**444-0279**
Centrifuge tube rack, PVC coated steel	15 ml tubes, holds 35 tubes	1	**444-0283**
Centrifuge tube rack, PVC coated steel	50 ml tubes, holds 12 tubes	1	**444-0284**
Flask clamps, stainless steel	10 ml	1	**444-7040**
Flask clamps, stainless steel	25 ml	1	**444-7041**
Flask clamps, stainless steel	50 ml	1	**444-7042**
Flask clamps, stainless steel	125 ml	1	**444-7043**
Flask clamps, stainless steel	250 ml	1	**444-7044**

Note: Shaker accommodates 1 of the racks detailed or 2 microtube racks (444-0276) or 35×10, 20×25, 12×50, 8×125, 5×250 ml flasks.

Incubating microplate shaker

Incubating microplate shaker with microprocessor control which holds four microplates or two microtube racks. The speed can be adjusted across a wide range to suit the application; a low speed ensures that the well contents are not ejected, more vigorous agitation provides effective aeration across the small surface area of each of the wells. Ideal for use in immunoassays, hybridisations, biotechnology, microbiology and pharmacology applications.

- Three independent LED displays show speed, temperature and time
- Integral timer, 1 s to 160 h, shows elapsed time or counts down, automatic switch-off and audible alarm when program is complete
- Microprocessor PID temperature controller maintains precise temperature from ambient +5 to 65 °C, adjustable in 1 °C increments
- Temperature calibration mode allows user to calibrate unit to an external temperature device
- Lexan® PC lid enables samples to be viewed, without altering internal temperature

Ordering information: Supplied with non perforated tray. The shaker can accommodate up to two accessory microtube racks. Each rack holds 70×1,5/2,0 ml microtubes.

Model	Incubating microplate shaker
No. of microplates held	4
Orbit (mm)	3,0
Speed (min^{-1})	100 - 900
Speed accuracy (%)	±2
Temperature range (°C)	Ambient +5...65
Uniformity at 37 °C (°C)	±0,5
Weight (kg)	12,5
W×D×H (mm)	280×430×200

Description	Pk	Cat. No.
Incubating microplate shaker, EU-plug	1	**444-0272**
Incubating microplate shaker, CH-plug	1	**444-0273**
Incubating microplate shaker, UK-plug	1	**444-7082**

Description	For	Pk	Cat. No.
Accessories			
Microtube rack, PVC coated steel	1,5/2,0 ml tubes, holds 70 tubes	1	**444-0276**

Incubating shaker, KS 3000 i control and KS 3000 ic control

IKA

Compact incubator shakers designed for safe, unattended operation in a temperature controlled environment. The units have a large LED display for speed, temperature and timer. An integrated PID temperature control allows the use of PT1000 temperature sensors to assure highly accurate temperature control. The electronically controlled incubators come equipped with RS232 and USB ports for PC interface. All functions can be controlled and documented using optional labworldsoft® software. In addition the KS 3000 ic control has a built in cooling coil for connection to an external cooling unit.

- Controls with antimicrobial coating for reduction of bacteria
- Junction box in the workspace for connection of an additional temperature sensor, e.g. PT1000
- Wide range of accessories accommodate almost all shapes and sizes of vessels
- Unit stops automatically when hood is lifted
- Collecting tray with drain at the rear of the unit
- Electronic timer and error code display

IP protection class according to DIN EN 60529: IP 30

Delivery information: Supplied with PT1000 sensor. Please order other accessories separately.

Model	KS 300 i control	KS 300 ic control
Internal W×D×H (mm)	330×330×258	
Max. load with attachments (kg)	7,5	
Orbital diameter (mm)	20	
Permitted ambient temperature (°C)	15 - 32	
Power input/output (W)	1120/1000	
Shaking motion	Orbital	
Speed range (min^{-1})	10 - 500	
Temperature range (°C)	Ambient +5 to 80	10 below ambient to 80*
Temperature stability (°C)	±0,1	
Weight (kg)	35	37
W×D×H (mm)	465×695×430	

Continued on next page

Continued from previous page

Description	Pk	Cat. No.
KS 3000 i control incubating shaker, EU-plug	1	444-0799
KS 3000 i control incubating shaker, UK-plug	1	444-0807
KS 3000 i control incubating shaker, CH-plug	1	444-0808
KS 3000 ic control incubating shaker, with connection for cooler, EU-plug	1	444-0809
KS 3000 ic control incubating shaker, with connection for cooler, UK-plug	1	444-0810
KS 3000 ic control incubating shaker, with connection for cooler, CH-plug	1	444-0811

Note: KS 3000 i control accommodates a maximum of 50×25, 23×50, 23×100, 11×250 or 9×500 ml flasks.
* The external cooling unit must be ordered separately.

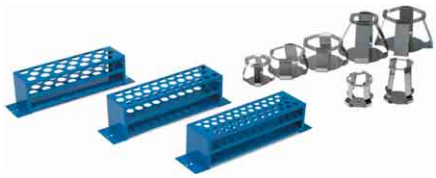
VWR COLLECTION

2 year warranty

SELECTED FOR YOU

Incubating orbital shaker, Professional 3500

Designed for a variety of shaking applications such as cell cultures, solubility studies, bacterial suspensions and general mixing. Large capacity platform holds up to 15,9 kg. Variable speed, microprocessor control provides consistent, uniform mixing action. Ramping feature slowly increases speed to the set point for added safety. The Accu-drive shaking system delivers exceptional speed control, accuracy, safety, and durability. System continuously monitors shaking speed and will maintain the set point even under changing loads. Displayed speed is accurate to 1% of set speed. Built-in load sensor can detect an unbalanced condition and will automatically reduce min^{-1} to a safe speed to prevent spills and protect samples. Powerful triple eccentric drive and brushless motor is designed for continuous duty and is able to handle heavy loads. Spill resistant design protects internal components from accidental spills and leaks. Removable tray design allows chamber to be cleaned easily. Opti-Flow forced ventilation system uses twin induction fans and air deflectors to deliver exceptional temperature uniformity and stability. Over-temperature sensor will shut down unit and activate audible and visual alarms if temperature limit is exceeded. Temperature calibration mode allows user to calibrate unit to an external temperature device and RS232 serial port provides two-way communication for data logging and unit control.



- Three independent LED displays show speed, temperature and time
- Integral timer, 1 s to 160 h, shows elapsed time or counts down, automatic switch-off and audible alarm when programme is complete
- Microprocessor PID temperature controller maintains precise temperature from ambient +5 to 65 °C, adjustable in 1 °C increments and recalls last set points, even when unit has been shut off. Will also restart if power is interrupted
- Opti-Flow forced ventilation system and triple eccentric drive with brushless motor
- Polycarbonate lid enables samples to be viewed, without altering internal temperature. When lid is opened, automatic shut off circuit will stop shaker platform to protect operator

Delivery information: Supplied with non perforated tray, non-slip rubber mat and 2340 mm detachable power cord. Rubber mat fits into the non perforated platform tray, suitable for holding Petri dishes and cell culture flasks, required accessories must be ordered separately.

Model	Professional 3500
Internal W×D×H (mm)	305×340×241
Max. load (kg)	15,9
Orbit (mm)	19
Platform W×D (mm)	279×330
Shaking motion	Orbital
Speed (min^{-1})	15 - 300
Speed accuracy (min^{-1})	±1 below 100
Speed range (min^{-1})	15 - 300
Temperature range (°C)	Ambient +5...65
Uniformity at 37 °C (°C)	±0,5
Weight (kg)	34
W×D×H (mm)	356×648×406

Description	Pk	Cat. No.
Professional 3500 incubating shaker, EU-plug	1	444-7084
Professional 3500 incubating shaker, UK-plug	1	444-7085
Professional 3500 incubating shaker, CH-plug	1	444-7086

Description	For	Pk	Cat. No.
Accessories			
Microtube rack, PVC coated steel	1,5/2,0 ml tubes, holds 70 tubes	1	444-0276
Test tube rack, PVC coated steel	10 - 13 mm Ø tubes, holds 63 tubes	1	444-0278
Test tube rack, PVC coated steel	14 - 16 mm Ø tubes, holds 48 tubes	1	444-0279
Test tube rack, PVC coated steel	18 - 20 mm Ø tubes, holds 35 tubes	1	444-0280
Test tube rack, PVC coated steel	22 - 25 mm Ø tubes, holds 24 tubes	1	444-0281
Centrifuge tube rack, PVC coated steel	15 ml tubes, holds 35 tubes	1	444-0283
Centrifuge tube rack, PVC coated steel	50 ml tubes, holds 12 tubes	1	444-0284
Flask clamps, stainless steel	10 ml	1	444-7040
Flask clamps, stainless steel	25 ml	1	444-7041
Flask clamps, stainless steel	50 ml	1	444-7042
Flask clamps, stainless steel	125 ml	1	444-7043
Flask clamps, stainless steel	250 ml	1	444-7044
Flask clamps, stainless steel	500 ml	1	444-7045

Continued on next page

Continued from previous page

Description	For	Pk	Cat. No.
Accessories			
Flask clamps, stainless steel, maximum 4 on platform	1000 ml	1	**444-7030**
Clamps for media bottles, stainless steel	500 ml	1	**444-7035**
Clamps for media bottles, stainless steel	1000 ml	1	**444-7036**
Universal platform 330×279 mm	Standard/Advanced 3500, Incubating 3500, Advanced 3750, Professional 3500 shakers, mounting Erlenmeyer flask clamps and test tube racks	1	**444-7087**

VWR COLLECTION

2 year warranty

SELECTED FOR YOU

Shaking incubators, INCU-Line

ILS 4

ILS 6

Shaking incubators with a small footprint. The compact units feature a stackable design and expanded temperature range which makes the ILS 4 & ILS 6 ideal for molecular biology applications and general use. The integral orbital shaker means they are highly versatile. The SmartChek™ temperature control system (exclusive to the VWR Collection) guarantees precise temperature control. Mechanical convection maintains a stable temperature environment and provides quick recovery after opening the door. A safety thermostat is located on the back of the unit. The insulated door has a large, double glazed observation panel and opens to almost to180° for easy access.

- Internal electrical socket
- SmartChek™ temperature control system
- Digital display
- Stackable design saves space
- Full range of accessories available

Ordering information: Supplied without accessories, these must be ordered separately.

