



Cell and Tissue Culture

1. Product Portfolio

For cell and tissue culture, Greiner Bio-One offers the following product lines:

- CELLSTAR®**
Cell culture vessels with physically modified surfaces for adherent or suspension cell cultures.
- CELLMASTER™**
Roller bottles made of polystyrene (with physical surface treatment) or polyethylene terephthalate.
- Advanced TC™**
Cell culture products with a novel polymer modification enhancing the adhesion and improving the cultivation of fastidious cells.
- CELLCOAT®**
Protein-coated culture vessels for adherent cell culture. Our CELLSTAR® product family is coated with the following proteins: Collagen Type I, Poly-D-Lysine, Poly-L-Lysine, Fibronectin and Laminin.
- CELLview™ Cell Culture Products with Glass Bottom**
CELLview™ combines the convenience of standard plastic cell culture products with the optical quality of glass, providing superior high-resolution microscopic images of in-vitro cultivated cultures.
- CELLSTAR® CELLreactor™**
Small bioreactor for the cultivation of suspension and spheroid cells facilitating miniaturisation of large-scale setups and maximising the number of parallel experiments. In addition to cell culture applications, the CELLreactor™ can be applied for the expansion of aerobic bacteria, yeast or other microorganisms in shaken cultures as well as for storage of components and liquids requiring gas exchange.

ThinCert™ Cell Culture Inserts

Membrane supports for multiwell plates, consisting of polystyrene housings and sealed PET capillary pore membranes. With the ThinCert™Plate, Greiner Bio-One offers an innovative solution for the air-lift culture with ThinCert™ cell culture inserts. Its deep wells allow a larger volume of medium to be available to the air-lift culture.

2. Material

Exclusively high-grade polystyrene and polyethylene terephthalate are used as raw materials for manufacturing our cell culture products.

- Polystyrene (PS)** is characterised by its high clarity, which greatly simplifies the optical control of cell growth in polystyrene flasks, tubes and roller bottles.
- Polyethylene terephthalate (PET)** is used for manufacturing roller bottles, media bottles and membranes, due to its beneficial chemical, optical and mechanical properties.

3. Surface Treatment

The surfaces of CELLSTAR® and CELLMASTER™ products for adherent cell culture are treated using a special physical method. This treatment leads to polar groups, such as carboxy and hydroxy groups, being incorporated into the plastic surface, making it hydrophilic. This significantly improves the adhesion of cells and the binding of proteins to the plastic surface. Cell culture treated products are labelled with **TC surface treatment** (TC = Tissue Culture) in the catalogue.

For the cultivation of fastidious cells or cells cultivated under restricted growth conditions Greiner Bio-One offers the **Advanced TC™** polymer modification. Based on this innovative technique, the cell culture surface is modified in such a way as to positively influence cellular features and functions. Enhanced cell attachment and higher proliferation rates improve and accelerate cell expansion.

In addition to the physically and chemically modified surfaces for cell culture, we also provide products coated with Collagen Type I, Poly-D-Lysine, Poly-L-Lysine, Fibronectin and Laminin. These coatings facilitate the growth of many cell types, including hepatocytes, muscle cells, epithelial/endothelial cells, neural cells and transfected cell lines. The products are summarised in our **CELLCOAT®** product range.

Our **suspension cell culture vessels** with their strongly hydrophobic surfaces are particularly well suited for non-adherent cell cultures, hybridomas and embryonic stem cell cultures.

4. Screw Caps with a Hydrophobic Capillary Pore Membrane

Filter screw caps for cell culture / suspension culture flasks and roller bottles have a patented hydrophobic capillary pore membrane (Fig. 1). The defined and constant pore size of 0.2 µm is achieved with minimal variation by means of a specially developed, high-technology method (Fig. 2).

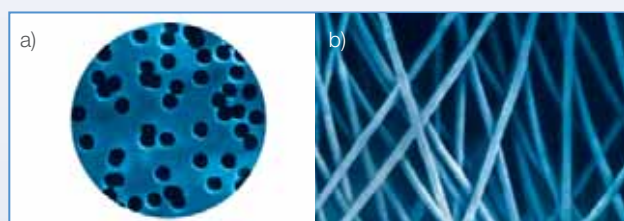


Figure 1: a) Top view of the capillary pore membrane (electron micrograph)
b) Cross-section of the capillary pore membrane: the capillaries are filled with copper and the PET is then removed by etching (electron micrograph)

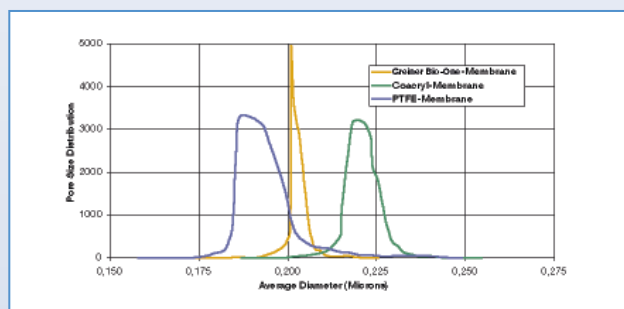


Figure 2: Comparison of different membrane types according to their pore size distribution

The filter insert provides both optimal protection against contamination and efficient gas exchange.

By using PET/PTFE which are responsible for the mechanical strength and hydrophobic properties of the membrane, these advantages are retained even if the inside of the cap is briefly wetted with medium.

5. Expiry / Lot Number

All cell culture products are labelled with expiry date and lot number in order to ensure transparency of product processes and retraceability of our products throughout the production process.

6. Quality Control

Based on automated production processes with quality controls, we provide immaculate, high-quality products for all areas of cell culture.

All CELLSTAR® and CELLMASTER™ products as well as ThinCert™, Advanced TC™ and CELLview™ are sterilised by irradiation. They are controlled for sterility as well as for absence of detectable endotoxins, DNase/RNase and human DNA (→ Quality p. V).

Cytotoxicity

In many experiments toxic effects on cells or tissue cultures play an important role particularly in the field of In-Vitro Diagnostics. Any adverse biological reaction due to contact with our production materials, e.g. polystyrene or polypropylene, is closely monitored by cultivating cells in the presence of extracts from these polymers.

The detection of cytotoxicity is evaluated with mammalian cells according to EN ISO 10993-5. All cell culture relevant end products are analysed for the absence of cytotoxic components. Therefore the end product is cultivated with cell culture media. The generated extract is then added to a sensitive cell culture for 24 hours.



Further information on cell culture products

- **Application Note “siRNA-dependent gene silencing on various cell culture surfaces”** (F071 105)
- **Application Note “Improved cultivation / differentiation of embryonic stem cells”** (F073 117)
- **Application Note “Cultivation and differentiation of hADSCs with CELLSTAR® and CELLCOAT® products”** (F073 113)

1 Cell/
Tissue Culture

2 HTS-
Microplates

3 Immunology/
HLA

4 Microbiology/
Bacteriology

5 Tubes/Multi-
Purpose Beakers

6 Liquid
Handling

7 Molecular
Biology

8 Protein
Crystallisation

9 Separation

10 Biochips/
Microfluidics

11 Cryo-
Techniques

12 Lids/Sealers/
CapMats

13 Reaction Tubes/
Analyser Cups

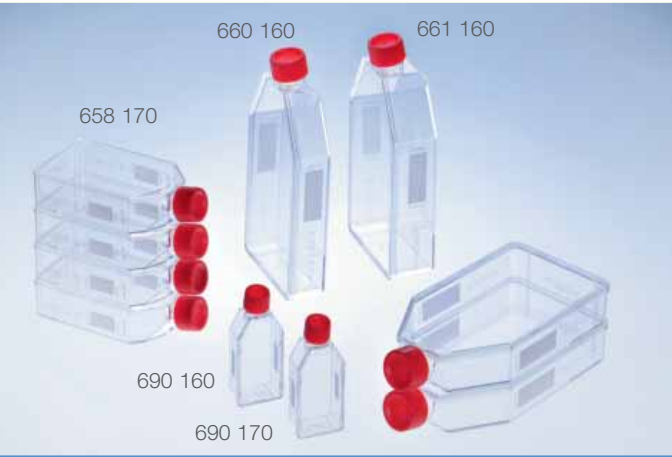
14 Accessories

Cell Culture Products

CELLSTAR® Standard Cell Culture Flasks

For cell culture, Greiner Bio-One offers standard and filter cap cell culture flasks with growth areas of 25 cm², 75 cm² and 175 cm². Suspension culture flasks complete the range in the sizes of 50 ml, 250 ml, 550 ml and 650 ml. All Greiner Bio-One cell culture flasks are made of high-grade polystyrene. For adherent cell culture, the surfaces of our standard and filter cap cell culture flasks are physically surface-treated to improve cell adhesion and proliferation.

The special design of our cell culture flasks makes it possible to efficiently reach the cell lawn with a cell scraper, whilst still providing optimal access with a pipette. The special neck design reduces the risk of wetting the inside of the cap with medium, thus providing additional protection against contamination. The stacking rim on the top of the flasks ensures firm standing and easy stackability in the incubator. Both sides have a printed graduation for easier filling.



Standard Cell Culture Flasks

- Improved cell adhesion through physical surface treatment
- Cell culture flasks with standard screw cap (without filter)
- Canted neck
- Graduation on both sides
- Sterile and user-friendly packaging
- 25 cm², 75 cm² and 175 cm² growth areas
- High and flat design of the 175 cm² cell culture flask for variability of media volume



Figure 1: Standard screw cap with ventilation position
a) ventilation position b) gas-tight position

Standard Screw Cap with Ventilation Position

The secured click-in ventilation position is reached, once the cap snaps in audibly. In addition, the correct position is indicated by a vertical tip of a triangle and the readable writing VENT (Fig. 1). This allows visual verification of the aeration position, even when the flasks are stacked in the incubator. If the cap is turned clockwise to the end stop, the flask is closed gas-tight.

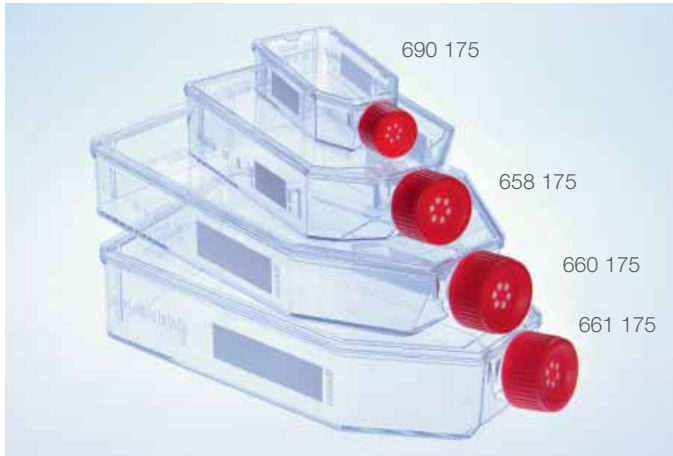
Free of detectable
DNase, RNase,
human DNA
non-pyrogenic

non-
cytotoxic

					
Cat.-No.	690 160	690 170*)	658 170	660 160	661 160
Flask design	-	-	-	flat	high
Growth area [cm²]	25	25	75	175	175
Total volume [ml]	50	50	250	550	650
Working volume [ml]	5 – 10	5 – 10	15 – 38	20 – 45	20 – 85
TC surface treatment	+	+	+	+	+
Sterile	+	+	+	+	+
Standard screw cap	red	red	red	red	red
Quantity per bag/case	10/200	10/200	5/120	5/50	4/40

*) with measuring grid

CELLSTAR® Filter Cap Cell Culture Flasks



Filter Cap Cell Culture Flasks

- Improved cell adhesion through physical surface treatment
- Cell culture flasks with filter screw cap
- Canted neck
- Graduation on both sides
- Sterile and user-friendly packaging
- 25 cm², 75 cm² and 175 cm² growth areas
- High and flat design of the 175 cm² cell culture flasks for variability of media volume

A specific capillary pore membrane is used for the filter screw caps of our filter cap cell culture flasks. The defined pore diameter of 0.2 µm provides a sterile barrier against contaminations. The inner surface of the PET membrane is PTFE-coated generating a hydrophobic facing which prevents wetting of the filter material from internal liquid. Due to the high airflow rate of the filter material, an optimal gas exchange is ensured.

- High airflow rate and optimal gas exchange
- Additional standard screw caps (without filter) in each case

Free of detectable
DNase, RNase,
human DNA
non-pyrogenic

non-
cytotoxic

Cat.-No.	690 175	658 175	660 175	661 175
Flask design	-	-	flat	high
Growth area [cm ²]	25	75	175	175
Total volume [ml]	50	250	550	650
Working volume [ml]	5 – 10	15 – 38	20 – 45	20 – 85
TC surface treatment	+	+	+	+
Sterile	+	+	+	+
Filter screw cap	red	red	red	red
Quantity per bag/case	10/200	5/120	5/50	4/40

CELLSTAR® Suspension Culture Flasks

2 HTS-
Microplates

3 Immunology/
HLA

4 Microbiology/
Bacteriology

5 Tubes/Multi-
Purpose Beakers

6 Liquid
Handling

7 Molecular
Biology

8 Protein
Crystallisation

9 Separation

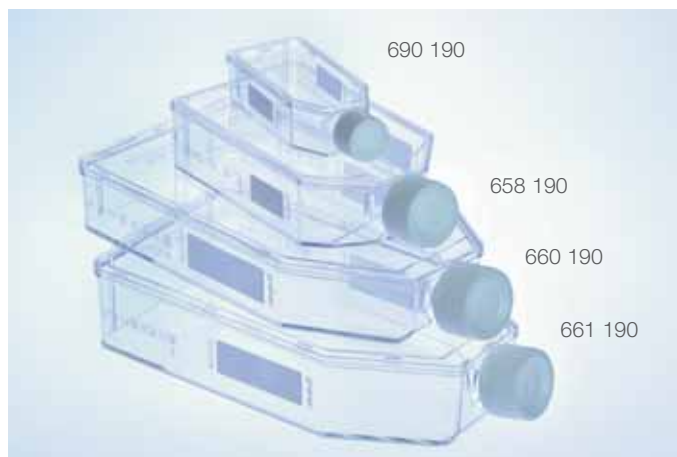
10 Biochips/
Microfluidics

11 Cryo-
Technics

12 Lids/Sealers/
CapMats

13 Reaction Tubes/
Analyser Cups

14 Accessories

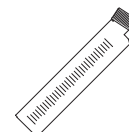
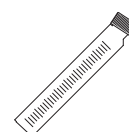


Standard Suspension Culture Flasks

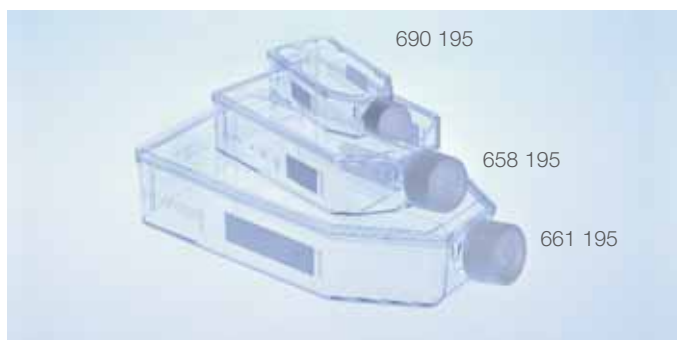
- Hydrophobic surface, ideal for suspension cultures, hybridoma and embryonic stem cells
- Suspension culture flasks with standard screw cap (without filter)
- White standard screw caps with ventilation position (→ p. 1 | 4)
- Canted neck
- Graduation on both sides
- Sterile and user-friendly packaging
- 50 ml, 250 ml, 550 ml and 650 ml volumes available

Free of detectable
DNase, RNase,
human DNA
non-pyrogenic

non-
cytotoxic



Cat.-No.	690 190	658 190	660 190	661 190
Flask design	-	-	flat	high
Volume [ml]	50	250	550	650
TC surface treatment	-/suspension	-/suspension	-/suspension	-/suspension
Sterile	+	+	+	+
Standard screw cap	white	white	white	white
Quantity per bag/case	10/200	5/120	5/50	4/40

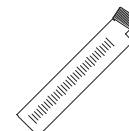


Filter Cap Suspension Culture Flasks

- Hydrophobic surface, ideal for suspension cultures, hybridoma and embryonic stem cells
- Suspension culture flasks with filter screw cap
- Graduation on both sides
- Sterile and user-friendly packaging
- Canted neck
- Additional standard screw caps (without filter) in each case

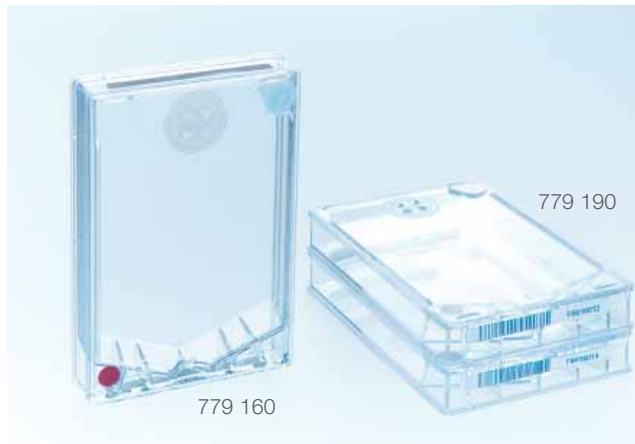
Free of detectable
DNase, RNase,
human DNA
non-pyrogenic

non-
cytotoxic



Cat.-No.	690 195	658 195	661 195
Flask design	-	-	high
Volume [ml]	50	250	650
TC surface treatment	-/suspension	-/suspension	-/suspension
Sterile	+	+	+
Filter screw cap	white	white	white
Quantity per bag/case	10/200	5/120	4/40

CELLSTAR® AutoFlask™



AutoFlask™

- Compatible with a wide range of cell culture and liquid handling systems
- Hydrophobic membrane for optimal gas exchange
- Format
Length: 127.76 mm
Width: 85.48 mm
Height: 19.5 mm
- Pre-scored multiple entry septum
- Centrifugation pocket for cell separation
- Customisable barcode labelling
- Handling and pipetting in horizontal position
- Different coatings and surface modifications available

2 HTS-
Microplates3 Immunology/
HLA4 Microbiology/
Bacteriology5 Tubes/Multi-
Purpose Beakers6 Liquid
Handling7 Molecular
Biology8 Protein
Crystallisation

9 Separation

10 Biochips/
Microfluidics11 Cryo-
Techniques12 Lids/Sealers/
CapMats13 Reaction Tubes/
Analyser Cups

14 Accessories

AutoFlask™ – Cell culture flask for automated systems

The standard microplate footprint of the AutoFlask™ ensures compatibility with a wide range of cell culture and liquid handling systems. A robotically accessible pre-scored multiple entry septum (Fig. 1 → 1) assures sterility of flask contents throughout processing.

