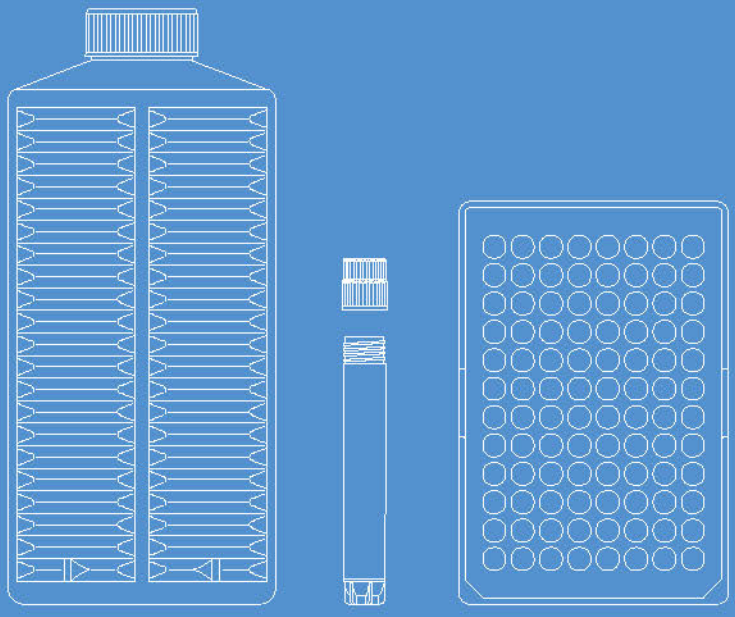
Your Power for Health

greiner bio-one

UK Catalogue BioScience

Edition 04 / 2019



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New in this edition:

CELLdisc™ – Innovative Multi-Layer Device for Mass Cell Culture

- Ergonomic round system for the propagation of adherent cells
- 40 % higher surface/volume ratio than competitive systems
- CELLSTAR® TC and Advanced TC™ surfaces assure high cell yield
- Centrally located gas exchange channel for uniform distribution

→ p. 42–44

Magnetic 3D Cell Culture

- Rapid development of three-dimensional model structures as well as co-culture of various cell lines
- Easy-to-use in different formats (from single well to 384 well format)
- No sample loss during experimental runs

→ p. 61–66

CELLview™ Plates – Glass Bottom Microplates for High Resolution Microscopy

- Cycloolefin-based black frame with 0.17 mm glass bottom for superior imaging
- Recessed bottom geometry facilitates imaging of all peripheral wells
- Appropriate surface treatment for improved cellular attachment and growth

→ p. 71

Sapphire Pipettes

- Single and Multi-channel models
- Light and comfortable design
- Digital volume setting
- Colour-coded for tip identification
- Optimised for use with Greiner Bio-One tips

→ p. 167–169

Triple-Packed Products for Cleanroom Applications

TRI

- Convenient and easy clean room handling
- No need for alcohol wipe downs or cleaning processes
- High sterilisation level (SAL 10^{-6}) for maximum security
- Three individual easy-to-open peel bags

→ p. 212–217

Barcoded Cryo.s™ for Biobanking/Low Volume Sample Storage + Scanners/Accessories

- Cryo.s™ with Datamatrix code, linear barcode and human readable ID on each tube
- Cryo.s™ Biobanking Tubes for space-efficient sample storage, best in class Datamatrix code
- Cryo.s™ Rack Scanner for the reliable and fast identification of tube and rack IDs
- Cryo.s™ 8-Channel Handheld Decapper for efficient tube closure

→ p. 225–233

Lab Equipment for Greiner Bio-One Consumables

- 6 different small lab equipment devices
- Mini versions with compact design fit in the palm of your hand
- General 2 year “no hassle” warranty

→ p. 250–254

Customer Account No.


greiner bio-one

Greiner Bio-One – Your Power for Health

Over seven billion people inhabit the earth today. As diverse as they all may be, one desire unites everybody: **The desire for a healthy, vital life.**

We know that we can make a significant contribution to the areas of health and safety in medicine. At the same time, this knowledge means **a great responsibility**, which we face up to with a high level of personal commitment and innovative solutions.

Products from Greiner Bio-One are applied worldwide from pure research to drug discovery to preanalytics and diagnostics. Thus we can offer scientists suitable platforms for their research work, laboratories the equipment for precise analysis and health professionals a basis for reliable diagnosis and therapy.

Offering an unsurpassed scope of products and services across a variety of disciplines, we focus on the evolving needs of our customers in the development of innovative products.

Our fast and flexible response in customer-specific projects, combined with multiple strategic manufacturing sites, ensures an uninterrupted supply of critical components to meet your product needs.

With **worldwide locations** and effective **global distribution**, you will always be within reach of the product, service and support you need.

Greiner Bio-One has many international production sites and distribution centres:

Germany • Austria • Belgium • Brazil • China
France • Hungary • India • Italy • Japan • Netherlands
Portugal • Spain • Thailand • United Kingdom • USA

More than 2000 employees throughout the world are dedicated to the aim of **constantly improving the life quality of all people.**

We put the **Power** in Health Protection.

Quality

Quality Management

Quality Standard in Compliance with DIN EN ISO 9001 and EN ISO 13485

Greiner Bio-One has been certified according to DIN EN ISO 9001 since 1994 through the continuing high standard of our production processes, quality controls and organisation (certificate → p. 264). Since 2004 we have additionally been certified according to EN ISO 13485 to fulfil the high international requirements for manufacturers of Medical Devices (certificate → p. 264). A total quality approach encompassing the latest production technologies, strict control of conditions and materials, as well as the qualification and development of personnel ensure constant improvement in both our products and processes. Our customers' trust in us for over 50 years certifies our high quality and our dedication to further quality improvement.

CE Marking

Products which fall within the scope of the European Directives 93/42/EEC for Medical Devices or 98/79/EC for In-Vitro Diagnostic Devices have to be labelled by a CE mark or a CE-IVD mark, respectively, in order to comply with the general requirements and safety regulations. According to this, some of our products have been considered as Medical or In-Vitro Diagnostic Devices. In our catalogue these products are labelled with a CE or a CE-IVD mark.

CE IVD

Quality Assurance and Quality Control

Good quality is an important criteria in the manufacturing of our products. For this purpose, our quality control system monitors the physical, chemical and biological functionality of our products. Quality control starts with the incoming raw material, is continued in production processes and ends with the dispatch of the finished product. Strict controls, conducted according to the legal provisions and specific standards, accompany the product. Continuous quality training ensures that our employees are informed about the applications of our products and the quality requirements placed on them.

Each product is retraceable to the production period, machine operators and tools, all the way back to the raw materials used.

A quality certificate for most products can be downloaded from our website www.gbo.com.

Quality Control System

Control of incoming goods
Incoming goods used for production (e.g. raw materials, foils, etc.) are checked for purity, identity and if they are in accordance with the agreed specifications.

In-process control (IPC)
During the manufacturing process, the quality of the products is checked periodically based on individual testing plans according to the specifications.

Quality control in the laboratory
Specific products are tested for physical, chemical and biological functionality (see below).

Final control
In addition to dimensional, visual and functional criteria, products are finally tested for labelling, packaging and documentation.

Products from Greiner Bio-One provide one or more of the following application-dependent features:

Free of detectable DNase, RNase and human DNA
For reliable and accurate results in molecular biology applications, e.g. sequencing and amplification, the applied products are free of detectable DNase, RNase and human DNA. Therefore protective apparel such as overalls, gloves and hairnets, is a prerequisite in all production areas. Furthermore, a routine monitoring of DNase, RNase and human DNA is performed. Products are washed with an appropriate volume of a 0.5 % Tween 20 solution to detach adherent nucleases and nucleotides. DNase, RNase and human DNA present in the washing solution are detected by Real Time PCR. The detection limits*) related to the applied PCR methods are **1.3×10^{-8} Kunitz units for DNase, 5×10^{-11} Kunitz units for RNase and 5 pg for human DNA.** All products that meet the above mentioned features are identified in our catalogue with the respective label.

Free of detectable endotoxins
Endotoxins are complex lipopolysaccharides and part of the outer membrane of gram-negative bacteria. These substances are the most widespread and effective species of a group of so-called pyrogens that can cause fever. The US Pharmacopoeia guidelines stipulate that eluates from Medical Devices (e.g. washing fluids from disposables) do not exceed endotoxin levels of more than 0.5 EU/ml. For consumables that are in contact with cerebrospinal fluid, the endotoxin level should be at a minimum value of 0.06 EU/ml. The testing of endotoxins is conducted in a **kinetic turbidimetric LAL assay** (Limulus Amoebocyte Lysate) with a **detection limit of 0.03 EU/ml***). This test procedure complies with the United States Pharmacopoeia (USP) Chapter <85> Bacterial Endotoxins Test. All products that meet the above mentioned feature are identified in our catalogue with the respective label.

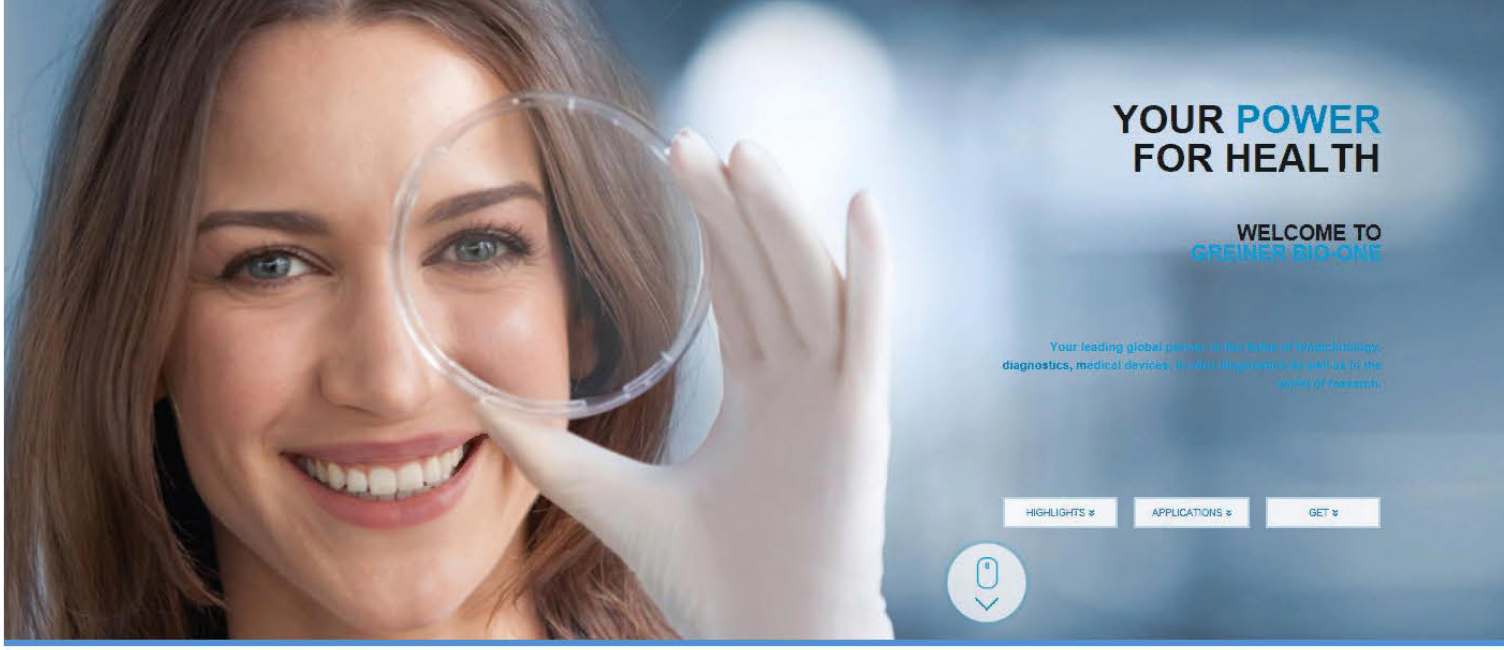
Sterility
The validation of our products is conducted in accordance with ISO 11137. Related to this standard, the bioburden (germ level) is established for each product and periodically repeated. Based on this data the necessary sterilisation process is conducted. Products labelled as sterile are routinely monitored. In-Vitro Diagnostic and Medical Devices appear with an **SAL (Sterility Assurance Level) of 10^{-6}**, other sterile products meet an **SAL of 10^{-3}**.

Binding properties of immunological products
The binding properties of all our immunological products are tested based on **ELISA**. The limits of the coefficient of variation (CV) of our products are as follows: MICROLON® **CV < 5 %**; FLUOTRAC™ and LUMITRAC™ **CV < 10 %**. We provide these products with a shelf life of 4 years for the binding characteristics.

Cell compatibility of cell culture products
The quality of cell culture products is validated with different cell lines. Relevant parameters like morphology, cell growth and cell vitality are monitored. More detailed information about the shelf life of our cell culture products is listed in the product data sheets on our website.

Free of cytotoxic substances
Cell culture products used in cell-based applications and for In-Vitro Diagnostic Devices should not contain any cytotoxic substances. Therefore all relevant cell culture end products are analysed for cytotoxicity. The detection of cytotoxicity is evaluated with mammalian cells according to **EN ISO 10993-5.**
All products that meet the above mentioned feature are identified in our catalogue with the respective label.

*) More information can be found on our website www.gbo.com. Errors and omissions excepted.



Greiner Bio-One Online

Fresh Design & More Services

The Greiner Bio-One website has received a complete makeover with a new, more intuitive layout and some great, new customer-orientated features.

We like to share the passion we have for our new home on the web. Here's an overview about the novel features contained within the site as well as some popular existing ones.

Online Product Catalogue

Acting in the spirit of ONE Bio-One, you are now able to access the complete product portfolio of Greiner Bio-One – Preanalytics, BioScience, OEM and Diagnostics.

Ⓐ Next to your product of interest, you will find additional information, such as technical data sheets and customer drawings **(Product Downloads).**

Ⓑ Beside the actual product image you have the possibility to scroll through different detail views.

Ⓒ The sections **Related Downloads** and **Related FAQs** contain product-related information such as brochures and flyers as well as product-specific questions and answers.

Ⓓ If you know the catalogue number or a keyword, you can enter this directly in the **search function**.

To register on our webshop go to **www.gbo.com**

click on

myGBO (Shop)

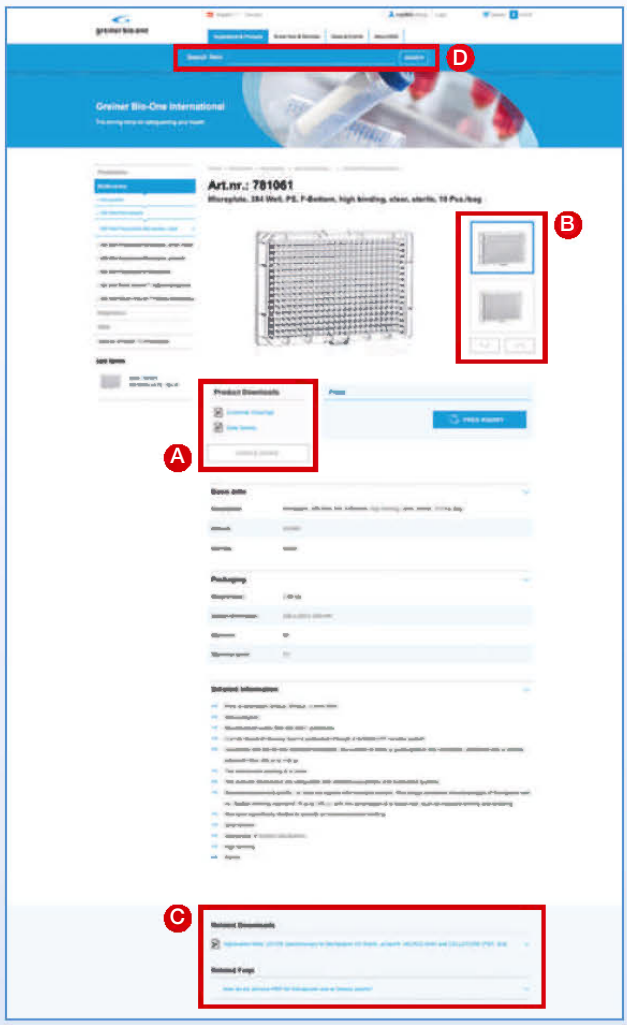
click

REGISTER NEW

following completion of the form

SEND REGISTRATION

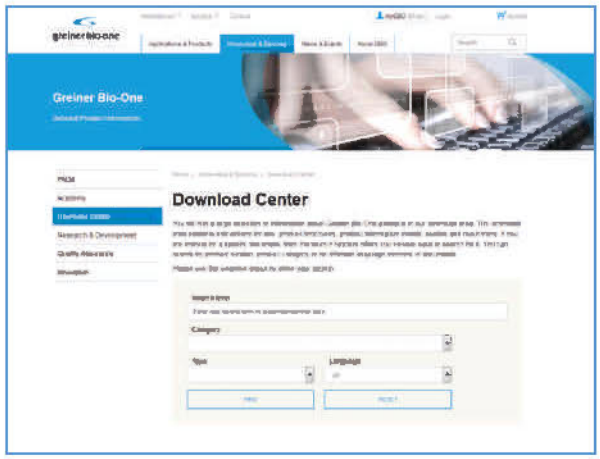
Login details will then be sent to you (usually the same day) so that you can see all products and pricing for your organisation and start shopping!



Download Centre

Your gateway to a wealth of information

The Download Center has been developed to house our complete library of information about Greiner Bio-One products and to make it easier to find and access this information. The download area contains instructions for use, product brochures, product data sheets, surveys and much more. If you are looking for a specific document, then the search function offers you various ways to search for it. You can search by product number, product category or by different language versions of documents.



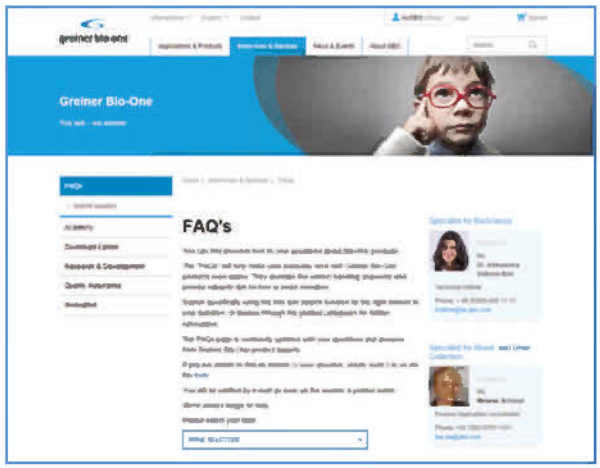
FAQs

You Ask – We Answer

Our Frequently Asked Questions section offers you the ability to send your question about Greiner Bio-One products and services straight to us. Our product specialists will be happy to assist you with your query and to make your daily work with Greiner Bio-One products even easier.

Search for already existing FAQs using the free text search function or browse through the product categories for further information.

The FAQs section is constantly updated with your questions and answers from Greiner Bio-One product experts.



e-Newsletters

Stay up-to-date

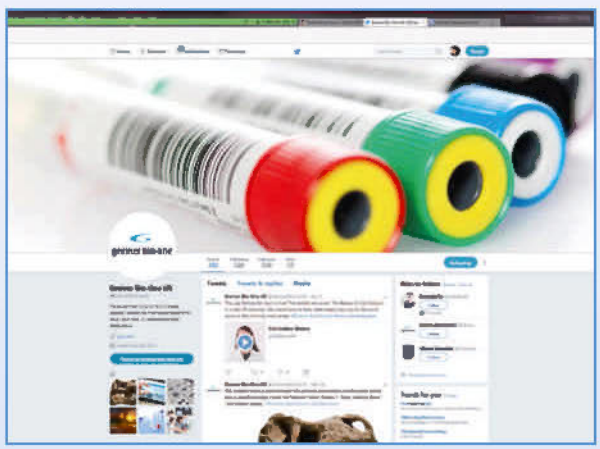
Our e-mail newsletter is one of our most popular methods of keeping our customers informed. It is sent periodically during the year and keeps you updated about the latest product developments, new services and applications. Subscribe today using the QR code below.

Subscribe to our newsletters >

Social Media

Stay up-to-date with Greiner Bio-One UK

Greiner Bio-One likes to keep its customers up to date using a fast, efficient and eco-friendly means of communication. By following us on Twitter, Linked In and YouTube you can stay up to date with product news, exhibitions and much more.



Follow Us

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Greiner Bio-One Ltd

Greiner Bio-One UK

The Green Spirit

Environment protection and careful resource planning
With increased public awareness of the ecological aspects and also of the increase in greenhouse gases and the worldwide climate change, business enterprises are facing a rise in social, economic and environmental responsibilities. As an enterprise concentrating on the production of plastic medical technology, Greiner Bio-One accepted the challenge and has already implemented a wide-reaching ecology project titled “The Green Spirit”.

Raw Material
This begins with the delivery of the raw materials. The delivery of the granulated plastic raw material is via truck silo transport. The granules are then stored in silos located at the production facility. This method avoids the use of additional packaging materials for the raw materials. In addition, Greiner Bio-One pays particular attention to the location of raw material suppliers. In doing so, travelling distances of raw materials are minimised.