Model	ILS 4	ILS 6
Internal W×D×H (mm)	343×375×381	442×396×406
Orbit (mm)	19	
Shaking motion	Orbital	
Speed (min^{-1})	20 - 300	
Speed range (min^{-1})	20 - 300	
Temperature accuracy at 37 (°C)	±0,1 °C	
Temperature range (°C)	Ambient +5...80 (in 0,1 °C increments)	
Temperature Uniformity	±0,25 °C	
Timer	0 - 99 minutes/continuous	
Weight (kg)	37,7	63,6
W×D×H (mm)	425×550×580	574×544×635

Description	Pk	Cat. No.
INCU-Line ILS 4 incubating shaker, chamber volume 49 litres	1	**444-0732**
INCU-Line ILS 6 incubating shaker, chamber volume 71 litres	1	**444-0733**

Description	For	Pk	Cat. No.
Accessories			
Shaking platform, pre-drilled for clamping flasks (supplied without clamps)	ILS 4	1	**444-0834**
Flat platform, with non-slip rubber mat (300×300 mm)	ILS 4	1	**444-0835**
Flat double platform, with non-slip rubber mat	ILS 4	1	**444-0836**
Universal spring loaded clamp rack for flasks and bottles	ILS 4	1	**444-0837**
Flat platform, with non-slip rubber mat (390×330 mm)	ILS 6	1	**444-0842**
Shaking platform, pre-drilled for clamping flasks (supplied without clamps)	ILS 6	1	**444-0843**
Flask clamp, for 125 ml flasks, max. 16 on platform	ILS 4/ILS 6	1	**444-0838**
Flask clamp, for 250 ml flasks, max. 9 on platform	ILS 4/ILS 6	1	**444-0839**
Flask clamp, for 500 ml flasks, max. 5 on platform	ILS 4/ILS 6	1	**444-0840**
Flask clamp, for 1000 ml flasks, max. 4 on platform	ILS 4/ILS 6	1	**444-0841**
Platform with 4×2000 ml flask clamps	ILS 6	1	**444-0844**
Platform with 6×1000 ml flask clamps	ILS 6	1	**444-0845**
Platform with 8×500 ml flask clamps	ILS 6	1	**444-0846**

Continued on next page

Continued from previous page

Description	For	Pk	Cat. No.
Accessories			
Platform with 12×250 ml flask clamps	ILS 6	1	**444-0847**
Platform with 20×125 ml flask clamps	ILS 6	1	**444-0848**
Platform with 30×50 ml flask clamps	ILS 6	1	**444-0849**

ILS 4 accommodates 4×1000 ml, 5×500 ml, 9×250 ml or 16×125 ml and ILS 6 accommodates 4×2000 ml, 6×1000 ml, 8×500 ml, 12×250 ml or 20×125 ml or 30×50 ml flasks.

Incubating Shakers, MaxQ™ 8000
Thermo Scientific

With three times the capacity of a floor shaker in virtually the same footprint, these units are ideal for high volume research or scale-up work. They are built both for sensitive eukaryotic culture applications - with contamination-reducing HEPA filtration, coved corner design, single piece chamber, and tight temperature uniformity - and for demanding prokaryotic culture applications, with rugged construction, wide speed range, and no limits on "hard shake" speed, even when stacked three-high.

- Microprocessor control/monitoring system: Run and setpoints displayed simultaneously; tracks total accumulated time on motor and drive systems; audible/visible over and under temperature tracking alarms ensure product protection
- Control panel: Backlit 2-line, 40-character LCD alphanumeric display of actual (run) and setpoint parameters and alarm condition; icons/buttons allow easy programming of set parameters
- Construction: Electronic components and HEPA filter easily accessed from the front during regular maintenance or service
- Mechanics: Heavy duty, eccentric drive mechanism allows extended speed ranges from 25 to 400 rpm (±1 rpm) with minimal vibration, even when shakers are stacked three high

Capacity: Twelve 2 l Erlenmeyer flasks.

Delivery information: Stacking kit included with each shaker. A dedicated or universal slideout shaker platform (74,9×45,7 cm) is required but not supplied. Please contact your local VWR office for full specifications and accessories available for these systems.

Model	SHKE8000-1CE	SHKE8000-8CE
Internal W×D×H (mm)	846×605×300	
Orbit (mm)	25	
Speed range (min^{-1})	25 - 400 (±1)	
Temperature range (°C)	+10...60 °C	Ambient –5 or +20...60
Timer	Continuous or timed for 1 minute up to 199 hr 59 min	

Description	Weight (kg)	W×D×H (mm)	Model	Pk	Cat. No.
MaxQ™ 8000 stackable incubated shaker, digital	298,5	1181×846×635	SHKE8000-1CE	1	**444-0896**
MaxQ™ 8000 stackable, incubated and refrigerated shaker, digital	328	1435×846×635	SHKE8000-8CE	1	**444-0897**

Quantitation

PALL Life Sciences

Protein Detection System, fortéBIO® BLItz™

The BLItz™ system brings the benefit of label-free protein detection to individual users. With a small footprint and affordable price, the BLItz™ system detects active proteins in just a drop of sample. Using Bio-Layer Interferometry (BLI) technology to detect small changes in the number of molecules bound to a disposable biosensor, real-time binding curves can be obtained in seconds, using as little as 4 µl of sample. With the binding rate proportional to the concentration of the target molecule, the highly sensitive BLItz™ system can detect ng/ml concentrations even in crude samples in some cases.

BLItz™ measurements can be used to complement and in some cases entirely replace more labour-intensive methods to assess: Binding pair optimisation, ligand binding studies, investigation of process conditions, or quantitative and kinetics studies.

- Determine protein presence/absence instantly, analyse binding kinetics at the bench
- Quantitate proteins in seconds and develop immunoassays in minutes
- No labels needed, saving time and reagent costs
- Only small sample volume required
- Simple to operate

Type	Required capture molecule	Analyte measured	Description
Protein A (ProA)	None	Many human and other IgG types	Binds with high affinity to the Fc region of human IgGs. Binds with moderate affinity to many subtypes of mouse and rabbit IgG. Applications include quantitation of IgG in cell line development, clone selection, process optimisation and production monitoring.
Protein G (ProG)	None	Many murine and other IgG types	Binds with high affinity to the Fc region of murine, rat, goat, and bovine IgGs. Binds with moderate affinity to many subtypes of human IgG. Applications include quantitation of IgG in cell line development, clone selection, process optimisation and production monitoring.
Protein L (ProL)	None	Most mouse, rat, human IgG and Fab	Binds with high affinity to most mouse, rat and human immunoglobulins containing a kappa light chain. Does not bind goat, bovine, rabbit or sheep IgG. Applications include quantitation of FAb fragments and of IgG in serum based culture.
Anti-GST (GST)	None	GST-tagged proteins, peptides	High affinity anti-GST antibody on biosensor binds GST-tagged proteins. Applications include quantitation of GST-tagged proteins and kinetics of proteins and peptides binding to GST-tagged proteins captured on biosensor.
Anti-Human Fab-CH1 (FAB)	None	hIgG, human Fab or human F(ab')2	Binds specifically to the CH1domain of human IgG, allowing quantitation and kinetic characterisation of human Fab, F(ab')2, and IgGs with no recognition towards free light chains.
Anti-Human IgG Fc Capture (AHC)	hIgG, human Fc fusion protein	Proteins, peptides, antibody fragments	Immobilisation of human IgG or other human Fc-containing proteins by binding to the human Fc region. Kinetic applications include protein and antibody kinetic and affinity characterisation (ka, kd, KD) and epitope binning.
Anti-Human IgG Quantitation (AHQ)	None	hIgG, human Fc fusion proteins	Binds specifically to the Fc portion of human IgGs and other proteins containing a human Fc region. Applications include quantitation of human IgG and proteins containing the human Fc region in cell line development, clone selection, process optimisation and production monitoring.
Anti-Mouse IgG Fc Capture (AMC)	mIgG, mouse Fc fusion protein	Proteins, peptides, antibody fragments	Binds the Fc portion of IgG1, IgG2a and IgG2b for capture-based immobilisation. Applications include kinetic analysis of antibody-antigen interactions (ka, kd, KD) and off-rate screening. IgG3 should be evaluated on a case-by-case basis.
Anti-Murine IgG Quantitation (AMQ)	None	mIgG, rat IgG, mouse-Fab, rat Fab	Binds specifically to the Fv(ab')2 portion of mouse and rat IgGs. Applications include quantitation of mouse and rat IgG in cell line development, clone selection, process optimisation and production monitoring.
Anti-Penta-HIS (HIS)	None	His-tagged proteins, peptides	Uses the Qiagen Penta-HIS antibody to bind with high affinity HIS tagged recombinant proteins. Applications include quantitation of HIS-tagged proteins.
Ni-NTA (NTA)	None	His-tagged proteins, peptides	Nickel charged tris-NTA with strong binding to HIS-tagged recombinant proteins for kinetic measurements and quantitation.
Streptavidin (SA)	Biotin-tagged peptides, oligos, proteins	Proteins, peptides, oligos	Streptavidin-coated biosensor. Immobilises biotinylated antibodies, proteins and nucleic acids to form a stable surface. Quantitation applications include antibody and protein quantitation in cell line development, clone selection, process optimisation and production monitoring. Kinetic applications include protein and antibody kinetic and affinity analysis (ka, kd, KD), and epitope binning.
Amine Reactive (AR2G)	Proteins, peptides, oligos	Proteins, antibody fragments	Second generation carboxylate functionalised surface allows covalent coupling of proteins via EDC/s-NHS mediated amide bond formation. Kinetic applications include protein and antibody kinetic and affinity characterisation (ka, kd, KD). Requires AR2G Assay Kit (P/N 18-5095).
Aminopropylsilane (APS)	Proteins, peptides	Proteins, peptides	Adsorption of proteins and membrane fractions through hydrophobic moieties. Kinetic applications include adsorption of proteins and membrane fractions through hydrophobic moieties for kinetic and affinity analysis (ka, kd, KD).

Continued on next page

Continued from previous page

Description	Pk	Cat. No.
BLItz™ system		
BLItz™ system	1	**733-2135**
Biosensors for use with the BLItz™ system		
Biosensor, Protein A (ProA), tray of 96	1	**733-2137**
Biosensor, Protein G (ProG), tray of 96	1	**733-2138**
Biosensor, Protein L (ProL), tray of 96	1	**733-2139**
Biosensor, Anti-GST (GST), tray of 96	1	**733-2144**
Biosensor, Anti-Human FAB-CH1 (FAB), tray of 96	1	**733-2140**
Biosensor, Anti-Human IgG Fc Capture (AHC), tray of 96	1	**733-2148**
Biosensor, Anti-Human IgG Quantitation (AHQ), tray of 96	1	**733-2136**
Biosensor, Anti-Mouse IgG Fc Capture (AMC), tray of 96	1	**733-2147**
Biosensor, Anti-Mouse IgG Quantitation (AMQ), tray of 96	1	**733-2141**
Biosensor, Anti-Penta-HIS (HIS), tray of 96	1	**733-2143**
Biosensor, Ni-NTA (NTA), tray of 96	1	**733-2142**
Biosensor, Streptavidin (SA), tray of 96	1	**733-2145**
Biosensor, Amine Reactive (AR2G), tray of 96	1	**733-2146**
Biosensor, Aminopropylsilane (APS), tray of 96	1	**733-2149**
Reagents for use with the BLItz™ system		
BLItz™ reagent, IgG calibrators, standard range set, concentration range 1 to 100 µg/ml	1	**733-2151**
BLItz™ reagent, IgG calibrators, extended range set, concentration range 1 to 700 µg/ml	1	**733-2152**
BLItz™ reagent, kinetics buffer 10X	50 ml	**733-2153**
BLItz™ reagent, amine coupling 2G reagent kit	1 KIT	**733-2154**
BLItz™ reagent, sample diluent, 50 ml	50 ml	**733-2150**
BLItz™ reagent, sample diluent with ProClin® 300	50 ml	**733-2155**

Description	Pk	Cat. No.
Accessories		
BLItz™ biosensor dispenser	1	**733-2156**
BLItz™ lamp change kit	1	**733-2159**
BLItz™ depot service agreement	1	**733-2158**