The unique centrifugation pocket (Fig. 1 → 2) enables separation of cells from supernatant inside the flask and the integrated hydrophobic filter (Fig. 1 → 3) facilitates gas exchange during the cultivation of cells. A user-friendly colour coding (Fig. 1 → 4) allows easy identification of the AutoFlask™ version. Beside the cell culture treated and the suspension culture version, Greiner Bio-One also offers the AutoFlask™ with **Poly-D-Lysine** (→ p. 1 | 34) or **Collagen Type I** (→ p. 1 | 32) coating as well as with **Advanced TC™** polymer modification (→ p. 1 | 28).

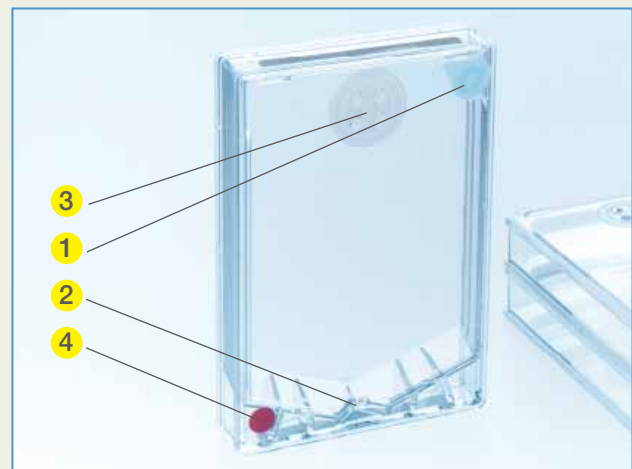


Figure 1: CELLSTAR® AutoFlask™



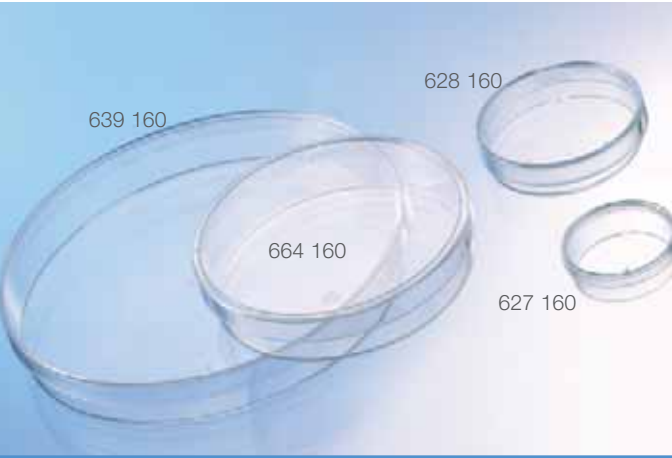
Further information on the AutoFlask™

→ “Comparative cell growth study using the AutoFlask™” (F072 094)

Free of detectable
DNase, RNase,
human DNA
non-pyrogenicnon-
cytotoxic

Cat.-No.	779 160	779 190
Description	AutoFlask™	AutoFlask™
TC surface treatment	+	-/suspension
Sterile	+	+
Growth area [cm²]	83.6	83.6
Max. volume [ml]	110	110
Working volume [ml]	20 – 40	60 – 80
Colour code	red	white
Barcode labelling	+	+
Quantity per bag/case	10/100	10/100

CELLSTAR® Cell Culture Dishes



Cell Culture Dishes

- Improved cell adhesion through physical surface treatment
- Vents ensure optimal gas exchange
- Sterile and user-friendly packaging
- Available in the sizes 35, 60, 94, 100 and 145 mm ø
- 8.7 to 143 cm² growth areas
- Easy stacking
- Maximal transparency for excellent microscopic analysis
- **New:** 35 ø dish also available with 4 internal wells

Like all Geiner Bio-One products, cell culture dishes are manufactured according to our high quality standards. Dishes are available in a wide variety of different dimensions and growth areas. In the case of 58 cm² and 143 cm² dishes, an extra high profile with a height of 20 mm is available.

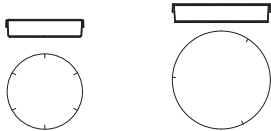
For exact dimensions of our cell culture dishes, please refer to the product data sheets on our website.

Free of detectable DNase, RNase, human DNA
non-pyrogenic

non-cytotoxic

Cat.-No.	627 160	627 170	628 160	632 171
ø [mm] x height [mm]	35 x 10	35 x 10	60 x 15	94 x 16
Growth area [cm²]	8.7	0.93/well	21	58
Total volume [ml]	10	10	28	80
Working volume [ml]	5	0.1/well	6 – 7	15 – 16
Vents	+	+	+	-
TC surface treatment	+	+	+	+
Sterile	+	+	+	+
Quantity per bag/case	10/740	10/740	10/600	10/480

New



	664 160	639 160
Cat.-No.	664 160	639 160
ø [mm] x height [mm]	100 x 20	145 x 20
Growth area [cm²]	58	143
Total volume [ml]	100	240
Working volume [ml]	16 – 17	25 – 27
Vents	+	+
TC surface treatment	+	+
Sterile	+	+
Quantity per bag/case	15/360	5/120

CELLview™ – Cell Culture Dish with Glass Bottom

The CELLview™ cell culture dish combines the convenience of a standard size 35 mm disposable plastic cell culture dish with the optical quality of glass, providing superior high-resolution microscopic images of in-vitro cultivated cultures.

It is made from high-grade polystyrene combined with an integrated glass bottom. The innovative design of the cell culture dish provides a single-plane, flat bottom with a consistent working distance and maximal planarity. Moreover, the dish bottom configuration facilitates optimal thermal conductivity and avoids thermal variations in heated platforms used for live cell imaging.

The subdivided version of the CELLview™ enables simultaneous multiplex analyses of different cell lines, various stimulations or diverse transfections. Quartering the cell culture dish provides four individual compartments with a growth area of approximately 1.9 cm², allowing minimisation of cells and reagents required per individual assay.

In addition to the untreated glass surface, Greiner Bio-One provides a **tissue culture surface treatment** as well as the innovative **Advanced TC™ surface modification** (→ p. 1 | 27) to enhance the attachment of adherent cells, thus eliminating the need for protein coating in many cases.

The high optical quality of the glass coverslip assures accurate planarity and inhibits any depolarisation of light.

Glass bottom features:

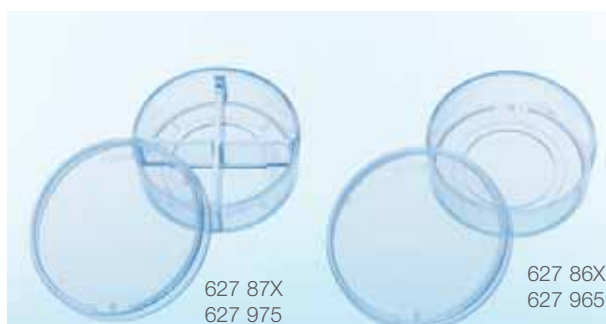
- High transparent achromatic borosilicate glass; hydrolytic class 1 (DIN ISO 719)
- Glass thickness 175 µm +/- 15 µm
- Maximal spectral transmission; no autofluorescence
- Exceptional planarity
- Manufactured according to ISO 8255-1:1986 (Optics and optical instruments - Microscopes - Cover glasses)



Further information on CELLview™

→ Application Note “Protein localisation using confocal laser scanning microscopy” (F073 101)

→ Application Note “Live cell imaging on Golgi morphology using the CELLview™ dish” (F074 048)



CELLview™

Advantages:

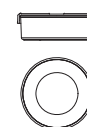
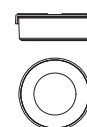
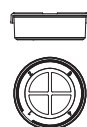
- Subdivided version enables simultaneous multiplex analysis
- Embedded glass bottom for maximal planarity
- Additional TC surface treatment and Advanced TC™ surface modification available

Applications:

- Phase contrast microscopy
- Fluorescence microscopy
- Confocal microscopy
- Live cell imaging
- Differential interference contrast microscopy
- Polarised light microscopy
- Fluorescence-in-situ-hybridisation (FISH)

Free of detectable
DNase, RNase,
human DNA
non-pyrogenic

non-
cytotoxic



Cat.-No.	627 870	627 975	627 871	627 860	627 965	627 861
Description	CELLview™ cell culture dish	CELLview™ cell culture dish	CELLview™ cell culture dish	CELLview™ cell culture dish	CELLview™ cell culture dish	CELLview™ cell culture dish
Bottom	glass	glass	glass	glass	glass	glass
No. of compartments	4	4	4	1	1	1
ø [mm] x height [mm]	35 x 10	35 x 10	35 x 10	35 x 10	35 x 10	35 x 10
Growth area [cm ²]	1.9/compartiment	1.9/compartiment	1.9/compartiment	8.7	8.7	8.7
Total volume [ml]	1.5/compartiment	1.5/compartiment	1.5/compartiment	10	10	10
Working volume [ml]	0.1/0.5 ^{*)}	0.1/0.5 ^{*)}	0.1/0.5 ^{*)}	5	5	5
Surface treatment	TC	Advanced TC™	-	TC	Advanced TC™	-
Sterile	+	+	+	+	+	+
Quantity per bag/case	10/40	10/40	10/40	10/40	10/40	10/40

^{*)} 0.1 ml for seeding or staining only on glass area; 0.5 ml for cultivation in the complete compartment

CELLSTAR® OneWell Plate™ and FourWell Plate™

CELLSTAR® OneWell Plate™

Non-divided plate for tissue culture applications

The new CELLSTAR® OneWell Plate™ can be used if large quantities of cells have to be cultivated. The external dimensions comply with ANSI standards to render the plate suitable for use on a wide range of cell culture and liquid handling systems. With a growth area of 95 cm², the OneWell Plate™ fills the gap between the growth areas of 58 cm² (Cat.-No. 664 160) and 143 cm² (Cat.-No. 639 160) in the cell culture dish product range. Handling and the required incubator space are improved compared to a round cell culture dish. Notches on the left side of the plate and the lid ensure a secured lid position. The TC-treated version is provided with a proprietary physical surface treatment increasing the hydrophilicity of the plate and facilitating the cultivation of adherent cells. As with all Greiner Bio-One CELLSTAR® products, the CELLSTAR® OneWell Plate™ is made of high grade polystyrene and is guaranteed to be sterile, non-pyrogenic, non-cytotoxic and free of detectable DNase, RNase and human DNA.

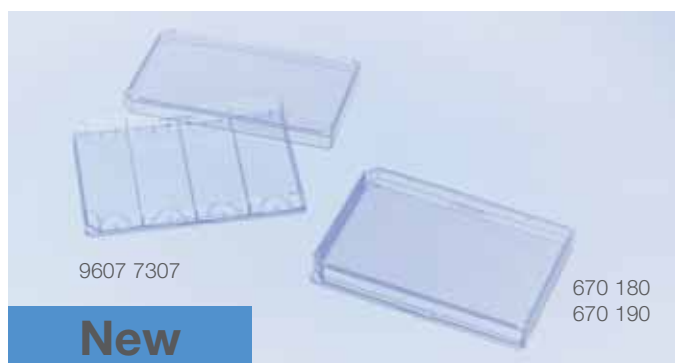
Beside general tissue culture applications the CELLSTAR® OneWell Plate™ can be used as a multipurpose liquid container or disposable for the denaturation, hybridisation and washing of membranes (Southern, Northern and Western Blot).

CELLSTAR® FourWell Plate™

Subdivided plate for microscopic applications

The new CELLSTAR® FourWell Plate™ facilitates the cultivation of cells and the storage of microscopic slides in an HTS - compatible plate complying with the ANSI standard. With its four subdivisions the plate offers space for four individual slides with standard dimensions and enables four parallel experiments. Cells and tissue samples cultivated on these slides can be supplied quickly with fresh media and can be examined directly under a microscope. Thereafter, samples can also be fixed and analysed by immunohisto- and immunocytochemical techniques. Notches on the left side and a numbering of each individual compartment make a laterally reversed usage or confusion of samples impossible.

A semicircular recession at the top and at the bottom of each compartment enables easy removal and handling of slides. The two pins at the left and right side of the semicircular recession hinder the microscopic slide to adjoin the outer rim of the plate and to fully cover the recession. This guarantees that the slide can always be removed manually from the compartment even if it adheres to the plate bottom due to capillary forces. Beyond the indicated microscopic applications, the CELLSTAR® FourWell Plate™ can also be used as a liquid container or disposable for the denaturation, hybridisation and washing of membranes (Southern, Northern and Western Blot).



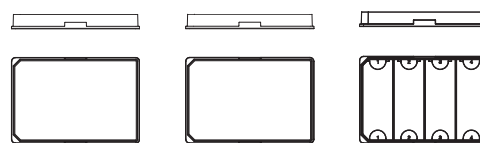
OneWell Plate™ FourWell Plate™

CELLSTAR® OneWell Plate™ (non-sterile) for bacteriological applications p. 4 | 4

New

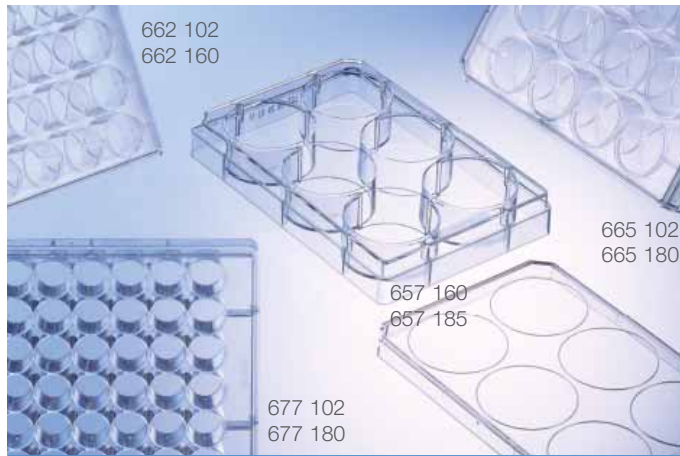
Free of detectable
DNase, RNase,
human DNA
non-pyrogenic

non-
cytotoxic



Cat.-No.	670 180	670 190	9607 7307
Description	OneWell Plate™	OneWell Plate™	FourWell Plate™
No. of chambers	1	1	4
Length [mm] x width [mm]	127.8 x 85.5	127.8 x 85.5	127.8 x 85.5
Height [mm]	14.4	14.4	14.4
Total volume [ml]	113.7	113.7	18.6/well
Growth area [cm ²]	95	95	-
Notches	+	+	+
TC surface treatment	+	-	-
Sterile	+	+	+
Lid	+	+	+
Quantity per bag/case	8/32	8/32	8/32

CELLSTAR® Cell Culture Multiwell Plates



Cell Culture Multiwell Plates

6, 12, 24, 48 Well Format

▶ Cell Culture Inserts p. 1 | 40 ff.