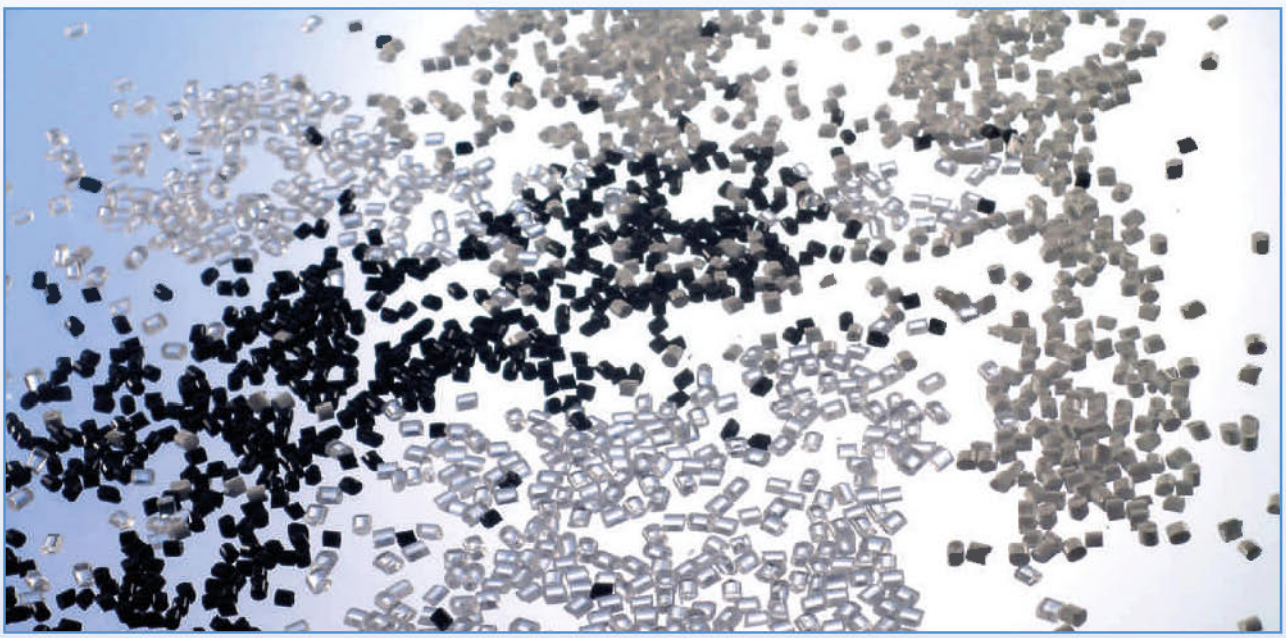


Figure 1: Granulated plastic as raw material for our products

Production

Greiner Bio-One, a technology leader in manufacturing high quality plastic products, relies on cutting-edge production facilities. These installations are powered with **clean, renewable forms of energy**. Fossil fuels such as gas or fuel oil are not being used. Energy is supplied in the form of electric power only.

Most plastic materials permit the recovery of either materials or energy. Based on generally ecological considerations, the **recovery of materials** is preferable, provided they can be used in the place of new plastic materials. It is for this reason that a special recycling solution helps the machinery save on materials.

The sprue parts, for example, that accumulate in every injection moulding process are recycled. After a homogenous selection of the remaining production wastes, they are delivered to a compounding contractor that recycles the material into plastic granulate for reuse in the injection moulding industry.

A state-of-the-art **heat recovery system** utilises the waste heat generated by the production machines to heat the entire building complex and help save additional energy.

Packaging

Wherever possible, unnecessary packaging material is dispensed with. The cartons consist of 100 % recycled material. All cartons from Greiner Bio-One Frickenhausen are labelled with the RESY symbol. This means that the RESY Organisation für Wertstoffentsorgung GmbH guarantees the complete disposal and reuse of all transport and grouped packaging bearing this symbol.

Energy Management System

The Greiner Bio-One site in Frickenhausen began introducing an energy management system as early as 2012 and has been certified to DIN EN ISO 50001 since 2013. All energy flows were analysed and valued so that steps could then be taken to optimise energy efficiency. Improving the energy balance while also reducing CO_2 emissions was a huge incentive for the management team and workforce alike. As a result, the company succeeded in saving 650,000 kWh of electricity in 2016 alone. The company has also been recertified to DIN EN ISO 50001 in 2016 successfully.

Introducing an energy management system is fundamentally a voluntary undertaking, as there is still no legal requirement to obtain certification. Greiner Bio-One nonetheless long ago established its own energy team that identifies potential energy savings. In addition, the team trains and motivates the workforce to achieve the shared goals of cutting energy costs and thus contributing to halting climate change.

DIN EN ISO 50001
Certification

OEM Services

OEM Product Portfolio

Greiner Bio-One GmbH as an Original Equipment Manufacturer (OEM) is a long-term partner of the pharmaceutical, biotechnology, diagnostic and medical technology industries.

OEM services range from 'simple' branding **(private labelling)** of an existing product line to fully customised manufacturing solutions **(true OEM)**. Whatever your requirement, we offer the best solution for your needs.

The product portfolio (Fig. 1) ranges from **laboratory supplies** up to numerous user-specific products.

As pioneers in the field of **microplates**, Greiner Bio-One develops new plate formats and geometries as well as production techniques such as the patented film bottom.

In the field of the **preanalytics** we offer the complete choice of customer-specific products for the sampling of body fluids (blood, urine, saliva).

We can also take over the **finishing of the plastic surface** by numerous surface modifications, as required by the customer and field of application.

In particular for the handling of samples at a microliter scale, we manufacture upon customer request **microfluidic product solutions** made of plastic material.

Based on the microarray technology Greiner Bio-One develops different customer-specific **DNA chips for medical diagnostics.** A large sample amount can be processed within the shortest time and be examined for the existence of certain viruses or bacteria.

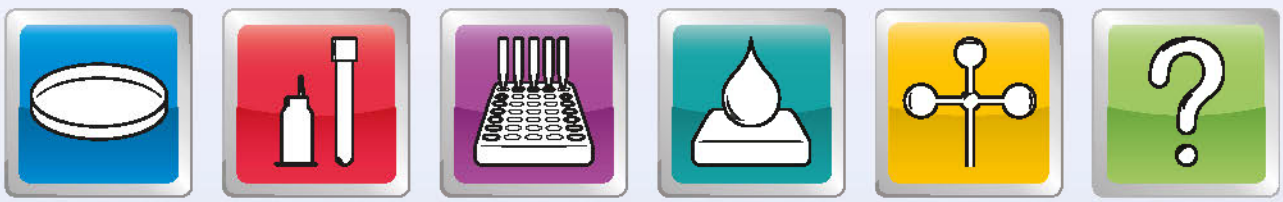


Figure 1: OEM product portfolio

OEM Service Portfolio

Greiner Bio-One manufactures numerous products through injection moulding and offers the entire product development and production process (Fig. 2) from an idea to the finished product:

- **Research & Development** with diverse application and research laboratories
- **Construction** of moulds, planning of plants and assembly lines
- Modern, fully automated **production**
- **Post production** according to customers' requirements
- Comprehensive **quality** assurance and management system
- **Worldwide** networked warehousing and customer service

From design, via prototyping, through fully automated manufacturing, Greiner Bio-One delivers the complete solution with support of experienced scientists, engineers and specialists.

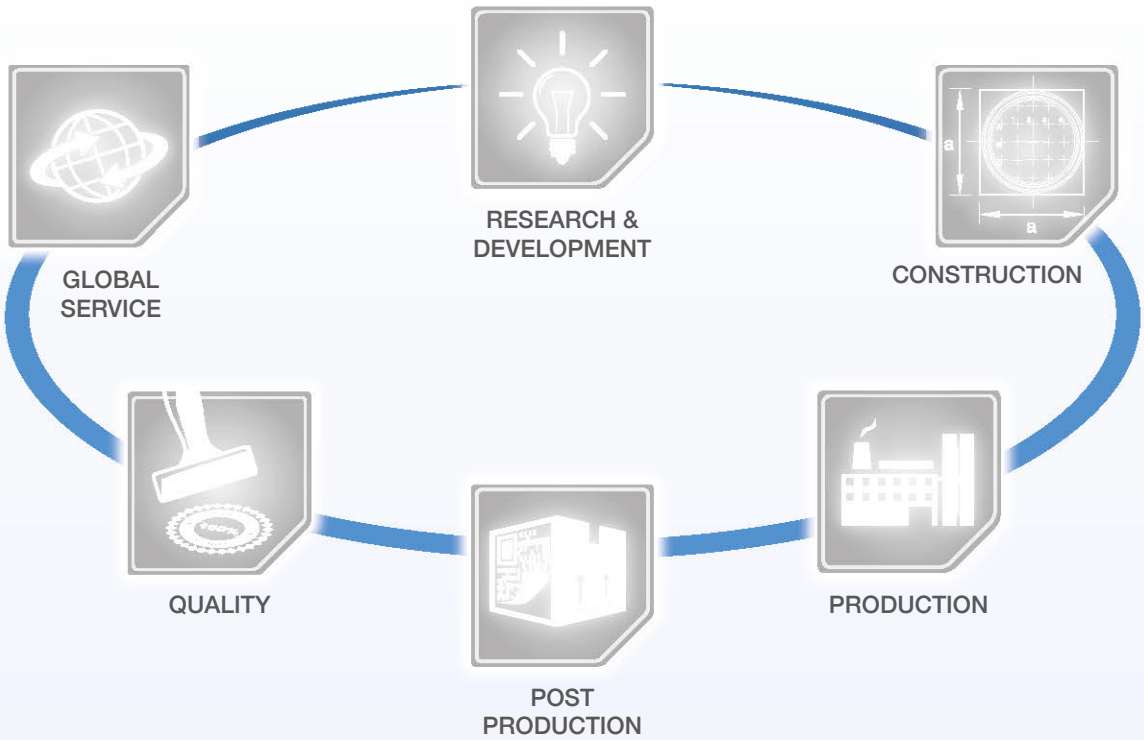


Figure 2: OEM service portfolio

Always close to the customer

As a global player and single source supplier, Greiner Bio-One offers **ultra-modern production plants on 4 continents** – with a centralised quality management system and a global procurement policy. As a result, customer-oriented production activities, high capacity, global warehousing and rapid delivery can be ensured. A code of conduct also governs worldwide company and employer business practices. With a **global sales network** specifically established for the field of OEM, Greiner Bio-One offers custom-made solutions with personal service.

Always highest quality standards

Quality is critical at Greiner Bio-One. All production sites are certified according to the international standards DIN EN ISO 9001, EN ISO 13485 as well as complying with FDA and CAMDCAS requirements for producers of medical products. Greiner Bio-One has established a multistage quality assurance system across all production sites. This starts with the goods-in control for raw materials. Further legal and customer-specified controls are applied throughout production. In addition, products are tested for compliance with customer-specific qualities such as sterility. Products are only considered as finished following strict quality checks. This is our quality promise.

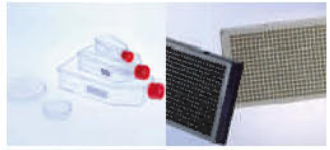
Service at Greiner Bio-One

EDI – Greiner Bio-One can provide you with a number of possibilities for reducing your administrative effort and therefore save you yet more time when processing orders. Contact our EDI team: **info.uk@gbo.com.**

@ **info.uk@gbo.com**

WEB **www.gbo.com**

TEL **01453 825255**














We reserve the right to make changes, deletions or additions. We cannot accept any responsibility for typographical errors or printing omissions.

1 Cell and Tissue Culture

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™**
  CELLview™ cell culture products with glass bottom combine 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.

- **EASYstrainer™ Cell Strainers**
  Cell sieves for the fast and safe filtration of cell suspensions such as those from tissue dissociation or for flow cytometry. The innovative design allows for secure, aseptic handling with a clearly reduced risk of contaminating the filtered cell suspension.

- **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.

CELLSTAR® cell culture vessels with a cell-repellent surface reliably prevent cell attachment in suspension cultures of semi-adherent and adherent cell lines where standard hydrophobic surfaces generally used for suspension culture are insufficient.

4. Screw Caps with a Hydrophobic Capillary Pore Membrane

Filter screw caps for cell culture/suspension culture flasks, roller bottles and the CELLreactor™ 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).

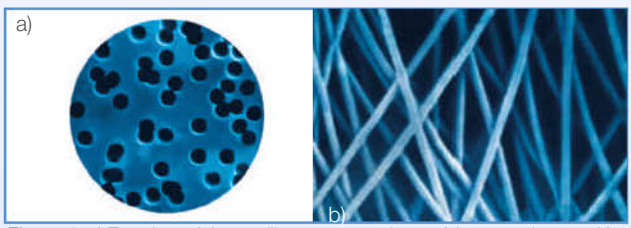


Figure 1: a) Top view of the capillary pore membrane (electron micrograph) b) Cross-section of the capillary pore membrane: the capillaries are filled with copper and the PET is then removed by etching (electron micrograph)

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.

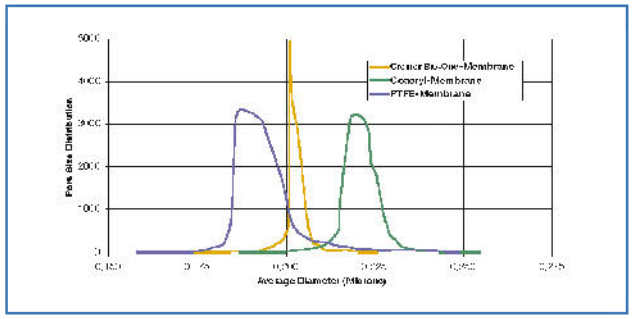


Figure 2: Comparison of different membrane types according to their pore size distribution

5. Expiry Date/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. 6–7).

Cytotoxicity

In many experiments toxic effects on cells or tissue cultures play an important role particularly in the field of In-Vitro Diagnostics. The absence of 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"** (F071105)
→ **Application Note "Improved cultivation/differentiation of embryonic stem cells"** (F073117)
→ **Application Note "Cultivation and differentiation of hADSCs with CELLSTAR® and CELLCOAT® products"** (F073113)

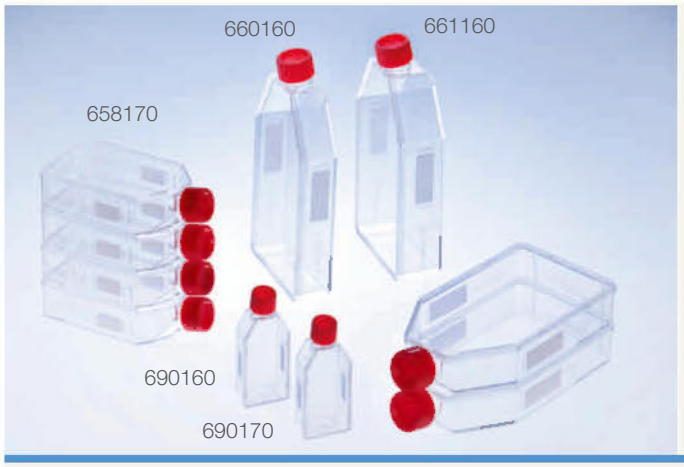
www.gbo.com
download centre >

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

Cat.-No. 690160/658170/660160 also available triple-packed p. 216

TRI

- 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

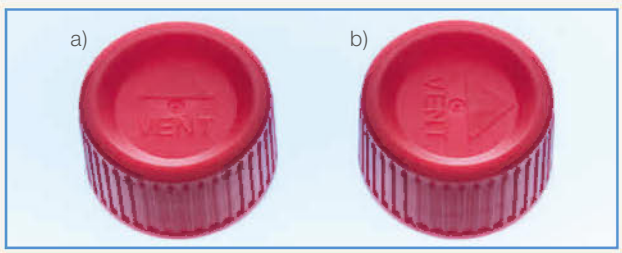


Figure 1: Standard screw cap with ventilation position
a) ventilation position b) gas-tight position

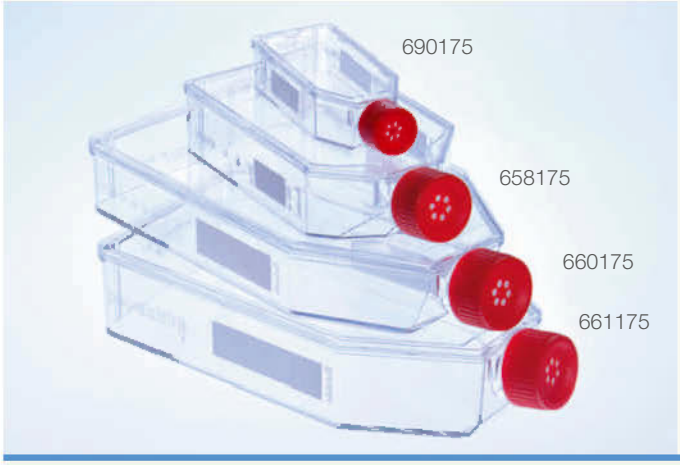
Standard Screw Cap with Ventilation Position
The secured click-in ventilation position is reached, once the cap snaps in audibly. In addition, the correct position is indicated by a vertical tip of a triangle and the readable writing VENT (Fig. 1). This allows visual verification of the aeration position, 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.	690160	690170*)	658170	660160	661160
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

Cat.-No. 690175/658175/660175 also available triple-packed p. 216

TRI

- 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 contamination. 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) available on request

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




Cat.-No.	690175	658175	660175	661175
Flask design	-	-	flat	high
Growth area [cm²]	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

Replacement Filter Flask Caps



Cat.-No.	315361	358361	350382
To fit flask	690 XXX	658 XXX	660 / 661 XXX
Sterile	+	+	+
Quantity per bag	1/4	1/3	1/3

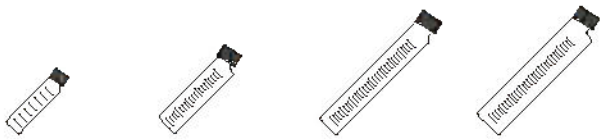
CELLSTAR® Suspension Culture Flasks

Standard Suspension Culture Flasks

All products also available triple-packed p. 217 TRI

- 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. 20)
- 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.	690190	658190	660190	661190
Flask design	-	-	flat	high
Total 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

All products also available triple-packed p. 217 TRI

- 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) available on request

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

Cat.-No.	690195	658195	661195
Flask design	-	-	high
Total 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

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. 51) or **Collagen Type I** (→ p. 49) coating as well as with **Advanced TC™** polymer modification (→ p. 45).

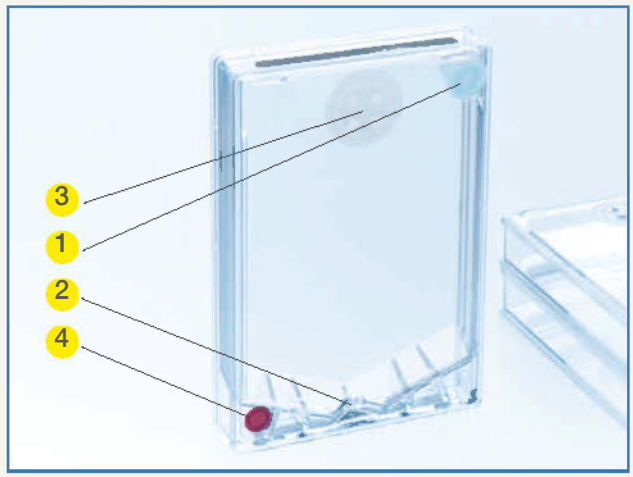


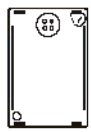
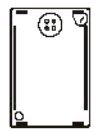
Figure 1: CELLSTAR® AutoFlask™

Further information on the AutoFlask™

→ **"Comparative cell growth study using the AutoFlask™"** (F072094)

www.gbo.com
download centre >

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

Cat.-No.	779160	779190
Description	AutoFlask™	AutoFlask™
TC surface treatment	+	-/suspension
Sterile	+	+
Growth area [cm²]	83.6	83.6
Total 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

→ **Cat.-No. 628160/664160/639160 also available triple-packed p. 215** TRI

→ **Sterile dishes without TC surface treatment available on request**

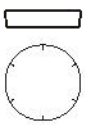
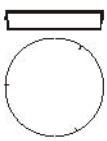
- Improved cell adhesion through physical surface treatment
- Vents ensure optimal gas exchange
- Sterile and user-friendly packaging
- Available in the nominal sizes 35, 60, 100 and 145 mm ø
- 8.7 to 143 cm² growth areas
- Easy stacking
- Maximal transparency for excellent microscopic analysis
- 35 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.	**627160**	**627170**	**628160**
Nominal size ø x height [mm]	35 x 10	35 x 10	60 x 15
Growth area [cm²]	8.7	0.93/well	21
Total volume [ml]	10	9	28
Working volume [ml]	3	0.08/well	6–7
Vents	+	+	+
TC surface treatment	+	+	+
Sterile	+	+	+
Quantity per bag/case	10/740	10/740	10/600

		
Cat.-No.	**664160**	**639160**
Nominal size ø 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

CELLSTAR® OneWell Plate™ and FourWell Plate™

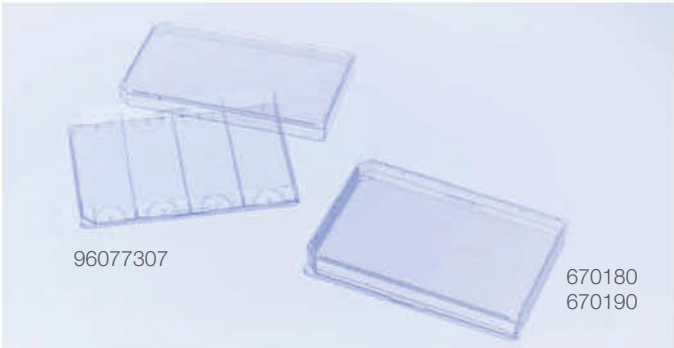
CELLSTAR® OneWell Plate™
Non-divided plate for tissue culture applications

The 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 cm^2, the OneWell Plate™ fills the gap between the growth areas of 58 cm^2 (Cat.-No. 664160) and 143 cm^2 (Cat.-No. 639160) 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 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).