Order number index

Cat No.	Page
1	
0106-100G	54
0106-250G	54
0167-10KG	56
0167-12KG	56
0167-1KG	56
0167-50KG	56
0167-5KG	56
0188-12KG	57
0188-1KG	57
0188-2.5KG	57
0188-500G	57
0188-50KG	57
0188-5KG	57
0192-1KG	55
0192-500G	55
0226-12KG	57
0226-1KG	57
0226-2.5KG	57
0226-50KG	57
0226-5KG	57
0230-EU-100G	44;45
0304-10G	44;46
0304-5G	44;46
0339-EU-100G	44;45
0339-EU-25G	44;45
0374-1KG	55
0374-500G	55
0382-EU-100G	44;47
0382-EU-50G	44;47
0408-EU-10G	44;47
0408-EU-25G	44;47
0421-1KG	55
0422-EU-25G	44;47
0558-EU-25G	44;47
0637-100G	57
0637-250G	57
0637-500G	57
0677-250G	44
0677-50G	44
0793-1G	41;87
0793-500MG	41;87
0793-5G	41;87
101-01N	64
101-10N	64
101-40N	64
101B-010N	64
102-01N	67
102-05N	67
103-01N	67
103-05N	67
105-05N	68
106-05N	68
108-01N	67
108-05N	67
114-01	64
114-07	64
114-15	64
114-75	64
114-75C	64
115-010	67
115-01L	67
115-375	67
116-001	66
116-010	66
116-100	66
135-1366	235
135-1368	235
135-1370	235
135-1372	235
135-1375	235
135-1382	235
135-1692	233
135-1704	233
135-1705	233
135-1706	233
135-1707	233
135-1708	233
135-1709	233
135-1710	233
135-1711	233
135-1712	233
135-1713	233
135-1714	233
135-1715	233
135-1716	233
135-1717	233
135-1718	233
135-1719	233
135-1720	233
135-1721	233
135-1722	233
135-1723	233
135-1724	233
135-1725	233
135-1726	233
135-1727	233
135-1728	233
135-1729	233
135-1730	233
135-1865	234
135-1866	234
135-1867	234
135-1868	234
135-1869	234
135-1870	234
135-1871	234
135-1872	234
1500-100	6
1500-500	6
1600-500	6
17-0891-01	39
17-0891-02	39
17-0891-09	39
17-1440-02	39
17-1440-03	39
17-5442-02	40
17-5442-03	40
17-5445-01	39
17-5445-02	39
17-5446-02	40
17-5446-52	40
1B1184-100G	57
1B1184-1KG	57
1B1184-500G	57
2	
201-10G	65
201-50G	65
202-10G	65
203-10G	66
205-10G	66
206-10G	66
211-0139	202
214-0137	128
214-0138	128
214-0139	128
214-0140	128
214-0141	128
214-0142	128
214-1925	128
214-1926	128
214-1927	128
214-1928	128
214-7107	127
214-7108	127
214-7109	127
214-7110	127
214-7206	128
214-7207	128
214-7208	128
214-7209	128
214-7210	128
214-7211	128
214-7212	128
214-7213	128
214-7214	128
214-7215	128
215-6700	160
216-0331	165
216-0443	205
216-0444	205
216-0445	205
216-0446	205
216-0447	205
216-0448	205
216-0449	205
216-0458	205
216-0945	207
216-0946	207
216-0947	207
216-0948	207
216-0949	207
216-0950	207
216-0951	207
216-0952	207
216-0953	207
216-0954	207
216-0955	207
216-0956	207
216-0957	207
216-0958	207
216-0959	207
216-0960	207
216-0961	207
216-0968	207
216-0970	207
216-0971	207
216-0973	207
216-0974	207
3	
30002.	87
30006.	87
30007.	87
30017.	88
30018.	88
30019.	87
30020-1	87
30020-2	87
30021.	42
30022.	42
30023.	42
30024.	42
30025-1	87
30025-2	87
30026.	87
30050.	88
30070.	42
390-0321	229
390-0322	229
390-0343	165
390-0344	165
390-0345	165
390-0672	229
390-0673	229
390-0674	229
390-0812	228;229
390-0813	228
390-0814	228
390-0815	229
390-0816	229
390-0817	229
390-0818	230
390-0819	230
390-0820	230
390-0821	230
390-0822	230
390-0823	230
390-0824	230
390-0825	230
390-0826	230
390-0827	230
390-0828	230
390-0829	230
390-0830	230
390-0831	229;230
390-0832	229
390-0833	230
390-0834	230
390-0835	230
390-0836	230
390-0837	230
390-0838	229
390-0839	229
390-0840	230
390-0841	230
390-0842	230
390-0843	230
390-0844	230
390-0845	229
390-0846	229
390-0847	230
390-0848	230
390-0849	230
390-0850	230
390-1000	228
390-1003	228
390-1004	228
390-1005	228
390-1006	228
390-1007	228
390-1008	228
390-1009	228
390-1012	228
390-1013	228
390-1014	228
390-1015	228
391-0000	155
391-0006	134
391-0108	169
391-0109	169
391-0283	105
391-0284	105
391-0286	105
391-0294	105
391-0295	105
391-0296	105
391-0297	105
391-0298	105
391-0299	105
391-0314	105
391-0315	105
391-0316	105
391-0317	105
391-0318	105
391-0319	105
391-0321	105
391-0322	105
391-0323	105
391-0475	169
391-7122	160
391-7123	160
391-7124	160
391-7125	160
391-7126	160
391-7127	160
391-8036	136
391-8055	151
391-8119	165
391-8339	165
392-0213	135
392-0214	135
392-0215	135
392-0286	159
392-0292	127
392-0293	165
392-0294	165
392-0295	165
392-0303	165
392-0307	159

Cat No.	Page
392-0308	161
392-0309	161
392-0310	158
392-0319	60;192
392-0320	56;59
392-0322	149
392-0323	170
392-0324	28;209
392-0326	160
392-0327	160
392-0328	165
392-0329	165
392-0330	165
392-0331	165
392-0332	165
392-0333	165
392-0334	170
392-0335	159;160
392-0336	159
392-0337	159
392-0338	159
392-0339	160
392-0340	160
392-0341	160
392-0342	160
392-0343	160
392-0344	160
392-0345	160
392-0346	237
392-0347	237
392-0348	237
392-0349	236
392-0350	236
392-0351	236
392-0352	236
392-0353	236;237
392-0354	236;237
392-0355	236;237
392-0356	236;237
392-0607	185
392-0608	185
392-0609	185
392-0610	185
392-0611	185
392-0612	187
392-0613	187
392-0614	187
392-0615	177
392-0616	177
392-1000	166
392-1007	166
392-1008	166
392-2502	60;192
392-2505	56;59

4

40060.	42
40060-1	42
40060-T	42
40061.	42
40061-1	42
40061-T	42
403-05	66
409-01	65
409-10	65
409-50	65
410-002	64
410-015	64
410-060	64
412-0167	252
412-0168	252
412-0169	252
412-0170	252
412-0171	252
412-0172	252
412-0173	252
412-0174	252
412-0175	252
412-0176	252
412-0177	252
412-0178	252
412-0179	252
412-0180	252
412-0181	252
412-0182	252
412-0183	252
412-0184	252
412-0185	252
412-0186	252
412-0187	252
412-0188	252
412-0189	252
412-0190	252
412-0191	252
412-0192	252
412-0193	252
412-0199	252
412-0200	252
412-0201	252
412-0202	252
412-0212	252
431-0109	251
431-0110	251
431-0111	251
431-0112	251
431-0124	251
431-0125	251
431-0170	253;254
431-1006	251
432-0140	253
432-0141	253
432-0142	253
432-0143	254
432-0144	254
432-0145	254
432-0160	253
432-0178	253
432-0239	254
432-0240	254
432-0241	254
432-0242	254
432-0243	254
432-0244	254
432-0245	254
432-0246	254
432-0247	254
432-0248	254
432-0249	254
432-3750	253
432-3751	253
432-3752	253
432-3753	253
432-3754	253
432-3755	253
432-3756	253
432-3757	253
432-3760	253
432-3761	253
442-0774	258
442-0775	258
442-0776	258
442-0777	258
442-0778	258
442-0779	258
442-0780	258
442-0781	258
442-0782	258
442-0789	258
442-0790	258
442-0791	258
442-0792	258
442-0834	257
442-0835	257
442-0836	257
442-2043	251
444-0268	258
444-0269	258
444-0272	260
444-0273	260
444-0274	259
444-0275	259
444-0276	259;260;261;262
444-0277	259
444-0278	259;261
444-0279	259;261
444-0280	259;261
444-0281	259;261
444-0282	259
444-0283	259;261
444-0284	259;261
444-0514	259
444-0565	259
444-0732	262
444-0733	262
444-0799	260;261
444-0807	261
444-0808	261
444-0809	260;261
444-0810	261
444-0811	261
444-0834	262;263
444-0835	262
444-0836	262
444-0837	262
444-0838	262
444-0839	262
444-0840	262
444-0841	262
444-0842	262
444-0843	262
444-0844	262
444-0845	262
444-0846	262
444-0847	263
444-0848	263
444-0849	263
444-0896	263
444-0897	263
444-1019	220
444-7030	262
444-7035	259;262
444-7036	262
444-7040	259;261;262
444-7041	259;261
444-7042	259;261
444-7043	259;261
444-7044	259;261
444-7045	259;261
444-7082	260
444-7083	259
444-7084	261
444-7085	261
444-7086	261
444-7087	262
444-7093	258
444-7121	256
444-7122	256
444-7123	256
444-7124	256
444-7125	257
444-7126	257
444-7127	256;257
444-7128	257
444-7129	257
471-0000	205
471-0001	205
471-0002	205
471-0003	205
478-0239	201
478-0240	201
478-0243	201
478-0244	201
478-0245	201
478-0246	201
478-0247	201
478-0248	201
478-0249	201
478-0252	201
478-0253	201
478-0254	201
478-0255	201
478-0256	201
478-0257	201
478-0274	213
478-0275	213
478-0279	213
478-0280	213
478-0324	213
478-0329	213
478-0330	213
478-0331	213
478-0332	213
478-0352	213
478-0353	213
478-0354	213
478-0355	213
478-0356	213
478-0367	213
478-5401	214
478-5402	214
478-5404	214
478-5410	214
479-0009	197
479-0010	197
479-0075	202
479-0076	202
479-0077	202
479-0078	202
479-0272	206
479-0273	206
479-0275	206
479-0276	206;208
479-0277	206
479-0278	206
479-0293	206
479-0294	206
479-0295	206
479-0296	206;208
479-0399	208
479-0467	208
479-0468	208
479-0469	208
479-0470	200;201
479-0471	200
479-0472	200
479-0473	200
479-0474	200
479-0475	200
479-0476	200
479-0477	200
479-0482	200
479-0483	200
479-0484	200
479-0485	200
479-0486	200
479-0487	200
479-0488	200
479-0489	201
479-0490	208
479-0492	203
479-0493	206
479-0494	206;208
479-0581	200
479-0588	199
479-0589	200
479-0590	200
479-0591	200
479-0592	200
479-0593	200
479-0594	200
479-0640	203
479-0641	204