Cell culture multiwell plates are available in the following versions:

- With hydrophilic surface (TC surface treatment) for improved cell adhesion
- With hydrophobic surface for suspension cultures and hybridoma cells

Properties

- High clarity and low autofluorescence
- Lid enables optimal gas exchange with the lowest possible evaporation
- Single position lids to prevent cross-contamination
- Alphanumeric well coding

- Compatible with common instruments and automated systems. For further information please visit our website.

- Easy-to-open packaging



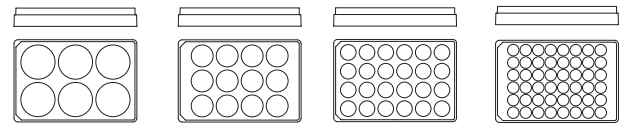
For applications with larger working volume, a 6 and 12 well ThinCert™Plate with deeper wells is available → p. 1 | 44

Free of detectable
DNase, RNase,
human DNA
non-pyrogenic

non-
cytotoxic

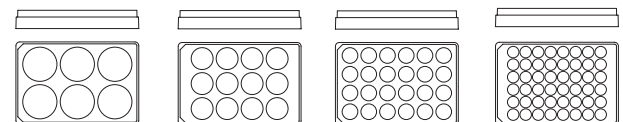
Cell Culture Multiwell Plates for Adherent Cell Cultures

Cat.-No.	657 160	665 180	662 160	677 180
Well format	6 well	12 well	24 well	48 well
Growth area per well [cm²]	9.6	3.9	1.9	1.0
Working volume per well [ml]	2 – 5	2 – 4	0.5 – 1.5	0.5 – 1
TC surface treatment	+	+	+	+
Sterile	+	+	+	+
Lid	+*)	+*)	+*)	+*)
Quantity per bag/case	1/100	1/100	1/100	1/100



Cell Culture Multiwell Plates for Suspension Cultures

Cat.-No.	657 185	665 102	662 102	677 102
Well format	6 well	12 well	24 well	48 well
Max. volume per well [ml]	16	6.5	3.3	1.7
TC surface treatment	-/suspension	-/suspension	-/suspension	-/suspension
Sterile	+	+	+	+
Lid	+*)	+*)	+*)	+*)
Quantity per bag/case	1/100	1/100	1/100	1/100



*) with condensation rings

CELLSTAR® Cell Culture Microplates

Cell culture treated microplates are available in the following versions: 96, 384, 1536 well format

Properties

- Improved cell adhesion through physical surface treatment
- Compatible with automated systems. For further information concerning ANSI standards please visit our website: www.gbo.com/bioscience/technical_information
- Alphanumeric well coding



An overview of all 96 well, 384 well and 1536 well microplates listed in this catalogue can be found in the Technical Appendix → p. A 1 3 ff.



Detailed technical information on microplates
→ p. 2 1 2 ff. HTS microplates
→ p. 3 1 2 ff. Immunology
→ p. 14 1 4 Barcode labelling of microplates

Further literature on cell culture treated microplates

- **Application Note “Establishing a cell culture assay based on TR-FRET for screening G-Protein-coupled receptors”** (F074 058)
- **Application Note “Selection of cell culture surfaces for the adipogenic differentiation of hMSCs”** (F010 003)

96 Well Polystyrene Cell Culture Microplates

Cell culture treated 96 well microplates are available in the following versions:

- With U-, V- and F-bottom
- Clear, black and white
- Standard or half area microplates
- Black and white “clear bottom” plates (μ Clear®)
- Chimney well design, raised wells and condensation rings in lids prevent cross-contamination
- With or without lid
- Improved cell adhesion through physical surface treatment
- Barcode-labelled on request

Properties

- Lid enables gas exchange with minimal evaporation
- High clarity of the clear microplates for optimal microscopic examinations
- Stackable
- Alphanumeric well coding
- Individually wrapped peel-off bags
- Consecutive lot numbering

Well Profile

Depending on the application, the well profile is a key feature in a 96 well cell culture microplate. For further information and figures on the well profiles see → p. 2 1 6 f.

1. U-Bottom

The “U” describes the round bottom shape.

- No sharp corners to facilitate easy and residue-free pipetting
- Suitable for +/- analyses
- Working volume: 40 – 280 μ l

2. V-Bottom

The “V” stands for the conically tapered well bottom.

- For precise pipetting
- Suitable for +/- analyses
- Working volume: 40 – 200 μ l

3. F-Bottom / Standard (ST)

The “F” refers to the flat well bottom.

- Excellent optical properties
- For precise optical measurements
- For microscopic applications (bottom reading)
- Cell growth area: 32 mm²
- Working volume: 25 – 340 μ l

4. F-Bottom / Chimney Well

The chimney well cell culture microplate has the same well profile as the standard F-bottom plate. The difference to the standard plate is the chimney-like arrangement of the wells i.e. each well stands on its own. Therefore the risk of contamination from sample material being carried over is minimised.

- Cell growth area: 34 mm²
- Working volume: 25 – 340 μ l

μ Clear® / Solid Bottom

Clear bottom microplates have pigmented walls and a transparent thin film bottom, the so-called μ Clear® bottom. In contrast to our standard microplates with a solid polystyrene bottom, they are ideal for cell culture and microscopic applications using fluorescence or luminescence detection methods.

Half Area Microplates

For many applications, a reduction of the sample volume is an important feature. Beside high-format plates, the 96 well half area microplates offer an interesting alternative here. They can be pipetted automatically as well as manually without any problem and allow a reduction of the sample volume up to 50 %.

- Cell growth area: 15.0 mm²
- Working volume: 15 – 175 μ l



Bulk Packaging

For selected products Greiner Bio-One also offers user-friendly bulk packaging (Fig. 1). Additional products are available in bulk pack upon request.

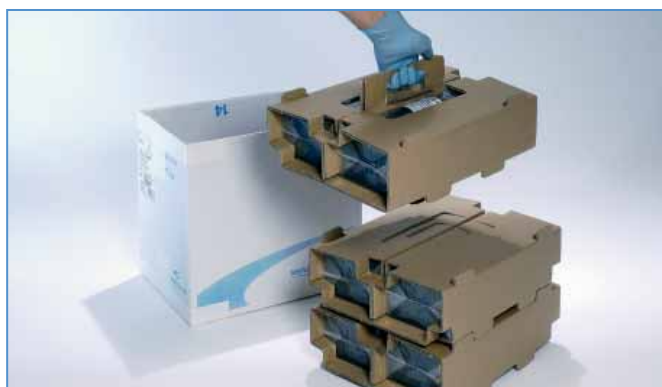
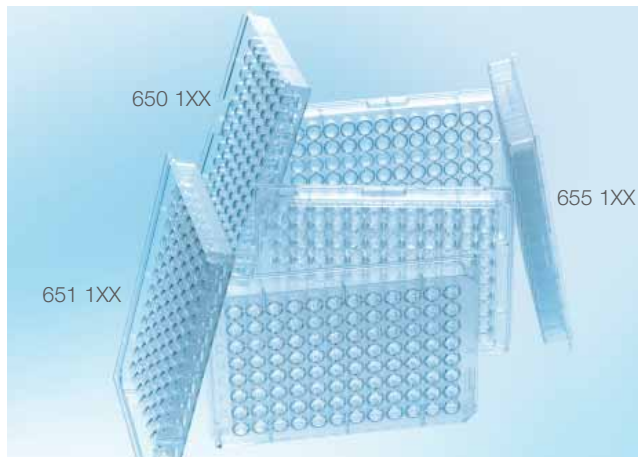


Figure 1: User-friendly bulk packaging



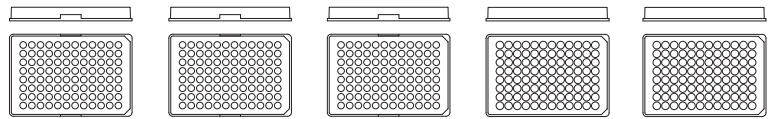
96 Well Polystyrene Cell Culture / Suspension Culture Microplates

solid bottom, clear

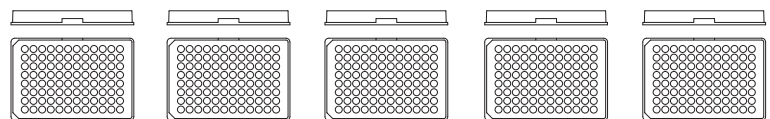
- 96 Well Microplates p. 2 | 7
- Sealers, Lids and CapMats p. 12 | 2 ff.
- Barcode Labelling p. 14 | 4

Free of detectable
DNase, RNase,
human DNA
non-pyrogenic

non-
cytotoxic

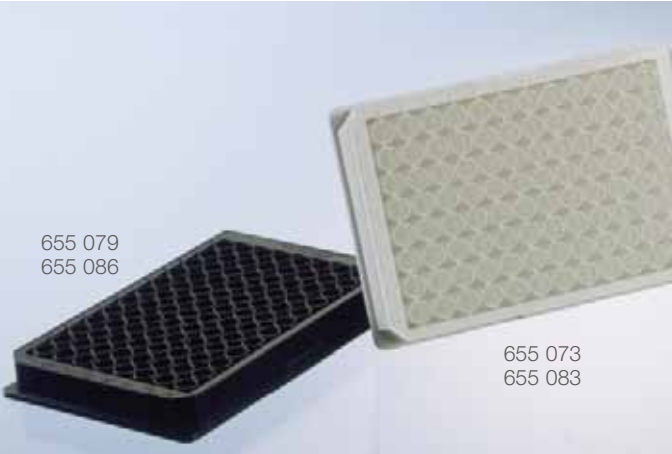


Cat.-No.	650 160	650 180	650 185	651 160	651 180
Well profile	U-bottom	U-bottom	U-bottom	V-bottom	V-bottom
Bottom	solid	solid	solid	solid	solid
Colour	clear	clear	clear	clear	clear
Growth area per well [mm²]	35	35	-	28	28
Working volume per well [µl]	40 – 280	40 – 280	40 – 280	40 – 200	40 – 200
TC surface treatment	+	+	-/suspension	+	+
Sterile	+	+	+	+	+
Lid	-	+	+	-	+
Quantity per bag/case	1/100	1/100	1/60	1/100	1/100



Cat.-No.	655 160	655 162	655 180	655 182	655 185
Well profile	F-bottom/ chimney well	F-bottom/ chimney well	F-bottom/ chimney well	F-bottom/ chimney well	F-bottom/ chimney well
Bottom	solid	solid	solid	solid	solid
Colour	clear	clear	clear	clear	clear
Growth area per well [mm²]	34	34	34	34	-
Working volume per well [µl]	25 – 340	25 – 340	25 – 340	25 – 340	25 – 340
TC surface treatment	+	+	+	+	-/suspension
Sterile	+	+	+	+	+
Lid	-	-	+))	+))	+))
Quantity per bag/case	1/100	5/100	1/100	10/160	1/60

*) with condensation rings



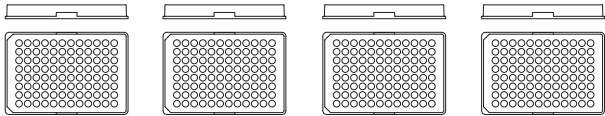
96 Well Polystyrene Cell Culture Microplates

solid bottom, white / black

- 96 Well Microplates p. 2 | 8
- Sealers, Lids and CapMats p. 12 | 2 ff.
- Barcode Labelling p. 14 | 4

Free of detectable
DNase, RNase,
human DNA
non-pyrogenic

non-
cytotoxic



Cat.-No.	655 073	655 083	655 079	655 086
Well profile	F-bottom/ chimney well	F-bottom/ chimney well	F-bottom/ chimney well	F-bottom/ chimney well
Bottom	solid	solid	solid	solid
Colour	white	white	black	black
Growth area per well [mm²]	34	34	34	34
Working volume per well [µl]	25 – 340	25 – 340	25 – 340	25 – 340
TC surface treatment	+	+	+	+
Sterile	+	+	+	+
Lid	-	+*)	-	+*)
Quantity per bag/case	10/40	8/32	10/40	8/32

*) with condensation rings



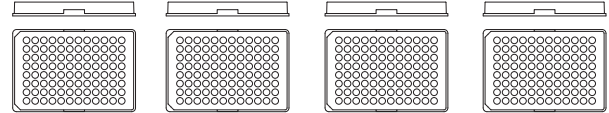
96 Well Polystyrene Cell Culture Microplates

μClear®, white / black

- 96 Well Microplates p. 2 | 8
- Sealers, Lids and CapMats p. 12 | 2 ff.
- Barcode Labelling p. 14 | 4

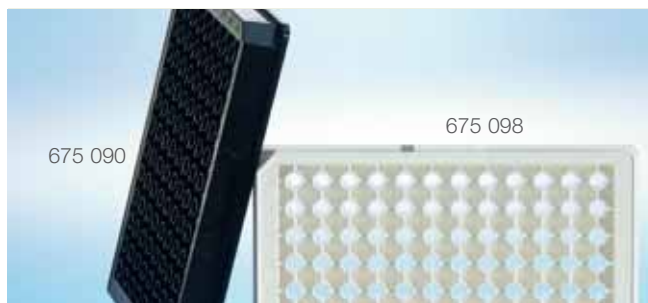
Free of detectable
DNase, RNase,
human DNA
non-pyrogenic

non-
cytotoxic



Cat.-No.	655 088	655 098	655 087	655 090
Well profile	F-bottom/ chimney well	F-bottom/ chimney well	F-bottom/ chimney well	F-bottom/ chimney well
Bottom	μClear®	μClear®	μClear®	μClear®
Colour	white	white	black	black
Growth area per well [mm²]	34	34	34	34
Working volume per well [μl]	25 – 340	25 – 340	25 – 340	25 – 340
TC surface treatment / Sterile	+ / +	+ / +	+ / +	+ / +
Lid	-	+*)	-	+*)
Quantity per bag/case	10/40	8/32	10/40	8/32

*) with condensation rings



96 Well Half Area Polystyrene Cell Culture Microplates

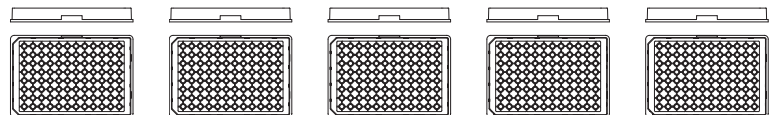
solid bottom, clear / white / black

μClear®, white / black

- 96 Well Half Area Microplates p. 2 | 9

Free of detectable
DNase, RNase,
human DNA
non-pyrogenic

non-
cytotoxic



Cat.-No.	675 180	675 083	675 086	675 098	675 090
Well profile	half area	half area	half area	half area	half area
Bottom	solid	solid	solid	μClear®	μClear®
Colour	clear	white	black	white	black
Growth area per well [mm²]	15	15	15	15	15
Working volume per well [μl]	15 – 175	15 – 175	15 – 175	15 – 175	15 – 175
TC surface treatment / Sterile	+ / +	+ / +	+ / +	+ / +	+ / +
Lid	+	+	+	+	+
Quantity per bag/case	8/32	8/32	8/32	8/32	8/32

384 Well Polystyrene Cell Culture Microplates

384 well cell culture microplates are physically surface treated for improved cell adhesion and available in the following versions:

- Clear, white or black colour
- White or black “clear bottom” plates (µClear®)
- 384 well Small Volume™ HiBase and LoBase microplates
- Barcode-labelled on request (→ p. 14 | 4)



384 Well Polystyrene Cell Culture Microplates

solid bottom, clear / white / black

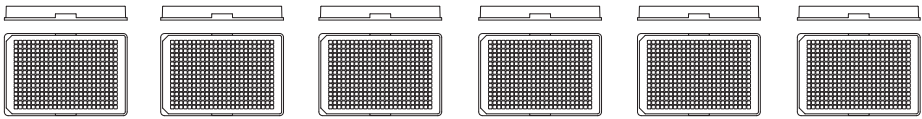
- 384 Well Microplates p. 2 | 13
- Sealers, Lids and CapMats p. 12 | 2 ff.
- Barcode Labelling p. 14 | 4

Properties:

- Lid enables gas exchange with the lowest possible evaporation
- High clarity of the clear microplates for optimal microscopic examinations
- Stackable
- Alphanumeric well coding

Free of detectable
DNase, RNase,
human DNA
non-pyrogenic

non-
cytotoxic



Cat.-No.	781 165	781 182	781 073	781 080	781 079	781 086
Well profile	F-bottom	F-bottom	F-bottom	F-bottom	F-bottom	F-bottom
Bottom	solid	solid	solid	solid	solid	solid
Colour	clear	clear	white	white	black	black
Growth area per well [mm²]	10	10	10	10	10	10
Working volume per well [µl]	15 – 110	15 – 110	15 – 110	15 – 110	15 – 110	15 – 110
TC surface treatment	+	+	+	+	+	+
Sterile	+	+	+	+	+	+
Lid	-	+	-	+	-	+
Quantity per bag/case	10/40	8/32	10/40	8/32	10/40	8/32