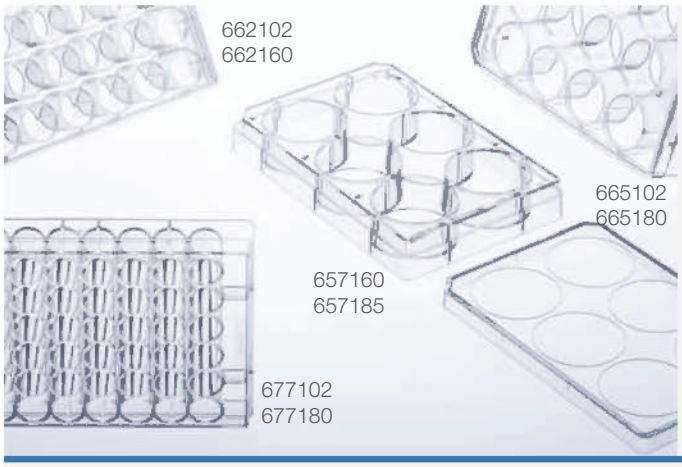
OneWell Plate™
FourWell Plate™

CELLSTAR® OneWell Plate™ (non-sterile) for bacteriological applications p. 138

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

Cat.-No.	670180	670190	96077307
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. 75–79

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

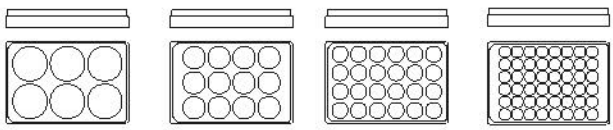
Properties

- 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. 79)

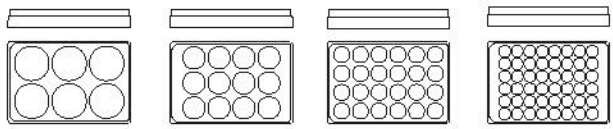
New:
6 well multiwell plates now with black printing:

- Designated surface treatment for improved identification
- Batch number and expiry date for reliable traceability
- Alphanumeric code for rapid orientation
- Additional frosted labelling field on plate side

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



For Adherent Cell Cultures				
Cat.-No.	**657160**	**665180**	**662160**	**677180**
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



For Suspension Cultures				
Cat.-No.	**657185**	**665102**	**662102**	**677102**
Well format	6 well	12 well	24 well	48 well
Total 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
- 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. 245–247

Detailed technical information on microplates
→ p. 82–85 HTS microplates
→ p. 120–121 Immunology
→ p. 243 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"** (F074058)
→ **Application Note "Selection of cell culture surfaces for the adipogenic differentiation of hMSCs"** (F010003)

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 (µClear®)
- 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. 86–87.

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 µl

2. V-Bottom
The "V" stands for the conically tapered well bottom.
- For precise pipetting
- Suitable for +/- analyses
- Working volume: 40–200 µl

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 µl

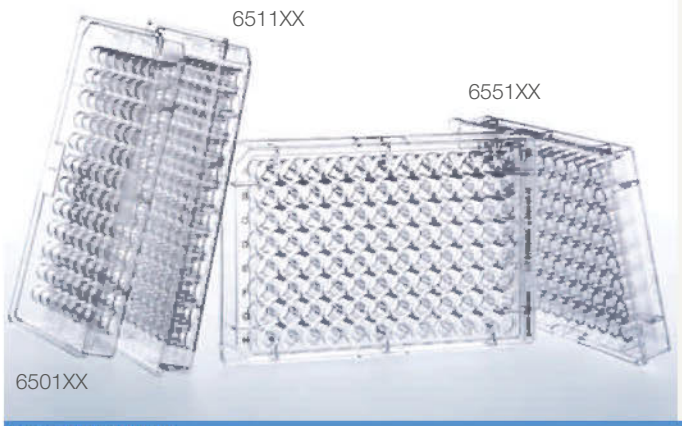
4. F-Bottom / Chimney Well
The chimney well cell culture microplate has the same well profile as the standard F-bottom plate. The difference to the standard plate is the chimney-like arrangement of the wells i.e. each well stands on its own. Therefore the risk of contamination from sample material being carried over is minimised.
- Cell growth area: 34 mm²
- Working volume: 25–340 µl

µClear® / Solid Bottom
Clear bottom microplates have pigmented walls and a transparent thin film bottom, the so-called µClear® 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 µl

Bulk Packaging
For selected products Greiner Bio-One also offers user-friendly bulk packaging. Additional products are available in bulk pack upon request.

New:
Clear 96 well microplates (F-bottom / chimney well) now with black printing:
- Designated surface treatment for improved identification
- Batch number and expiry date for reliable traceability
- Alphanumeric code for rapid orientation
- Additional frosted labelling field on plate side



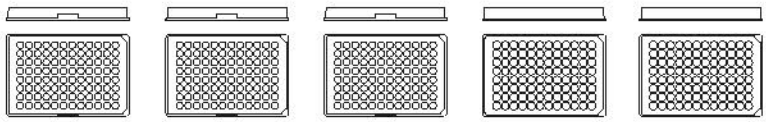
96 Well Polystyrene Cell Culture/ Supension Culture Microplates

solid bottom, clear

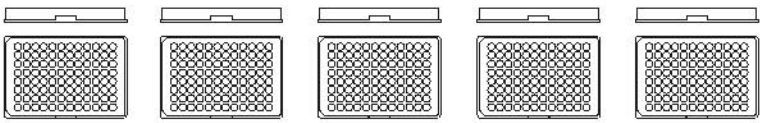
96 Well Microplates p. 88
Sealers, Lids and CapMats p. 235–241
Microplate Centrifuge p. 251
Barcode Labelling p. 263

New: Clear 96 well microplates (F-bottom/chimney well) now with black printing for easy plate identification

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



Cat.-No.	650160	650180	650185	651160	651180
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.	655160	655162	655180	655182	655185
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

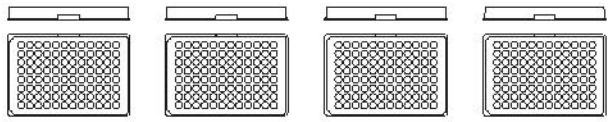
96 Well Polystyrene Cell Culture Microplates

solid bottom, white/black

- 96 Well Microplates p. 88
- Sealers, Lids and CapMats p. 235–241
- Microplate Centrifuge p. 251
- Barcode Labelling p. 263

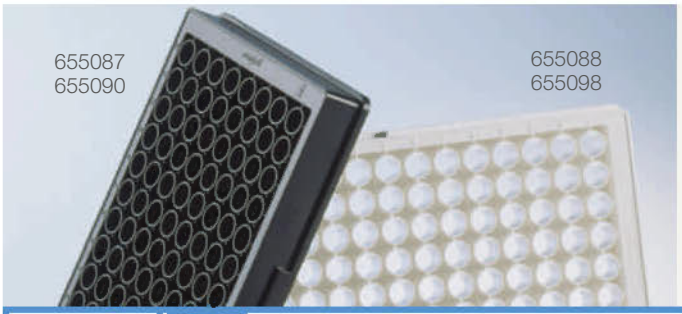
Free of detectable DNase, RNase, human DNA
non-pyrogenic

non-cytotoxic



Cat.-No.	655073	655083	655079	655086
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

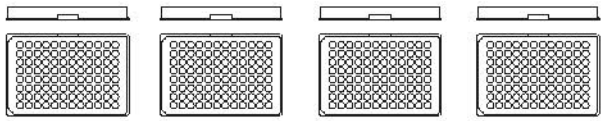


96 Well Polystyrene Cell Culture Microplates

µClear®, white/black

96 Well Microplates p. 88
Microplate Centrifuge p. 251
Barcode Labelling p. 263

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



Cat.-No.	655088	655098	655087	655090
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. 91
Microplate Centrifuge p. 251

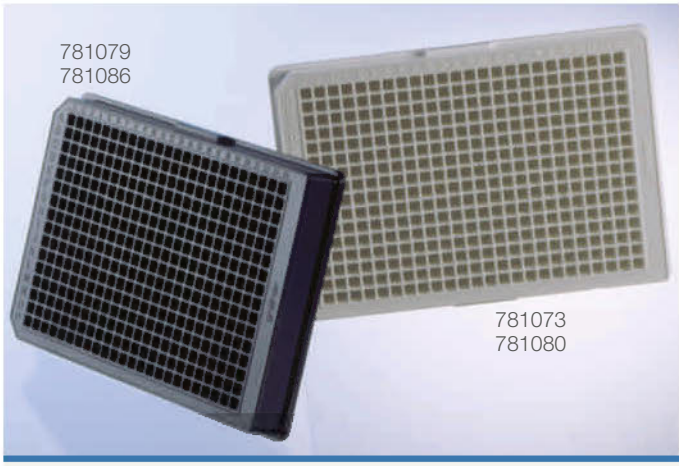
Free of detectable DNase, RNase, human DNA
non-pyrogenic
non-cytotoxic

Cat.-No.	675180	675083	675086	675098	675090
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 microplates
- Barcode-labelled on request (→ p. 243)



384 Well Polystyrene Cell Culture Microplates

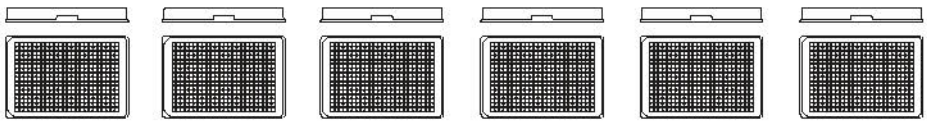
solid bottom, clear/white/black

- 384 Well Microplates p. 94
- Sealers, Lids and CapMats p. 223–241
- Barcode Labelling p. 263

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



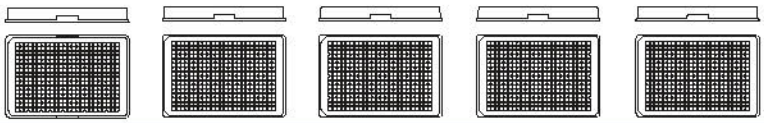
Cat.-No.	781165	781182	781073	781080	781079	781086
Well profile	F-bottom	F-bottom	F-bottom	F-bottom	F-bottom	F-bottom
Bottom	solid	solid	solid	solid	solid	solid
Colour	clear	clear	white	white	black	black
Growth area per well [mm²]	10	10	10	10	10	10
Working volume per well [µl]	15–110	15–110	15–110	15–110	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

384 Well Polystyrene Cell Culture Microplates

µClear®, white/black

384 Well Microplates p. 94
Sealers, Lids and CapMats p. 223–241
Barcode Labelling p. 263

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



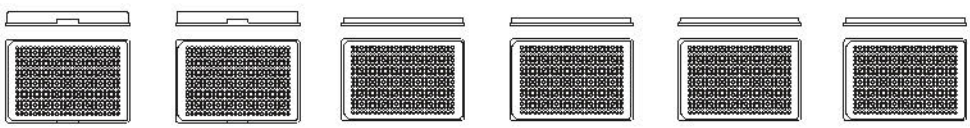
Cat.-No.	781093	781098	781092	781091	781090
Well profile	F-bottom	F-bottom	F-bottom	F-bottom	F-bottom
Bottom	µClear®	µClear®	µClear®	µClear®	µClear®
Colour	white	white	black	black	black
Growth area per well [mm²]	10	10	10	10	10
Working volume per well [µl]	15–110	15–110	15–110	15–110	15–110
TC surface treatment	+	+	+	+	+
Sterile	+	+	+	+	+
Lid	-	+	-	+	+
Quantity per bag/case	10/40	8/32	10/40	8/32	20/120

384 Well Small Volume™ HiBase/LoBase Cell Culture Microplates

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

384 Well Microplates p. 94

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



Cat.-No.	784080	784086	788073	788086	788093	788092
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

1536 Well Cell Culture Microplates

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

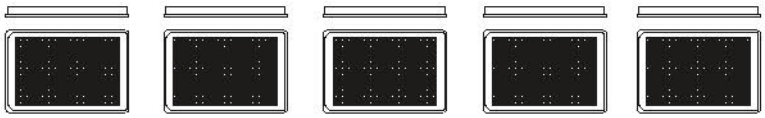
- In clear, white or black polystyrene
- As clear bottom variants (µClear®)
- HiBase version
- Barcode-labelled on request (→ p. 243)

1536 Well Cell Culture Microplates
HiBase

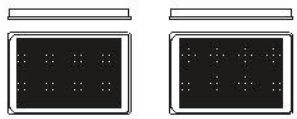
- 1536 Well Microplates p. 101
- Sealers, Lids and CapMats p. 223–241
- Barcode Labelling p. 263

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

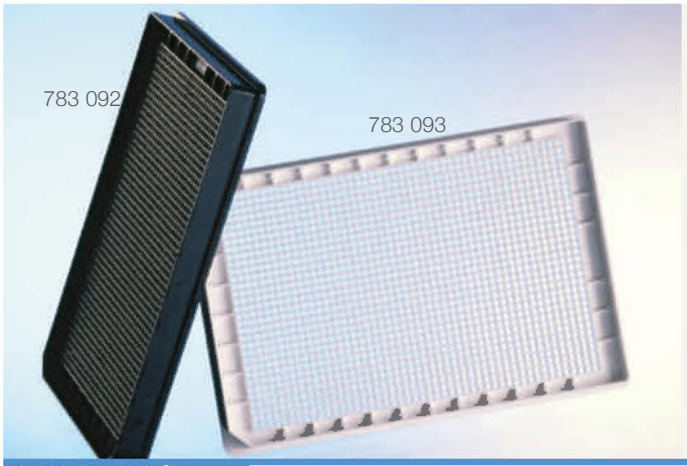
non-cytotoxic



	782180	782073	782080	782078	782086
Cat.-No.					
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



	782093	782092
Cat.-No.		
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

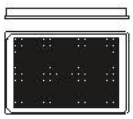


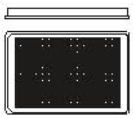
1536 Well Cell Culture Microplates

LoBase

1536 Well Microplates p. 101
Sealers, Lids and CapMats p. 223–241
Barcode Labelling p. 263

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





Cat.-No.	783093	783092
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

CELLSTAR® Cell Culture Tubes

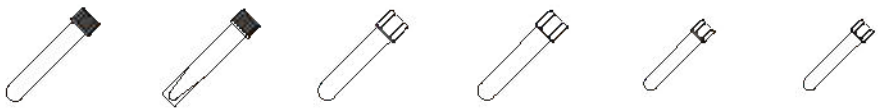
Polystyrene Cell Culture Tubes

Tubes p. 147–156

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

The dimensions and volumes of our tubes are only nominal values. For exact dimensions and volumes, please refer to the product data sheets on our website www.gbo.com/bioscience.

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



Cat.-No.	163160	164160	191160	191170	120160	120190
ø [mm] x height [mm]	17x100	16.8x100	18x95	18x95	12.4x75	12.4x75
Nominal volume [ml]	12	12	14	14	4.5	4.5
Working volume [ml]	12	12	12.5	12.5	4	4
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

CELLSTAR® CELLreactor™ – 15 ml and 50 ml Polypropylene Tube with Filter Screw Cap

The 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 several 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 tubes fit in standard 15 ml/50 ml centrifuge rotors 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 tubes with standard cap (→ p. 145–146) can be used.

!

Further information on CELLreactor™:

→ **Application Note: Cultivation of Suspension and Hybridoma Cells in CELLSTAR® CELLreactor™ Tubes** (F073918)

www.gbo.com
download centre >

CELLreactor™ 15 ml and 50 ml

CELLSTAR® polypropylene tubes p. 151–152

Sample packs available on request

Advantages:
- Facilitates a high number of parallel experiments
- Flexible working volume
- 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

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

Cat.-No.	188240	227245
Description	CELLreactor™ 15 ml tube with filter cap	CELLreactor™ 50 ml tube with filter cap
Bottom design	conical	conical
ø [mm] x height [mm]	17 x 120	30 x 115
Total volume [ml]	15	50
Working volume [ml]	1–5	1–35
Sterile	+	+
Colour	natural	natural
Filter screw cap	blue	blue
Graduation	blue	blue
Writing field	white	white
Quantity per bag/case	20/300	20/500

EASYstrainer™ Cell Strainers

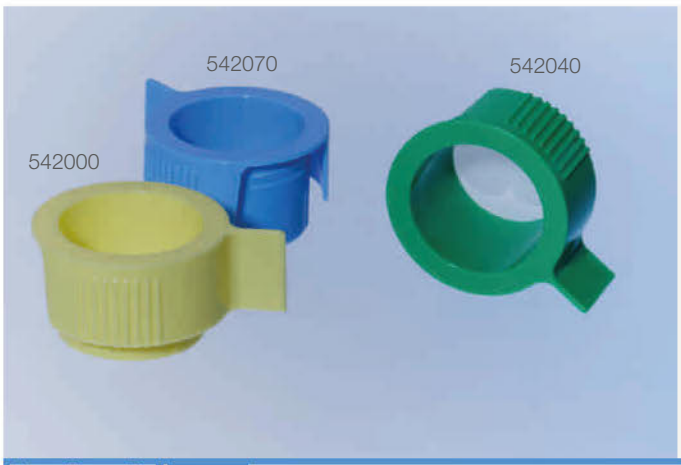
EASYstrainer™ is a novel product for the fast and safe filtration of cell suspensions such as those from tissue dissociation or for flow cytometry. The filter fits all standard 50 ml tubes and is available with filter mesh sizes of 40, 70 and 100 µm.

The innovative design of EASYstrainer™ allows for secure, aseptic handling with a clearly reduced risk of contaminating the filtered cell suspension. The grip ridges on the skirt of the unit in conjunction with a handle allow the unit to be manipulated safely and easily and so reduce the risk of accidental contact with the wetted filter. This significantly lowers the chance of contaminating the sample during the filtration process. In addition, the single blister pack allows for convenient and aseptic removal of the unit from its packaging.

A striking feature of EASYstrainer™ is the venting slot between tube and filter. This feature allows excess air to escape from the tube passively as to not create a vacuum or slow the flow rate. Thus, problems seen with other strainer brands such as liquid trapping between tube and filter as well as overspill of cell suspension are avoided.

INFORMATION

Watch our video
"EASYstrainer™ cell sieves"



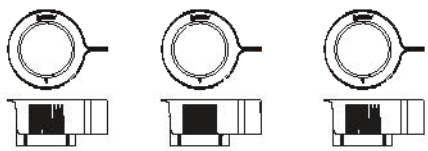
EASYstrainer™

CELLSTAR® polypropylene tubes p. 151–152

Sample packs available on request

- Three color-coded mesh sizes
- Fits all standard 50 ml tubes
- Handle and ridged skirt for improved aseptic handling
- Venting slot for fast filtration
- No liquid overspill
- Convenient blister pack

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



Cat.-No.	542040	542070	542000
Description	EASYstrainer™	EASYstrainer™	EASYstrainer™
Mesh size [µm]	40	70	100
Colour code	green	blue	yellow
Venting slot	+	+	+
Sterile	+	+	+
Quantity per blister/case	1/50	1/50	1/50

Mass Cell Culture

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 (116x276 mm, 122x271 mm, 122x275 mm, 122x500 mm) with or without a radially ribbed surface for an expanded growth area (850 cm^2, 1700 cm^2, 2125 cm^2, 4250 cm^2)
- 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 cm^2
- 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)

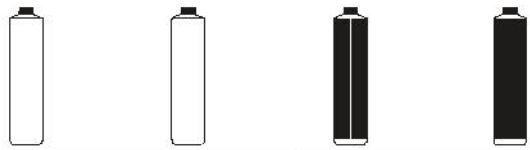
Polystyrene Roller Bottles

Polystyrene Roller Bottles

- For adherent cell culture
- Particularly high stability and optical clarity
- Improved cell adhesion through physical surface treatment
- Thread enables quick opening with a $^{2}/_{3}$ turn
- Screw caps with larger knurls for improved grip and ease of opening/closing
- Lot number and expiry date on each roller bottle
- Sterile, individually packed screw caps available:
  – Standard screw cap (Cat.-No. 383361)
  – Filter screw cap (Cat.-No. 383382)
- Nomenclature p. 38
- 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.	680060	680065	681070	681075
Description	1 X	1 X	2.5 X	2.5 X
Surface	smooth	smooth	ribbed	ribbed
ø [mm] x height [mm]	122x271	122x271	122x271	122x271
Growth area [cm²]	850	850	2125	2125
Total volume [ml]	2520	2520	2300	2300
TC surface treatment	+	+	+	+
Sterile	+	+	+	+
Standard screw cap	+	+	+	+
Quantity per bag/case	2/24	24	2/24	24

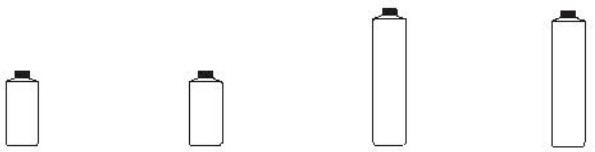


Cat.-No.	682012	682060	682075	682070
Description	1 XL	1 XL	5 XL	5 XL
Surface	smooth	smooth	ribbed	ribbed
ø [mm] x height [mm]	122x500	122x500	122x500	122x500
Growth area [cm²]	1700	1700	4250	4250
Total volume [ml]	4970	4970	4640	4640
TC surface treatment	+	+	+	+
Sterile	+	+	+	+
Standard screw cap	+	+	+	+
Quantity per bag/case	12	1/12	12	1/12

Polystyrene Filter Cap Roller Bottles

- For adherent cell culture
- Particular high stability and optical clarity
- Improved cell adhesion through physical surface treatment
- Thread enables quick opening with a $^{2}/_{3}$ turn
- Screw caps with larger knurls for improved grip and ease of opening/closing
- Lot number and expiry date on each roller bottle
- Sterile, individually packed screw caps available:
  – Standard screw cap (Cat.-No. 383361)
  – Filter screw cap (Cat.-No. 383382)
- Nomenclature p. 38
- 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.	680058	680068	682015	682065
Description	1 X	1 X	1 XL	1 XL
Surface	smooth	smooth	smooth	smooth
ø [mm] x height [mm]	122x271	122x271	122x500	122x500
Growth area [cm²]	850	850	1700	1700
Total 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.	681072	682078
Description	2.5 X	5 XL
Surface	ribbed	ribbed
ø [mm] x height [mm]	122x271	122x500
Growth area [cm²]	2125	4250
Total volume [ml]	2300	4640
TC surface treatment	+	+
Sterile	+	+
Filter screw cap	+	+
Quantity per bag/case	2/24	1/12

Polyethylene Terephthalate (PET) Roller Bottles

Polyethylene Terephthalate (PET) Roller Bottles

- For adherent cell culture
- PET material with high impact resistance and gas permeability
- Surface suitable for many adherent cell lines
- All PET roller bottles have a standard screw cap
- Break-proof
- Nomenclature p. 38

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



Cat.-No.	680160	680170	680180*)
Description	1 X	1 X	1 X
Material	PET	PET	PET
Surface	smooth	smooth	smooth
ø [mm] x height [mm]	116x276	116x276	116x276
Growth area [cm²]	850	850	850
Total volume [ml]	2300	2300	2300
Sterile	+	+	+
Quantity per bag/case	1/18	30	1/18

*) black graduation

CELLdisc™ Products

CELLdisc™ is a multilayer device covering a range of cell culture surfaces from 250 cm² up to 1 square meter. The innovative ergonomic design of CELLdisc™ provides a versatile system for the propagation of adherent mammalian cells from research scale to industrial batches.
To guarantee an ideal cell culture environment CELLdisc™ is provided with two surface treatments to assure consistent cell growth and high cell or product yield. Beside the **TC surface** for standard cells and applications CELLdisc™ is also available with the **Advanced TC™ surface**, improving cultivation of sensitive cells, even under restricted growth conditions and increasing cellular adhesion, proliferation and transfection rates.
Due to the identical footprint of all versions, required cell densities, media volumes and cultivation protocols can be easily defined. The wide opening port facilitates easy filling of liquids while the centrally located gas exchange channel allows uniform distribution throughout the device.
A socle rim guarantees that the bottom layer of CELLdisc™ does not touch the surface of the incubator assuring equal thermal distribution and consistent cell growth in all layers.
The compact and robust cylindrical device is ideally suited for automation and upscaling of mass cell culture. For the connection of the individual layers a proprietary, particle-free assembly technique is used. All basic materials required for CELLdisc™ production comply with the quality standards of the U.S. Pharmacopoeia and the complete end product is USP Class VI certified. As for all Greiner Bio-One cell culture devices CELLdisc™ is guaranteed to be sterile (SAL 10^{-6}), non-pyrogenic, non-cytotoxic and free of detectable DNase, RNase and human DNA.