Order number index

Cat No.	Page
479-0642	204
479-0643	204
479-0803	202
479-0804	196
479-0805	196
479-0806	196
479-0807	196
479-0808	196
479-0809	196
479-0810	196
479-0811	196
479-0812	196
479-0813	196
479-0814	196
479-0815	196
479-0882	201
479-0883	201
479-0891	201
479-0892	201
479-0893	201
479-0894	201
479-0927	208
479-0928	208
479-0935	208
479-0936	208
479-0941	206
479-0942	206
479-0943	206
479-0944	206
479-0946	206
479-0949	208
479-0950	208
479-0951	208
479-0952	208
479-0953	208
479-0954	206
479-0956	208
479-0957	206
479-0958	206
479-0959	206
479-0960	206
479-0961	206
479-0962	206
479-0963	206
479-0964	206
479-0965	208
479-0966	203
479-0967	203
479-0987	203
479-0988	203
479-0989	203
479-0991	203
479-0992	203
479-1012	203
479-1015	198;199
479-1016	198
479-1017	198
479-1020	198
479-1021	198
479-1022	198
479-1023	198
479-1024	198
479-1025	198
479-1026	198
479-1027	198
479-1028	198
479-1029	198
479-1030	199
479-1031	199
479-1032	199
479-1033	199
479-1034	199
479-1035	199
479-1036	199
479-1037	199
479-1038	199
479-1039	199
479-1040	198
479-1041	198
479-1042	198
479-1045	198
479-1046	198
479-1047	198
479-1048	198
479-1049	198
479-1050	198;199
479-1051	198
479-1052	199
479-1053	199
479-1054	199
479-1055	199
479-1056	198
479-1057	199
479-1058	199
479-1059	199
479-1060	199
479-1061	198
479-1062	198
479-1063	198
479-1065	198
479-1066	198
479-1070	200
479-1072	200
479-1073	200
479-1074	200
479-1075	200
479-1076	200
479-1077	199;200
479-1078	200
479-1079	200
479-1080	200
479-1081	200
479-1082	200
479-1083	200
479-1084	200
479-1085	200
479-1086	200
479-1087	200
479-1088	200
479-1089	200
479-1157	203
479-1159	197
479-1169	201
479-1170	201
479-1171	201
479-1172	201
479-1178	204
479-1179	204
479-1180	204
479-1181	204
479-1182	204
479-1207	196
479-1208	196
479-1209	196
479-1210	196
479-1217	196
479-1218	196
479-1219	196
479-1220	196
479-1235	196
479-1236	196
479-1237	196
479-1238	196
479-1239	196
479-1240	196
479-1251	196
479-1252	196
479-1253	196
479-1254	196
479-1255	196
479-1256	196
479-1257	196
479-1258	196
479-1259	196
479-1260	196
479-1261	196
479-1262	196
479-1263	196
479-1264	196
479-1265	196
479-1266	196
479-1296	208
479-1297	208
479-1298	206
479-1299	207
479-1300	207
479-1301	207
479-1302	207
479-1303	207
479-1304	207
479-1305	207
479-1306	207
479-1326	199
479-1327	199
479-1328	199
479-1329	200
479-1330	199
479-1331	200
479-1332	206
479-1337	198
479-1338	199
479-1339	199
479-1340	199
479-1341	199
479-1342	199
479-1343	199
479-1344	199
479-1345	200
479-1346	199
479-1347	199
479-1348	199
479-3200	203
479-3221	197
479-3222	197
479-3223	197
479-3460	205
479-3461	205
479-6816	197
479-6836	197
479-6837	197
479-6838	197
479-6839	197
479-6840	197
479-6841	197
479-6842	197
479-6843	197
479-6844	197
479-6845	197
479-6846	197
479-6847	197
479-6848	197
479-6849	197
479-6850	197
479-6852	197
479-6853	197
479-6854	200
479-6855	200
479-6857	200
5	
501-01	68
501-04	68
513-3344	113
513-3345	113
513-3346	112
513-3347	112
513-3348	112
513-3349	112
513-3354	112
513-3355	112
513-3356	112
513-3357	112
513-3358	112
513-3359	112
513-3360	113
513-3361	113
513-3362	113
514-0023	111
514-0024	111
514-0025	111
514-0026	111
514-0027	111
514-0028	111
514-0029	111
514-0030	111
514-0031	111
514-0032	111
514-0033	111
514-0034	111
514-0049	92
514-0060	93
514-0061	93
514-0062	93
514-0063	93
514-0072	93
514-0073	93
514-0074	93
514-0075	93
514-0101	96
514-0168	112
514-0169	112
514-0248	116
514-0296	104;105
514-0297	104
514-0298	104
514-0299	104
514-0300	104
514-0301	104
514-0302	104
514-0303	104
514-0304	105
514-0305	104
514-0306	104
514-0307	105
514-0308	104
514-0309	104
514-0317	104
514-0318	104
514-0319	105
514-0324	105
514-0328	106
514-0329	106
514-0330	106
514-0331	106
514-0332	106
514-0333	106
514-0334	106
514-0335	106
514-0336	106
514-0337	106
514-0338	106
514-0339	106
514-0340	106
514-0341	106
514-0342	106
514-0343	106
514-0344	106
514-0345	106
514-0346	106
514-0347	106
514-0348	104
514-0349	104
514-0350	104
514-0354	104
514-0355	104
514-0358	105
514-0359	104
514-0360	104
514-0362	104
514-0363	104;105
514-0364	104
514-0365	104

Cat No.	Page
514-0366	104
514-0367	104
514-0378	111
514-0490	96
514-0537	96
514-0538	96
514-0541	95;96
514-0542	96
514-0590	111
514-0612	111
514-0613	111
514-0614	111
514-1111	96
514-1112	96
514-1113	96
514-1114	96
514-1115	96
514-1117	96
514-1121	96
514-1123	96
514-1124	96
514-1125	96
514-1126	96
514-1127	96
514-1140	96
514-1141	96
514-1224	97
514-1226	97
514-1228	97
514-1231	97
514-4011	95
514-4086	116
514-4094	115
514-4097	115
514-4098	116
514-4102	94
514-4107	97
514-4108	98
514-4109	98
514-4110	98
514-4111	98
514-4114	97
514-4115	98
514-4117	97
514-4118	97
514-4119	94
514-4122	94
514-4123	94
514-4124	94
514-4125	94
514-4126	94
514-4127	94
514-4128	94
514-4130	94
514-4131	94
514-4132	94
514-4133	94
514-4227	97
514-4228	97
514-4238	95
514-8039	96
515-0001	117
515-0002	117
515-0003	117
515-0004	117
515-0009	114
515-0010	114
515-0011	114
515-0012	107
515-0013	107
515-0014	107
515-0015	107
515-0016	107
515-0017	107
515-0018	107
515-0019	107
515-0107	117
515-0110	117
515-0112	117
515-0113	99
515-0116	120
515-0117	120
515-0118	120
515-0119	120
515-0120	120
515-0121	120
515-0122	120
515-0123	120
515-0124	120
515-0125	98
515-0126	117
515-0127	117
515-0155	107
515-2001	92
515-2005	92
515-2006	92
515-2007	92
515-2028	92
515-2029	92
515-2030	92
515-2048	93
515-2049	93
515-2051	93
515-2075	92
515-2077	92
515-2078	92
515-2079	92
515-2080	92
515-2081	92
515-2087	92
516-0186	120
516-0187	120
516-0205	120
516-0206	120
516-0354	119
516-0355	119
516-0356	119
516-0357	119
516-0358	119
516-0359	119
516-0360	119
516-0361	119
516-0362	119
516-0363	119
516-0364	119
516-0365	119
516-0366	118;119
516-0367	119
516-0368	119
516-0369	119
516-0370	118
516-0371	118
516-0372	118
516-0373	119
516-0374	119
516-0375	119
516-0376	119
516-0377	119
516-0378	118;119
516-0381	119
516-0382	119
516-0383	119
516-0442	117
516-0483	118;119
516-0484	119
516-0485	118
516-0581	119
516-0584	118
516-1104	99
516-1105	99
516-4441	117
516-4532	92
516-4533	92
516-4549	92
516-4552	92
516-6879	120
516-6880	120
516-6881	120
516-6919	107
516-6942	115
516-6943	115
516-6946	116
516-6947	116
516-6948	116
516-6949	116
516-6950	116
516-6951	116
516-7542	117
516-7543	117
516-7544	117
516-7545	117
516-7600	98
516-7627	98
516-7628	98
516-7654	94
516-7717	95
516-8157	120
516-8159	119
516-8160	119
516-8161	119
516-8162	119
516-8480	118
516-8481	118
516-8490	118
516-8491	118
516-8492	118
516-8500	120
516-8501	118
516-8502	118
516-8503	118
516-8511	120
516-8519	118
516-8520	118
516-8521	118
516-8529	120
516-8530	118
516-8531	118
516-8532	118
516-8540	120
516-8934	98
516-8971	95
516-8972	95
516-8973	95
516-9342	119
516-9472	120
516-9812	107
516-9813	107
516-9919	119
516-9920	118;119
518-0022	102
518-0023	102
518-0024	102
518-0026	100
518-0027	104
518-0028	104
518-0029	104
518-0030	101
518-0031	101
518-0032	104
518-0051	103
518-0052	103
518-0075	120
521-1409	256
521-1410	256
521-1418	255
521-1419	255
521-1646	254
521-1647	254
521-1749	255
521-1750	255
521-1751	256
521-1752	256
525-0122	156
525-0123	156
525-0144	223
525-0400	153
525-0401	153
525-0402	153
525-0403	153
525-0416	153
525-0417	153
525-0418	153
525-0447	153
525-0448	153
525-0449	153
525-0450	153
525-0477	154
525-0478	154
525-0479	154
525-0480	154
525-3409	113
525-3412	154
525-3413	154
525-3414	154

6

Cat No.	Page
612-1240	219
612-1243	219
612-1245	219
612-1248	219
612-1270	219
612-1271	219
612-1274	219
612-1276	219
612-1279	219
612-1288	219
612-1289	219
612-1290	219
612-1291	219
612-1600	219
612-1962	218
612-1963	218
612-1964	218
612-1967	218
612-2625	218
612-2626	218
612-2627	218
612-2628	218
612-2881	218
612-2882	218
612-2883	218
612-2884	218
612-3678	218
612-3679	218
612-3681	218
612-3695	219
612-3696	219
612-3697	219
612-3698	219
612-3699	219
612-3700	219
612-3701	219
612-3702	219
612-3703	219
612-3704	219
612-3705	219
612-3707	219
612-3720	220
612-3982	219
612-4220	222
612-4221	222
612-4222	222
612-4223	222
612-4224	222
612-4225	222
612-4552	218
612-4553	218
612-4753	218
612-4843	218
612-5123	220
612-5124	220
612-5125	220