781 090
781 091
781 092

781 093
781 098

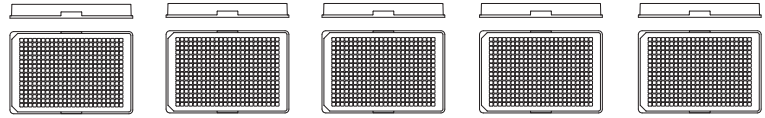
384 Well Polystyrene Cell Culture Microplates

μClear®, white / black

- 384 Well Microplates p. 2 | 14
- Sealers, Lids and CapMats p. 12 | 2 ff.
- Barcode Labelling p. 14 | 4

Free of detectable
DNase, RNase,
human DNA
non-pyrogenic

non-
cytotoxic



Cat.-No.	781 093	781 098	781 092	781 091	781 090
Well profile	F-bottom	F-bottom	F-bottom	F-bottom	F-bottom
Bottom	μClear®	μClear®	μClear®	μClear®	μClear®
Colour	white	white	black	black	black
Growth area per well [mm²]	10	10	10	10	10
Working volume per well [μl]	15 – 110	15 – 110	15 – 110	15 – 110	15 – 110
TC surface treatment	+	+	+	+	+
Sterile	+	+	+	+	+
Lid	-	+	-	+	+
Quantity per bag/case	10/40	8/32	10/40	8/32	20/120

2 HTS-
Microplates3 Immunology/
HLA4 Microbiology/
Bacteriology5 Tubes/Multi-
Purpose Beakers6 Liquid
Handling7 Molecular
Biology



788 092

788 093

784 086
784 080

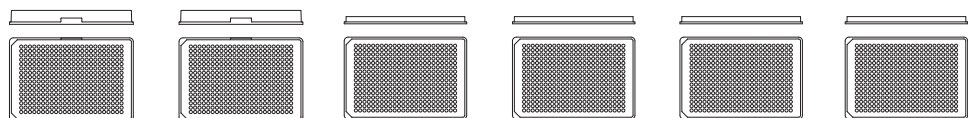
384 Well Small Volume™ HiBase/ LoBase Cell Culture Microplates

solid bottom, white / black
μClear®, white / black

- 384 Well Microplates p. 2 | 17

Free of detectable
DNase, RNase,
human DNA
non-pyrogenic

non-
cytotoxic



Cat.-No.	784 080	784 086	788 073	788 086	788 093	788 092
Well profile	Small Volume™	Small Volume™	Small Volume™	Small Volume™	Small Volume™	Small Volume™
Bottom	solid	solid	solid	solid	μClear®	μClear®
Colour	white	black	white	black	white	black
Growth area per well [mm²]	2.7	2.7	2.7	2.7	2.7	2.7
Working volume per well [μl]	4 – 25	4 – 25	4 – 25	4 – 25	4 – 25	4 – 25
TC surface treatment	+	+	+	+	+	+
Sterile	+	+	+	+	+	+
Lid	+	+	-	+	-	-
Quantity per bag/case	8/32	8/32	10/80	15/60	10/80	10/80
Plate design	HiBase	HiBase	LoBase	LoBase	LoBase	LoBase

→ New

→ New

8 Protein
Crystallisation

9 Separation

10 Biochips/
Microfluidics11 Cryo-
Techniques12 Lids/Sealers/
CapMats13 Reaction Tubes/
Analyser Cups

14 Accessories

1536 Well Cell Culture Microplates

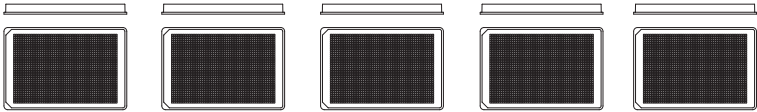
1536 well cell culture microplates are physically surface-treated for improved cell adhesion and available in the following versions:

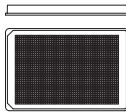
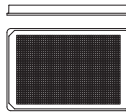
- LoBase and HiBase version (→ p. 2 | 20 f.)
- Barcode-labelled on request (→ p. 14 | 4)
- In clear, white or black polystyrene
- As clear bottom variants (µClear®)

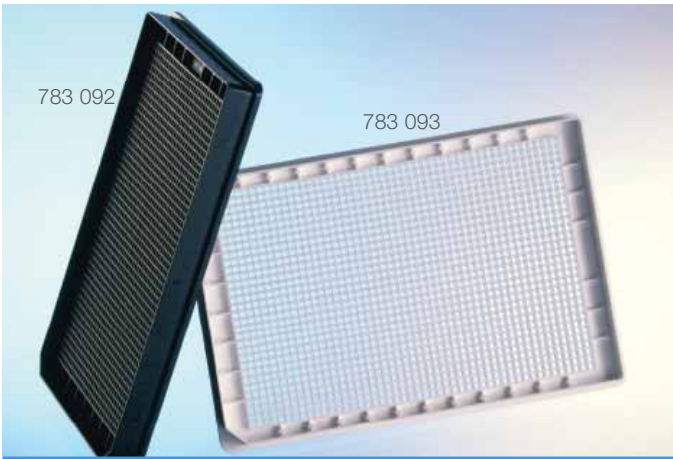


1536 Well Cell Culture Microplates HiBase

- 1536 Well Microplates p. 2 | 20
- Sealers, Lids and CapMats p. 12 | 2 ff.
- Barcode Labelling p. 14 | 4

Free of detectable DNase, RNase, human DNA non-pyrogenic		non- cytotoxic			
Cat.-No.	782 180	782 073	782 080	782 078	782 086
Well profile	F-bottom	F-bottom	F-bottom	F-bottom	F-bottom
Bottom	solid	solid	solid	solid	solid
Colour	clear	white	white	black	black
Growth area per well [mm²]	2.3	2.3	2.3	2.3	2.3
Working volume per well [µl]	3 – 10	3 – 10	3 – 10	3 – 10	3 – 10
TC surface treatment	+	+	+	+	+
Sterile	+	+	+	+	+
Lid	+	-	+	-	+
Quantity per bag/case	1/32	15/60	10/40	15/60	10/40
Plate design	HiBase	HiBase	HiBase	HiBase	HiBase

		
Cat.-No.	782 093	782 092
Well profile	F-bottom	F-bottom
Bottom	µClear®	µClear®
Colour	white	black
Growth area per well [mm²]	2.3	2.3
Working volume per well [µl]	3 – 10	3 – 10
TC surface treatment	+	+
Sterile	+	+
Lid	-	-
Quantity per bag/case	15/60	15/60
Plate design	HiBase	HiBase

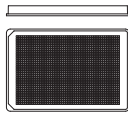
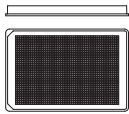


1536 Well Cell Culture Microplates LoBase

- 1536 Well Microplates p. 2 | 21
- Sealers, Lids and CapMats p. 12 | 2 ff.
- Barcode Labelling p. 14 | 4

Free of detectable
DNase, RNase,
human DNA
non-pyrogenic

non-
cytotoxic



Cat.-No.	783 093	783 092
Well profile	F-bottom	F-bottom
Bottom	µClear®	µClear®
Colour	white	black
Growth area per well [mm²]	2.3	2.3
Working volume per well [µl]	3 – 10	3 – 10
TC surface treatment	+	+
Sterile	+	+
Lid	-	-
Quantity per bag/case	15/60	15/60
Plate design	LoBase	LoBase

1536 Well SCREENSTAR Microplate

The increasing significance of High-Content Screening (HCS), which means the microscopic analysis of cells, cell growth and cell signalling in drug discovery, created a new demand for specialised microplates with excellent optical features.

To fulfill the expectations of researchers in this field of application, Greiner Bio-One developed the 1536 well SCREENSTAR microplates as a new product line especially suited for advanced microscopy in drug discovery.

Applications:

- For automated microscopy in drug discovery such as high-content screening applications
- For fluorescence measurements in classical high-throughput microplate readers
- Suitable for all microscopic applications such as fluorescence microscopy, confocal fluorescence microscopy and bright field microscopy

Features:

- 190 µm cycloolefin film bottom for optimum resolution even with higher magnifications
- Recessed film bottom for better access with high magnification lenses (Fig. 1)
- Low background especially in the lower UV
- Smooth microplate top absent of alphanumeric coding facilitates flush lid mounting

- Excellent cell attachment and cell growth due to cell culture treatment
- High optical quality and minimal contamination with dust and particles due to a clean room like production of the film and the microplate
- Innovative packaging for improved protection of the microplates and film bottom

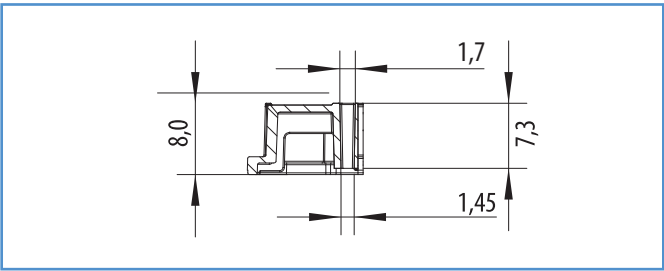
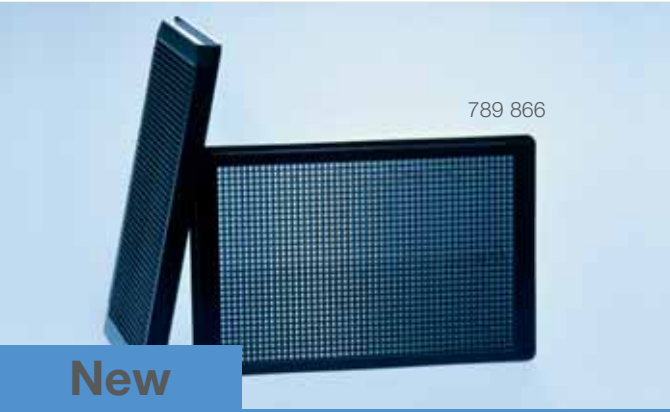


Figure 1: Well profile: 1536 well SCREENSTAR microplate
Total volume: 17.8 µl
Working volume: 3 - 15 µl
Growth area: 2.1 mm²
Film bottom thickness: 190 µm
Distance inner well bottom to microplate rim: 0.7 mm
Distance outer well bottom to microplate rim: 0.51 mm



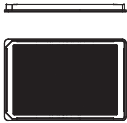
New

Free of detectable
DNase, RNase,
human DNA
non-pyrogenic

non-
cytotoxic

1536 Well SCREENSTAR Microplate

- Non-sterile, non-treated version (Cat.-No. 789 896) available on request
- 1536 Well Microplates p. 1 | 18 and 2 | 20
- 1536 Well SensoPlate™ p. 2 | 35
- Barcode Labelling p. 14 | 4



Cat.-No.	789 866
Well format	1536 well
Well profile	F-bottom
Bottom	CO film
Colour	black
Growth area per well [mm²]	2.1
Working volume per well [µl]	3 – 15
TC surface treatment	+
Sterile	+
Lid	-
Quantity per bag/case	17/68

CELLSTAR® Cell Culture Tubes



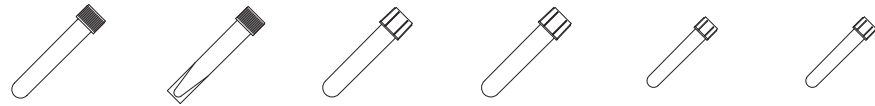
Polystyrene Cell Culture Tubes

→ Tubes p. 5 | 2 ff.

- Made of high-grade polystyrene
- Improved cell adhesion through physical surface treatment
- Available with screw cap, bayonet cap or two-position vent stopper

Free of detectable
DNase, RNase,
human DNA
non-pyrogenic

non-
cytotoxic



Cat.-No.	163 160	164 160	191 160	191 170	120 160	120 190
ø [mm] x height [mm]	17 x 100	16.8 x 100	18 x 95	18 x 95	12.4 x 75	12.4 x 75
Volume [ml]	12	12	14	14	4.5	4.5
TC surface treatment	+	+	+	+	+	+
Sterile	+	+	+	+	+	+
Support skirt	-	+	-	-	-	-
Screw cap	red	-	-	-	-	-
Bayonet cap ^{*)}	-	red	-	-	-	-
Two-position vent stopper	-	-	+	+	+	+
Quantity per bag/case	5/1000	5/1000	1/750	100/1200	1/1000	25/2000

^{*)} open by a 1/3 turn

2 HTS-
Microplates3 Immunology/
HLA4 Microbiology/
Bacteriology5 Tubes/Multi-
Purpose Beakers6 Liquid
Handling7 Molecular
Biology8 Protein
Crystallisation

9 Separation

10 Biochips/
Microfluidics11 Cryo-
Technics12 Lids/Sealers/
CapMats13 Reaction Tubes/
Analyser Cups

14 Accessories

CELLSTAR® CELLreactor™ - 50 ml Polypropylene Tube with Filter Screw Cap

The new CELLSTAR® CELLreactor™ tube can be used as small bioreactor for suspension and spheroid cell culture, facilitating miniaturisation of large-scale setups and maximising the number of parallel experiments.

Each CELLreactor™ tube cap features 8 holes and a specific USP Class VI certified PTFE-coated capillary pore filter membrane with a pore size of 0.2 µm to guarantee maximal sterility while providing excellent gas exchange. In case the aeration has to be reduced, individual openings can be sealed.

Agitation of internal liquids is achieved with standard shaking lab equipment minimising foam formation and shearing forces induced by integrated mixing devices. Compared to cell culture and spinner flask as well as other cultivation disposables, no transfer for cell harvest is required. Based on the conical design, the tube fits in a standard 50 ml centrifuge rotor and cells can be spun down in the same tube.

In addition to cell culture applications, the CELLSTAR® CELLreactor™ tube can also be applied for the expansion of aerobic bacteria, yeast or other microorganisms in shaken cultures as well as storage of components and liquids requiring gas exchange. For anaerobic culture, the CELLSTAR® polypropylene tube with standard cap (→ p. 5 | 7) can be used.



CELLreactor™

CELLSTAR® polypropylene tubes with standard cap
p. 5 | 7

Advantages:

- Facilitates a high number of parallel experiments
- Flexible working volume from 1 - 35 ml
- Maximal sterility and excellent gas exchange
- Conical tube design and in-tube cell harvest

Applications:

- Bioreactor for suspension and spheroid cells
- Expansion of aerobic bacteria, yeast and microorganisms
- Storage of components and liquids requiring gas exchange



Cat.-No.	227 245
Description	CELLreactor™ 50 ml tube with filter cap
Bottom design	conical
ø [mm] x height [mm]	30 x 115
Volume [ml]	50
Sterile	+
Colour	natural
Filter screw cap	blue
Graduation	blue
Writing field	white
Quantity per bag/case	20/500

CELLMASTER™ Cell Culture Roller Bottles

The cultivation of cells as mass cultures has become increasingly important over the past few decades and has led to further developments of high-quality products. This includes items such as roller bottles which are used for the production of virus vaccines or recombinant proteins used for therapeutic approaches. CELLMASTER™ roller bottles are made from polystyrene (PS) or polyethylene terephthalate (PET). These materials, like those used for the screw caps (HDPE) and the hydrophobic membrane (PET/PTFE) of the filter screw caps (Fig. 1), comply with the quality standards of the U.S. Pharmacopoeia. The complete end product is USP Class VI certified. All roller bottles are sterilised by irradiation. Pyrogen testing is conducted using the kinetic turbidimetric “Limulus Amoebocyte Lysate” (LAL) assay in accordance with FDA guidelines (12/8) with a tolerance level of 0.03 EU/ml. Since roller bottles are manufactured using a two-phase blow-moulding procedure, the bottles are seamless ruling out the risk of liquid leaking from a faulty seam.