Applications:
- Mass cell culture
- Antibody, virus and vaccine production
- Production of recombinant or therapeutic proteins

CELLdisc™ concept:
The individual layers or stacked discs form a cylinder with a defined center point (Fig. 1). Due to the round concept any position can be achieved by rotating. Therefore handling requires little effort with minimal motion and space requirement. The innovative design simplifies the workflow (just fill, tilt and turn), eliminates multiple working steps and reduces the risk of contamination (Fig. 2).

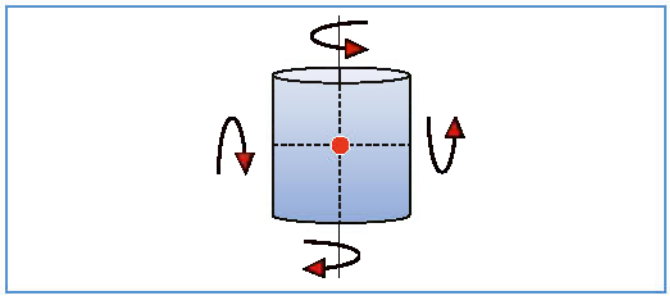


Figure 1: Defined center point of a round system

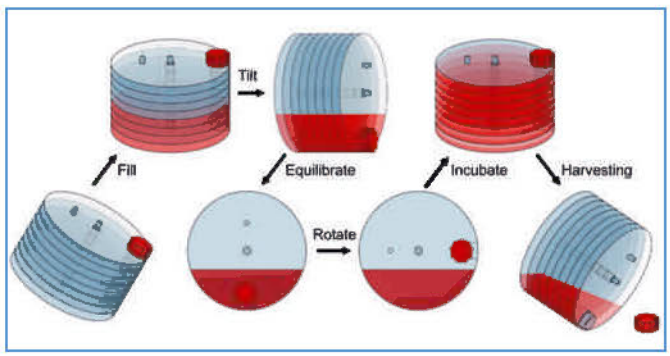


Figure 2: CELLdisc™ workflow for cell seeding, media change and harvest.

CELLdisc™ features:
- Compact multi-layer cell culture device for basic research and industrial production
- 40 % higher surface/volume ratio than comparable systems
- Easy operation and minimal space occupation
- Predictable scale-up from 250 cm² to 10,000 cm² corresponding to 1, 4, 8, 16 or 40 layers
- Surface treatments (TC, Advanced TC™) for ideal cell attachment
- Central gas support channel assures permanent ventilation of each unit
- Wide opening port for optimal accessibility and filling of the device
- Media exchange without contact to cell layers
- Manufactured in accordance to GMP standards
- Lot number and expiry date on each CELLdisc™
- CELLswing™ (→ p. 43) automated system for easy handling and uniform results

!

Further information on CELLdisc™ and CELLswing™
→ **CELLdisc™ Products – Simplify your scale up and mass cell culture (F074007)**

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INFORMATION

Watch our video
"CELLdisc™ multilayer device for mass cell culture – general information"

"CELLdisc™ multilayer device for mass cell culture – filling and pouring procedure"

and further CELLdisc™/CELLswing™ videos on our video channel

New

Free of detectable DNase, RNase, human DNA

non-pyrogenic

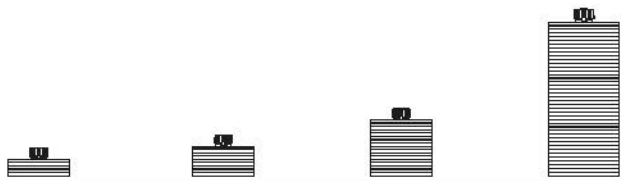
non-cytotoxic

CELLdisc™

CELLswing™ Automation p. 44

CELLMASTER™ Roller Bottles p. 38–41

Cat.-No.	678101	678104	678108	678116	678140
Description	CELLdisc™	CELLdisc™	CELLdisc™	CELLdisc™	CELLdisc™
No. of layers	1	4	8	16	40
ø [mm] x height with lid [mm]	200x61	200x93	200x135	200x220	200x474
Growth area [cm²]	250	1000	2000	4000	10000
Working volume [ml]	70	280	560	1020	2800
Surface treatment	TC	TC	TC	TC	TC
Sterile	+	+	+	+	+
Cap colour	red	red	red	red	red
Quantity per bag/case	1/8	1/4	1/3	1/2	1



Cat.-No.	678904	678908	678916	678940
Description	CELLdisc™	CELLdisc™	CELLdisc™	CELLdisc™
No. of layers	4	8	16	40
ø [mm] x height with lid [mm]	200x93	200x135	200x220	200x474
Growth area [cm²]	1000	2000	4000	10000
Working volume [ml]	280	560	1020	2800
Surface treatment	Advanced TC™	Advanced TC™	Advanced TC™	Advanced TC™
Sterile	+	+	+	+
Cap colour	blue	blue	blue	blue
Quantity per bag/case	1/4	1/3	1/2	1

CELLswing™ Automation

CELLswing™ is a compact mechanical device (335 x 216 mm) that allows to bring CELLdisc™ in any desired position in the fastest, still gentlest way. The automation is provided with several standard motion sequences. Customer-specific sequences can be programmed on demand. It is designed to meet the requirements of easy-cleaning and minimal space occupation. When filling multiple units of CELLdisc™ with valuable cell suspension, the automation concept allows the operator/technicians to keep the attention to aspects of sterility and control, leaving the correct motion patterns for filling and distribution of the cells to the system.

Further accessories like a gripper facilitating manual handling (CELLhandle™, article no. 878074), a levelling stand equilibrating CELLdisc™ (CELLring™, article no. 878075) as well as stacking ribs are available.

CELLswing™

CELLdisc® p. 42–43

Cat.-No.	878070
Description	CELLswing™
Weight [kg]	17
ø [mm] x height [mm]	200[1]/216[2] x 335[3]/550[4]
Suitable for	CELLdisc™ 4, 8, 16
Power input [VAC/Hz]	90~264/47~63
Power output [V DC/W]	24/120
Quantity per bag/case	1

[1] base
[2] top
[3] empty
[4] loaded with CELLdisc™ 16

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 consistant 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

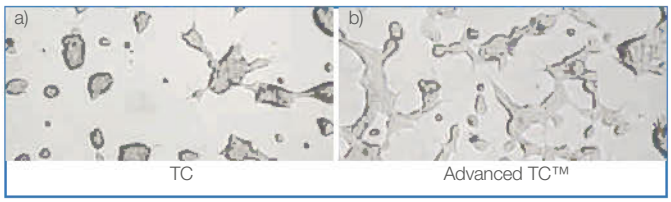


Figure 1:
HEK 293 cells were seeded with a concentration of 20,000 cells/well in a 96 well microplate and cultivated in serum-free media at 37 °C and 5 % CO_2. After 48 hours cells are semi-adherent on the standard tissue culture surface (a) whereas on the Advanced TC™ surface (b) HEK 293 cells display improved attachment and their cell-specific morphology.

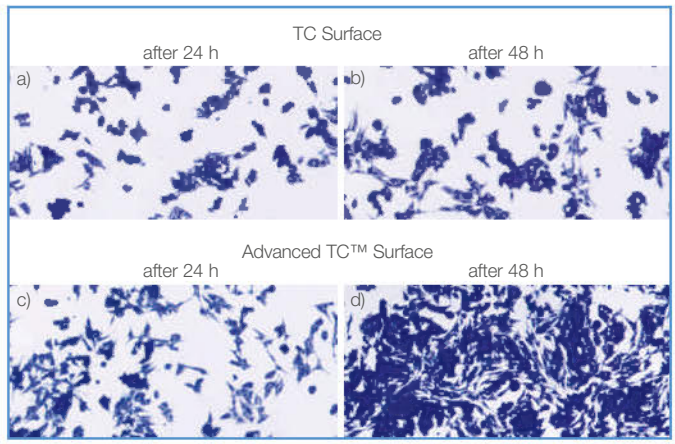


Figure 2:
SKNMC cells were seeded with a concentration of 20,000 cells/well in a 96 well microplate with standard tissue culture surface (a, b) and Advanced TC™ surface (c, d) and cultivated at 37 °C and 5 % CO_2 for 24 or 48 hours respectively. Cells were stained with crystal violet to identify living cells. Due to the increased proliferation rate higher cell densities can be detected on the Advanced TC™ surface at both time points.

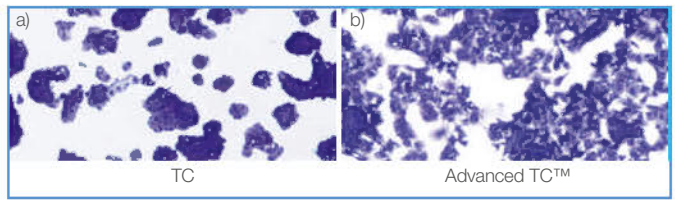


Figure 3:
HepG2 cells were seeded with a concentration of 20,000 cells/well in a 96 well microplate with standard tissue culture surface (a) and Advanced TC™ surface (b), cultivated under identical conditions for 48 hours and stained with crystal violet. Only on the Advanced TC™ surface cells display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

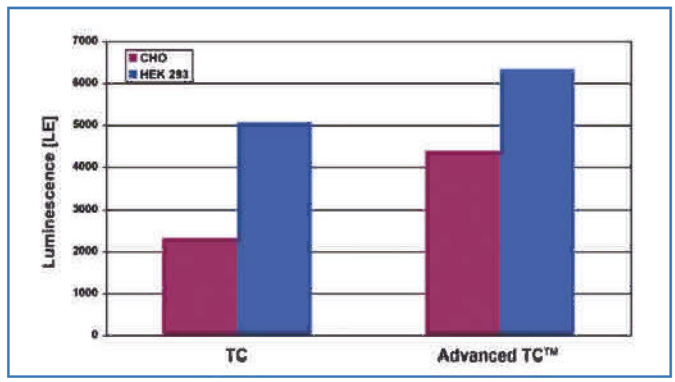


Figure 4:
CHO and HEK 293 cells were seeded in a 96 well microplate with a concentration of 40,000 cells/well or 100,000 cells/well respectively, cultivated at 37 °C and 5 % CO_2 for 24 hours and thereafter transfected with the pCMV- GLuc-vector. Both cell lines exhibit raised Luciferase activity on the Advanced TC™ surface.

!

Further information on Advanced TC™

→ **Forum No. 12: Advanced TC™: An innovative surface improving cellular assays** (F071104)
→ **Application Report "Advanced TC™ for improving the cultivation/differentiation of embryonic stem cells"** (F076036)

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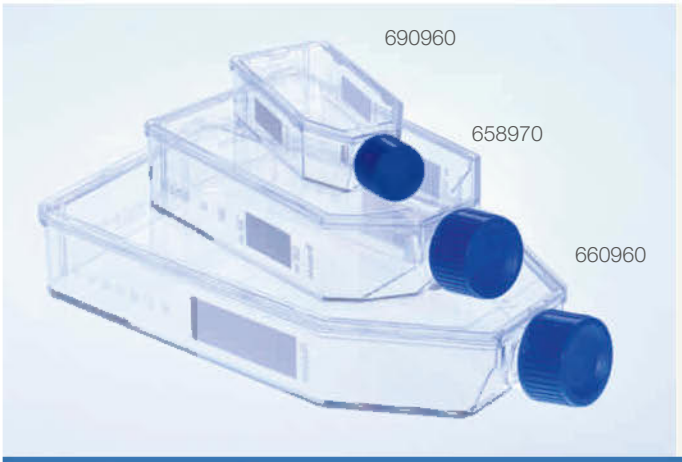


Advanced TC™

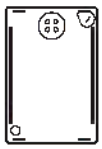
Standard Cell Culture Flasks

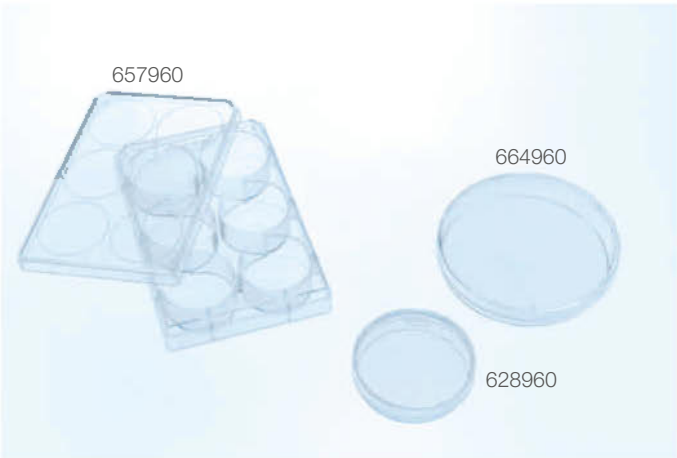
Filter Cap Cell Culture Flasks

Standard Cell Culture Flasks p. 20
Filter Cap Cell Culture Flasks p. 21

Free of detectable DNases, RNases, human DNA
non-pyrogenic
non-cytotoxic

Standard Cell Culture Flasks				
Cat.-No.	**690960**	**658970**	**660960**	**661960**
Flask design	-	-	flat	high
Growth area [cm²]	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.	**690975**	**658975**	**660975**	**779960**
Flask design	-	-	flat	AutoFlask™
Growth area [cm²]	25	75	175	83.6
Total volume [ml]	50	250	550	110
Working volume [ml]	5–10	15–38	20–45	20–40
Advanced TC™	+	+	+	+
Sterile	+	+	+	+
Filter screw cap	blue	blue	blue	-
Colour code	-	-	-	blue
Barcode labelling	-	-	-	+
Quantity per bag/case	10/200	5/120	5/50	10/100



Advanced TC™

Cell Culture Dishes

Cell Culture Multiwell Plates

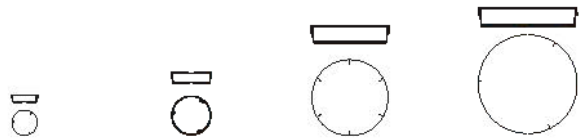
Cell Culture Dishes p. 24

Advanced TC™ CELLview™ Products with Glass Bottom p. 69–71

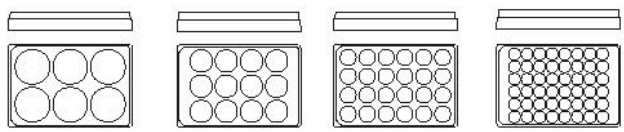
Cell Culture Multiwell Plates p. 26

New: Clear 6 well multiwell plates now with black printing for easy plate identification (→ p. 26)

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



Cat.-No.	627960	628960	664960	639960
ø [mm] x height [mm]	35x10	60x15	100x20	145x20
Growth area [cm²]	8.7	21	58	143
Total volume [ml]	10	28	100	240
Working volume [ml]	3	6–7	16–17	25–27
Vents	+	+	+	+
Advanced TC™	+	+	+	+
Sterile	+	+	+	+
Quantity per bag/case	10/740	10/600	15/360	5/120



Cat.-No.	657960	665980	662960	677980
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

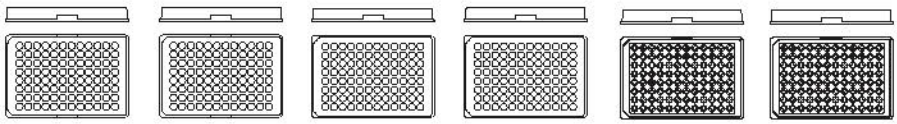
*) with condensation rings

Advanced TC™
96 Well Cell Culture Microplates

96 Well Cell Culture Microplates p. 28–30

New: Clear 96 well microplates (F-bottom/chimney well) now with black printing for easy plate identification (→ p. 27)

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



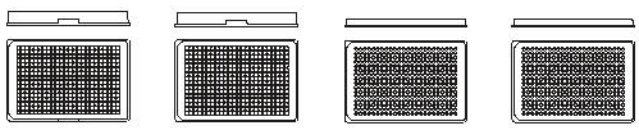
Cat.-No.	655980	655982	655983	655986	675983	675986
Well format	96 well	96 well	96 well	96 well	96 well	96 well
Well profile	F-bottom/ chimney well	F-bottom/ chimney well	F-bottom/ chimney well	F-bottom/ chimney well	half area	half area
Bottom	solid	solid	µClear®	µClear®	µClear®	µClear®
Colour	clear	clear	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

Advanced TC™
384 Well Cell Culture Microplates

384 Well Cell Culture Microplates p. 31–32

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



Cat.-No.	781983	781986	788983	788986
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).

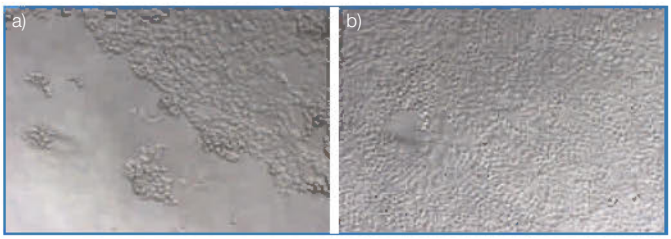


Figure 1:
a) HEK 293 cells 48 h after seeding and single washing with PBS on an uncoated, TC-treated surface
b) HEK 293 cells 48 h after seeding and single washing with PBS on a surface coated with Poly-D-Lysine

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

Also available: Double coating with Poly-D-Lysine and Laminin

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"** (F073022)

→ **Application Note "Enhanced transfection efficiency on protein-coated microplates"** (F073103)

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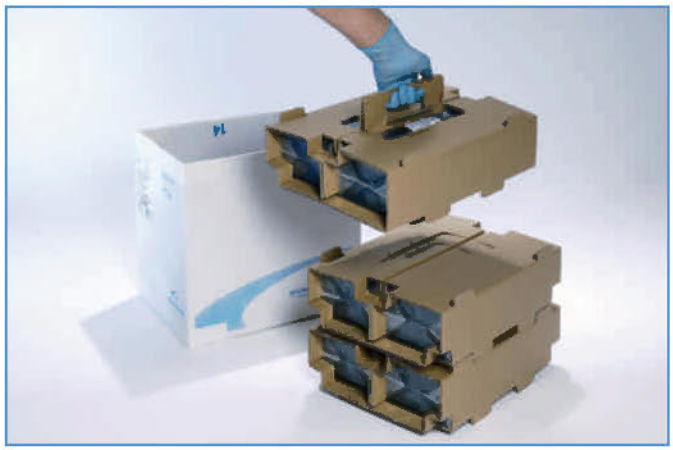


Figure 2: User-friendly bulk packaging

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, mesenchymal cells, hepatocytes, muscle cells, pheochromocytoma cells (PC 12) and other cell types
- Cell cultivation in serum-free or serum-reduced medium

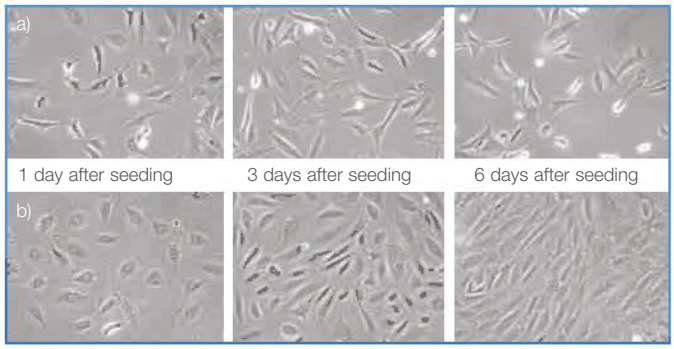


Figure 1: Comparison of the proliferation of human endothelial cells from the umbilical vein (HUVEC) on a) TC-treated surfaces and b) surfaces coated with Collagen Type I