Order number index

Cat No.	Page
612-5126	220
612-5127	220
612-5128	220
613-0238	223
613-0241	223
613-0242	223
613-0255	223
613-0260	223
613-0272	223
613-0300	223
613-0337	223
613-0338	223
613-0339	223
613-0340	223
613-0342	223
613-0344	223
613-0721	223;224
613-0723	224
613-0725	224
613-0727	223
613-0729	224
613-0731	224
613-0732	223
613-0735	223
613-0737	224
613-0738	224
613-0740	224
613-0742	224
613-0744	224
613-0831	223
613-1488	222
613-1489	222
613-1490	222
613-1491	222
613-1492	222
613-1493	222
613-1628	222
613-1646	223
613-2000	99;100
613-2001	99
613-2002	99
613-2003	99
613-2004	99
613-2005	99
613-2006	99
613-2007	99
613-2008	99
613-2009	99
613-2010	99
613-2033	99
613-2034	99
613-2035	99
613-2036	99
613-2037	99
613-2038	99
613-2104	223
613-2105	223
613-2106	223
613-2107	224
613-2108	224
613-2109	223
613-2110	224
613-2151	99;100
613-2152	99
613-2153	99
613-2155	99
613-2157	100
613-2159	100
613-2160	100
613-2161	100
613-2162	100
613-2163	100
613-2213	226
613-2214	226
613-2215	226
613-2216	226
613-2221	226
613-2222	226
613-2223	226
613-2224	226
613-2225	226
613-2226	226
613-2266	99
613-2267	100
613-2268	100
613-6015	225
613-6016	225
613-6017	225
613-6018	225
613-6019	225
613-6020	225
613-6021	225
613-6022	225
613-6023	225
613-6024	225
613-6025	226
613-6026	226
613-6029	226
613-6030	226
613-6031	226
613-6032	226
613-6033	226
613-6034	226
613-6035	226
613-6036	226
620-1814	216
620-1815	216
620-1822	214
620-1823	214
620-1827	214
620-1859	216
620-1860	216
620-1861	216
620-1863	216
620-1929	215
620-1930	215
620-1931	215
620-1932	215
620-1934	215
620-1935	215
620-1941	215
620-1944	215
620-1945	215
620-1946	215
620-1947	215
620-1948	215
620-1976	214
620-1977	214
620-1978	214
620-1979	214
620-2224	230
620-2226	230
620-2227	230
620-2755	230
620-2757	230
630-0162	246;247
630-0456	243
630-1030	245
630-1031	245
630-1032	245
630-1121	245
630-1122	245
630-1123	245
630-1124	245
630-1138	247
630-1139	247
630-1140	247
630-1148	247
630-1175	241
630-1176	243
630-1224	244
630-1225	244
630-1226	244
630-1255	240
630-1269	244
630-1287	240;243
630-1289	240;243
630-1290	240;243
630-1291	240;243
630-1316	242
630-1317	242
630-1319	242
630-1320	240;242
630-1338	240
630-1364	242
630-1366	242
630-1367	242
630-1368	242
630-1369	242
630-1370	242
630-1371	242
630-1372	242
630-1373	242;243
630-1374	242
630-1376	242
630-1377	242
630-1378	243
630-1379	243
630-1380	242
630-1381	243
630-1383	242
630-1385	243
630-1386	242
630-1387	242
630-1401	244
630-1456	240;242
630-1457	241
630-1458	241
630-1471	240;243
630-1484	245
630-1489	245
630-1490	245
630-1497	245
630-1498	245
630-1500	242
630-1501	242
630-1502	242
630-1503	240;242
630-1504	244
630-1507	86
630-1508	84
630-1513	246
630-1515	246
630-1516	246
630-1517	246
630-1518	246
630-1519	246
630-1520	246
630-1541	84
630-1575	241
630-1645	239
630-1650	239
630-1746	239
630-1747	239
630-1748	239
630-1749	239
630-1756	238
630-1757	242
630-1758	242
630-1759	241
630-1760	241
630-1761	241
630-1762	241
630-1763	241
630-1764	241
630-1765	241
630-1766	242
630-1767	241
630-1768	241
630-1769	242
630-1824	239
630-1825	239
630-1826	239
630-1827	239
630-1828	240
630-1829	240
630-1830	240
630-1840	247
630-1848	246
630-1858	247
630-1888	247
630-1937	238
630-1938	238
630-1940	238
630-1941	238
630-1967	238
630-1968	238
630-1969	238
630-1970	238;239
630-1971	238
630-1972	238
630-1973	239
630-1974	239
630-1975	239
630-1976	239
630-1977	239
630-1978	239
630-1979	239
630-1980	239
630-1981	239
630-1982	239
630-1983	239
630-2034	247
630-2035	247
630-2044	240
630-2079	241
630-2080	241
630-2132	240;243
630-2133	239
630-2134	239
630-2135	239
630-2136	239
630-2137	240
630-2138	240
630-2140	240
630-2145	244
630-2146	244
630-2150	244
630-2151	244
630-2152	241
630-2289	244
631-0695	85
631-0696	85
631-0697	85
631-0920	84
631-0921	84
631-0923	85
631-0926	86
631-0929	86
631-0975	84
661-0154	236
662-0520	250
662-1267	250
662-1346	250
662-1347	250
662-1378	249
662-1672	250
662-1673	250
662-1674	250
662-1675	250
662-1676	250
662-1677	250
662-1678	250
662-1679	250
662-1680	250
662-1681	250
662-2863	250
662-2864	250
662-2865	250
662-2866	250
662-6063	250
662-6069	250

Cat No.	Page
662-6070	250
662-6095	250
662-6096	250
662-6109	250
662-6135	250
662-6174	250
663-0086	248
7	
700-1783	114
700-1785	114
700-1786	114
700-1787	114
702-250	64
702-50	64
704-10	66
705-0745	236
705-0746	236
705-0747	236
705-0748	236
710-0979	236
710-0980	236
710-0981	236
710-0982	236
710-0983	236
710-0984	236
710-0985	236
710-0986	236
720-1898	85
731-1011	79
731-1012	78;79
731-1013	78
732-0020	79
732-0021	79
732-0023	79
732-0345	78;80
732-0476	78;80
732-0477	78;80
732-0479	78;80
732-0480	78;80
732-0481	78;80
732-0516	224
732-0517	224
732-0528	224
732-0534	224
732-0541	224
732-0543	224
732-0610	224
732-0611	224
732-0779	79
732-0799	224
732-0800	224
732-0801	224
732-1102	224
732-1103	224
732-1135	79
732-1136	79
732-1137	79
732-1486	224
732-1487	224
732-1488	224
732-1489	224
732-1490	224
732-1491	224
732-1622	226
732-1623	226
732-1626	226
732-1627	226
732-1649	142;143
732-1650	142
732-1651	142
732-1652	142
732-1653	142
732-1654	142
732-1655	142
732-1656	142
732-1657	142
732-1658	142
732-1659	143
732-1660	143
732-1661	143
732-1662	143
732-1663	143
732-1664	143
732-1665	143
732-1666	143
732-1668	143
732-1669	143
732-1670	143
732-1671	143
732-1672	143
732-1673	143
732-1674	143
732-1675	143
732-1676	143
732-1677	143
732-1678	143
732-1679	143
732-1680	143
732-1681	143
732-1682	143
732-1683	143
732-1684	142
732-1685	142
732-2195	134
732-2365	78
732-2376	78
732-2385	224
732-2603	165
732-2606	165
732-2609	152
732-5052	226
732-5053	226
732-5054	226
732-5055	226
732-5538	136
733-2135	265
733-2136	265
733-2137	265
733-2138	265
733-2139	265
733-2140	265
733-2141	265
733-2142	265
733-2143	265
733-2144	265
733-2145	265
733-2146	265
733-2147	265
733-2148	265
733-2149	265
733-2150	265
733-2151	265
733-2152	265
733-2153	265
733-2154	265
733-2155	265
733-2156	265
733-2158	265
733-2159	265
734-0000	155
734-0001	156
734-0002	155
734-0003	155
734-0004	155
734-0009	123;124
734-0010	123
734-0012	124
734-0014	124
734-0019	134
734-0020	134
734-0023	134
734-0025	134
734-0027	134
734-0028	134
734-0031	123
734-0032	146
734-0033	146
734-0034	146
734-0035	146
734-0036	146
734-0037	146
734-0038	146
734-0040	146
734-0041	146
734-0042	146
734-0043	123
734-0044	123
734-0045	123
734-0046	123
734-0047	124
734-0049	124
734-0050	124
734-0051	146
734-0052	146
734-0053	146
734-0054	134
734-0055	134
734-0056	134
734-0057	134
734-0058	134
734-0060	146
734-0061	146
734-0062	146
734-0063	146
734-0065	146
734-0066	146
734-0067	146
734-0068	169
734-0070	129
734-0071	129
734-0072	129
734-0073	124
734-0074	124
734-0075	124
734-0076	124
734-0077	134
734-0078	134
734-0079	134
734-0080	136
734-0085	61;192
734-0088	150
734-0089	150
734-0090	122
734-0091	123
734-0092	123
734-0093	123
734-0094	123
734-0095	158;159
734-0096	159
734-0097	193
734-0098	193
734-0099	60;192
734-0100	60;192
734-0101	61;192
734-0103	61;192
734-0104	60;192
734-0105	60;192
734-0106	61;192
734-0107	193
734-0108	179
734-0110	180
734-0112	184
734-0114	179
734-0115	179
734-0116	180
734-0117	184
734-0118	184
734-0120	178
734-0121	178
734-0125	179
734-0126	179
734-0127	179
734-0146	178
734-0151	178
734-0158	174
734-0159	174
734-0161	174
734-0162	176
734-0166	179
734-0168	184
734-0170	179
734-0172	184
734-0174	178
734-0175	178
734-0176	178
734-0179	179
734-0180	175
734-0181	175
734-0182	174
734-0184	175
734-0185	174
734-0188	175
734-0189	175
734-0190	174
734-0196	185
734-0206	186
734-0208	187
734-0213	185
734-0219	185
734-0220	186
734-0221	185
734-0237	178
734-0241	186
734-0242	187
734-0243	186
734-0245	178
734-0247	175
734-0248	179
734-0249	179
734-0250	178
734-0257	178
734-0258	178
734-0259	178
734-0260	178
734-0261	179
734-0262	179
734-0263	179
734-0264	179
734-0266	124
734-0267	124
734-0268	194
734-0269	194
734-0270	194
734-0271	194
734-0272	194
734-0273	194
734-0274	179
734-0276	179
734-0277	179
734-0286	178
734-0289	174
734-0290	174
734-0291	174
734-0292	174
734-0293	176
734-0295	179
734-0296	179
734-0297	221
734-0298	178
734-0299	178
734-0300	178
734-0303	179
734-0305	221
734-0307	221
734-0310	221
734-0311	174
734-0312	174
734-0313	221
734-0314	221
734-0315	221
734-0316	178