- PS or PET roller bottles depending on the cultivation requirements
- Particularly high stability and clarity
- Different sizes (116 x 276 mm, 122 x 271 mm, 122 x 275 mm, 122 x 500 mm) with or without a radially ribbed surface for an expanded growth area (850 cm², 1700 cm², 2125 cm², 4250 cm²)
- Seamless blow-moulding technique rules out leaking seams
- Free of detectable endotoxins (tolerance limit 0.03 EU/ml)
- Graduations from 150 to 2000 ml
- Lot number and best-before date to ensure lot traceability for roller bottles made of polystyrene
- Certified USP Class VI end product testing
- Safety screw cap for tightly closed, contamination-free cultivation
- Short screw cap thread for quick and easy opening of all roller bottles made of polystyrene



Figure 1: Filter screw cap



CELLMASTER™ Roller Bottle Nomenclature:

- The product range includes two different sizes, a short and a long form. The sizes are labelled as **X** (short) and **XL** (long)
- Both sizes are available with a smooth or a radially ribbed surface. The ribbed design increases the growth area of the roller bottle without changing the height. The **figure** in front of the **X** or **XL** indicates the multiplication factor by which the surface of a ribbed type increases compared to the short smooth roller bottle with 850 cm²
- Short forms with a ribbed design have a 2-fold or 2.5-fold expanded growth area (2 X or 2.5 X)
- Long roller bottles with a ribbed design have a 5-fold expanded growth area (5 XL) compared to the smooth short form (1 X)

Polystyrene Roller Bottles



Free of detectable
DNase, RNase,
human DNA
non-pyrogenic

non-
cytotoxic

Polystyrene Roller Bottles

- Particularly high stability and optical clarity
- Improved cell adhesion through physical surface treatment
- Thread enables quick opening with a $\frac{2}{3}$ turn
- Screw caps with larger knurls for improved grip and ease of opening/closing
- Lot number and best-before date on each roller bottle
- Sterile, individually packed screw caps available:
 - Standard screw cap (Cat.-No. 383 361)
 - Filter screw cap (Cat.-No. 383 382)
- Nomenclature p. 1 | 23
- Double-bag bulk packaging (suited for clean room use) available on request

						
Cat.-No.	680 060	680 065	681 060	681 065	681 070	681 075
Description	1 X	1 X	2 X	2 X	2.5 X	2.5 X
Surface	smooth	smooth	ribbed	ribbed	ribbed	ribbed
ø [mm] x height [mm]	122 x 271	122 x 271	122 x 271	122 x 271	122 x 271	122 x 271
Growth area [cm²]	850	850	1700	1700	2125	2125
Max. volume [ml]	2520	2520	2280	2280	2300	2300
TC surface treatment	+	+	+	+	+	+
Sterile	+	+	+	+	+	+
Standard screw cap	+	+	+	+	+	+
Quantity per bag/case	2/24	24	2/24	24	2/24	24

				
Cat.-No.	682 012	682 060	682 075	682 070
Description	1 XL	1 XL	5 XL	5 XL
Surface	smooth	smooth	ribbed	ribbed
ø [mm] x height [mm]	122 x 500	122 x 500	122 x 500	122 x 500
Growth area [cm²]	1700	1700	4250	4250
Max. volume [ml]	4970	4970	4640	4640
TC surface treatment	+	+	+	+
Sterile	+	+	+	+
Standard screw cap	+	+	+	+
Quantity per bag/case	12	1/12	12	1/12



Polystyrene Filter Cap Roller Bottles

- Particular high stability and optical clarity
- Improved cell adhesion through physical surface treatment
- Thread enables quick opening with a $\frac{1}{8}$ turn
- Screw caps with larger knurls for improved grip and ease of opening/closing
- Lot number and best-before date on each roller bottle
- Sterile, individually packed screw caps available:
 - Standard screw cap (Cat.-No. 383 361)
 - Filter screw cap (Cat.-No. 383 382)
- Nomenclature p. 1 | 23
- Double-bag bulk packaging (suited for clean room use) available on request

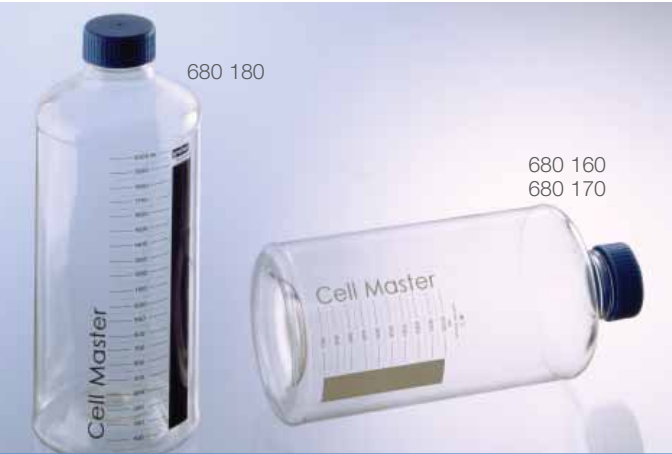
Free of detectable
DNase, RNase,
human DNA
non-pyrogenic

non-
cytotoxic

				
Cat.-No.	680 058	680 068	682 015	682 065
Description	1 X	1 X	1 XL	1 XL
Form	short	short	long	long
Surface	smooth	smooth	smooth	smooth
ø [mm] x height [mm]	122 x 271	122 x 271	122 x 500	122 x 500
Growth area [cm ²]	850	850	1700	1700
Max. volume [ml]	2520	2520	4970	4970
TC surface treatment	+	+	+	+
Sterile	+	+	+	+
Filter screw cap	+	+	+	+
Quantity per bag/case	2/24	24	12	1/12

			
Cat.-No.	681 062	681 072	682 078
Description	2 X	2.5 X	5 XL
Form	short	short	long
Surface	ribbed	ribbed	ribbed
ø [mm] x height [mm]	122 x 271	122 x 271	122 x 500
Growth area [cm ²]	1700	2125	4250
Max. volume [ml]	2280	2300	4640
TC surface treatment	+	+	+
Sterile	+	+	+
Filter screw cap	+	+	+
Quantity per bag/case	2/24	2/24	1/12

Polyethylene Terephthalate (PET) Roller Bottles



Free of detectable DNase, RNase, human DNA non-pyrogenic

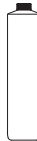
non-cytotoxic

Polyethylene Terephthalate (PET) Roller Bottles

- PET material with high impact resistance and gas permeability
- Surface suitable for many adherent cell lines
- All PET(G) roller bottles have a standard screw cap
- PETG (glycolised PET) with high stability at a consistent level of transparency
- Break-proof
- Nomenclature p. 1 | 23

					
Cat.-No.	680 160	680 170	680 180*)	681 160	681 170
Description	1 X	1 X	1 X	2 X	2.5 X
Material	PET	PET	PET	PETG	PETG
Form	short	short	short	short	short
Surface	smooth	smooth	smooth	ribbed	ribbed
ø [mm] x height [mm]	116 x 276	116 x 276	116 x 276	122 x 275	122 x 275
Growth area [cm²]	850	850	850	1700	2125
Max. volume [ml]	2500	2500	2500	2450	2500
Sterile	+	+	+	+	+
Quantity per bag/case	1/18	30	1/18	20	5/20

*) black graduation

		
Cat.-No.	682 180	682 160
Description	1 XL	5 XL
Material	PETG	PETG
Form	long	long
Surface	smooth	ribbed
ø [mm] x height [mm]	122 x 500	122 x 500
Growth area [cm²]	1800	4250
Max. volume [ml]	5130	4750
Sterile	+	+
Quantity per bag/case	22	22

Advanced TC™ Cell Culture Vessels

For the propagation of fastidious cells like primary or sensitive cells as well as cells cultivated under restricted growth conditions (serum-free or serum-reduced) Greiner Bio-One offers the Advanced TC™ polymer modification. Based on an innovative technique, the cell culture surface is modified to promote cellular features and functions. Enhanced cell attachment (Fig. 1) and higher proliferation rates (Fig. 2) improve and accelerate cell expansion. Furthermore, the Advanced TC™ surface facilitates consistent and homogenous cell attachment increasing the overall cell yield and reducing cell loss, for example during automated washing steps.

The positive effect on cell morphology is particularly apparent during cultivation of sensitive cells (Fig. 3), serum deprivation or after cellular stress induced by transfection or transduction processes. Moreover, cells cultivated on the Advanced TC™ surface exhibit higher transgene activity after gene transfer/insertion (Fig. 4).

Due to the production process, the modification of the polymer assures consistent and reproducible product quality. Transport and storage can be carried out at room temperature.

Applications:

- Cultivation of fastidious and sensitive cells
- Usage of serum-reduced or serum-free media
- Differentiation of semi-adherent cells
- Transfection
- Transduction
- Automation/High-throughput analysis

Advantages:

- Improved cell adherence
- Consistent cell attachment
- Homogenous cell growth
- In-vivo like morphology
- Increased cell yield
- Optimal cultivation conditions for sensitive cells
- Permits usage of serum-reduced or serum-free media
- Reduced cell loss due to (automated) washing steps
- Improved assay consistency
- Storage at room temperature
- 2-year shelf life

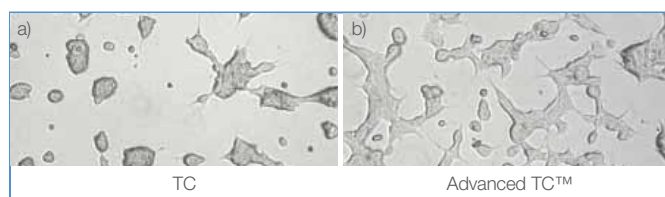


Figure 1: HEK 293 cells were seeded with a concentration of 20,000 cells/well in a 96 well microplate and cultivated in serum-free media at 37 °C and 5 % CO₂. After 48 hours cells are semi-adherent on the standard tissue culture surface (a) whereas on the Advanced TC™ surface (b) HEK 293 cells display improved attachment and their cell-specific morphology.

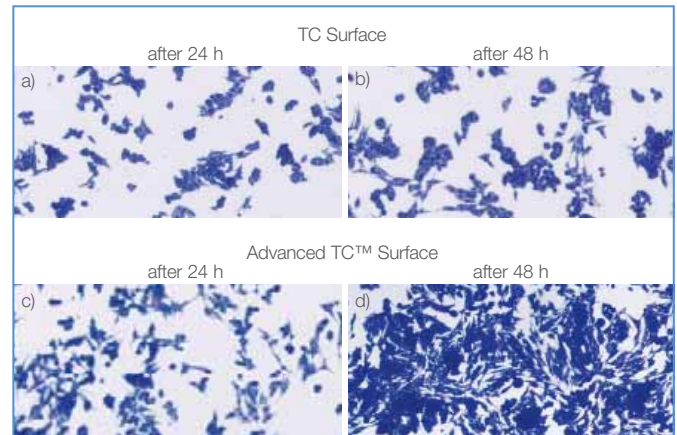


Figure 2: SKNMC cells were seeded with a concentration of 20,000 cells/well in a 96 well microplate with standard tissue culture surface (a, b) and Advanced TC™ surface (c, d) and cultivated at 37 °C and 5 % CO₂ for 24 or 48 hours respectively. Cells were stained with crystal violet to identify living cells. Due to the increased proliferation rate higher cell densities can be detected on the Advanced TC™ surface at both time points.

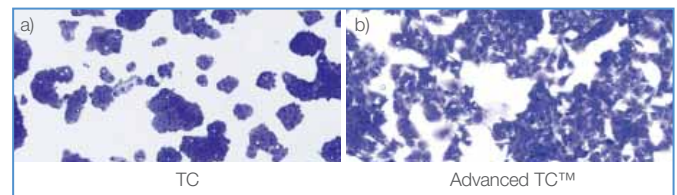


Figure 3: HepG2 cells were seeded with a concentration of 20,000 cells/well in a 96 well microplate with standard tissue culture surface (a) and Advanced TC™ surface (b), cultivated under identical conditions for 48 hours and stained with crystal violet. Only on the Advanced TC™ surface cells display their in-vivo like morphology.

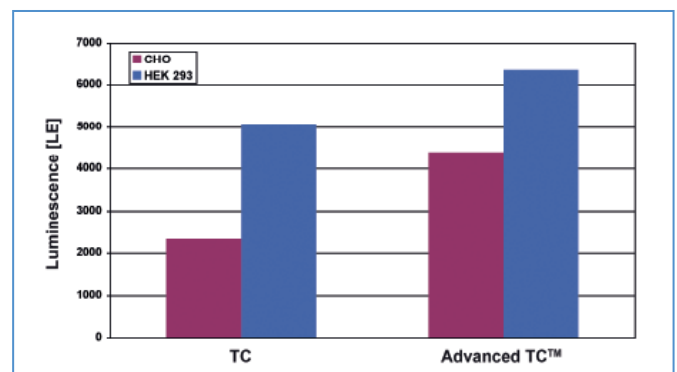
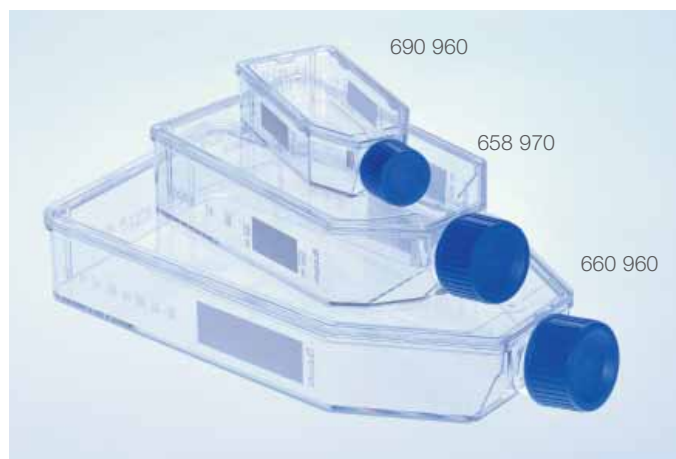


Figure 4: CHO and HEK 293 cells were seeded in a 96 well microplate with a concentration of 40,000 cells/well or 100,000 cells/well respectively, cultivated at 37 °C and 5 % CO₂ for 24 hours and thereafter transfected with the pCMV- GLuc-vector. Both cell lines exhibit raised Luciferase activity on the Advanced TC™ surface.

Further information on Advanced TC™

- **Forum No. 12: Advanced TC™: An innovative surface improving cellular assays** (F071 104)
- **Application Report "Advanced TC™ for improving the cultivation / differentiation of embryonic stem cells"** (F076 036)



Advanced TC™

Standard Cell Culture Flasks Filter Cap Cell Culture Flasks

- Standard Cell Culture Flasks p. 1 | 4
- Filter Cap Cell Culture Flasks p. 1 | 5

Free of detectable
DNase, RNase,
human DNA
non-pyrogenic

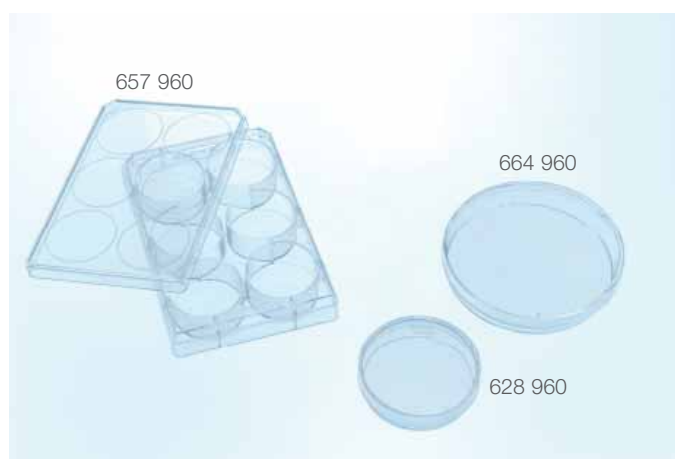
non-
cytotoxic

Standard Cell Culture Flasks

Cat.-No.	690 960	658 970	660 960	661 960
Flask design	-	-	flat	high
Growth area [cm ²]	25	75	175	175
Total volume [ml]	50	250	550	650
Working volume [ml]	5 – 10	15 – 38	20 – 45	20 – 85
Advanced TC™	+	+	+	+
Sterile	+	+	+	+
Standard screw cap	blue	blue	blue	blue
Quantity per bag/case	10/200	5/120	5/50	4/40

Filter Cap Cell Culture Flasks

Cat.-No.	690 975	658 975	660 975	661 975	779 960
Flask design	-	-	flat	high	AutoFlask™
Growth area [cm ²]	25	75	175	175	83.6
Total volume [ml]	50	250	550	650	110
Working volume [ml]	5 – 10	15 – 38	20 – 45	20 – 85	20 – 40
Advanced TC™	+	+	+	+	+
Sterile	+	+	+	+	+
Filter screw cap	blue	blue	blue	blue	-
Colour code	-	-	-	-	blue
Barcode labelling	-	-	-	-	+
Quantity per bag/case	10/200	5/120	5/50	4/40	10/100



Advanced TC™ Cell Culture Dishes Cell Culture Multiwell Plates

- Cell Culture Dishes p. 1 | 8
- Advanced TC™ CELLview™ Cell Culture Dish with Glass Bottom p. 1 | 9
- Cell Culture Multiwell Plates p. 1 | 11