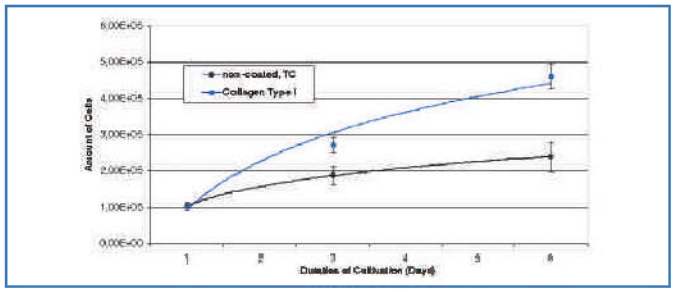
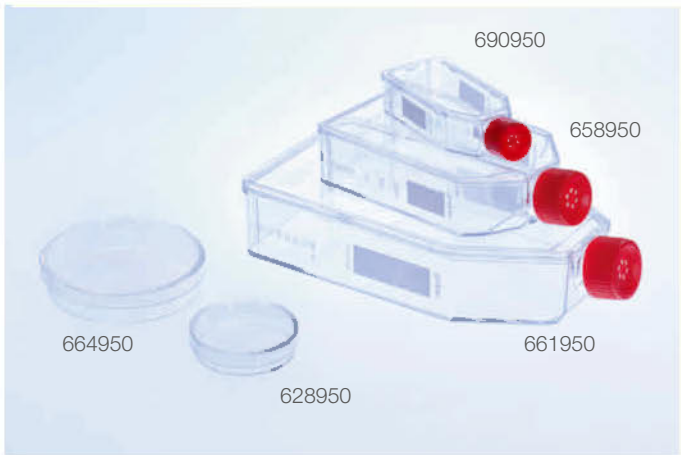


Figure 2: Comparison of the proliferation of human endothelial cells from the umbilical vein (HUVEC) on TC-treated surfaces and surfaces coated with Collagen Type I



Collagen Type I CELLCOAT®

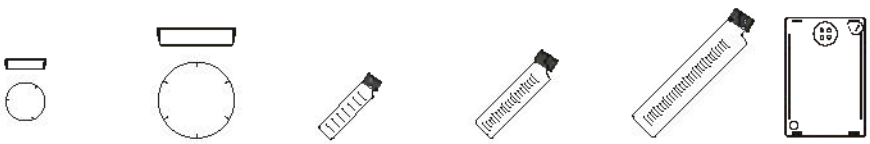
Cell Culture Dishes/Flasks

Cell Culture Vessels p. 20–24

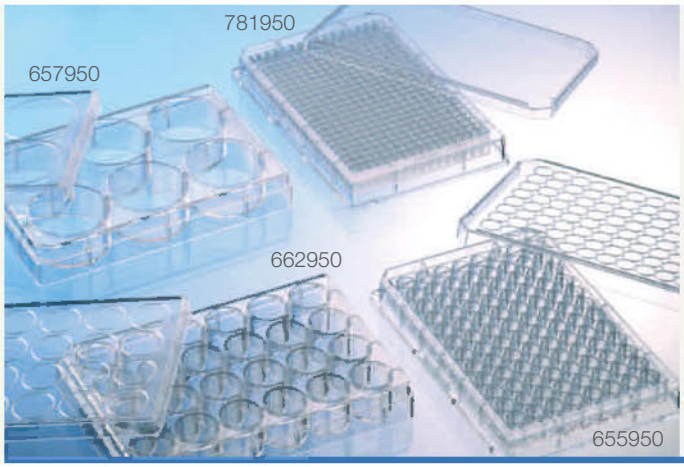
ThinCert™ Cell Culture Inserts coated with Collagen Type I p. 78

Further cell culture vessels coated with Collagen Type I available on request

- Cell culture flasks with filter caps
- Shelf life: 24 months at room temperature



Cat.-No.	628950	664950	690950	658950	661950	779959
Description	dish	dish	flask	flask	flask	AutoFlask™
ø [mm] x height [mm]	60x15	100x20	-	-	-	-
Growth area [cm²]	21	58	25	75	175	83.6
Total 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



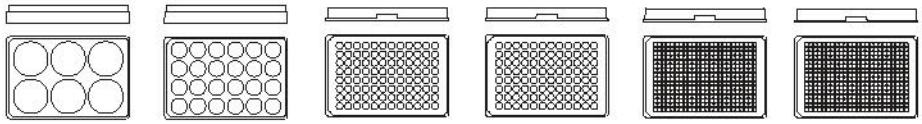
Collagen Type I CELLCOAT®

Cell Culture Multiwell Plates
Cell Culture Microplates

Further cell culture vessels coated with Collagen Type I available on request

- Shelf life: 24 months at room temperature

New: Clear 6 well multiwell plates and 96 well microplates (F-bottom/chimney well) now with black printing for easy plate identification (→ p. 26–27)



Cat.-No.	657950	662950	655950	655956	781950	781956
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
Total volume per well [ml]	16.1	3.3	0.392	0.392	0.131	0.131
Working volume per well [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.

- 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

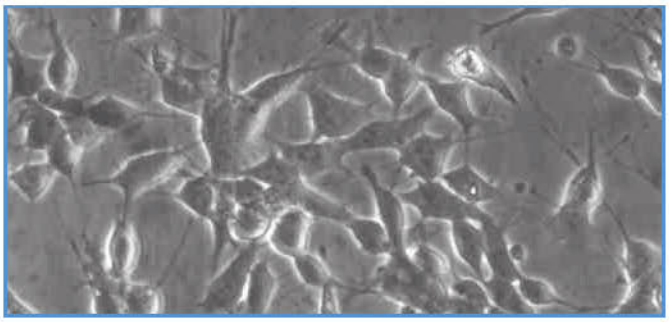
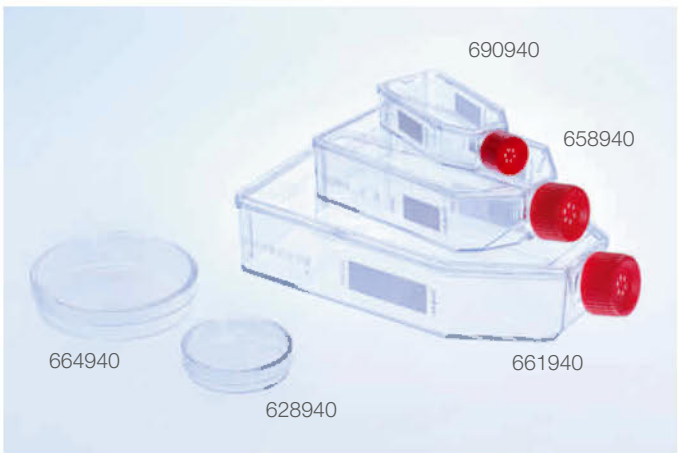


Figure 1: Cells of a neuroblastoma cell line on PDL CELLCOAT®, 24 hours after seeding.



Poly-D-Lysine CELLCOAT®

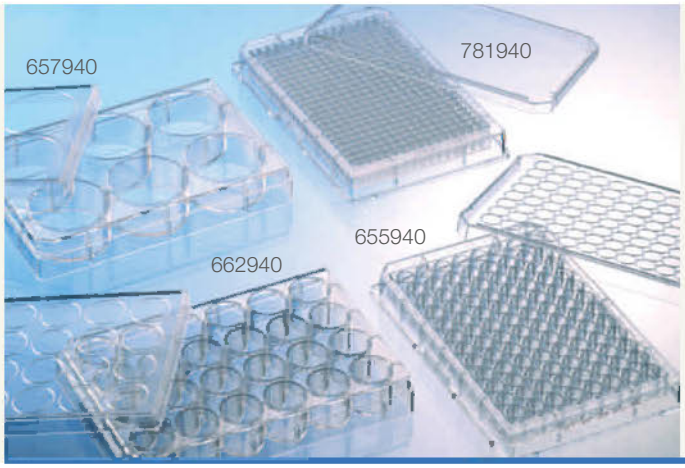
Cell Culture Dishes/Flasks

Cell Culture Vessels p. 20–24

Further cell culture vessels coated with Poly-D-Lysine available on request

- Cell culture flasks with filter caps
- Shelf life: 24 months at room temperature

	628940	664940	690940	658940	661940	779946
Cat.-No.						
Description	dish	dish	flask	flask	flask	AutoFlask™
ø [mm] x height [mm]	60x15	100x20	-	-	-	-
Growth area [cm²]	21	58	25	75	175	83.6
Total 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



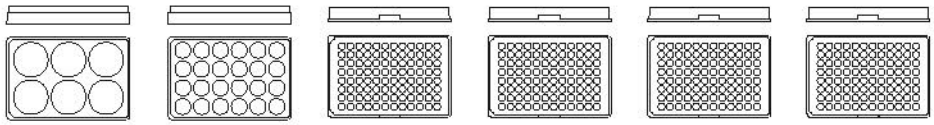
Poly-D-Lysine CELLCOAT®

Cell Culture Multiwell Plates
Cell Culture Microplates

Further cell culture vessels coated with Poly-D-Lysine available on request

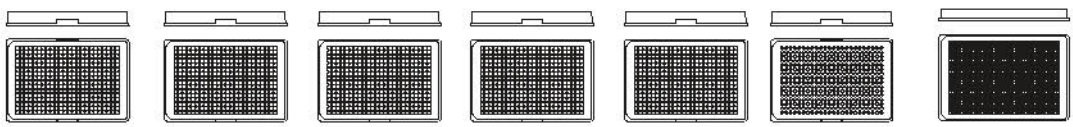
- Cat.-No. 655948 and 781948 have a user-friendly bulk package
- Shelf life: 24 months (multiwell plates)/ 18 months (microplates) at room temperature

New: Clear 6 well multiwell plates and 96 well microplates (F-bottom/chimney well) now with black printing for easy plate identification (→ p. 26–27)

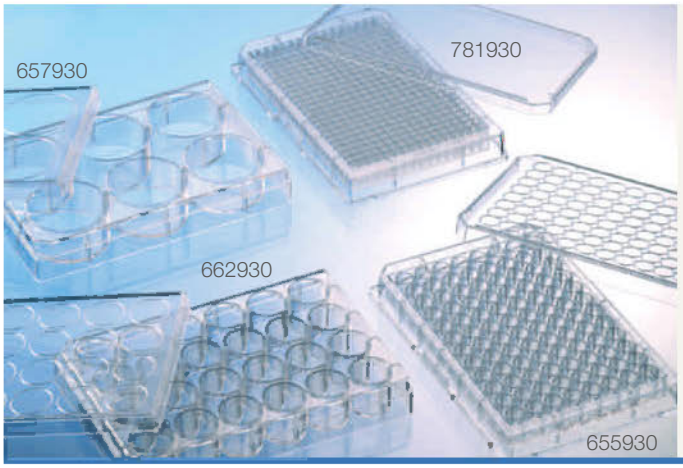


Cat.-No.	657940	662940	655940	655944	655946	655948
Well format	6 well	24 well	96 well	96 well	96 well	96 well
Well profile	F-bottom	F-bottom	F-bottom	F-bottom	F-bottom	F-bottom
Bottom	solid	solid	solid	µClear®	µClear®	µClear®
Colour	clear	clear	clear	white	black	black
Growth area per well [cm²]	9.6	1.9	0.34	0.34	0.34	0.34
Total volume per well [ml]	16.1	3.3	0.392	0.392	0.392	0.392
Working volume per well [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.	781940	781945	781944	781946	781948	784946	782946
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
Total volume per well [ml]	0.131	0.131	0.131	0.131	0.131	0.028	0.013
Working volume per well [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

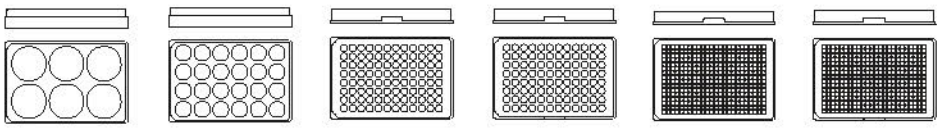


Poly-L-Lysine CELLCOAT®

Cell Culture Dish
Cell Culture Multiwell Plates
Cell Culture Microplates

Further cell culture vessels coated with Poly-L-Lysine available on request

- Shelf life: 24 months (multiwell plates, dish)/ 18 months (microplates) at room temperature
- **New:** Clear 6 well multiwell plates and 96 well microplates (F-bottom/chimney well) now with black printing for easy plate identification (→ p. 26–27)



Cat.-No.	657930	662930	655930	655936	781930	781936
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
Total volume per well [ml]	16.1	3.3	0.392	0.392	0.131	0.131
Working volume per well [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.	628930
Description	dish
ø [mm] x height [mm]	60x15
Growth area [cm²]	21
Total 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:

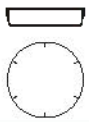
- Increase of isolation and cultivation efficiency
- Low-serum or serum-free cultivation
- Cell adhesion studies
- Promotion of cell adhesion, proliferation and growth of endothelial cells, fibroblasts, smooth muscle cells, neurons and epithelial cells

Fibronectin CELLCOAT®
Cell Culture Dishes / Flasks

Cell Culture Vessels p. 20–24

Further cell culture vessels coated with Fibronectin available on request

- Cell culture flasks with filter caps
- Shelf life: 6 months at 2–8 °C
- Minimum order amount: 60 pieces/cat.-no.

					
Cat.-No.	**628920**	**664920**	**690920**	**658920**	**661920**
Description	dish	dish	flask	flask	flask
ø [mm] x height [mm]	60x15	100x20	-	-	-
Growth area [cm²]	21	58	25	75	175
Total 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	5/10	10	10	5

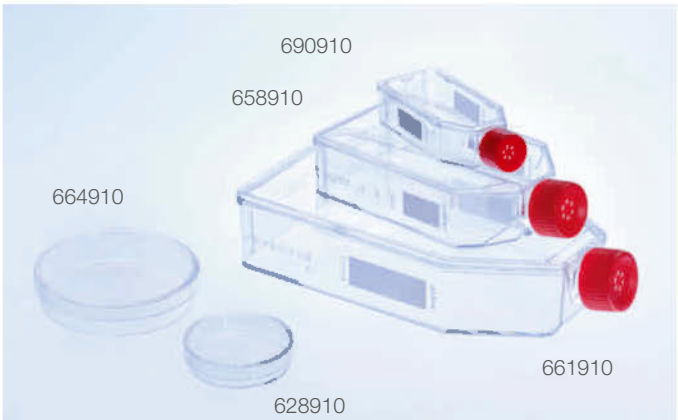
*) Minimum order amount: 60 pieces/cat.-no.

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. 20–24

Further cell culture vessels coated with Laminin available on request

- Cell culture flasks with filter caps
- Minimum order amount: 60 pieces/cat.-no.
- Shelf life: 6 months at 2–8 °C

Cat.-No.	628910	664910	690910	658910	661910
Description	dish	dish	flask	flask	flask
ø [mm] x height [mm]	60x15	100x20	-	-	-
Growth area [cm²]	21	58	25	75	175
Total 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	5/10	10	10	5

*) Minimum order amount: 60 pieces/cat.-no.

3D Cell Culture

CELLSTAR® Cell Culture Vessels with Cell-Repellent Surface and Magnetic 3D Cell Culture

Cell culture is an essential tool in drug discovery, tissue engineering, toxicology testing, stem cell research, as well as in basic research. Beside conventional two-dimensional (2D) monolayer cell culture, 3D cell culture models are becoming a routine tool. Cell culturing in 3D enables the expression of extracellular matrix (ECM) components as well as the formation of cell-cell and cell-matrix interactions. These characteristics are important for replicating in-vivo cell differentiation, proliferation, and function *in vitro*. The establishment of 3D cell culture techniques will lead to the development of in-vitro models with high physiological relevance.

In preclinical drug discovery validation processes, monolayer cell cultures are still predominant. However, results generated with 2D cultures may often be of limited relevance for predicting clinical effectiveness and toxicity, contributing to high attrition rates in the drug development process. The employment of spheroid cultures is regarded as an improved approach to developing predictive in-vitro screening assays for preclinical drug development, especially in cancer research and toxicology.

Greiner Bio-One developed **CELLSTAR® cell culture vessels with cell-repellent surface** specifically for culturing in 3D (→ p. 57–59). The cell-repellent surface effectively prevents cell adherence and therefore can promote the spontaneous formation of three-dimensional spheroids: a single spheroid per well in round bottom microplates or multiple spheroids in flat bottom plates (Fig. 1 and 2). Cell culture vessels with cell-repellent surface are also ideal platforms for long-term cultivation in hydrogels.

For applications such as microscopic analysis of single spheroids under high magnification, where ideal optical properties for high-throughput screening are desired, Greiner Bio-One offers an additional technology for 3D cell culture: **magnetic 3D cell culture** (→ p. 60–65). Magnetic cell culturing is based on magnetic nanoparticles coated with poly-lysine that magnetise cells by attaching to the cell membrane. The application of a weak magnetic force induces aggregation of magnetised cells within a short timeframe.

Figure 1: Tumor cell spheroids grown in a 96 well U-bottom CELLSTAR® cell culture microplate with cell-repellent surface.

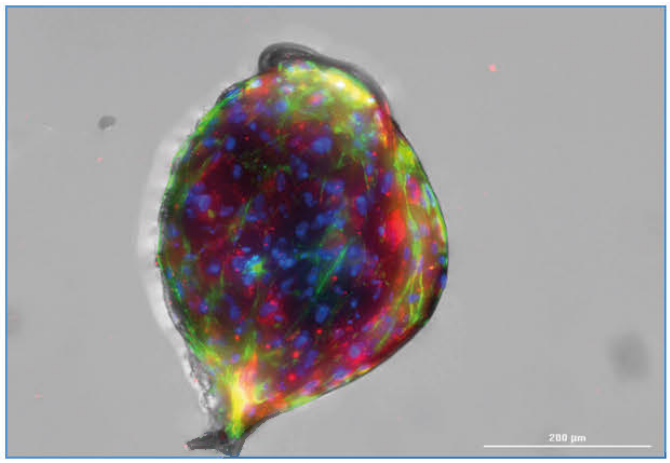


Figure 2: Human mesenchymal stem cell spheroid differentiated to chondrocyte lineage.

CELLSTAR® Cell Culture Vessels with Cell-Repellent Surface

In contrast to standard tissue culture surfaces which are optimised to enhance conditions for cell attachment, the cell-repellent surface has been developed to effectively prevent cell attachment.

CELLSTAR® cell culture vessels with a cell-repellent surface reliably prevent cell attachment in suspension cultures of semi-adherent and adherent cell lines where standard hydrophobic surfaces generally used for suspension culture are insufficient (Fig. 1).

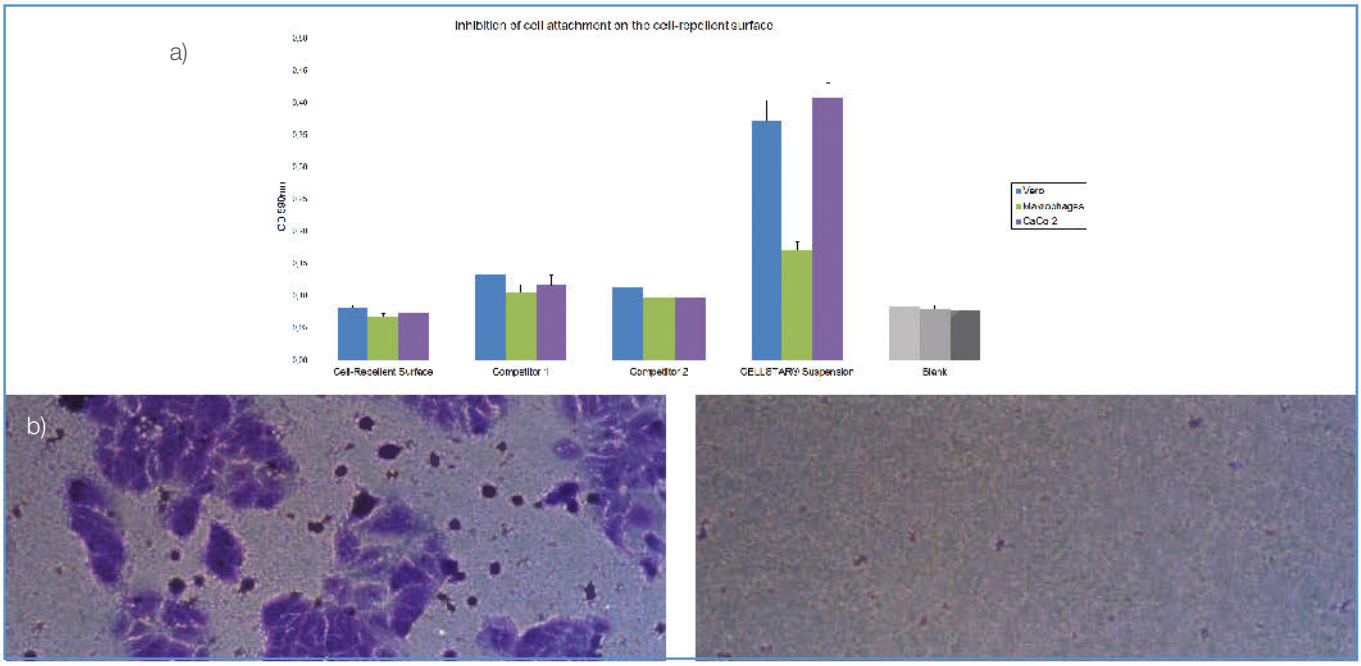


Figure 1: The cell-repellent surface effectively inhibits cell attachment.
a) Spectroscopic analysis of cell attachment of Vero, CaCo-2 cells and macrophages. Cells were seeded in F-bottom 96 well microplates, incubated at 37 °C and 5 % CO_2 for 24 hours. The media was discarded prior to analysis of cell attachment by crystal violet staining. After dissolving the crystal violet dye in the cells attached to the well surface, optical density was measured at 590 nm.
b) Microscopic analysis of CaCo-2 cells with 10 x magnification following crystal violet staining (left: CELLSTAR® suspension; right: cell-repellent surface).