Order number index

Cat No.	Page
734-0317	178
734-0319	179
734-0320	179
734-0321	178
734-0322	184
734-0325	178
734-0326	178
734-0327	178
734-0328	178
734-0329	179
734-0330	179
734-0331	179
734-0332	179
734-0335	221
734-0336	221
734-0337	221
734-0338	221
734-0340	221
734-0343	221
734-0344	221
734-0345	221
734-0347	221
734-0350	221
734-0351	221
734-0352	221
734-0355	221
734-0370	147
734-0371	147
734-0374	147
734-0375	147
734-0376	147
734-0377	147
734-0385	126
734-0386	126
734-0387	126
734-0396	134
734-0397	146
734-0398	169
734-0401	150
734-0402	150
734-0418	174
734-0419	174
734-0420	184
734-0435	155;156
734-0436	155
734-0438	155
734-0439	156
734-0440	156
734-0441	156
734-0442	156
734-0443	156
734-0444	156
734-0445	156
734-0446	156
734-0447	156
734-0448	153
734-0449	153
734-0450	153
734-0451	153
734-0452	153
734-0453	153
734-0454	153
734-0488	220
734-0884	130
734-0885	130
734-0947	137;140
734-0948	137;140
734-0949	137;140
734-0954	137;140
734-0955	137;140
734-0956	137;140
734-0957	124
734-0964	124
734-0985	156
734-0986	156
734-0987	153
734-0988	153
734-0989	156
734-0991	136
734-0992	136
734-0993	136
734-0994	137
734-1014	163
734-1015	163
734-1016	163
734-1017	163
734-1031	124
734-1038	163
734-1039	163
734-1040	163
734-1041	163
734-1053	186
734-1066	124
734-1067	124
734-1068	124
734-1074	177
734-1075	177
734-1076	177
734-1084	60;192
734-1085	60;192
734-1095	146
734-1096	60;192
734-1097	60;192
734-1098	61;193
734-1099	61;193
734-1100	194
734-1101	194
734-1102	60;193
734-1108	164
734-1109	164
734-1110	164
734-1111	126
734-1121	178
734-1122	178
734-1123	178
734-1124	178
734-1128	178
734-1129	179
734-1130	179
734-1131	179
734-1132	179
734-1133	179
734-1134	179
734-1136	179
734-1147	136
734-1175	169
734-1183	184
734-1185	184
734-1187	184
734-1188	184
734-1189	131
734-1197	163
734-1200	139
734-1205	164
734-1206	123
734-1207	163
734-1208	164
734-1209	164
734-1210	135
734-1211	135
734-1212	135
734-1214	123
734-1215	127
734-1216	127
734-1272	60;192
734-1273	61;193
734-1304	56;58
734-1305	56;58
734-1306	56;58
734-1309	56;58
734-1310	56;59
734-1311	56;58
734-1312	193
734-1315	56;59
734-1316	180
734-1317	56;59
734-1318	56;59
734-1337	124;176
734-1338	124;176
734-1340	125;157
734-1376	134
734-1402	194
734-1403	131
734-1405	56;58
734-1406	56;58
734-1407	56;58
734-1410	56;58
734-1431	32
734-1433	32
734-1434	40
734-1435	40
734-1436	41
734-1440	194
734-1441	194
734-1443	165
734-1444	165
734-1445	165
734-1491	158
734-1492	158
734-1493	158
734-1519	123
734-1520	123
734-1526	126
734-1527	126
734-1528	126
734-1531	122
734-1532	122
734-1540	123
734-1541	123
734-1543	123
734-1544	123
734-1549	138
734-1558	149
734-1559	149
734-1560	149
734-1561	149
734-1562	149
734-1563	148
734-1564	148
734-1566	149
734-1567	148
734-1568	148
734-1569	148
734-1570	148
734-1571	148
734-1572	148
734-1573	148
734-1574	148
734-1576	148
734-1577	148
734-1578	148
734-1579	148
734-1580	148
734-1581	148
734-1582	135
734-1583	148
734-1584	135
734-1585	135
734-1586	150
734-1587	150
734-1588	150
734-1589	150
734-1590	148
734-1591	148
734-1592	148
734-1593	148
734-1594	148
734-1595	148
734-1596	135
734-1597	135
734-1598	135
734-1599	135
734-1604	135
734-1605	135
734-1606	135
734-1607	135
734-1609	138
734-1610	138
734-1623	138
734-1624	138
734-1635	139
734-1640	139
734-1646	149
734-1660	138
734-1661	138
734-1664	138
734-1665	138
734-1687	220
734-1688	220
734-1689	220
734-1690	220
734-1691	220
734-1692	220
734-1693	220
734-1694	220
734-1695	220
734-1696	220
734-1697	156
734-1698	130
734-1699	130
734-1700	122
734-1701	156
734-1702	158;159
734-1703	130
734-1705	130
734-1706	122
734-1707	132
734-1708	132
734-1709	132
734-1710	132
734-1711	130
734-1712	122
734-1713	123
734-1714	159
734-1715	123
734-1716	123
734-1717	123
734-1718	123
734-1719	123
734-1720	158
734-1722	123
734-1723	123
734-1724	123
734-1725	123
734-1726	123
734-1728	131
734-1729	159
734-1730	158
734-1733	123
734-1734	220
734-1735	220
734-1736	220
734-1737	220
734-1738	220
734-1739	220
734-1740	220
734-1741	220
734-1742	220
734-1743	220
734-1744	220
734-1789	135
734-1793	135
734-1794	135
734-1796	135
734-1799	135
734-1810	113
734-1811	113
734-1812	154
734-1813	154
734-1814	154
734-1815	130
734-1820	127

Cat No.	Page
734-1824	114
734-1825	114
734-1827	154
734-1828	154
734-1829	154
734-1830	112
734-1831	112
734-1832	127
734-1833	127
734-1841	113
734-1842	113
734-1843	113
734-1845	112
734-1846	112
734-1847	114
734-1848	113
734-1859	159
734-1862	154
734-1866	154
734-1867	154
734-1868	154
734-1869	154
734-1870	159
734-1872	154
734-1876	154
734-1883	159
734-1884	159
734-1885	127
734-1886	127
734-1887	127
734-1888	127
734-1889	127
734-1890	113
734-1891	113
734-1896	113
734-1897	114
734-1898	159
734-1900	112
734-1901	112
734-1902	127
734-1903	127
734-1904	127
734-1905	127
734-1907	162
734-1908	162
734-1909	162
734-1910	162
734-1911	162
734-1912	162
734-1913	162
734-1914	162
734-1915	162
734-1916	162
734-1917	162
734-1918	162
734-1919	162
734-1920	162
734-1921	162
734-1922	162
734-1923	162
734-1924	162
734-1925	162
734-1926	162
734-1927	162
734-1928	162
734-1929	162
734-1930	162
734-1931	162
734-1932	162
734-1933	162
734-2000	125;157
734-2001	125;157
734-2004	125;157
734-2005	140
734-2028	165
734-2036	156
734-2037	156
734-2040	131
734-2041	131
734-2042	131
734-2043	131
734-2045	131
734-2046	125;157
734-2047	152
734-2048	152
734-2049	152
734-2050	152
734-2051	152
734-2052	152
734-2053	152
734-2054	152
734-2055	151
734-2056	151
734-2057	151
734-2058	151
734-2059	151
734-2060	151
734-2061	151
734-2062	151
734-2063	124;125;176
734-2064	124;176
734-2065	124;176
734-2066	124;176
734-2067	125;157
734-2068	156
734-2079	140
734-2081	125;157
734-2082	165
734-2096	130
734-2103	131
734-2105	165
734-2106	165
734-2107	152
734-2109	132
734-2110	165
734-2111	151;152
734-2112	131
734-2113	131
734-2114	131
734-2119	151
734-2120	151
734-2121	151
734-2122	151
734-2124	151
734-2125	151
734-2126	151
734-2127	151
734-2129	125;157
734-2131	125;157
734-2156	136
734-2157	136
734-2167	124;176
734-2168	124;176
734-2176	136
734-2187	165
734-2242	165
734-2272	122
734-2273	123
734-2275	123
734-2281	125;176
734-2282	125;176
734-2283	125;176
734-2284	125;176
734-2285	125;176
734-2286	125;176
734-2289	161
734-2290	161
734-2309	122
734-2310	122
734-2311	122
734-2312	122
734-2313	122
734-2314	122
734-2315	122
734-2316	122
734-2317	129
734-2318	129
734-2319	129
734-2320	129
734-2321	129
734-2322	129
734-2323	133
734-2324	133
734-2325	133
734-2326	133
734-2327	133
734-2328	133
734-2361	180
734-2372	136
734-2373	136
734-2374	132
734-2375	137
734-2385	32
734-2386	32
734-2389	56;59
734-2391	56;58
734-2392	159
734-2394	159
734-2395	159
734-2396	159
734-2397	159
734-2404	170
734-2405	171
734-2406	169
734-2456	157
734-2457	157
734-2483	164
734-2484	164
734-2485	164
734-2486	164
734-2487	164
734-2488	164
734-2489	164
734-2490	164
734-2491	164
734-2492	164
734-2600	122
734-2601	122
734-2602	125
734-2603	125
734-2604	125
734-2605	125
734-2612	222
734-2613	222
734-2614	222
734-2615	222
734-2616	222
734-2617	222
734-2631	166
734-2632	166
734-2633	166
734-2674	86
734-2675	86
734-2676	86
734-2677	86
734-2678	86
734-2690	180
734-2691	180
734-2692	165
734-2693	169
734-2694	159
734-2695	159
734-3006	162;163
734-3007	162
734-3008	162
734-3009	163
734-3010	163
734-3011	163
734-3012	163
734-3013	163
734-3014	163
734-3062	237
734-4010	164
734-4041	123
734-4042	123
734-4044	123
734-4045	123
734-4047	123
734-4049	161
734-4050	161
734-4052	163
734-4055	130
734-4056	130
734-4057	130
734-4058	135
734-4059	163
734-4060	163
734-4061	163
734-4062	164
734-4063	164
734-4064	164
734-4066	164
734-4067	135
734-4068	164
734-4071	149
734-4072	149
734-4073	149
734-4074	149
734-4075	149
734-4076	149
734-4077	149
734-4078	149
734-4079	149
734-4080	149
734-4081	149
734-4082	149
734-4083	149
734-4084	149
734-4086	139
734-4087	139
734-4097	161
734-4098	161
734-4099	161
734-4100	161
734-4101	161
734-4102	161
734-4103	161
734-4104	140
734-4105	140
734-4114	149
734-4122	138
734-4123	138
734-4139	123
734-4140	122
734-4141	123
734-4145	140
734-4149	140
734-4153	138
734-4156	138
734-4159	138
734-4161	138
734-4166	164
734-4167	164
734-4189	159
734-4190	158
734-4191	159
734-4193	154
734-4194	127
734-4195	127
734-4197	127
734-4198	127
734-4199	127
734-4200	127
734-4201	127
734-4202	127
734-4203	127
734-4204	127
734-4205	113
734-4206	113
734-4207	113
734-4208	113
734-4209	127