Free of detectable
DNase, RNase,
human DNA
non-pyrogenic

non-
cytotoxic

Cat.-No.	627 960	628 960	664 960	639 960
ø [mm] x height [mm]	35 x 10	60 x 15	100 x 20	145 x 20
Growth area [cm²]	8.7	21	58	143
Total volume [ml]	10	28	100	240
Working volume [ml]	5	6 – 7	16 – 17	25 – 27
Vents	+	+	+	+
Advanced TC™	+	+	+	+
Sterile	+	+	+	+
Quantity per bag/case	10/740	10/600	15/360	5/120

Cat.-No.	657 960	665 980	662 960	677 980
Well format	6 well	12 well	24 well	48 well
Growth area per well [cm²]	9.6	3.9	1.9	1.0
Working volume per well [ml]	2 – 5	2 – 4	0.5 – 1.5	0.5 – 1
Advanced TC™	+	+	+	+
Sterile	+	+	+	+
Lid	+))	+))	+))	+))
Quantity per bag/case	1/100	1/100	1/100	1/100

*) with condensation rings

655 986

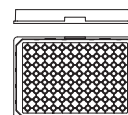
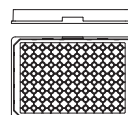
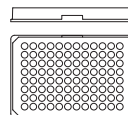
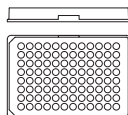
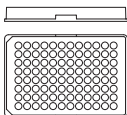
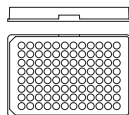
655 983

Advanced TC™

96 Well Cell Culture Microplates



96 Well Cell Culture Microplates p. 1 | 12 ff.

Free of detectable
DNase, RNase,
human DNA
non-pyrogenicnon-
cytotoxic

Cat.-No.	655 980	655 982	655 983	655 986	675 983	675 986
Well format	96 well	96 well	96 well	96 well	96 well	96 well
Well profile	F-bottom/ chimney well	F-bottom/ chimney well	F-bottom/ chimney well	F-bottom/ chimney well	half area	half area
Bottom	solid	solid	µClear®	µClear®	µClear®	µClear®
Colour	clear	clear	white	black	white	black
Growth area per well [mm²]	34	34	34	34	15	15
Working volume per well [µl]	25 – 340	25 – 340	25 – 340	25 – 340	15 – 175	15 – 175
Advanced TC™ / Sterile	+/+	+/+	+/+	+/+	+/+	+/+
Lid	+*)	+*)	+*)	+*)	+	+
Quantity per bag/case	1/100	10/160	8/32	8/32	8/32	8/32

*) with condensation rings

781 986

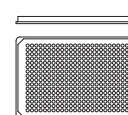
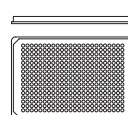
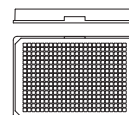
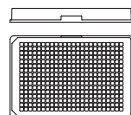
781 983

Advanced TC™

384 Well Cell Culture Microplates



384 Well Cell Culture Microplates p. 1 | 16 ff.

Free of detectable
DNase, RNase,
human DNA
non-pyrogenicnon-
cytotoxic

Cat.-No.	781 983	781 986	788 983	788 986
Well format	384 well	384 well	384 well	384 well
Well profile	F-bottom	F-bottom	Small Volume™	Small Volume™
Bottom	µClear®	µClear®	µClear®	µClear®
Colour	white	black	white	black
Growth area per well [mm²]	10	10	2.7	2.7
Working volume per well [µl]	15 – 110	15 – 110	4 – 25	4 – 25
Advanced TC™ / Sterile	+/+	+/+	+/+	+/+
Lid	+	+	+*)	+*)
Quantity per bag/case	8/32	8/32	15/60	15/60
Plate design			LoBase	LoBase

*) ultra low profile lid

CELLCOAT® – Protein Coated Cell Culture Vessels

The Greiner Bio-One CELLCOAT® product line comprises cell culture vessels which are coated with proteins of the extracellular matrix (Collagen Type I, Fibronectin, Laminin) or synthetic proteins (Poly-D- and Poly-L-Lysine). Beside an improved adhesion and proliferation of primary cells and various cell lines, CELLCOAT® plates are highly suitable for serum-free and serum-reduced cell cultivation and experiments which include additional washing steps or stressful procedures, e.g. transfection. Moreover, the differentiation of individual cell types can be enhanced through the protein-coating.

Applications:

- Improved adhesion
- Improved cell proliferation
- Cell adhesion assays
- Receptor-ligand binding studies
- Reduced-serum or serum-free cultivation
- Improved growth of primary cells
- Differentiation of individual cell types

Advantages:

- Increase in isolation and cultivation efficiency
- Ready-to-use products: immediate use, time-saving
- Consistent quality
- Poly-Lysine- and Collagen Type I-coated products storable at room temperature

CELLCOAT® products are produced under the highest purity and manufacturing standards according to validated procedures and established protocols. Consistent quality of the raw material and of the biological activity of the coating is ensured by conducting strict controls.

A protein coating of the growth surfaces with, for example, Poly-D-Lysine can improve the adhesion of cells (Fig. 1).

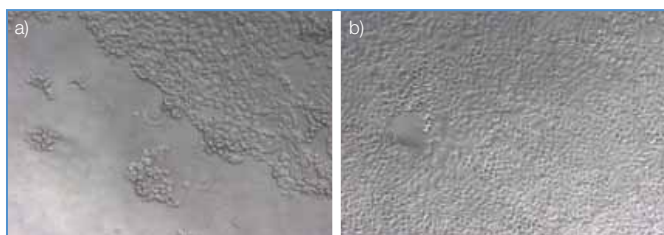


Figure 1:

- a) HEK 293 cells 48 h after seeding and single washing with PBS on an uncoated, TC-treated surface
b) HEK 293 cells 48 h after seeding and single washing with PBS on a surface coated with Poly-D-Lysine



Upon request additional CELLCOAT® cell culture vessels are available with Collagen Type I, Poly-Lysine, Fibronectin and Laminin coating.

For selected CELLCOAT® products, Greiner Bio-One also offers user-friendly bulk packaging (Fig. 2)

Further information on CELLCOAT®

- Application Note “Influence of washing steps on cell attachment: Comparison of PDL-coated and cell culture treated microplates” (F073 022)
- Application Note “Enhanced transfection efficiency on protein-coated microplates” (F073 103)

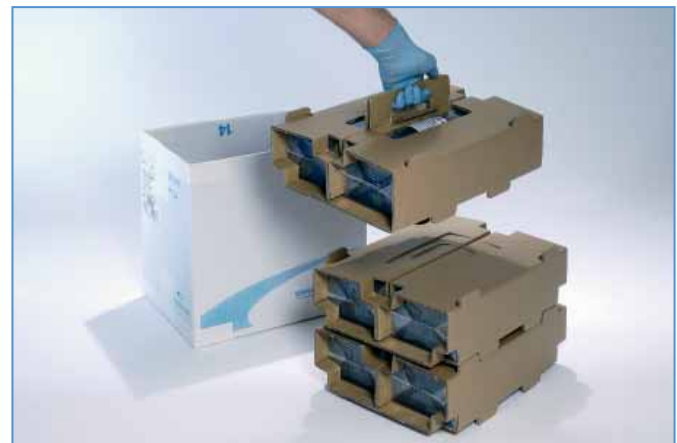


Figure 2: User-friendly bulk packaging

Collagen Type I CELLCOAT®

Collagen Type I is a protein of the extracellular matrix, an intercellular substance which *in vivo* influences adhesion, migration and proliferation among other processes. *In vivo* Collagen Type I is primarily found in the skin, tendon and bone. Collagen Type I represents one of the most important ECM proteins for in-vitro cell cultures. Many otherwise difficult-to-cultivate cells adhere to Collagen Type I and show a positive growth behaviour. For certain cell lines Collagen Type I also has a positive influence on differentiation and morphology.

- Promotion of cell adhesion, proliferation and growth of endothelial cells, hepatocytes, muscle cells, pheochromocytoma cells (PC 12) and other cell types
- Cell cultivation in serum-free or serum-reduced medium
- Quality control: promotion of the adhesion and proliferation of human fibrosarcoma cells

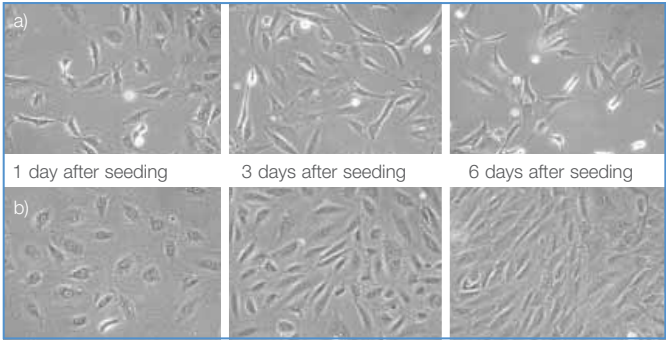


Figure 1: Comparison of the proliferation of human endothelial cells from the umbilical vein (HUVEC) on a) TC-treated surfaces and b) surfaces coated with Collagen Type I

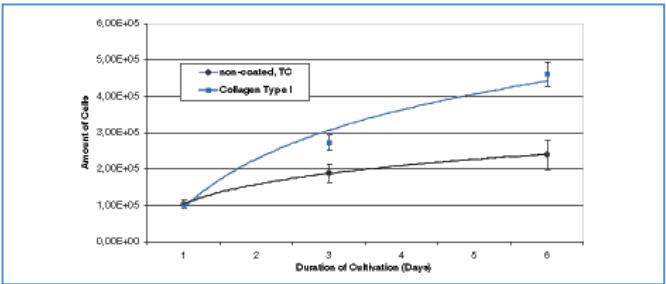
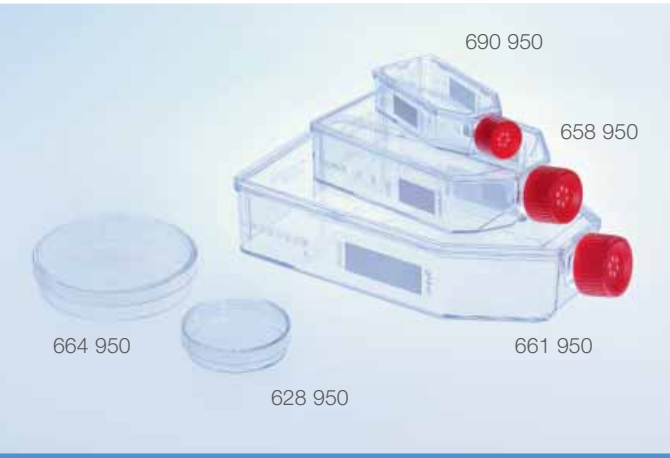


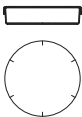
Figure 2: Comparison of the proliferation of human endothelial cells from the umbilical vein (HUVEC) on TC-treated surfaces and surfaces coated with Collagen Type I

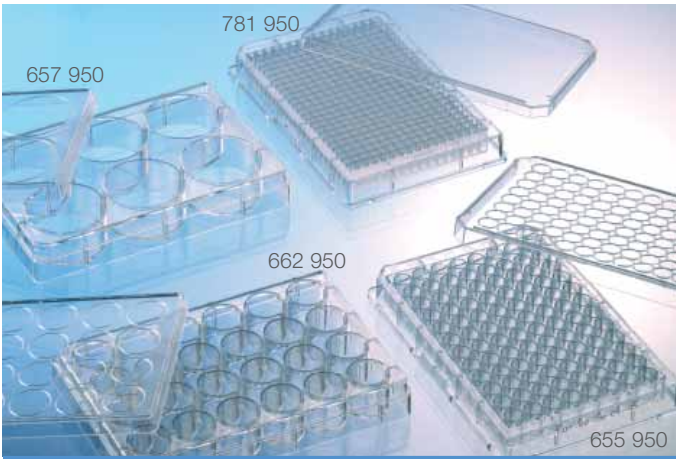


Collagen Type I CELLCOAT®
Cell Culture Dishes / Flasks

Cell Culture Vessels p. 1 | 4 ff.

- Further cell culture vessels coated with Collagen Type I are available on request.
- Shelf life: 24 months at room temperature
- Cell culture flasks with filter caps

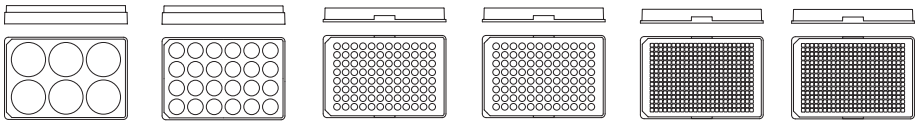
						
Cat.-No.	628 950	664 950	690 950	658 950	661 950	779 959
Description	dish	dish	flask	flask	flask	AutoFlask™
ø [mm] x height [mm]	60 x 15	100 x 20	-	-	-	-
Growth area [cm²]	21	58	25	75	175	83.6
Max. volume [ml]	28	100	50	250	650	110
Working volume [ml]	6 – 7	16 – 17	5 – 10	15 – 38	20 – 85	20 – 40
Protein coating	Collagen Type I	Collagen Type I	Collagen Type I	Collagen Type I	Collagen Type I	Collagen Type I
Filter screw cap	-	-	red	red	red	-
Quantity per bag/case	20/100	10/40	10/50	5/50	5/40	10/100



Collagen Type I CELLCOAT®
Cell Culture Multiwell Plates
Cell Culture Microplates

- Cell Culture Multiwell Plates p. 1 | 11
- Cell Culture Microplates p. 1 | 12 ff.

- Further cell culture vessels coated with Collagen Type I are available on request.
- Shelf life: 24 months at room temperature



Cat.-No.	657 950	662 950	655 950	655 956	781 950	781 956
Well format	6 well	24 well	96 well	96 well	384 well	384 well
Bottom	solid	solid	solid	μClear®	solid	μClear®
Colour	clear	clear	clear	black	clear	black
Growth area per well [cm²]	9.6	1.9	0.34	0.34	0.1	0.1
Max. volume [ml]	16.1	3.3	0.392	0.392	0.131	0.131
Working volume [ml]	2 – 5	0.5 – 1	0.025 – 0.34	0.025 – 0.34	0.015 – 0.11	0.015 – 0.11
Protein coating	Collagen Type I	Collagen Type I	Collagen Type I	Collagen Type I	Collagen Type I	Collagen Type I
Lid	+	+	+	+	+	+
Quantity per bag/case	5/50	5/50	5/20	5/20	5/20	5/20

*) with condensation rings

Poly-Lysine CELLCOAT®

Poly-D-Lysine (PDL) and Poly-L-Lysine (PLL) are synthetic molecules that are used to improve adhesion of different cell types to polystyrene surfaces (Fig. 1). Especially when serum-free or serum-reduced medium is used or when experiments such as transfections are performed, the cultivation efficiency of individual cell lines can be improved. As synthetic molecule Poly-D-Lysine is free of impurities carried by other proteins.

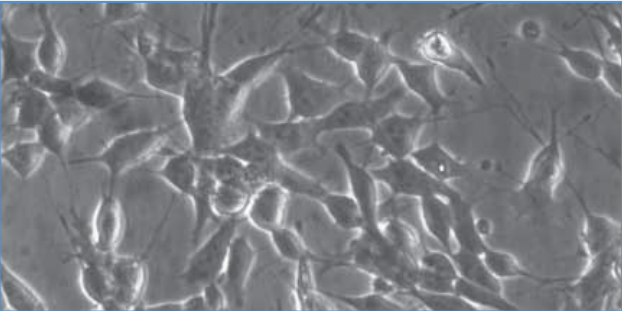
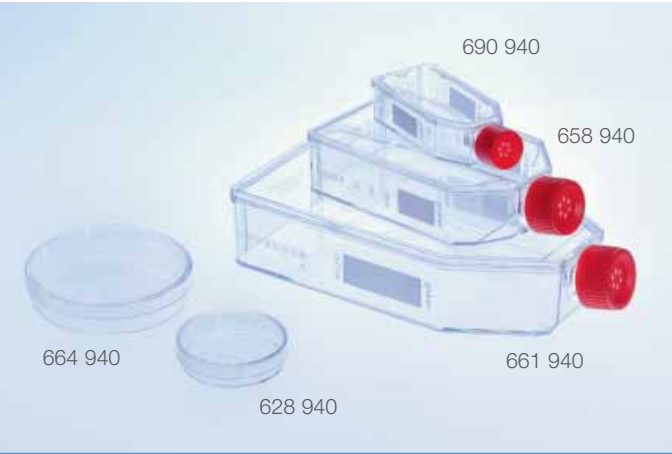


Figure 1: Cells of a neuroblastoma cell line on PDL CELLCOAT®, 24 hours after seeding.