For formation of spheroids (Fig. 2a), self-assembled spherical clusters used as 3D cell culture models, the cell-cell interaction must dominate over the interaction between the cells and the culture surface of containment. The same principle is true for the formation of stem cell aggregates (Fig. 2b), a key step within many protocols for cultivation and differentiation of stem cells. Cell culture vessels equipped with the Greiner Bio-One cell-repellent surface present an ideal platform for cultivating both spheroids and stem cell aggregates. Long-term incubations of hydrogel cultures are frequently performed as an approach to mimic a 3D environment. When standard tissue culture vessels are used in this approach, some cells tend to migrate out of the hydrogel, forming a 2D subculture on the vessel surface.
Analysis of such a cell population will therefore result in mixed data from both 2D and 3D cell cultures. CELLSTAR® cell culture vessels with a cell-repellent surface may be used for hydrogel cultures to effectively suppress the formation of 2D subcultures.

Applications:

- Spheroid culture of tumour cells
- Aggregation of stem cells
- Suspension culture of semi-adherent and adherent cell lines
- 3D culture in hydrogels

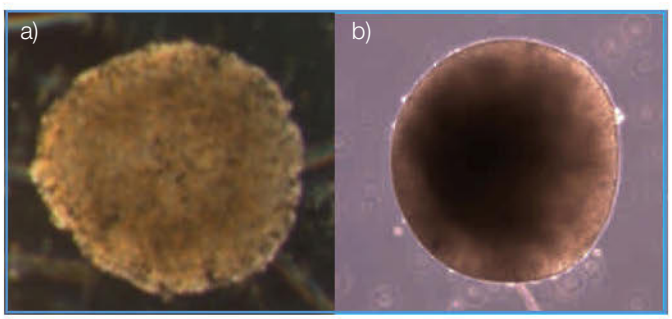


Figure 2:
a) LNCaP cells form single spheroids in 96 well U-bottom microplates with cell-repellent surface. 3,000 cells were seeded per well and incubated at 37 °C and 5 % CO_2 over a 7 day period.
b) Aggregate formation of human induced pluripotent stem cells (iPSCs) cultured in a 96 well U-bottom microplate with cell-repellent surface.

Further information on CELLSTAR® cell-repellent surface

→ **Forum No. 17: CELLSTAR® Cell Culture Vessels with Cell-Repellent Surface** (F073777)
→ **Application Report "Advantage of CELLSTAR® Cell Culture Vessels with Cell-Repellent Surface for 3D Cell Culture in Hydrogels"** (F073792)

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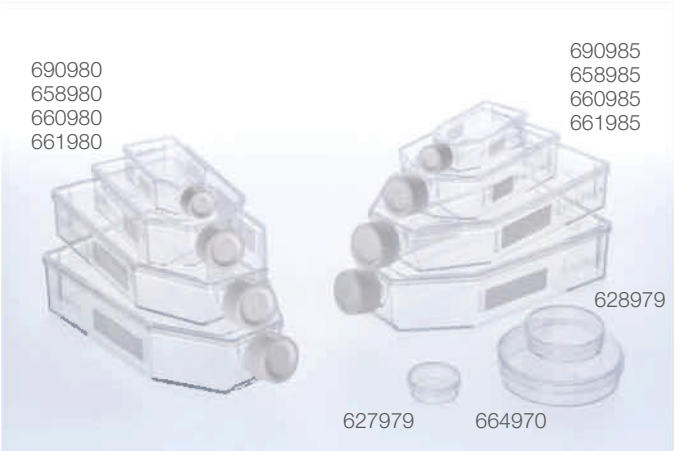
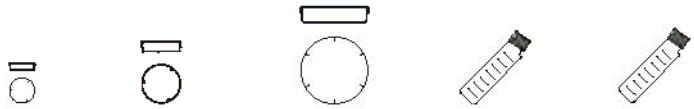


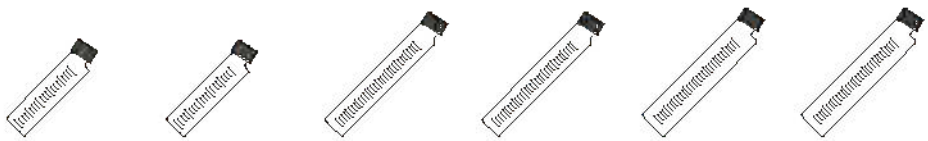
Cell Culture Dishes/Flasks With Cell-Repellent Surface

Further cell culture vessels with cell-repellent surface are available on request.

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



Cat.-No.	627979	628979	664970	690980	690985
Description	dish	dish	dish	flask	filter flask
ø [mm] x height [mm]	35x10	60x15	100x20	-	-
Total volume [ml]	10	28	100	50	50
Working volume [ml]	3	6–7	16–17	5–10	5–10
Surface treatment	cell-repellent	cell-repellent	cell-repellent	cell-repellent	cell-repellent
Sterile	+	+	+	+	+
Screw cap	-	-	-	standard (white)	filter (white)
Quantity per bag/case	10/40	10/20	1/5	10/20	10/20
				New	New



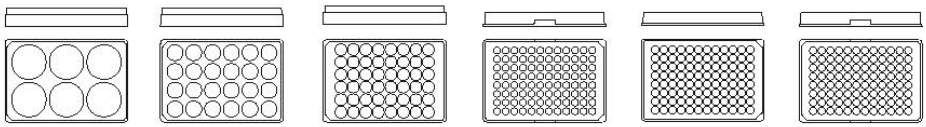
Cat.-No.	658980	658985	660980	660985	661980	661985
Description	flask	filter flask	flask	filter flask	flask	filter flask
Design	-	-	flat	flat	high	high
Total volume [ml]	250	250	550	550	650	650
Working volume [ml]	15–38	15–38	20–45	20–45	20–85	20–85
Surface treatment	cell-repellent	cell-repellent	cell-repellent	cell-repellent	cell-repellent	cell-repellent
Sterile	+	+	+	+	+	+
Screw cap	standard (white)	filter (white)	standard (white)	filter (white)	standard (white)	filter (white)
Quantity per bag/case	5/15	5/15	5	5	4	4
	New	New	New	New	New	New

Cell Culture Multiwell Plates/ Microplates With Cell-Repellent Surface

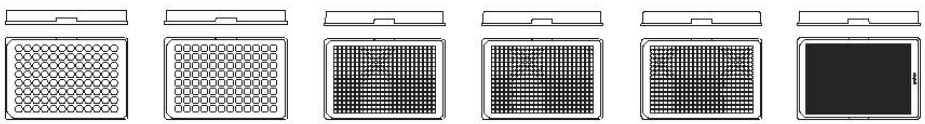
Further cell culture vessels with cell-repellent surface are available on request.

- **New:** Clear 6 well multiwell plates and 96 well microplates (F-bottom/chimney well) now with black printing for easy plate identification (→ p. 26–27)

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



Cat.-No.	657970	662970	677970	650970	651970	655970
Well format	6 well	24 well	48 well	96 well	96 well	96 well
Well profile	F-bottom	F-bottom	F-bottom	U-bottom	V-bottom	F-bottom/ chimney well
Bottom	solid	solid	solid	solid	solid	solid
Colour	clear	clear	clear	clear	clear	clear
Total volume per well [ml]	16100	3300	1700	323	234	392
Working volume per well [ml]	2000–5000	500–1500	500–1000	40–280	40–200	25–340
Surface treatment	cell-repellent	cell-repellent	cell-repellent	cell-repellent	cell-repellent	cell-repellent
Sterile	+	+	+	+	+	+
Lid	+	+	+	+	+	+
Quantity per bag/case	1/5	1/5	1/5	1/6	1/6	1/6
					→ New	



Cat.-No.	655976	655976-SIN	781970	781976	781976-SIN	787979
Well format	96 well	96 well	384 well	384 well	384 well	384 well
Well profile	F-bottom/ chimney well	F-bottom/ chimney well	F-bottom	F-bottom	F-bottom	U-bottom
Bottom	µClear®	µClear®	solid	µClear®	µClear®	solid
Colour	black	black	clear	black	black	clear
Total volume per well [ml]	392	392	131	131	131	122
Working volume per well [ml]	25–340	25–340	15–110	15–110	15–110	10–90
Surface treatment	cell-repellent	cell-repellent	cell-repellent	cell-repellent	cell-repellent	cell-repellent
Sterile	+	+	+	+	+	+
Lid	+	+	+	+	+	+
Quantity per bag/case	8/32	1/32	1/60	8/32	1/32	8/32
	→ New	→ New	→ New	→ New	→ New	→ New

Magnetic 3D Cell Culture

The core technology of Greiner Bio-One's Magnetic 3D Cell Culture is the magnetisation of cells with NanoShuttle™-PL. The cells can be aggregated with magnetic forces, either by levitation or printing, to form structurally and biologically representative 3D models *in vitro*. NanoShuttle™-PL consists of gold, iron oxide, and Poly-L-Lysine. These nanoparticles (Ø < 50 nm) magnetise cells by electrostatically attaching to cell membranes during an overnight static incubation. Magnetised cells will appear peppered with dark nanoparticles after incubation. NanoShuttle™-PL is biocompatible, having no effect on metabolism, proliferation and inflammatory stress. Additionally, it does not interfere with experimental techniques, such as fluorescence or Western blotting. With magnetised spheroids, solution addition and removal is made easy by using magnetic force to hold them in a stationary position during aspiration, thereby limiting spheroid loss. Spheroids can also be picked up and transferred between vessels using magnetic tools such as the MagPen™ (→ p. 66).

Advantages of magnetic cell culture:

- 3D in a 2D workflow
- Fast 3D tissue assembly
- Easy to handle/no sample loss
- Scalable – single well to 384 well
- Ease of co-culturing cells
- High-throughput Screening (HTS) with flat bottom for optical imaging
- Ready for automation
- Positioning spheroid centrally within the well

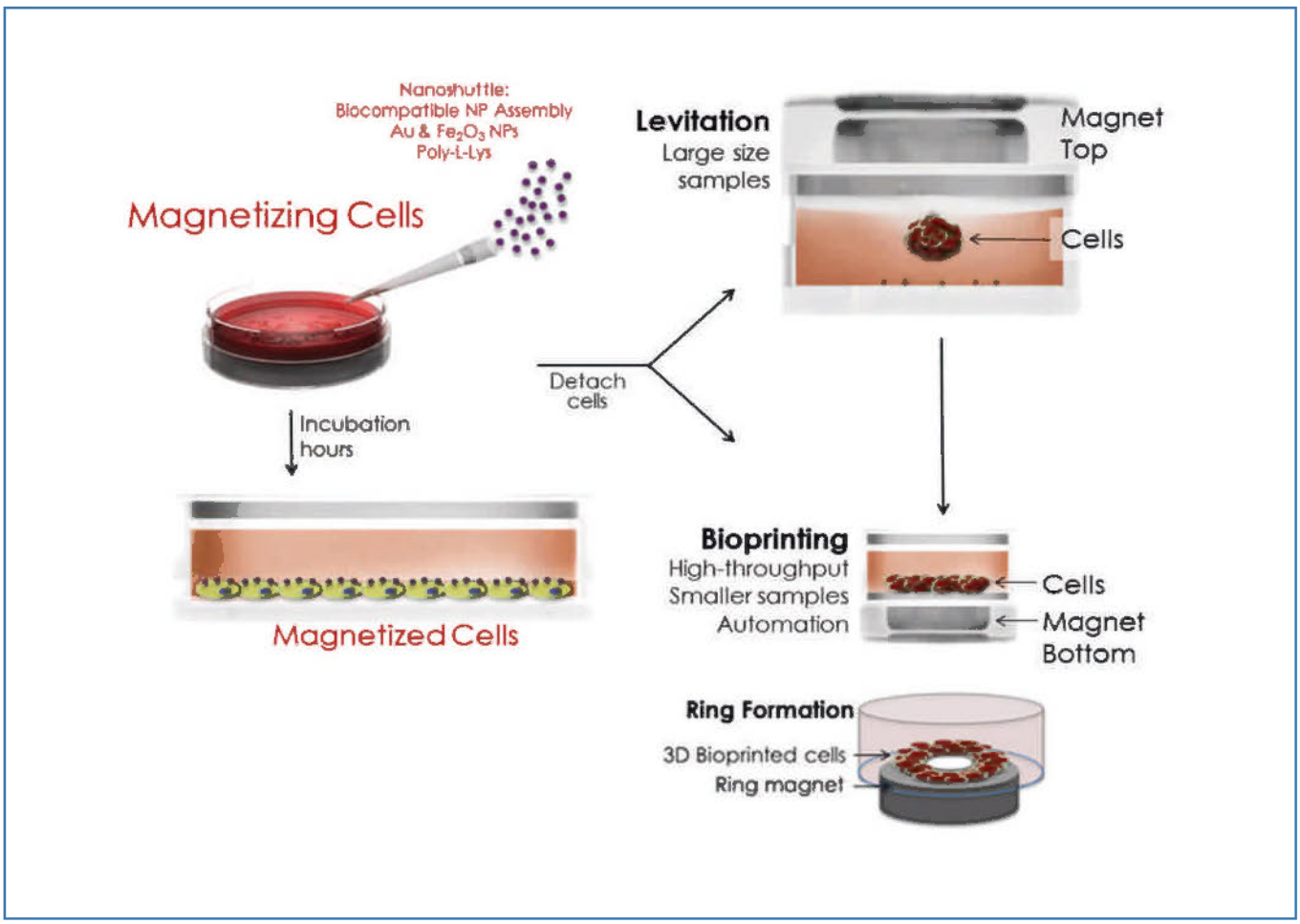


Figure 1: Magnetic levitation, bioprinting and ring formation

Magnetic Levitation

Magnetic levitation is an easy tool to create native tissue environments *in vitro*. Cells are magnetised with NanoShuttle™-PL through overnight incubation and dispensed into a cell-repellent dish or multiwell plate, where they are levitated off the bottom by a magnet above the cell-repellent vessel. When levitating, cells come off the stiff well bottom and the magnetic forces work as an invisible scaffold that rapidly aggregates cells to encourage cell-cell interactions and induce ECM synthesis. The magnetic levitation method has been successfully used to make 3D cultures with different cell types, including cell lines, stem cells and primary cells. The basic application of this technology is to culture 3D cell cultures under different environmental conditions and then analyse them using common biological research techniques, such as immunohistochemical analysis and western blotting.

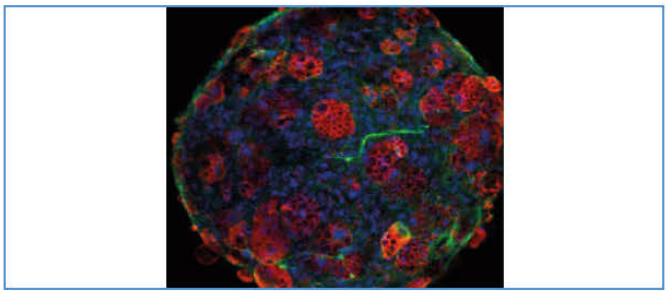


Figure 2: Spheroid formed by 3T3-L1 preadipocytes and GFP-expressing mouse bEND.3 endothelial cells. Post-adipogenesis spheroids were subjected to immunofluorescence with perilipin antibodies (red) and GFP antibodies (green).

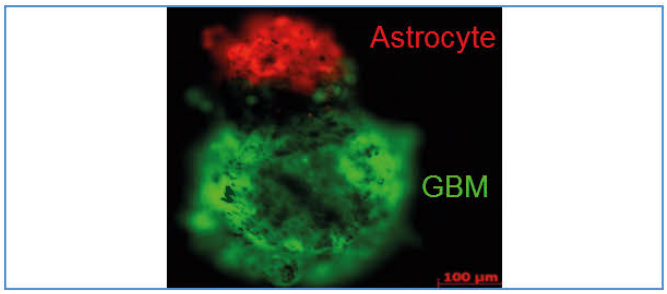


Figure 3: Invasion assay of human astrocytes (NHA, red) and glioblastoma (LN229, green).

Magnetic Bioprinting

In contrast to magnetic levitation, with magnetic 3D bioprinting, cells incubated with NanoShuttle™-PL overnight are printed into spheroids by placing a microplate containing magnetised cells atop a drive of magnets. The magnets below each well utilise mild magnetic forces to induce cell aggregation and print a spheroid at the bottom of each well. After 15 minutes to a few hours, the plate containing the spheroids can be removed from the magnetic drive and cultured long-term without use of magnetic force. This system overcomes the limitations of other platforms by enabling rapid formation of spheroids unattached to any stiff substrate, reproducible in size without limitation to cell type and scalable in size for high-throughput formats (96 and 384 well). With magnetic 3D bioprinting, viable spheroids can be printed that compact and subsequently grow over time, facilitating continuous assessment of cell viability and other functions using commercially available assays. The 3D printing method, together with commercially available standardised assay methods, provide an ideal combination for high-throughput compound screening.

Magnetic Printing of Rings and Imaging System

Additionally, it was demonstrated that magnetic 3D bioprinting can be used to develop novel migration assays (ring formation) and that automated kinetic imaging can facilitate high-throughput screening. These assays form a foundation for robust screening of compound effects on cell migration. Based on magnetic 3D bioprinting, cells magnetised with NanoShuttle™-PL are printed into 3D rings. Immediately after printing, these structures will compact and eventually close, as a function of cell migration and viability. Ring closure can be captured using a compact imaging kit with an iPod*) programmed by a freely available app (Experiment Assistant) to image whole plates at specific intervals, foregoing the need to image well-by-well under a microscope (Fig. 4). Culture contraction is generally complete within 24 hours, and images are batch processed to rapidly yield toxicity data. Moreover, as closure is label-free, the remaining rings are available for further experimentation (IHC, Western blot, genomics, etc.).

Figure 4: iPod*)-based imaging system

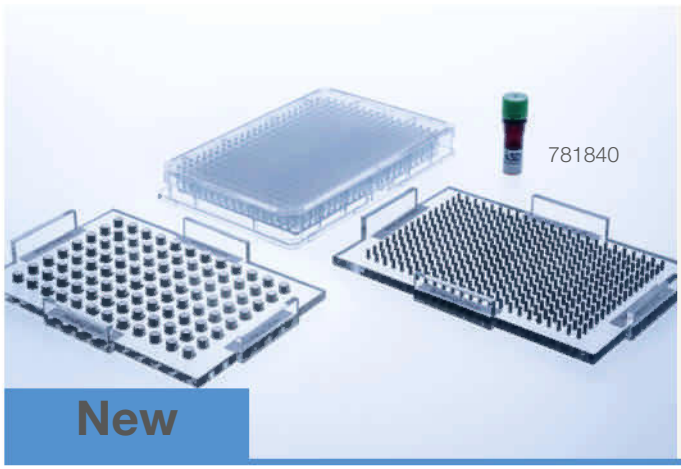
! Further information about Magnetic 3D Cell Culture **Brochure "3D Cell Culture"**

*) iPod is a trademark of Apple Inc., registered in the U.S. and other countries.