Order number index

Cat No.	Page
734-4210	127
734-4211	127
734-4212	127
734-4213	127
734-4214	127
734-5033	111
734-5035	111
734-5037	111
734-5039	111
734-5041	111
734-5950	155
735-0223	137
735-0224	137
735-0225	137
735-0226	184
735-2082	133
735-2083	133
735-2084	133
735-2085	133
735-2086	133
735-2087	133
735-2088	133
735-2089	133
735-2090	133
735-2091	133
735-2097	133
735-2098	133
735-2099	133
735-2100	133
735-2101	133
735-2102	133
735-2103	133
735-2104	133
735-2105	139
735-2106	139
735-2107	139
735-2111	139
735-2112	139
735-2116	133
735-2117	133
735-2118	133
735-2119	133
735-2120	133
735-2121	139
735-2122	139
735-2123	139
735-2124	133
735-2125	133
735-2126	133
735-2127	133
735-2128	133
735-2129	139
735-2130	139
735-2131	139
736-0203	139
736-2025	134
736-2026	134
736-2027	134
736-2042	134;137;140;141
736-2044	141
736-2045	141
738-0109	103
738-0110	103
738-0116	100
738-0117	102
738-0118	102
738-0123	104
738-0124	104
738-0125	104
738-0126	104
738-0129	101
738-0130	100
738-0133	101
8	
80030	88
9	
94271-100MG	44;46
94271-1G	44;46
94271-25G	44;46
94271-5G	44;46
94341-100G	54;55
94341-500G	54;55
A	
A0296-100	20
A0296-1000	20
A0296-500	20
A0601.0010	62
A0955.0050	57
A0955.0100	57
A0955.0250	57
A0966.0050	57
A1001.0010	40;49
A1001.0025	40;49
A1001.0100	40;49
A1052.0100	57
A1052.0250	57
A1052.1000	57
A2085.0010	57
A2085.0100	57
A2088.0025	57
A2088.0100	57
A2089.0005	57
A2091.0025	57
A2094.0010	57
A2188.1000	57
A3008.0001	60
A3008.0100	60
A3008.0250	60
A3124.0100	60
A3124.0250	60
A3401.1000	56
A3406.1000	56
A3410.0100	56
A3410.1000	56
A3448.0100	56
A3496.1000	56
A3642.1000	56
A3653.1000	56
A3665.0500	56
A3671.1000	56
A3672.0050	29;209
A3672.0100	29;209
A3672.0250	29;209
A3680.1000	56
A3713.1000	56
A3742.0100	56
A3742.0250	56
A3744.0020	48
A3897.1000	56
A3926.1000	56
A3943.1000	56
A3946.1000	56
A4859.0050	36
A4859.0100	36
A4859.0500	36
A4859.1000	36
A5219.0100	53
A5230.0500	53
A5230.1000	53
A5240.0010	52
A5240.0020	52
A5240.0100	52
A7248.0005	29;209
A7248.0010	29;209
A8360.0010	52
A8360.0020	52
A8360.0100	52
A8366.0002	52
A8906.0050	53
A8994.0050	48
A9019.0025	49
A9019.0100	49
A9390.0250	53
B	
BDAA354009	56;58
BDAA354107	56;59
BDAA354256	193
BDAA354261	60;192
BDAA356004	56;58
BDAA356052	56;58
BDAA356123	56;58
C	
C1-28	61
C2-28	61
C3-28	61
C4-28	61
E	
E485-20ML	44
E490-20ML	44
E506-100ML	35
E506-500ML	35
E525-100ML	35
E525-500ML	35
E529-100ML	35
E529-500ML	35
E545-100ML	57
E550-100ML	61
E709-20ML	44;47
E710-20ML	44;47
E713-20ML	44;47
E737-20ML	44
E737-20ML	46
E806-100G	56
E806-25G	56
E806-500G	56
E859-100MG	44;46
E859-1G	44;46
E859-5G	44;46
F	
F-00100-0250	65
F-00100-0750	65
F-00100-1500	65
F0465	28
F0483	59
F0545	28
F0555	28
F0855	28
F2285	29;209
F2295	29;209
F5013	32
F5023	32
F8023	28
F8045	28
F8055/1	29
F8075	28
F8085	32
F8105	28
F8205	28
F8275	28
F8820	28
F9061-01	29
FG0465	28
J	
J358-1G	44;45
J358-250MG	44;45
J592-100MG	44
J593-25MG	44;47
J594-2MG	44
J607-100MG	44
J607-100MG	46
J608-5MG	44
J847-20ML	44;46
K	
K-00100-0005	74
K-00100-0010	74
K-00101-0002	74
K-00101-0005	74
K-00201-0002	74
K-00201-0005	74
K-00301-0002	74
K-00301-0005	74
K-00401-0002-H	74
K-00401-0002-M	74
K-00401-0002-R	74
K-00401-0005-H	74
K-00401-0005-M	74
K-00401-0005-R	74
K-00501-0002	74
K-00501-0005	74
K-00601-0002	74
K-00601-0005	74
K-00701-0002	74
K-00701-0005	74
K-00801-0002	74
K-00801-0005	74
K-00901-0002	74
K-00901-0005	74
K-00910-0002-H	74
K-00910-0005-H	74
K-00911-0002-M	74
K-00911-0005-M	74
K-00912-0002-R	74
K-00912-0005-R	74
K-01000-0002	74
K-01000-0005	74
K-01010-0002	74
K-01010-0005	74
K-01020-0002	74
K-01020-0005	74
K-01030-0002	74
K-01030-0005	74
K-01040-0002	74
K-01040-0005	74
K-01050-0002	74
K-01050-0005	74
K3520	59
K3530	59
K3540	59
K3620	59
K547-20ML	44
K646-1G	44
K721-20ML	44;45;48
K940-100ML	41
K952-100ML	44;47
L	
L0008-020	45
L0009-020	48
L0009-050	48
L0009-100	48
L0010-020	48
L0010-100	48
L0011-010	45;46
L0011-100	45
L0012-010	45
L0012-100	45
L0014-100	45
L0015-010	45
L0015-020	45
L0015-100	45
L0018-100	45
L0022-020	45
L0022-100	45
L0040-010	45
L0040-020	45
L0040-050	45
L0040-100	45
L0042-500	24
L0053-500	24
L0060-500	24
L0064-500	24
L0065-500	24
L0066-500	24
L0090-500	24
L0091-500	24
L0092-500	24
L0093-500	24

Order number index

Cat No.	Page
L0094-500	24
L0095-500	24
L0096-500	24
L0100-500	24
L0101-500	24
L0102-500	24
L0103-500	24
L0104-500	24
L0106-500	24
L0107-500	24
L0130-500	24
L0135-500	24
L0136-500	24
L0138-500	24
L0140-500	24
L0145-500	24
L0180-100	34
L0180-500	34
L0190-500	24
L0191-500	24
L0192-500	24
L0207-500	26
L0210-500	25
L0211-500	25
L0300-500	24
L0325-500	25
L0330-500	25
L0355-500	25
L0356-500	25
L0360-500	25
L0361-500	25
L0415-500	25
L0416-500	25
L0430-500	25
L0440-500	25
L0444-500	25
L0445-500	25
L0465-500	25
L0470-500	25
L0475-500	25
L0476-500	25
L0490-500	25
L0492-500	25
L0495-500	25
L0496-500	26
L0498-100	26
L0498-500	26
L0500-100	25
L0500-500	25
L0501-100	26
L0501-500	26
L0503-500	25
L0505-500	25
L0560-100	40
L0560-500	40
L0601-500	34
L0602-500	34
L0605-500	34
L0606-500	34
L0607-500	34
L0608-500	34
L0611-100	34
L0611-500	34
L0612-500	34
L0615-100	34
L0615-1000	34
L0615-500	34
L0625-1000	34
L0625-500	34
L0630-100	38
L0640-500	35
L0642-100	35
L0642-500	35
L0643-100	35
L0643-500	35
L0680-100	35
L0680-500	35
L0909-100	38
L0910-100	38
L0930-100	38
L0930-500	38
L0931-100	38
L0931-500	38
L0932-100	38
L0940-100	38
L0940-500	38
L0950-100	38
L0970-100	54
L0970-1000	54
L0970-500	54
L0990-100	41
L2181	38
L2193	38
L2223	39
L7117	61
L7213	61
L7220	61
L7230	61
L7240	61
L-X16-010	45
L-X16-100	45

N

N100899-0.5	32
N182-5X10ML	29;209
N407-1G	44
N600-5ML	41;88
N655-50ML	28;208
N655-6X5ML	28;208
N676-50ML	28;208

P

P0017-1GR	45
P0017-5GR	45
P0018-1MU	45
P0030-N10L	24
P0030-N1L	24
P0058-N10L	24
P0058-N1L	24
P0058-N5L	24
P0061-N10L	24
P0061-N1L	24
P0061-N50L	24
P0061-N5L	24
P0095-N10L	24
P0095-N1L	24
P0102-N10L	24
P0102-N1L	24
P0102-N50L	24
P0102-N5L	24
P0103-N10L	24
P0103-N1L	24
P0103-N50L	24
P0103-N5L	24
P0105-N10L	24
P0105-N1L	24
P0120-N10L	24
P0120-N1L	24
P0120-N50L	24
P0134-N10L	24
P0134-N1L	24
P0134-N5L	24
P0146-N10L	24
P0146-N1L	24
P0146-N50L	24
P0146-N5L	24
P0153-N10L	34
P0153-N1L	34
P0154-N10L	34
P0154-N1L	34
P0191-N10L	24
P0191-N1L	24
P0191-N50L	24
P0192-N10L	24
P0192-N1L	24
P0350-N10L	24
P0350-N1L	24
P0350-N5L	24
P0390-N10L	25
P0390-N1L	25
P0410-N10L	25
P0410-N1L	25
P0410-N50L	25
P0420-N10L	25
P0420-N1L	25
P0420-N50L	25
P0420-N5L	25
P0425-N10L	25
P0425-N1L	25
P0425-N50L	25
P0440-N10L	25
P0440-N1L	25
P0440-N50L	25
P0440-N5L	25
P0450-N10L	25
P0450-N1L	25
P0450-N50L	25
P0451-N10L	25
P0451-N1L	25
P0451-N50L	25
P0451-N5L	25
P0452-N10L	25
P0452-N1L	25
P0460-N10L	25
P0460-N1L	25
P0515-N10L	25
P0515-N1L	25
P0515-N50L	25
P0750-N10L	34
P0750-N1L	34
P0750-N50L	34
P0750-N5L	34
P0860-N10L	25
P0860-N1L	25
P0860-N50L	25
P0860-N5L	25
P0870-N10L	26
P0870-N1L	25
P0870-N50L	26
P0870-N5L	26
P0871-N10L	25
P0871-N1L	25
P0875-N10L	25
P0875-N1L	25
P0875-N50L	25
P0876-N10L	25
P0876-N1L	25
P0876-N50L	25
P0880-N10L	25
P0880-N1L	25
P0880-N50L	25
P0883-N10L	25
P0883-N1L	25
P0935-1GR	41
P0940-100GR	38
P0940-1GR	38
P1011-100GR	55
P1011-500GR	55
P1011-KG	55
P1012-100GR	55
P1012-500GR	55
P1012-KG	55
P1031-100GR	55
P1031-10GR	55
P1031-1GR	55
P2035-500GR	35
P2035-KG	35
P2060-500GR	35
P2060-KG	35
P2064-N5L	35
P2065-N5L	35
P2066-KG	35
P4020-1GR	45
P4020-5GR	45
P4030-250MG	48
P5030-500GR	57
P5030-KG	57
P5455-100GR	34
P5455-250GR	34
P5455-500GR	34
P5648-10GR	62
P5957-100GR	38
P6140-100GR	20
P6140-500GR	20
P6140-KG	20
P6154-100GR	20
P6154-10GR	20
P6154-500GR	20
P6154-KG	20
P6155-100GR	20
P6155-500GR	20
P6155-KG	20
P6156-100GR	20
P6156-500GR	20
P6156-KG	20
P9010-005	62

S

S0250-100	14
S0250-1000	14
S0250-500	14
S025H-100	14
S025H-500	14
S025R-500	14
S0260-100	22
S0260-500	22
S0400-100	14
S0400-500	14
S040H-100	14
S040H-500	14
S040R-500	14
S0500-100	15
S0500-1000	15
S050H-1000	15
S0750-100	14
S0750-500	14
S075H-100	14
S075H-500	14
S0800-100	15
S0800-500	15
S0900-100	16
S0900-500	16
S090H-100	16
S090H-500	16
S0960-100	16
S0960-500	16
S1500-100	8
S1500-500	8
S150H-100	8
S150H-500	8
S1520-100	6
S1520-500	6
S152H-100	6
S152H-500	6
S1560-100	6
S1560-500	6
S156H-100	7
S156H-500	7
S1600-100	6
S1600-500	7
S160H-100	7
S160H-500	7
S1650-100	7
S1650-500	7
S165H-100	7
S165H-500	7
S165S-100	7
S165S-500	7
S1700-100	7
S1700-500	7
S1750-100	8
S1750-500	8
S175H-100	8