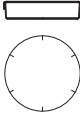
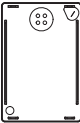
- Reduced-serum or serum-free cultivation
- Cell differentiation and neuron growth
- Promotion of cell adhesion, proliferation and growth of transfected cell lines (e.g. HEK 293, PC 12, L929, certain 3T3 cell lines), neuronal cell lines, as well as primary neurons and glia cells
- Synthetic polypeptides
- Molecular weight PDL: 75 – 150 kDa; PLL: 30 – 70 kDa
- Experiments with automated cell culture
- Experiments with washing steps

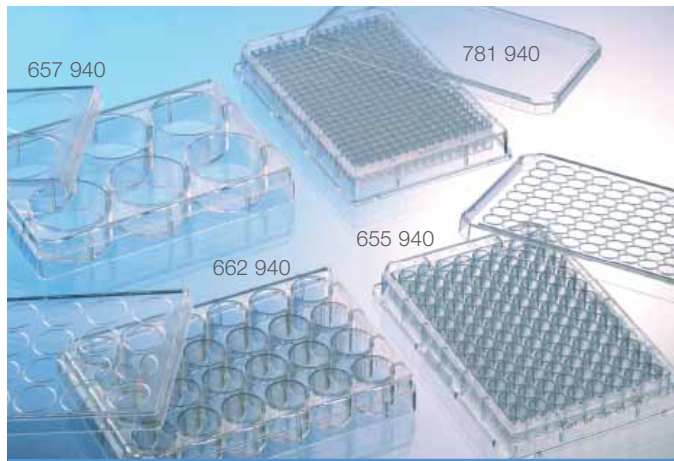


Poly-D-Lysine CELLCOAT®
Cell Culture Dishes / Flasks

➤ Cell Culture Vessels p. 1 | 4 ff.

- Further cell culture vessels coated with Poly-D-Lysine are available on request.
- Shelf life: 24 months at room temperature
- Cell culture flasks with filter caps

						
Cat.-No.	628 940	664 940	690 940	658 940	661 940	779 946
Description	dish	dish	flask	flask	flask	AutoFlask™
ø [mm] x height [mm]	60 x 15	100 x 20	-	-	-	-
Growth area [cm²]	21	58	25	75	175	83.6
Max. volume [ml]	28	100	50	250	650	110
Working volume [ml]	6 – 7	16 – 17	5 – 10	15 – 38	20 – 85	20 – 40
Protein coating	Poly-D-Lysine	Poly-D-Lysine	Poly-D-Lysine	Poly-D-Lysine	Poly-D-Lysine	Poly-D-Lysine
Filter screw cap	-	-	red	red	red	-
Quantity per bag/case	20/100	10/40	10/50	5/50	5/40	10/100



Poly-D-Lysine CELLCOAT®

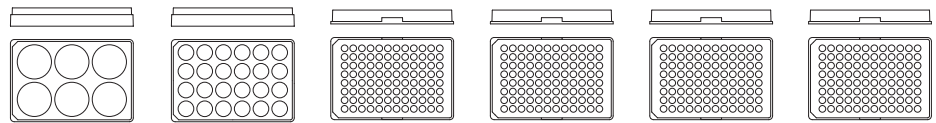
Cell Culture Multiwell Plates

Cell Culture Microplates

➔ Cell Culture Multiwell Plates p. 1 | 11

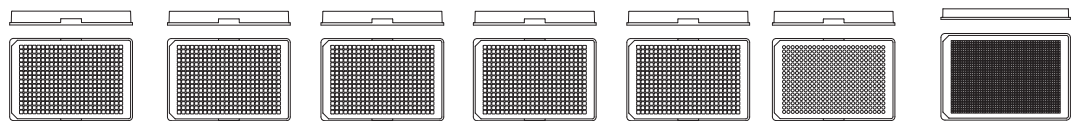
➔ Cell Culture Microplates p. 1 | 12 ff.

- Further cell culture vessels coated with Poly-D-Lysine are available on request
- Cat.-No. 655 948 and 781 948 have a user-friendly bulk package
- Shelf life: 24 months (multiwell plates) / 18 months (microplates) at room temperature



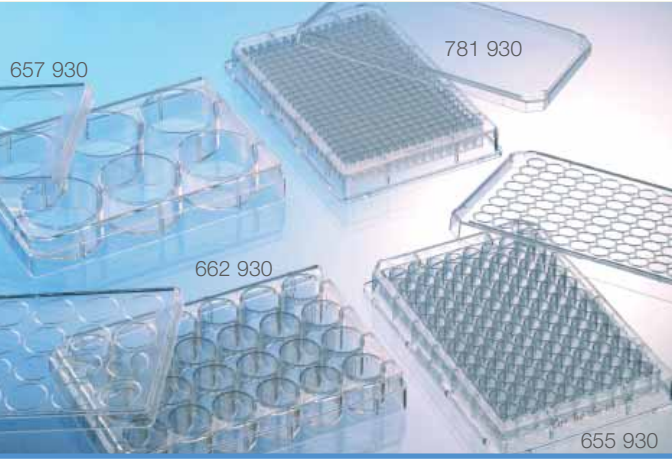
Cat.-No.	657 940	662 940	655 940	655 944	655 946	655 948
Well format	6 well	24 well	96 well	96 well	96 well	96 well
Well profile	F-bottom	F-bottom	F-bottom	F-bottom	F-bottom	F-bottom
Bottom	solid	solid	solid	µClear®	µClear®	µClear®
Colour	clear	clear	clear	white	black	black
Growth area per well [cm²]	9.6	1.9	0.34	0.34	0.34	0.34
Max. volume [ml]	16.1	3.3	0.392	0.392	0.392	0.392
Working volume [ml]	2 – 5	0.5 – 1	0.025 – 0.34	0.025 – 0.34	0.025 – 0.34	0.025 – 0.34
Protein coating	Poly-D-Lysine	Poly-D-Lysine	Poly-D-Lysine	Poly-D-Lysine	Poly-D-Lysine	Poly-D-Lysine
Lid	+	+	+	+	+	+
Quantity per bag/case	5/50	5/50	5/20	5/20	5/20	20/120

*) with condensation rings



Cat.-No.	781 940	781 945	781 944	781 946	781 948	784 946	782 946
Well format	384 well	384 well	384 well	384 well	384 well	384 well	1536 well
Well profile	F-bottom	F-bottom	F-bottom	F-bottom	F-bottom	Small Volume™	F-bottom
Bottom	solid	solid	µClear®	µClear®	µClear®	solid	µClear®
Colour	clear	white	white	black	black	black	black
Growth area per well [cm²]	0.1	0.1	0.1	0.1	0.1	0.027	0.023
Max. volume [ml]	0.131	0.131	0.131	0.131	0.131	0.028	0.013
Working volume [ml]	0.015 – 0.11	0.015 - 0.11	0.015 – 0.11	0.015 – 0.11	0.015 – 0.11	0.004 - 0.025	0.003 – 0.01
Protein coating	Poly-D-Lysine	Poly-D-Lysine	Poly-D-Lysine	Poly-D-Lysine	Poly-D-Lysine	Poly-D-Lysine	Poly-D-Lysine
Lid	+	+	+	+	+	+	+
Quantity per bag/case	5/20	5/20	5/20	5/20	20/120	5/20	5/20
Plate Design						HiBase	HiBase

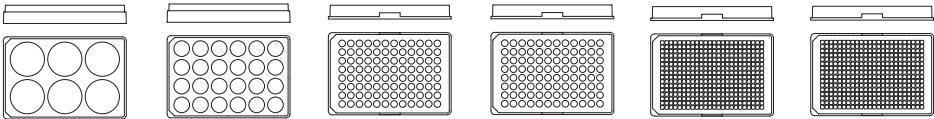
➔ New



Poly-L-Lysine CELLCOAT®
Cell Culture Dish
Cell Culture Multiwell Plates
Cell Culture Microplates

- Cell Culture Multiwell Plates p. 1 | 11
- Cell Culture Microplates p. 1 | 12 ff.

- Further cell culture vessels coated with Poly-L-Lysine are available on request.
- Shelf life: 24 months (multiwell plates, dish) / 18 months (microplates) at room temperature



Cat.-No.	657 930	662 930	655 930	655 936	781 930	781 936
Well format	6 well	24 well	96 well	96 well	384 well	384 well
Bottom	solid	solid	solid	μClear®	solid	μClear®
Colour	clear	clear	clear	black	clear	black
Growth area per well [cm²]	9.6	1.9	0.34	0.34	0.1	0.1
Max. volume [ml]	16.1	3.3	0.392	0.392	0.131	0.131
Working volume [ml]	2 – 5	0.5 – 1	0.025 – 0.34	0.025 – 0.34	0.015 – 0.11	0.015 – 0.11
Protein coating	Poly-L-Lysine	Poly-L-Lysine	Poly-L-Lysine	Poly-L-Lysine	Poly-L-Lysine	Poly-L-Lysine
Lid	+*)	+*)	+*)	+*)	+	+
Quantity per bag/case	5/50	5/50	5/20	5/20	5/20	5/20

*) with condensation rings



Cat.-No.	628 930
Description	dish
ø [mm] x height [mm]	60 x 15
Growth area [cm²]	21
Max. volume [ml]	17
Working volume [ml]	6 - 7
Protein coating	Poly-L-Lysine
Quantity per bag/case	20/100

Fibronectin CELLCOAT®

Fibronectin is a high molecular weight glycoprotein present in the extracellular matrix (ECM) and plasma. *In vivo* Fibronectin mediates the adhesion of cells to the extracellular matrix via integrin receptors. It is further involved in migration and differentiation of various cells in embryogenesis as well as wound healing.

Coated as a thin layer on the cultivation surface, Fibronectin serves as a substrate to promote adhesion, proliferation and growth of different cell types.

- Applications:**
- Increase of isolation and cultivation efficiency
 - Low-serum or serum-free cultivation
 - Cell adhesion studies
 - Promotion of cell adhesion, proliferation and growth of endothelial cells, fibroblasts, smooth muscle cells, neurons and epithelial cells

690 920
658 920
664 920
628 920
661 920

Fibronectin CELLCOAT®
Cell Culture Dishes / Flasks

➤ Cell Culture Vessels p. 1 | 4 ff.

- Cell culture flasks with filter caps
- Shelf life: 6 months at 2 – 8 °C
- Minimum order amount: 60 pieces/cat.-no.
- Further cell culture vessels coated with Fibronectin are available on request

Cat.-No.	628 920	664 920	690 920	658 920	661 920
Description	dish	dish	flask	flask	flask
ø [mm] x height [mm]	60 x 15	100 x 20	-	-	-
Growth area [cm²]	21	58	25	75	175
Max. volume [ml]	28	100	50	250	650
Working volume [ml]	6 – 7	16 – 17	5 – 10	15 – 38	20 – 85
Protein coating	Fibronectin	Fibronectin	Fibronectin	Fibronectin	Fibronectin
Filter screw cap	-	-	red	red	red
Quantity per bag/case	5/20	10	10	10	5

Laminin CELLCOAT®

Laminin is one of the main components of the basement membrane. It consists of three subunits that provide binding sites for the integrin receptor of the cell membrane as well as other extracellular matrix proteins. *In vitro* Laminin is used as a cultivation substrate for improved adhesion and maintenance of the differentiation status of various cells. Further applications are for cell adhesion studies, chemotaxis assays and to increase isolation and cultivation efficiency.

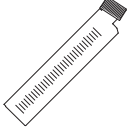
- Applications:**
- Increase of isolation and cultivation efficiency
 - Introduction of cell differentiation and neurite outgrowth
 - Cell adhesion studies
 - Chemotaxis studies
 - Promotion of cell adhesion; proliferation of various cell types such as endothelial, epithelial, muscle and neuronal cells



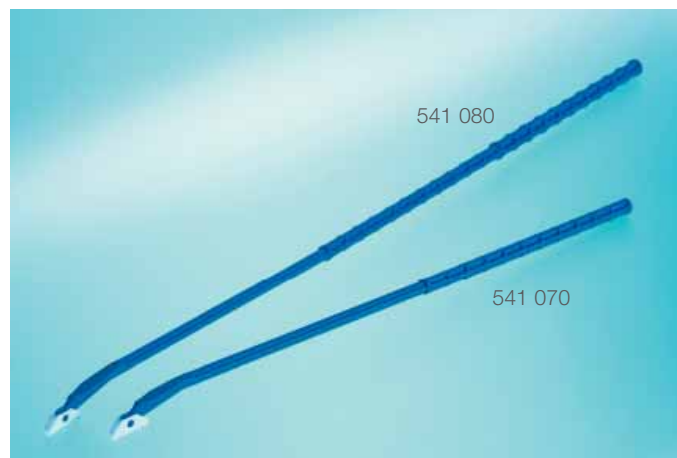
Laminin CELLCOAT®
Cell Culture Dishes / Flasks

➤ Cell Culture Vessels p. 1 | 4 ff.

- Cell culture flasks with filter caps
- Shelf life: 6 months at 2 – 8 °C
- Minimum order amount: 60 pieces/cat.-no.
- Further cell culture vessels coated with Laminin are available on request

					
Cat.-No.	628 910	664 910	690 910	658 910	661 910
Description	dish	dish	flask	flask	flask
ø [mm] x height [mm]	60 x 15	100 x 20	-	-	-
Growth area [cm²]	21	58	25	75	175
Max. volume [ml]	28	100	50	250	650
Working volume [ml]	6 – 7	16 – 17	5 – 10	15 - 38	20 – 85
Protein coating	Laminin	Laminin	Laminin	Laminin	Laminin
Filter screw cap	-	-	red	red	red
Quantity per bag/case	5/20	10	10	10	5

Accessories



Cell Scrapers

- For gentle mechanical removal of adherent cells
- Optimised blade design for maximum cell harvest
- Blade length: 1.8 cm
- Minimal mechanical strain
- 28 cm and 40 cm handhold length
- Pivot angle 60°
- Sterile individual packaging

2 HTS-
Microplates3 Immunology/
HLA4 Microbiology/
Bacteriology5 Tubes/Multi-
Purpose Beakers6 Liquid
Handling7 Molecular
Biology8 Protein
Crystallisation

9 Separation

10 Biochips/
Microfluidics11 Cryo-
Techniques12 Lids/Sealers/
CapMats13 Reaction Tubes/
Analyser Cups

14 Accessories

Optimised scraper design

The optimised design of the scraper blade features a pivot angle of 60° that facilitates uniform contact with the growth surface, minimal mechanical strain and efficient cell harvest, even from poorly accessible surfaces. The scraper design also minimises any accumulation of cell suspension to the blade structure. The handle length has been adapted for use with all commercially available cell culture flasks. Cell scrapers from Greiner Bio-One are available in two handle sizes: 28 cm for cell culture flask harvest and 40 cm for removal of cells in larger cell culture devices such as roller bottles. Both cell scrapers are provided sterile and individually packed.

User-friendly packaging

The user-friendly packaging can be opened either by peeling off (Fig. 1a) or tearing (Fig. 1b) the plastic bag. Lot number and expiry date are embossed on each bag.

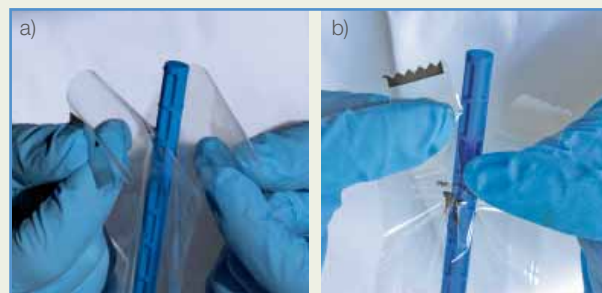


Figure 1: User-friendly packaging

Cat.-No.	541 070	541 080
Length [cm]	28	40
Sterile	+	+
Quantity per bag/case	1/100	1/100

ThinCert™

6, 12 and 24 Well Cell Culture Inserts for Multiwell Plates

For advanced cell and tissue culture applications, Greiner Bio-One offers an extensive family of membrane supports - ThinCert™. Combining 6 different membrane specifications (pore size and density) in geometries to fit 6, 12 and 24 well plates, the ThinCert™ cell culture inserts are suitable for a wide range of applications including transport, secretion and diffusion studies, migrational experiments, cytotoxicity testing, co-cultures, trans epithelial electric resistance (TEER) measurements, as well as primary cell culture. ThinCert™ cell culture inserts are compatible with standard CELLSTAR® multiwell plates from Greiner Bio-One, and are pre-packed together with the requisite number of plates. The automated production process includes double optical control of each insert produced, ensuring that any biological contamination is avoided. The sterility of the single blister-packed inserts and multiwell plates is ensured by irradiation.