Spheroid Bioprinting 96 Well

Cell Culture Vessels with Cell-Repellent Surface p. 59–60

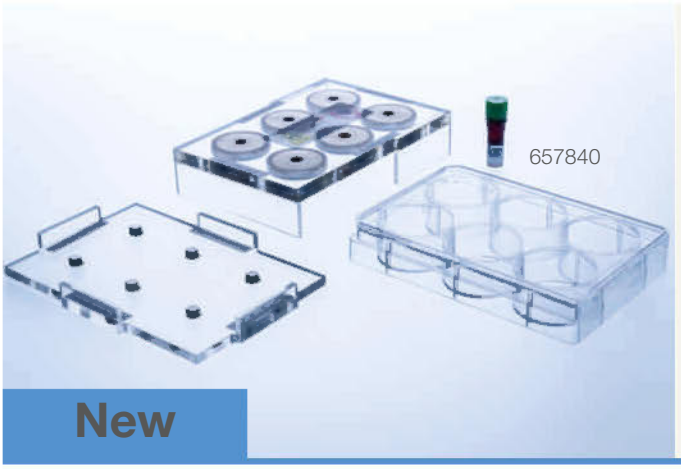
Cat.-No.	655840	655841	655850
Description	**96 Well Bioprinting Kit**	**96 Well Bioprinting Kit**	**96 Well Ring Drive**
Content	NanoShuttle™-PL (3), Spheroid Drive (1), Holding Drive (1), 96 Well Cell Culture Microplates (**Clear**) with Cell-Repellent Surface (2)	NanoShuttle™-PL (3), Spheroid Drive (1), Holding Drive (1), 96 Well Cell Culture Microplates (**Black, µClear®**) with Cell-Repellent Surface (2)	Ring Drive



Spheroid Bioprinting 384 Well

Cell Culture Vessels with Cell-Repellent Surface p. 59–60

Cat.-No.	781840	781841	781850
Description	**384 Well Bioprinting Kit**	**384 Well Bioprinting Kit**	**384 Well Ring Drive**
Content	NanoShuttle™-PL (2), Spheroid Drive (1), Holding Drive (1), 384 Well Cell Culture Microplates (**Clear**) with Cell-Repellent Surface (2)	NanoShuttle™-PL (2), Spheroid Drive (1), Holding Drive (1), 384 Well Cell Culture Microplates (**Black, µClear®**) with Cell-Repellent Surface (2)	Ring Drive



New

Magnetic Levitation Single Well/6 Well/24 Well

Cell Culture Vessels with Cell-Repellent Surface p. 59–60

Cat.-No.	627840	657840
Description	**Single Well Bio-Assembler™ Kit**	**6 Well Bio-Assembler™ Kit**
Content	NanoShuttle™-PL (2), Levitating Drives (3), Concentrating Drives (3), 35 mm Cell Culture Dishes with Cell-Repellent Surface (10), Holding Lid (1)	NanoShuttle™-PL (2), Levitating Drive (1), Concentrating Drive (1), 6 Well Cell Culture Multiwell Plates with Cell-Repellent Surface (2)

Cat.-No.	662840	662824
Description	**24 Well Bio-Assembler™ Kit**	**24 Well Special Lid**
Content	NanoShuttle™-PL (2), Levitating Drive (1), Concentrating Drive (1), 24 Well Cell Culture Multiwell Plates with Cell-Repellent Surface (2), Special Lid (1)	Special Lid (1)

655849

New

Screening & Imaging 96 Well/384 Well

Cell Culture Vessels with Cell-Repellent Surface p. 59–60

Cat.-No.	655846	655849	781846	781849
Description	**96 Well BiO Assay™ Kit**	**96 Well BiO Assay™ Kit & Imaging System**	**384 Well BiO Assay™ Kit**	**384 Well BiO Assay™ Kit & Imaging System**
Content	NanoShuttle™-PL (3), Levitating Drive (1), Spheroid Drive (1), Holding Drive (1), Ring Drive (1), 96 Well Deep Well Plate (1), 6 Well Cell Culture Multiwell Plates with Cell-Repellent Surface (2), 96 Well Cell Culture Microplates with Cell-Repellent Surface (2)	NanoShuttle™-PL (3), Levitating Drive (1), Spheroid Drive (1), Holding Drive (1), Ring Drive (1), 96 Well Deep Well Plate (1), 6 Well Cell Culture Multiwell Plates with Cell-Repellent Surface (2), 96 Well Cell Culture Microplates with Cell-Repellent Surface (2), Imaging System (1), Light Pad (1), Cooling Fan (1), Adapter (1), Extension Cord (1), Analytical Software (link)	NanoShuttle™-PL (2), Levitating Drive (1), Spheroid Drive (1), Holding Drive (1), 96 Well Deep Well Plate (1), 6 Well Cell Culture Multiwell Plates with Cell-Repellent Surface (2), 384 Well Cell Culture Microplates with Cell-Repellent Surface (2)	NanoShuttle™-PL (2), Levitating Drive (1), Spheroid Drive (1), Holding Drive (1), 96 Well Deep Well Plate (1), 6 Well Cell Culture Multiwell Plates with Cell-Repellent Surface (2), 384 Well Cell Culture Microplates with Cell-Repellent Surface (2), Imaging System (1), Light Pad (1), Cooling Fan (1), Adapter (1), Extension Cord (1), Analytical Software (link)

New

Consumables/Accessories for Magnetic 3D Cell Culture

Cell Culture Vessels with Cell-Repellent Surface p. 59–60

Cat.-No.	657841	657843	657846	657852
Description	**NanoShuttle™-PL Refill**	**NanoShuttle™-PL Refill 3 Pack**	**NanoShuttle™-PL Refill 6 Pack**	**NanoShuttle™-PL Refill 12 Pack**
Content	600 µl vials of NanoShuttle™-PL (1)	600 µl vials of NanoShuttle™-PL (3)	600 µl vials of NanoShuttle™-PL (6)	600 µl vials of NanoShuttle™-PL (12)

Cat.-No.	657850	657860	657810
Description	**MagPen™ 3 Pack**	**Imaging Kit**	**Battery Power for Imaging Kit**
Content	Teflon caps (3), Magnets (3)	Imaging System (1), Light Pad (1), Cooling Fan (1), AD-to-USB Adapter (1), Extension Cord (1)	Batteries (2)

Cell Culture Products for Microscopy

Microscopy is a basic and highly important method in life science frequently used in research as well as medical diagnostics. Technological progression in confocal microscopy, optical systems and emerging technologies such as total internal reflection fluorescence microscopy (TIRFM), continues to elevate microscopy as one of the most powerful tools in cell biology. With its advantages for molecular selectivity and capability of live observation, fluorescence microscopy currently is among the most widely used approaches for high-resolution, non-invasive imaging of living cells. Depending on the complexity of live cell imaging experiments and the requirements of the corresponding microscope, the requests for the utilised disposables can be as comprehensive. Greiner Bio One's CELLview™ imaging consumables are tailored solutions to provide optimal basic settings for your microscopic experiment:

- Maximal light transmission for enhanced signal-to-noise ratio
- Innovative design for maximal planarity and stable focal plane
- Reduced meniscus effect due to optimised well design
- Proprietary surface technology for optimal cell attachment and viability
- Subdivided versions for multiplex analysis and comparability
- Elaborate features to reduce reagent consumption

For live cell imaging experiments and high-resolution microscopic applications high Numerical Aperture (N.A.) objectives are required. Standard glass slides with a thickness of 1 mm are much too thick to image when using N.A. objectives. Using such glass slides or thicker coverslips will lead to spherical aberration resulting in a loss of contrast and image sharpness whereas immanent thickness variations can cause axial shift, affect spatial resolution, loss of contrast as well as reduced intensity in fluorescent imaging (Fig. 1). Beside that the general quality of the glass significantly influences image quality in bright field and fluorescence applications. Low quality cover glasses containing scratches and digs can cause diffraction and stray light. The CELLview™ cover glass, with a thickness of 0.17mm ideal for N.A. objectives, is of high optical quality according to DIN ISO 719 and ISO 8255–1 for microscopic applications, assuring accurate planarity and inhibiting any depolarisation of light. The adhesives used for the assembly of the CELLview™ components are solvent-free UV curing medical device sealants which exhibit absolute no cytotoxic effect.
For high content screening (HCS), film bottom plates are very common. With the SCREENSTAR and the µClear® microplates, Greiner Bio-One offers a cost-effective solution while still facilitating excellent microscopic analysis (Fig. 2).

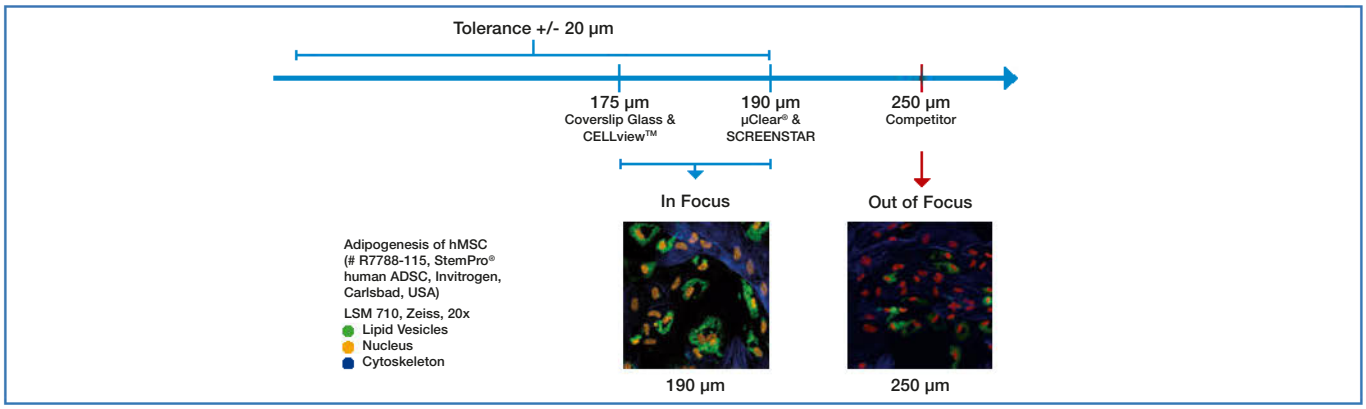


Figure 1: Influence of bottom thickness on resolution and image quality
The adipogenesis of human mesenchymal stem cells (hMSC) was analysed in microplates with 190 µm film bottom and competitive microplates with 250 µm film bottom. The 190 µm film bottom demonstrates exceptional performance, giving high image quality with excellent resolution due to the bottom thickness being within the tolerance range of the microscopic system. The 250 µm film bottom of the competitive microplate yield blurry images, incapable of sharp focus and magnifications above 20x.

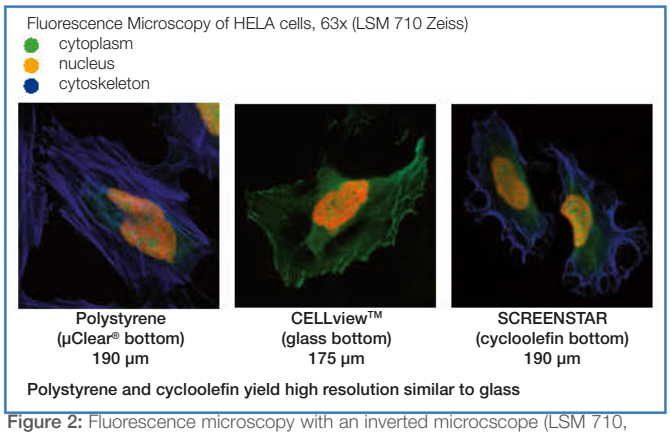


Figure 2: Fluorescence microscopy with an inverted microcscope (LSM 710, Carl Zeiss AG, Germany, 63x with oil). Comparison of different base materials of ultra-thin bottoms: polystyrene (µClear® film), glass (CELLview™) and cycloolefin (SCREENSTAR). All materials gave a very high resolution.

CELLview™ products combine the convenience of a plastic disposable with the high optical quality of a 0.17 mm thin cover glass bottom, providing superior high-resolution microscopic images of in-vitro cultures. The specific design with the embedded cover glass bottom guarantees a single-plane, flat bottom with a consistent working distance, maximal planarity and optimal thermal conductivity in heated platforms. Glass bottom microplates feature excellent intra- and inter-well flatness due to the rigidity of the glass bottom. As microscope objectives are adapted to the bottom thickness and refractive index of cover glass, generally the best optical quality with highest resolution can be achieved using glass bottom disposables.

Beside visual requirements, a glass bottom should also meet cell culture demands and facilitate successful cultivation of various cell types. Due to the general hydrophobicity of glass, only a minor proportion of cells can adhere to it. Therefore these cells are often only loosely attached, do not display their cell-specific morphology and can get lost during staining and washing steps. Furthermore live cell analysis of such ailing cells might not reveal their realistic in-vivo response. To guarantee optimal cell culture conditions during cultivation and microscopic analysis, the CELLview™ cell culture disposables are provided with two surfaces: Tissue culture treated (TC) for propagation of standard cell lines and Advanced TC™ surface facilitating in particular cultivation of sensitive and primary cells. The non-biological surface optimisation leads to consistent and homogenous cell attachment reducing cell loss during transfection or staining procedures making previously required protein coatings of glass surfaces dispensable (Fig. 3). Neither the proprietary tissue culture treatment nor the Advanced TC™ technology interferes with the spectral transmission or fluorescent analysis of stained samples. If still a cell-specific protein coating is required, this can be achieved using the TC-treated version. As the surface is polar, proteins will bind to it equivalent to tissue culture treated plastic labware.

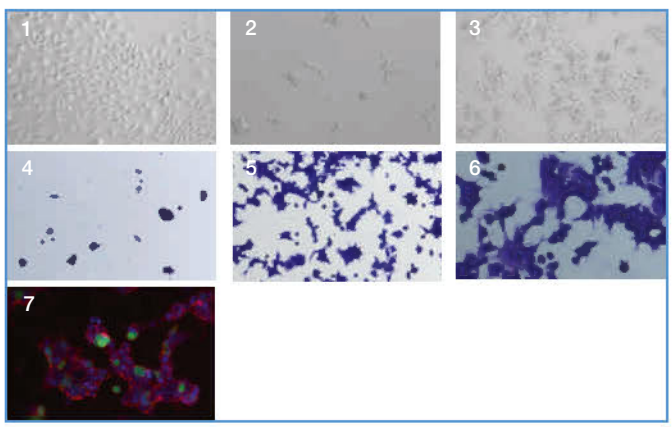


Figure 3: Brightfield analysis (standard widefield microscope, 10x magnification) of CHO and HEK 293 cells on the CELLview™ TC and Advanced TC™ surface. 1–3: CHO cells exhibit normal cell morphology (1) whereas serum-free cultivated HEK 293 cells show only minor attachment on a TC surface (2). Cultivation on the Advanced TC™ surface leads to a major improvement and healthy cell culture conditions (3). 4–6: Crystal violet staining of serum-free cultivated HEK 293 cells on a TC treated (4) or Advanced TC™ surface (5/10x magnification). Even after vigorous washing steps cells are strongly attached to the Advanced TC™ surface and display their cell typical morphology; clearly visible in the 20x magnification (6). 7: Fluorescent analysis (20x magnification) of GFP-transfected, serum-free cultivated HEK 293 cells on an Advanced TC™ surface. Cultivating these cells on the Advanced TC™ surface leads to stable attachment, optimal cell survival and high transfection efficiency.

Applications:
- Phase contrast microscopy
- Fluorescence microscopy
- Confocal microscopy (CLSM/LSCM)
- Live cell imaging/video-enhanced microscopy
- High-resolution microscopy
- Differential interference contrast microscopy
- Polarised light microscopy
- Fluorescence-in-situ-hybridisation (FISH)

Glass bottom features:
- Highly transparent borosilicate glass; hydrolytic class 1 (DIN ISO 719)
- Glass thickness 0.17 mm
- Maximal spectral transmission; no autofluorescence
- Exceptional planarity
- Manufactured according to ISO 8255–1:1986 (Optics and optical instruments – Microscopes – Cover glasses)

SCREENSTAR microplates (→ p. 71–72) with a 0.19 mm cycloolefin film bottom are suitable for sophisticated microscopic applications, in high content screening (HCS) or high resolution microscopy with water and oil immersion objectives. Cycloolefins comprise a new class of polymeric materials with inherent physical properties of high glass transition temperature, optical clarity, low shrinkage, low moisture absorption, and low birefringence. Cycloolefins possess excellent optical features and display a low background in the lower UV, with a refractive index and focus background comparable to glass. Cycloolefins are frequently used to manufacture compound storage microplates due to their low water absorption, high vapour barrier, low level of leachables and resistance to DMSO, the most prevalent compound solvent in high throughput screening.

µClear® film bottom plates (→ p. 30, 32–33) with a 0.19 mm polystyrene film bottom can be applied for microscopic applications, as the thickness fits into the tolerance window of most microscopic objectives and does not require any special adaptations or corrective lenses. Depending on the wavelength of the analysed probes excellent images can be achieved due to Greiner Bio One`s optical quality of the polystyrene film bottom.

Greiner Bio-One offers excellent imaging consumables for each application. As for all cell culture devices CELLview™, SCREENSTAR and µClear® are made of high grade polystyrene and are guaranteed to be sterile, non-pyrogenic, non-cytotoxic and free of detectable DNase, RNase and human DNA.

CELLview™ Dish – 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™ Dish 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 cm^2, 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** as well as the innovative **Advanced TC™ surface modification** (→ p. 44–47) to enhance the attachment of adherent cells, thus eliminating the need for protein coating in many cases.

Sample packs are available on request.

Further information on CELLview™ Dish

→ **Application Note "Protein localisation using confocal laser scanning microscopy"** (F073101)
→ **Application Note "Live cell imaging on Golgi morpholgy using the CELLview™ dish"** (F074048)
→ **Brochure "CELLview™ - Ideal Imaging Consumables"** (F074004)

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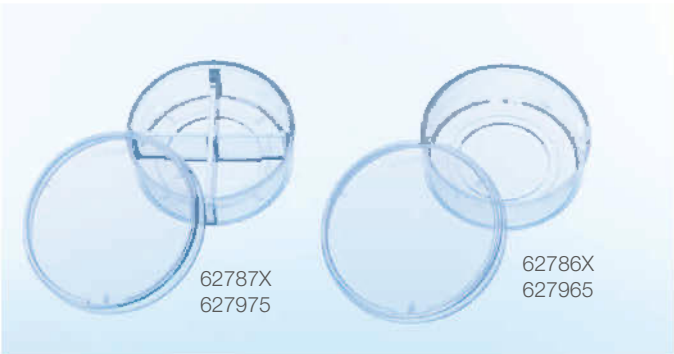


CELLview™ Dish

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

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

Cat.-No.	627870	627975	627871	627860	627965	627861
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/compartment	1.9/compartment	1.9/compartment	8.7	8.7	8.7
Total volume [ml]	1.5/compartment	1.5/compartment	1.5/compartment	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

CELLview™ Slide – Cell Culture Slide with Glass Bottom

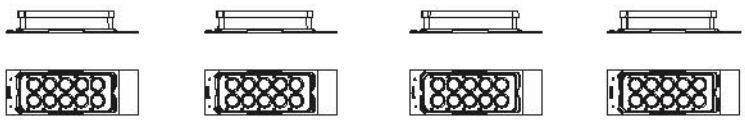
CELLview™ Slide consists of a transparent slide with a black upper housing that effectively subdivides the slide into 10 compartments, which have been designed to mimic the size and layout of a standard 96 well microplate. Because of this standard layout, the slide is compatible with multi-channel pipettes making it simple and efficient to use. Furthermore, the round well design helps to reduce meniscus effects for optimum results in cell culture and microscopic analysis. The slide has a 0.17 mm thin cover glass embedded in its bottom for improved optical clarity and imaging. Embedding the cover glass guarantees an even focal plane which is a prerequisite for all high-speed and high-resolution microscopy applications. Furthermore, the black upper housing reduces cross talk between adjacent wells during fluorescence microscopy and the optical glass, which exhibits virtually no autofluorescence, allows for maximum spectral transmission without depolarisation of transmitted light.

! Sample packs are available on request.

CELLview™ Slide

- 10 wells with alphanumeric coding
- Positioning notch for automated microscopy in well A1
- Detachable black upper housing
- Reduced meniscus effect due to round well design
- Well distance is equal to a 96 well microplate
- Borosilicate glass, hydrolytic class 1, absolutely colourless, perfectly clear, suitable for fluorescence microscopy, in compliance with DIN ISO 8255
- Glass thickness: 0.17 mm

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



Cat.-No.	543079	543078	543979	543978
Description	CELLview™ Slide	CELLview™ Slide	CELLview™ Slide	CELLview™ Slide
Bottom	glass	glass	glass	glass
No. of wells	10	10	10	10
Length x width x height [mm]	75x25x12.6	75x25x12.6	75x25x12.6	75x25x12.6
Growth area [mm²]	32/well	32/well	32/well	32/well
Total volume [µl]	447/well	447/well	447/well	447/well
Surface treatment	TC	TC	Advanced TC™	Advanced TC™
Sterile	+	+	+	+
Quantity per packaging unit/case	5/45	1/20	5/45	1/20
		New		New

CELLview™ Plate – Cell Culture Plate with Glass Bottom

CELLview™ glass bottom microplates are designed for demanding and high-resolution microscopic applications. They consist of a cycloolefin-based black frame with a 0.17 mm thin borosilicate glass bottom providing superior images of in-vitro cultures. The optimised microplate geometry and the recessed bottom facilitate imaging of all peripheral wells even with immersion objectives. The round conical well design reduces the meniscus effect in order to assure equal cellular distribution and constant imaging results. An appropriate surface treatment improves cellular attachment and growth.

Features:

- For outstanding image quality and resolution
- Cycloolefin-based frame with 0.17 mm ultra-clear borosilicate glass bottom
- Excellent optical transparency
- Recessed well bottom facilitating the use of lenses with low working distance and high aperture
- Compatible with advanced confocal microscopic systems such as Opera Phenix, Perkin Elmer – Yokogawa, WAKO – Image Express, Molecular Devices – Cytation, Biotek
- Plates also available with optical cycloolefin film bottom as SCREENSTAR microplates (Cat.-No. 781866, → p. 72)

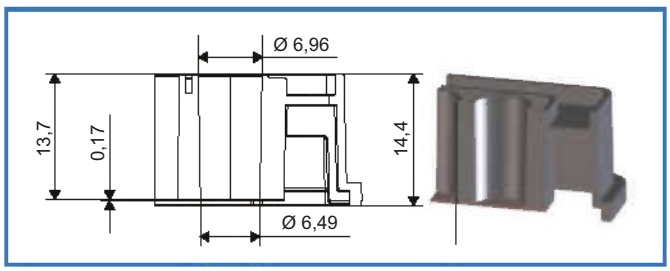


Figure 1: Well design of a 96 well CELLview™ plate

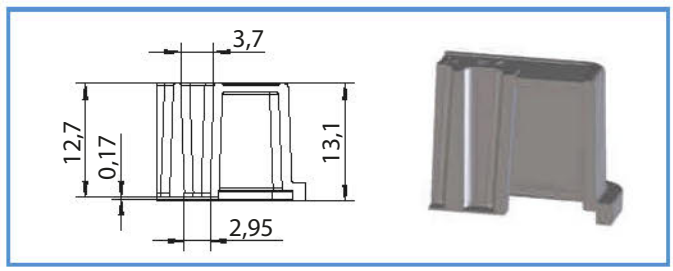


Figure 2: Well design of a 384 well CELLview™ plate

New

Free of detectable DNase, RNase, human DNA

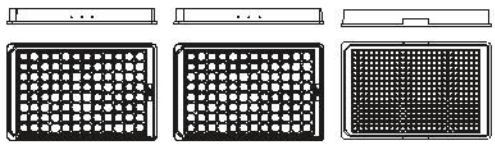
non-pyrogenic

non-cytotoxic

CELLview™ Plates

SCREENSTAR Microplates p. 72

SensoPlate™ Glass Bottom Microplates p. 117



Cat.-No.	655891	655981	781855
Well format	96 well	96 well	384 well
Well profile	F-bottom/ chimney well	F-bottom/ chimney well	F-bottom
Bottom	glass	glass	glass
Colour	black	black	black
Working volume per well [µl]	25–340	25–340	15–110
Growth area per well [mm²]	33	33	8.1
Surface treatment	TC	Advanced TC™	Advanced TC™
Sterile	+	+	+
Lid	+	+	+
Quantity per bag/case	1/16	1/16	1/16

SCREENSTAR Microplates

SCREENSTAR microplates:
- Are specialised products for sophisticated microscopic applications, in high content screening (HCS) or high resolution microscopy with water and oil immersion objectives
- Combine outstanding glass-like optical properties with an excellent surface for adherent cell culture
- Display excellent optical properties with reduced autofluorescence in the lower UV range, low birefringence and a refractive index of 1.53 comparable to glass
- Enable complete periphery access for high magnification objectives (Fig. 1)
- Are entirely manufactured out of cycloolefin with a black pigmented cycloolefin frame and a 190 µm ultraclear cycloolefin film bottom
- Are available in 96, 384 and 1536 well format

Greiner Bio-One developed SCREENSTAR microplates as a product line especially suited for advanced microscopy:
- with water or oil immersion objectives
- with high magnification objectives (40 x and above)
- with high resolution (high numerical aperture) objectives

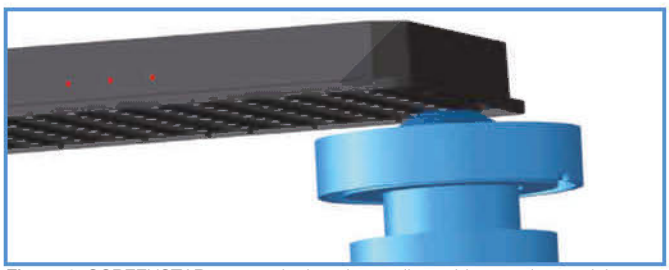


Figure 1: SCREENSTAR recessed microplate wells enable complete periphery access for high magnification objectives.
40 x water immersion objective for microscopic detection in a 96 well SCREENSTAR microplate. The SCREENSTAR microplate recessed well bottom allows a close proximity for the objectives to fully access all microplate wells.