Order number index

Cat No.	Page
S175H-500	8
S1780-100	8
S1780-500	8
S1810-100	7
S1810-500	7
S181B-100	7
S181B-500	7
S181BH-100	7
S181BH-500	7
S181D-100	7
S181D-500	8
S181F-100	7
S181F-500	7
S181H-100	7
S181H-500	7
S181L-100	8
S181L-500	8
S181R-100	8
S181R-500	8
S181S-100	8
S181S-500	8
S181T-100	8
S181T-500	8
S1820-100	8
S1820-500	8
S182H-100	8
S182H-500	8
S1860-100	8
S1860-500	8
S2000-100	16
S2000-500	16
S200H-500	16
S2140-050	22
S2140-100	22
S2140-500	22
S2150-010	18
S2150-020	18
S2150-050	18
S2150-100	18
S2150-500	18
S2160-010	17
S2160-020	17
S2160-050	17
S2160-100	17
S2160-500	17
S2170-100	15
S2170-500	15
S2300-100	17
S2300-500	17
S230H-500	17
S2350-100	18
S2350-500	18
S235H-500	18
S2400-100	17
S2400-500	17
S240H-500	17
S2450-100	16
S2450-500	16
S2500-100	18
S2500-500	18
S250H-500	18
S2600-100	22
S2600-500	22
S2610-100	22
S2610-500	22
S26200-500	22
S2620-100	22
S2800-010	15
S2800-100	15
S2900-010	15
S2900-050	15
S2900-100	15
S2901-010	15
S2901-100	15
S2920-050	22
S2920-100	22
S381G-N005L	9
S382G-N005L	9
S382G-N005L25	9
S4180-100	22
S4180-500	22
S4190-100	17
S419H-100	17
S419L-100	17
S4200-100	17
S6000-100	9

X

X0112-100	34
X0112-500	34
X0113-500	34
X0311-100	25
X0311-500	25
X0507-500	34
X0509-500	34
X0510-500	34
X0513-500	34
X0515-100	34
X0515-500	34
X0520-500	34
X0550-100	55
X0551-100	55
X0552-100	54
X0554-100	54
X0556-100	57
X0557-100	54
X0915-100	38
X0920-100	38
X0930-100	38

NOTES

NOTES

NOTES

NOTES

NOTES

Table of Contents

Serum
Fetal Bovine Serum (FBS) - US origin 6
Fetal Bovine Serum (FBS) - USDA approved 6
Fetal Bovine Serum (FBS) - South American origin 7
Fetal Bovine Serum (FBS) - Canadian origin 8
Fetal Bovine Serum (FBS) - EU origin 8
FBS alternatives 9
Bovine calf serum 14
Newborn calf serum 14
Adult bovine serum 14
Other Sera 15

Serum Albumin
Bovine (BSA) 20
Human 20

Plasma
Animal 22
Human 22

Classical media
Classical media 24

Speciality media
Insect 28
Serum-free 28
Freezing 28
Hybridoma 29
CHO 32
Others 32

Salt solutions and salts
DPBS 34
HBSS 34
EBSS 34
HEPES 34
Sodium bicarbonate 35
Calcium chloride 35
Magnesium chloride 35
Potassium chloride 35
Sodium chloride 35
Sodium pyruvate 35

Cell culture reagents
Cell dissociation/detachment - Animal derived 38
Cell dissociation/detachment - Non-animal derived 38
Cell separation 39
Cell stains 40
Antibiotics 44
Antimycotics 48
Mycoplasma - Detection 48
Mycoplasma - Treatment 52
Mycoplasma - Prevention 53
Water 54
Supplements - Aminoacids 54
Supplements - Vitamines 57
Supplements - Sugars 57
Supplements - Growth supplements 58
Supplements - Attachment 60
Supplements - Other supplements 61

Transfection reagents
Standard 64
High throughput 64
siRNA 65
In vivo 65
Bioproduction 66
Specialty 67

RNAi
siRNA controls 74
miRNA - miRNA controls 74

Electroporation
Electroporators 78
Cuvettes 79
Plates 80

Cell counting
Manual - Hemocytometers 84
Automated - Cell counter 86
Viability reagents 87

Filtration
Membrane filtration 92
Syringe filters 93
Syringes 99
Filtration plates 100
Vacuum filtration systems 104
Capsule filtration 114
Ultrafiltartion - Spin filters 118
Ultrafiltration - TFF systems 120

Cell culture platsicware
Flasks - Treated 122
Cell scrapers 125
Flasks - Erlenmeyer 126
Dishes - Treated 129
Dishes - Non-treated 131
Multiwell plates - Treated 132
Multiwell plates - Non-treated 136
Microplates - Treated 138
Microplates - Non-treated 140
Inserts 142
Slides - Chamber slides 150
Slides - Microscope slides 152
Tubes 153
Bioproduction - Flasks 157
Bioproduction - Roller bottles 158
Bioproduction - Spinner flasks 161
Bioproduction - Cell factories 163
Bioproduction - Bioreactors 166
IVF 169

Bioproduction
Pre-Coated Plasticware 174
Coatings 192
Extracellular Matrices (ECM) 193

Cryoware
Cryovials 196
Cryoboxes and racks 200
Freezing containers 203
Freezing media 208
Liquid nitroget freezers 213
Thermometers and data loggers 214

Pipetting
Pipette aids 218
Serolgoical pipettes 219
Pipettes and pipette tips 222

Instruments
Co_2 incubators 228
Laminar flow cabinets 231
Roller apparatus 236
Microscopes 237
pH Meters 248
Homogenisers 251
Centrifuges 254
Shakers 256
Quantitation 264

VWR
We Enable Science

ALL YOU NEED GUIDES

Biobanking

Genomics

Liquid handling

Proteomics

Handy reference tools for your application or technique. Go to vwr.com to see the latest additions.

Request your copy from your local VWR sales office

VWR®
We Enable Science

Austria
VWR International GmbH
Graumanngasse 7
1150 Vienna
Tel.: +43 1 97 002 0
Fax: +43 1 97 002 600
E-mail: info@at.vwr.com

Belgium
VWR International bvba
Researchpark Haasrode 2020
Geldenaaksebaan 464
3001 Leuven
Tel.: 016 385 011
Fax: 016 385 385
E-mail: customerservice@be.vwr.com

Czech Republic
VWR International s. r. o.
Veetee Business Park
Pražská 442
CZ - 281 67 Stříbrná Skalice
Tel.: +420 321 570 321
Fax: +420 321 570 320
E-mail: info@cz.vwr.com

Denmark
VWR - Bie & Berntsen
Transformervej 8
2860 Søborg
Tel.: 43 86 87 88
Fax: 43 86 87 90
E-mail: info@dk.vwr.com

Finland
VWR International Oy
Valimotie 9
00380 Helsinki
Tel.: 09 80 45 51
Fax: 09 80 45 52 00
E-mail: info@fi.vwr.com

France
VWR International S.A.S.
Le Périgares – Bâtiment B
201, rue Carnot
94126 Fontenay-sous-Bois cedex
Tel.: 0 825 02 30 30 (0,15 € TTC/min)
Fax: 0 825 02 30 35 (0,15 € TTC/min)
E-mail: info@fr.vwr.com

Germany
VWR International GmbH
Hilpertstraße 20a
D - 64295 Darmstadt
Freecall: 0800 702 00 07
Fax: 0180 570 22 22*
E-mail: info@de.vwr.com
*0,14 €/Min. aus d. dt. Festnetz

Hungary
VWR International Kft.
Simon László u. 4.
4034 Debrecen
Tel.: (52) 521-130
Fax: (52) 470-069
E-mail: info@hu.vwr.com

Ireland / Northern Ireland
VWR International Ltd /
VWR International (Northern Ireland) Ltd
Orion Business Campus
Northwest Business Park
Ballycoolin
Dublin 15
Tel.: 01 88 22 222
Fax: 01 88 22 333
E-mail: sales@ie.vwr.com

Italy
VWR International PBI S.r.l.
Via San Giusto 85
20153 Milano (MI)
Tel.: 02-3320311/02-487791
Fax: 800 152999/02-40090010
E-mail: info@it.vwr.com

The Netherlands
VWR International B.V.
Postbus 8198
1005 AD Amsterdam
Tel.: 020 4808 400
Fax: 020 4808 480
E-mail: info@nl.vwr.com

Norway
VWR International AS
Haavard Martinsens vei 30
0978 Oslo
Tel.: 02290
Fax: 815 00 940
E-mail: info@no.vwr.com

Poland
VWR International Sp. z o.o.
Limbowa 5
80-175 Gdansk
Tel.: 058 32 38 200 do 204
Fax. 058 32 38 205
E-mail: info@pl.vwr.com

Portugal
VWR International -
Material de Laboratório, Lda
Edifício Neopark
Av. Tomás Ribeiro, 43- 3 D
2790-221 Carnaxide
Tel.: 21 3600 770
Fax: 21 3600 798/9
E-mail: info@pt.vwr.com

Spain
VWR International Eurolab S.L.
C/ Tecnología 5-17
A-7 Llinars Park
08450 - Llinars del Vallès
Barcelona
Tel.: 902 222 897
Fax: 902 430 657
E-mail: info@es.vwr.com

Sweden
VWR International AB
Fagerstagatan 18a
163 94 Stockholm
Tel.: 08 621 34 00
Fax: 08 621 34 66
E-mail: kundservice@se.vwr.com

Switzerland
VWR International GmbH
Lerzenstrasse 16/18
8953 Dietikon
Tel.: 044 745 13 13
Fax: 044 745 13 10
E-mail: info@ch.vwr.com

Turkey
Pro Lab Laboratuar Teknolojileri Ltd.Şti.
a VWR International Company
Orta Mah. Cemal Gürsel Caddesi
Ördekcioglu Işmerkezi No.32/1
34896 Pendik - Istanbul
Tel.: +90216 598 2900
Fax: +90216 598 2907
E-mail: info@pro-lab.com.tr

UK
VWR International Ltd
Customer Service Centre
Hunter Boulevard - Magna Park
Lutterworth
Leicestershire
LE17 4XN
Tel.: 0800 22 33 44
Fax: 01455 55 85 86
E-mail: uksales@uk.vwr.com

Australia
VWR International, Pty Ltd.
Unit 1/31 Archimedes Place
Murarrie, Queensland 4172
Tel.: 1300 727 696
Fax: 1300 135 123

China
VWR International China Co., Ltd
Rm.219, 2100 Dongming Road
Pudong New District
Shanghai 200123
Tel.:+86-21-5898 6888
Fax:+86-21-5855 8801
E-mail: info_china@vwr.com

India
VWR Lab Products Private Limited
135/12, Brigade Towers, 2nd Floor
Front wing, Brigade Road,
Bengaluru, India – 560 025
Tel.: +91-80-41117125/26 (Bengaluru)
Tel.: +91-2522-647911/922 (Mumbai)
Fax: +91-80-41117120
E-mail: vwr_india@vwr.com

New Zealand
Global Science - A VWR Company
241 Bush Road
Albany 0632, Auckland
Tel.: 0800 734 100
Fax: 0800 999 002
E-mail: sales@globalscience.co.nz

Singapore
VWR Singapore Pte Ltd
18 Gul Drive
Singapore 629468
Tel.: +65 6505 0760
Fax: +65 6264 3780
E-mail: sales@sg.vwr.com

GO TO **VWR.COM** FOR THE LATEST NEWS, SPECIAL OFFERS AND DETAILS OF YOUR LOCAL VWR DISTRIBUTOR

ZPROVWRI2099-EN.