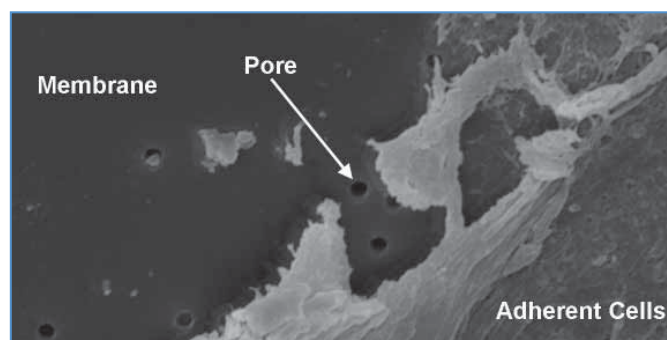


Figure 1: Electron micrograph of human osteosarcoma cells on ThinCert™ membrane. Courtesy of the Department of Oral and Maxillar Facial Surgery, University Hospital Freiburg.

ThinCert™ cell culture inserts are produced from high-grade clear polystyrene housings, and polyethylene terephthalate (PET) capillary pore membranes. Both materials, polystyrene and PET, are USP class VI certified and cell culture compatible. The coupling between the housing and the membrane is achieved using an automated process which produces an extremely strong and robust seal without compromising or weakening the membrane in any way. The membranes undergo a physical surface treatment to optimise cellular adherence and growth characteristics (Fig. 2). All the capillary pores in a membrane exhibit a high degree of uniformity in diameter. This uniformity ensures reliable and consistent exchange rates between the two compartments and thus provides reproducibility when conducting multiple experiments.

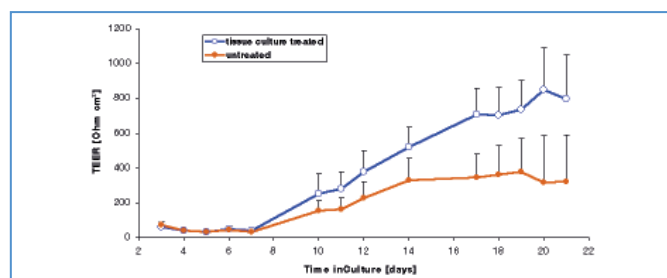


Figure 2: Different growth of bronchial epithelial cells on non-treated vs. TC-treated membranes, measured by TEER (Trans Epithelial Electric Resistance). Courtesy of the Department of Biopharmaceutics and Pharmaceutical Technology, University of Saarbruecken.

For light or electron microscopy applications, the membranes can be easily detached from the housing using a scalpel, and once detached, the membrane stays flat and does not curl up, simplifying further manual working steps and avoiding loss of cells. Due to a high chemical resistance to solvents (→ p. A I 8) a broad spectrum of cell fixation protocols can be performed.

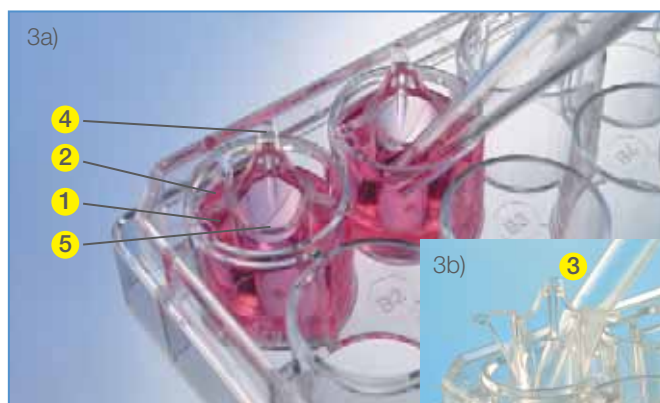


Figure 3a: ThinCert™ cell culture inserts
Figure 3b: "Self-lift" geometry of ThinCert™ cell culture inserts



Figure 4: ThinCert™ cell culture inserts packaging

The specific hanging geometry design of the ThinCert™ cell culture inserts ensures that there is always a gap between the membrane support and the bottom of the well. This avoids damage to the cells growing in the lower compartment. In addition the spacers (Fig. 3a → 1) prevent capillary suction between the side of the well and the ThinCert™ housing. Consequently component exchange between compartments can only take place through the membrane pores. The ThinCert™ cell culture inserts sit in an eccentric position within the well (Fig. 3a → 2). This specific design gives rise to the so called "self-lift" function, with the insert sliding easily upwards when the pipette is inserted into the lower compartment and gliding back into its original position after the pipette has been withdrawn (Fig. 3b → 3). The largest of three pipetting openings is located opposite of the small conical foot (Fig. 3a → 4). This allows for very convenient pipetting of media or supplements even with the ThinCert™ remaining in the well.

The scalloped rims (Fig. 3a → 5) of the ThinCert™ cell culture inserts allow for flatter pipetting angles. This helps to minimise the risk of contamination as the hand of the user does not remain above the open cell culture. Additionally, the scallops significantly enhance the freedom of movement when pipetting and enhance gas exchange during cultivation.

The sales carton can be used as a donor box (Fig. 4). The required number of ThinCert™ cell culture inserts and CELLSTAR® cell culture plates may conveniently be removed from the donor box, whereas the remaining parts may safely be stored in it.

Which Membrane to use?

General Aspects:

- Small pore sizes (0.4 and 1 µm in diameter) for co-cultivation as well as for transportation, secretion, and diffusion studies
- Larger pore sizes (3 and 8 µm in diameter) for migration and invasion studies
- Transparent membranes (in general low pore density) suitable for light and electron microscopy
- Translucent membranes (in general high pore density) suitable for electron microscopy, TEER, and transport assays

For detailed application protocols and a comprehensive bibliography visit www.gbo.com/bioscience/thincert



Further information on ThinCert™

- **Forum No. 8: ThinCert™ cell culture products – Overview** (F073 017)
- **ThinCert™ Migration Assay** (F073 115)
- **ThinCert™ Invasion Assay** (F073 114)
- **Application Note “Immunocytochemistry”** (F073 100)
- **Application Note “Skin models”** (F074 062)
- **Application Note “Co-culture”** (F074 059)
- **Application Note “TEER and impedance measurements”** (F073 037)

	0.4 µm transparent	0.4 µm translucent	1.0 µm transparent	3.0 µm transparent	3.0 µm translucent	8.0 µm translucent
Light microscopy	+	-	+	+	-	+
Electron microscopy	+	+	+	+	+	+
Fluorescence microscopy	+	+	+	+	+	+
Immunocytochemistry	+	+	+	+	+	+
Trans epithelial electric resistance (TEER)	+	+	+	+	+	+
Transport and uptake studies	-	+	+	+	+	+
Co-cultivation	+	+	+	-	-	-
Cell retention	+	+	+	-	-	-
Migration/chemotaxis/metastasis	-	-	-	+	+	+

+* very suitable

+ suitable

- not suitable

Table 1: Suitability chart of the different ThinCert™ membrane types

2 HTS-
Microplates3 Immunology/
HLA4 Microbiology/
Bacteriology5 Tubes/Multi-
Purpose Beakers6 Liquid
Handling7 Molecular
Biology8 Protein
Crystallisation

9 Separation

10 Biochips/
Microfluidics11 Cryo-
Techniques12 Lids/Sealers/
CapMats13 Reaction Tubes/
Analyser Cups

14 Accessories

ThinCert™ Cell Culture Inserts



Free of detectable
DNase, RNase,
human DNA
non-pyrogenic

non-
cytotoxic

ThinCert™ Cell Culture Inserts 6 Well, 12 Well

Cell Culture Multiwell Plates p.1 | 11

Pre-configured Multiwell Plates with ThinCert™
Cell Culture Inserts available on request

Features

- Stable clear polystyrene housing
- Hanging geometry
- Sealed PET capillary pore membrane
- Single, sterile blister packing
- Improved cell adhesion through physical surface treatment
- Simplified pipetting due to self-lift geometry
- Enhanced pipetting access and gas exchange



6 w e l l	Cat.-No.	657 640	657 641	657 610	657 630	657 631	657 638
	Pore size [µm]	0.4	0.4	1.0	3.0	3.0	8.0
	Pore density [cm ⁻²]	1 x 10 ⁸	2 x 10 ⁶	2 x 10 ⁶	0.6 x 10 ⁶	2 x 10 ⁶	0.15 x 10 ⁶
	Optical membrane properties	translucent	transparent	transparent	transparent	translucent	translucent
	Culture surface [mm ²]	452.4	452.4	452.4	452.4	452.4	452.4
	Height (overall) [mm]	16.25	16.25	16.25	16.25	16.25	16.25
	Inner/Outer diameter (top) [mm]	24.85/27.85	24.85/27.85	24.85/27.85	24.85/27.85	24.85/27.85	24.85/27.85
	Working volume ThinCert™ [ml]	1.0 – 3.6	1.0 – 3.6	1.0 – 3.6	1.0 – 3.6	1.0 – 3.6	1.0 – 3.6
	Working volume well [ml]	2.0 – 4.15	2.0 – 4.15	2.0 – 4.15	2.0 – 4.15	2.0 – 4.15	2.0 – 4.15
	TC surface treatment/Sterile	+/+	+/+	+/+	+/+	+/+	+/+
	Multiwell plates/box	4	4	4	4	4	4
	ThinCert™ inserts/box	24	24	24	24	24	24



12 w e l l	Cat.-No.	665 640	665 641	665 610	665 630	665 631	665 638
	Pore size [µm]	0.4	0.4	1.0	3.0	3.0	8.0
	Pore density [cm ⁻²]	1 x 10 ⁸	2 x 10 ⁶	2 x 10 ⁶	0.6 x 10 ⁶	2 x 10 ⁶	0.15 x 10 ⁶
	Optical membrane properties	translucent	transparent	transparent	transparent	translucent	translucent
	Culture surface [mm ²]	113.1	113.1	113.1	113.1	113.1	113.1
	Height (overall) [mm]	16.25	16.25	16.25	16.25	16.25	16.25
	Inner/Outer diameter (top) [mm]	13.85/15.85	13.85/15.85	13.85/15.85	13.85/15.85	13.85/15.85	13.85/15.85
	Working volume ThinCert™ [ml]	0.3 – 1.0	0.3 – 1.0	0.3 – 1.0	0.3 – 1.0	0.3 – 1.0	0.3 – 1.0
	Working volume well [ml]	1.0 – 2.0	1.0 – 2.0	1.0 – 2.0	1.0 – 2.0	1.0 – 2.0	1.0 – 2.0
	TC surface treatment/Sterile	+/+	+/+	+/+	+/+	+/+	+/+
	Multiwell plates/box	4	4	4	4	4	4
	ThinCert™ inserts/box	48	48	48	48	48	48



ThinCert™ Cell Culture Inserts 24 Well

- ▶ Cell Culture Multiwell Plates p. 1 | 11
- ▶ Pre-configured Multiwell Plates with ThinCert™ Cell Culture Inserts available on request

Features

- Stable clear polystyrene housing
- Hanging geometry
- Sealed PET capillary pore membrane
- Single, sterile blister packing
- Improved cell adhesion through physical surface treatment
- Simplified pipetting due to self-lift geometry
- Enhanced pipetting access and gas exchange

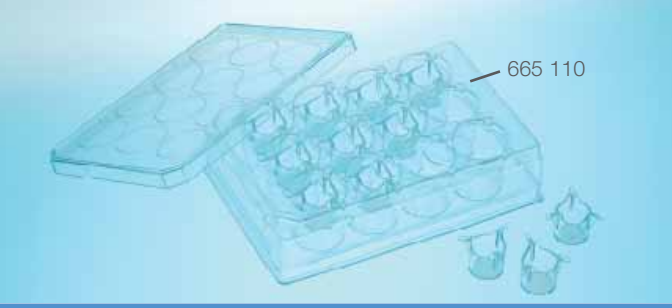
Free of detectable
DNase, RNase,
human DNA
non-pyrogenic

non-
cytotoxic



24 Well	Cat.-No.	662 640	662 641	662 610	662 630	662 631	662 638
	Pore size [µm]	0.4	0.4	1.0	3.0	3.0	8.0
	Pore density [cm ²]	1 x 10 ⁸	2 x 10 ⁶	2 x 10 ⁶	0.6 x 10 ⁸	2 x 10 ⁶	0.15 x 10 ⁶
	Optical membrane properties	translucent	transparent	transparent	transparent	translucent	translucent
	Culture surface [mm ²]	33.6	33.6	33.6	33.6	33.6	33.6
	Height (overall) [mm]	16.25	16.25	16.25	16.25	16.25	16.25
	Inner/Outer diameter (top) [mm]	8.4/10.4	8.4/10.4	8.4/10.4	8.4/10.4	8.4/10.4	8.4/10.4
	Working volume ThinCert™ [ml]	0.1 – 0.35	0.1 – 0.35	0.1 – 0.35	0.1 – 0.35	0.1 – 0.35	0.1 – 0.35
	Working volume well [ml]	0.4 – 1.2	0.4 – 1.2	0.4 – 1.2	0.4 – 1.2	0.4 – 1.2	0.4 – 1.2
	TC surface treatment/Sterile	+/+	+/+	+/+	+/+	+/+	+/+
	Multiwell plates/box	2	2	2	2	2	2
	ThinCert™ inserts/box	48	48	48	48	48	48

ThinCert™Plate



ThinCert™Plate

Cell Culture Multiwell Plates p. 1 | 11

- Optimised for use with ThinCert™ cell culture inserts
- Deep wells for an increased volume of medium in air-lift culture
- Notches for fixed insert position
- Available in 6 and 12 well format

ThinCert™Plate

The in-vitro reconstruction of many types of epithelia, such as skin, cornea and airway epithelium, requires that the cells used differentiate at the air-liquid-interphase (air-lift culture). Therefore, the tissue is cultivated in permeable membrane supports (cell culture inserts), with the cell culture medium nourishing the cells from below the membrane and the air exerting its influence from above (Fig. 1b). If cell culture inserts and conventional cell culture plates are utilised in the air-lift culture, the available volume of culture medium is severely limited (Fig. 1b). This reduced volume results in an elevated nutrient consumption rate from the lower compartment and an increased number of medium exchanges. With the ThinCert™Plate, Greiner Bio-One offers an innovative solution for the air-lift culture with ThinCert™ cell culture inserts. The plate is available in 6 and 12 well format. Its deep wells allow a larger volume of medium to be available to the air-lift culture (Fig. 1c). As a consequence, the frequency of medium exchanges may be reduced to one medium change per week. Furthermore, the reduced frequency of medium changes ensures that the medium conditioning lasts longer and an improved tissue quality is achieved. The ThinCert™Plate design consists of notches for fixing the position of the inserted ThinCert™ cell culture inserts (Fig. 2). This ensures a stable and predictable position of the inserts during the entire process of cell culture. With ThinCert™ cell culture inserts and the optimised ThinCert™Plate Greiner Bio-One provides the professional answer to the challenges of tissue reconstruction *in vitro*.



Figure 2: ThinCert™Plate: Notches (arrows) secure the position of the ThinCert™ cell culture inserts during cell culture.

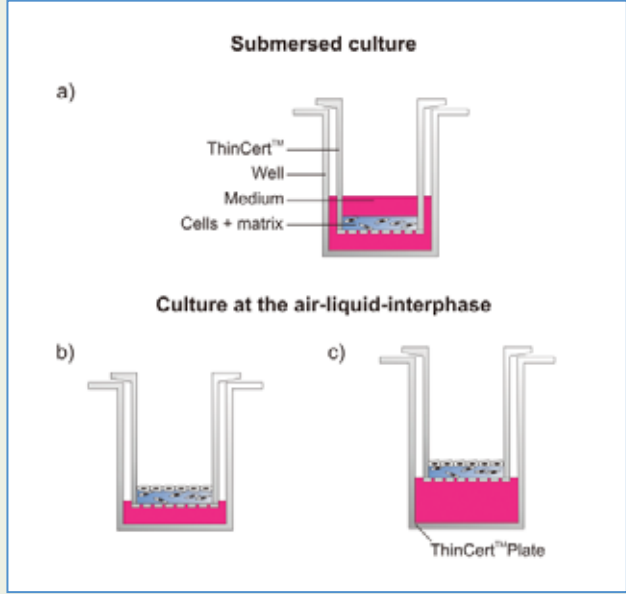


Figure 1: Reconstruction of a full thickness skin *in vitro*. a) A permeable membrane support carries fibroblasts in an extracellular matrix (e.g. Collagen). This dermis equivalent is cultivated under submersed culture conditions. b) Keratinocytes are superimposed upon the dermis equivalent and differentiated at the air-liquid-interphase (air-lift culture). If performed in a regular cell culture plate only a very limited medium volume is available for the air-lift culture. c) The ThinCert™Plate enables the air-lift culture to access an increased medium volume thereby reducing the frequency of medium exchanges. This allows the cells to stay longer in their conditioned environment which may lead to an increase in tissue quality.

Cat.-No.	657 110	665 110
Well format	6 well	12 well
Total volume per well [ml]	30	10
Working volume in air-lift culture [ml]	20	4
Sterile	+	+
Lid	+	+
Quantity per bag/case	1/50	1/60

*) with condensation rings