96 Well SCREENSTAR Microplate

- Proven cell culture surface treatment guarantees reliable and homogenous cell growth
- Superior optical, highly transparent cycloolefin film bottom with low background
- Recessed microplate bottom allows low working distance and high aperture (Fig. 1)
- Round well geometry (Fig. 2) to reduce optical distortions
- Ditch at the perimeter can be filled with fluids to minimise edge effects and evaporation (Fig. 3)
- Working volume up to 440 µl for prolonged cell culture
- Protective film on optical bottom to diminish airborne contamination and surface defects
- Individually wrapped plate with lid and easy-to-open packaging

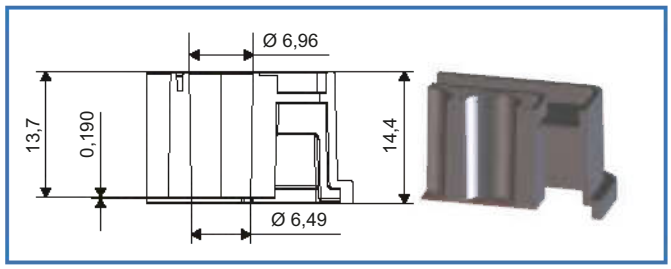


Figure 2: Well design of a 96 well SCREENSTAR microplate

Plate height:	14.4 mm
Well depth:	13.7 mm
Well diameter top:	6.96 mm
Well diameter bottom:	6.49 mm
Distance microplate rim to internal well bottom:	0.7 mm
Distance microplate rim to external well bottom:	0.51 mm
Film bottom thickness:	190 µm
Total volume:	483 µl
Working volume:	25–440 µl
Growth area:	33 mm²

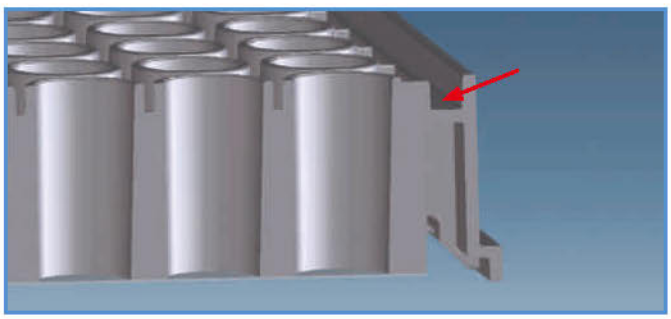


Figure 3: Detail of the 96 well SCREENSTAR microplate demonstrating the perimeter ditch which can be filled with sterile water or media

384 Well SCREENSTAR Microplate

- For high content screening in drug discovery
- Proven Greiner Bio-One cell culture quality
- Superior optical, highly transparent cycloolefin film bottom with low background
- Recessed film bottom for high magnification and improved resolution

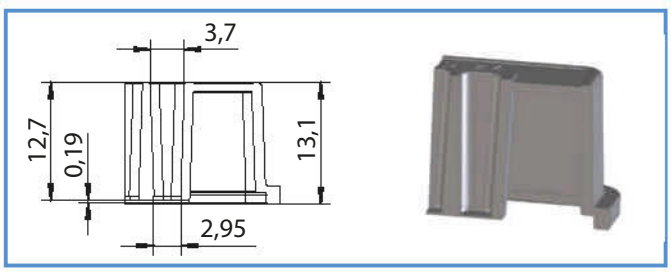


Figure 4: Well design of a 384 well SCREENSTAR microplate

Plate height:	13.1 mm
Well depth:	12.7 mm
Well diameter top:	3.7 mm
Well diameter bottom:	2.85 mm
Distance microplate rim to internal well bottom:	0.4 mm
Distance mictoplate rim to external well bottom:	0.21 mm
Film bottom thickness:	190 µm
Total volume:	133 µl
Working volume:	10–110 µl
Growth area:	8.1 mm²

1536 Well SCREENSTAR Microplate

- For high throughput and high content screening applications
- Proven Greiner Bio-One cell culture quality
- Smooth microplate top absent of alphanumeric coding facilitates flush lid mounting for use within automated systems and improves heat sealing
- Microplates are shrink-wrapped in recyclable PET bags with a bottom tray enclosure for added protection of the film bottom
- Recommended lid: Cat.-No. 691161 (sterile ultra low profile lid → p. 222)

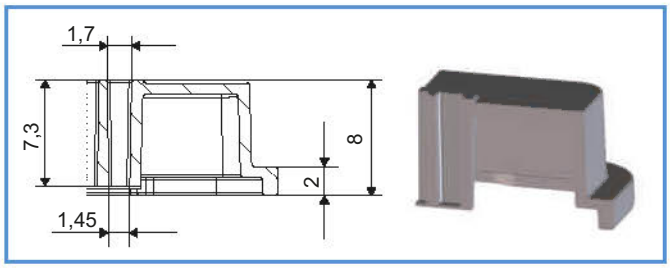


Figure 5: Well design of a 1536 well SCREENSTAR microplate

Plate height:	8 mm
Well depth:	7.3 mm
Well diameter top:	1.7 mm
Well diameter bottom:	1.45 mm
Distance microplate rim to internal well bottom:	0.7 mm
Distance microplate rim to external well bottom:	0.51 mm
Film bottom thickness:	190 µm
Total volume:	18 µl
Working volume:	3–15 µl
Growth area:	2.1 mm²

Further information on SCREENSTAR microplates

→ **Forum No. 15: SCREENSTAR. A new 1536 Well Microplate for High Content and High Throughput Screening** (F073120)

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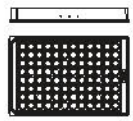
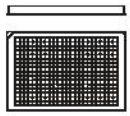
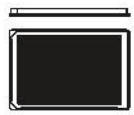
655866 781866 789866

96, 384, 1536 Well SCREENSTAR Microplates

- SensoPlate™ Microplates p. 117
- Barcode Labelling p. 263
- Non-sterile, non-treated versions available on request

non-cytotoxic

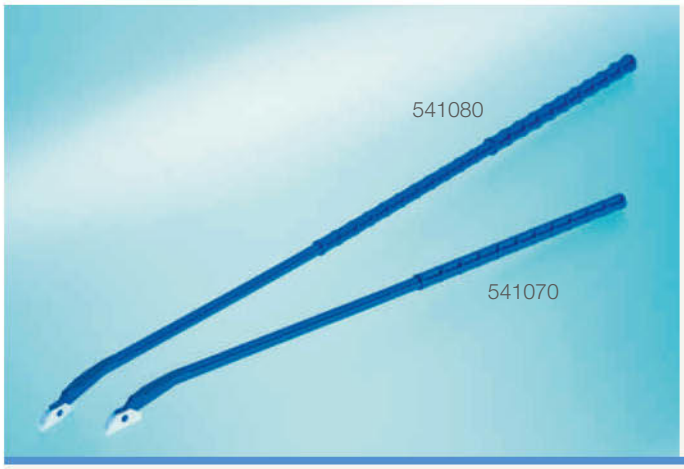




Cat.-No.	655866	781866	789866
Well format	96 well	384 well	1536 well
Well profile	F-bottom/ chimney well	F-bottom	F-bottom
Bottom	CO film	CO film	CO film
Colour	black	black	black
Growth area per well [mm²]	33	8	2.1
Total volume [µl]	483	133	18
Working volume per well [µl]	25–440	10–110	3–15
TC surface treatment	+	+	+
Sterile	+	+	+
Lid	+	+*)	-
Quantity per bag/case	1/16	8/32	17/68

*) ultra low profile lid

New

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

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.

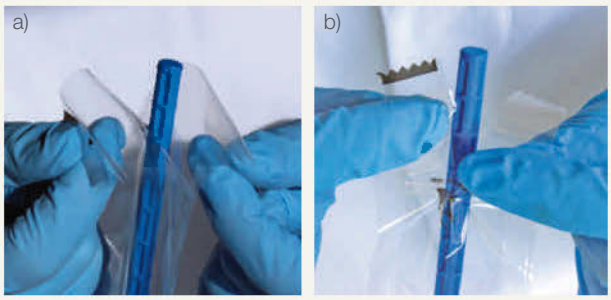


Figure 1: User-friendly packaging

Cat.-No.	541070	541080
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.

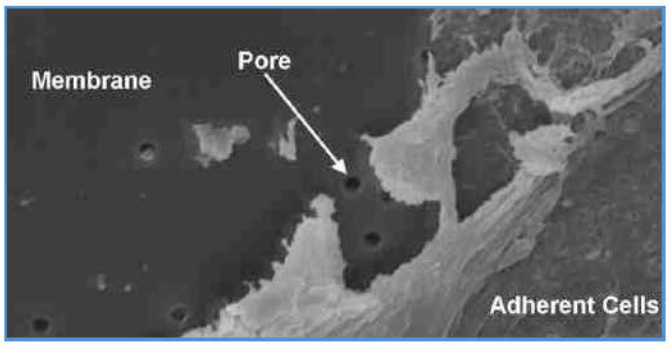


Figure 1: Electron micrograph of human osteosarcoma cells on ThinCert™ membrane. Courtesy of the Department of Oral and Maxillar Facial Surgery, University Hospital Freiburg.

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. 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.

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. 250) a broad spectrum of cell fixation protocols can be performed.

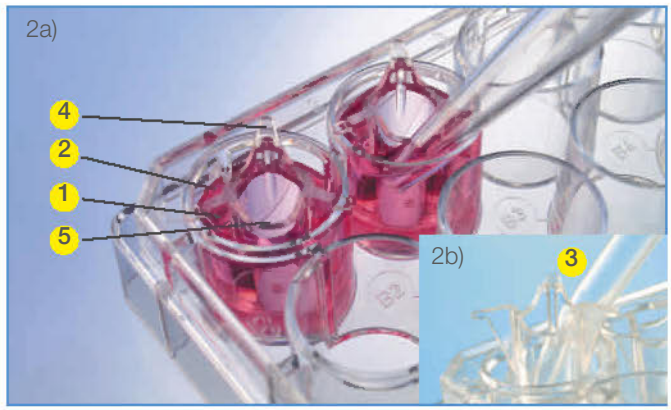


Figure 2a: ThinCert™ cell culture inserts
Figure 2b: "Self-lift" geometry of ThinCert™ cell culture inserts

Figure 3: 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. 2a → 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. 2a → 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. 2b → 3). The largest of three pipetting openings is located opposite of the small conical foot (Fig. 2a → 4). This allows for very convenient pipetting of media or supplements even with the ThinCert™ remaining in the well.

The scalloped rims (Fig. 2a → 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 donator box (Fig. 3). The required number of ThinCert™ cell culture inserts and CELLSTAR® cell culture plates may conveniently be removed from the donator box, whereas the remaining parts may safely be stored in it.

Which Membrane to use?

- 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; not suited for all applications requiring high diffusion rates such as transport studies
- Translucent membranes (in general high pore density)

  suitable for electron microscopy, fluorescence microscopy, confocal microscopy, TEER and transport studies

!

Further information on ThinCert™

→ **Forum No. 8: ThinCert™ cell culture products – Overview** (F073017)
→ **ThinCert™ Migration Assay** (F073115)
→ **ThinCert™ Invasion Assay** (F073114)
→ **Application Note "Immunocytochemistry"** (F073100)
→ **Application Note "Skin models"** (F074062)
→ **Application Note "Co-culture"** (F074059)
→ **Application Note "TEER and impedance measurements"** (F073037)

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ThinCert™ Cell Culture Inserts 6 Well, 12 Well

Cell Culture Multiwell Plates p. 26

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

6 well

Cat.-No.	657640	657641	657610	657630	657631	657638
Pore size [µm]	0.4	0.4	1.0	3.0	3.0	8.0
Pore density [cm^{-2}]	1×10^8	2×10^6	2×10^6	0.6×10^6	2×10^6	0.15×10^6
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 well

Cat.-No.	665640	665641	665610	665630	665631	665638
Pore size [µm]	0.4	0.4	1.0	3.0	3.0	8.0
Pore density [cm^{-2}]	1×10^8	2×10^6	2×10^6	0.6×10^6	2×10^6	0.15×10^6
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. 26

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.	662640	662641	662610	662630	662631	662638
	Pore size [µm]	0.4	0.4	1.0	3.0	3.0	8.0
	Pore density [cm^{-2}]	1×10^8	2×10^6	2×10^6	0.6×10^6	2×10^6	0.15×10^6
	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™ Cell Culture Inserts coated with Collagen Type I

Greiner Bio-One features ThinCert™ cell culture inserts coated with Collagen Type I. The applied industrial coating process ensures a maximum coating quality with minimum batch-to-batch variation. Collagen Type I coated ThinCert™ cell culture inserts are ideal for enhanced cell growth and differentiation within a multitude of organotypic culture applications, such as the reconstruction of functional epithelia for transport studies.

Further information on pre-coated ThinCert™ Cell Culture Inserts:

→ **Application Note: "Protein coatings facilitate the differentiation of reconstructed epithelia inThinCert™ cell culture inserts"** (F073921)

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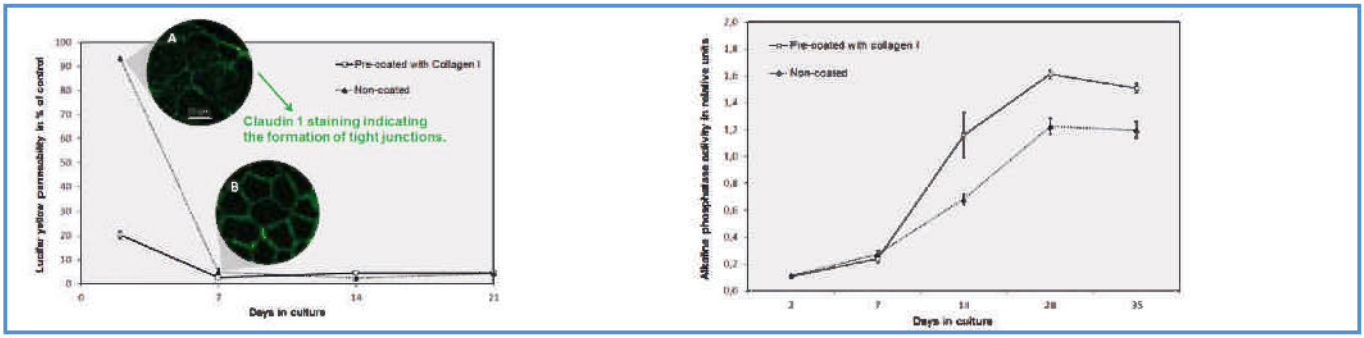


Figure 1: Barrier formation and differentiation of CaCo-2 cells cultivated on Collagen Type I coated ThinCert™ cell culture inserts and non-coated control inserts

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

ThinCert™ Cell Culture Inserts coated with Collagen Type I

Cell Culture Multiwell Plates p. 26

- Available in 6 and 24 well format
- Native Collagen Type I from rat tail
- Inserts pre-installed in plates
- PET capillary pore membrane

Cat.-No.	657654	662654–06	662654
Description	ThinCert™ pre-installed in plates	ThinCert™ pre-installed in plates	ThinCert™ pre-installed in plates
Size	6 well	24 well	24 well
Pore size [µm]	0.4	0.4	0.4
Pore density [cm²]	1x10⁸	1x10⁸	1x10⁸
Optical membrane properties	translucent	translucent	translucent
Culture surface [mm²]	452.4	33.6	33.6
Height (overall) [mm]	16.25	16.25	16.25
Inner/Outer diameter (top) [mm]	24.85/27.85	8.4/10.4	8.4/10.4
Working volume ThinCert™ [ml]	1.0–3.6	0.1–0.35	0.1–0.35
Working volume well [ml]	2.0–4.15	0.4–1.2	0.4–1.2
Protein coating	Collagen Type I	Collagen Type I	Collagen Type I
Sterile	as	as	as
Multiwell plates/bag	1x6 well	1x24 well	1x24 well
ThinCert™ inserts/plate	6	6	24

ThinCert™ Plate

ThinCert™ Plate

Cell Culture Multiwell Plates p. 26

- 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.

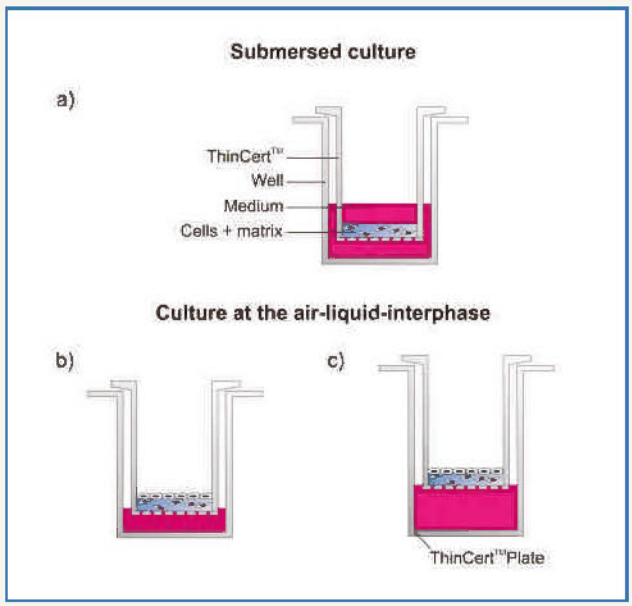


Figure 1: Reconstruction of a full thickness skin in vitro. a) A permeable membrane support carries fibroblasts in an extracellular matrix (e.g. Collagen). This dermis equivalent is cultivated under submersed culture conditions. b) Keratinocytes are superimposed upon the dermis equivalent and differentiated 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.	657110	665110
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

Sapphire Liquid Handling

see page 163

Sapphire Pipettes and Tips

Pipettes - page 167
Tips - page 170

NEW

- *8 x single-channel models with a volume range from 0.2 µl up to 10 ml*
- *4 x 8-channel models with a volume range from 0.5 µl – 300 µl*
- *4 x 12-channel models with a volume range from 0.5 µl – 300 µl*

- *Standard, Filter and Low Retention Tips*
- *Volume Range: 10 µl, 20 µl, 100 µl, 200 µl, 300 µl and 1250 µl*
- *Thin-walled top for optimal seal*
- *Graduations for perfect visual control*

Contact us: Tel: **01453 825255** email: **sapphire.uk@gbo.com**

2 HTS-Microplates

HTS-Microplates

1. Standard Microplate Footprint
The manufacture of user-friendly products is one of our most important goals. All microplates manufactured by Greiner Bio-One have a uniform footprint which is conform to the recommendation of the American National Standards Institute (ANSI 1–2004). For detailed information about the external dimensions of our microplates and the conformity with ANSI standards, please visit our website: www.gbo.com/bioscience – or ask for data sheets and customer drawings.
For further information about ANSI standards, please visit the society's website: www.slas.org.

2. Material
Polypropylene (PP) and **polystyrene** (PS) are the standard materials used to manufacture the majority of microplates. Polystyrene is a highly clear polymer with excellent optical properties which makes it ideal for precise optical measurements. Polystyrene is also characterised by its ability to bind biomolecules, such as proteins, and it is therefore often used for manufacturing immunological products. Polystyrene is suitable for work with cell cultures.

Polypropylene is characterised by its excellent chemical and thermal stability. It is the ideal polymer for storage vessels or microplates. Polar molecules, such as proteins or DNA, are binding less to polypropylene than to polystyrene.

In addition to polystyrene and polypropylene microplates, Greiner Bio-One manufactures microplates with special requirement profiles, such as the UV-Star® or SCREENSTAR microplates made from different **cycloolefins** (cycloolefin co-polymer COC/cycloolefin polymer COP).
These cycloolefins are characterised by their low level of autofluorescence (Fig. 1), exceptionally high clarity, especially in the UV range (Fig. 2), and greater chemical stability when compared with polystyrene.
A listing of chemical compatibilities of the main polymers used can be found in the → Technical Appendix.

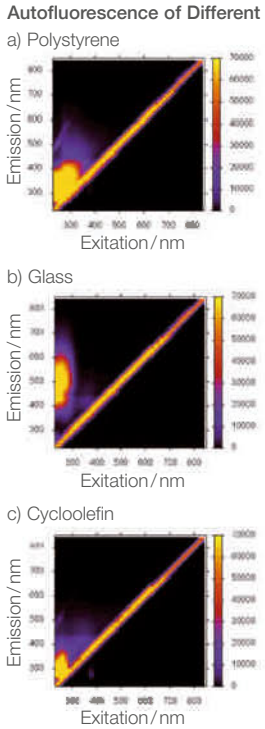


Figure 1:
Autofluorescence of polystyrene (A), borosilicate glass (B) and cycloolefin (C) in the UV. The graphs display autofluorescence in a 2-D diagonal plot, where the diagonal peak represents equal excitation and emission wavelengths. Due to energetic loss, emitted light generally exhibits a higher wavelength than that of excitation, therefore autofluorescence only occurs when the emission wavelength is above the excitation. The lowest autofluorescence can be detected in the cycloolefin micoplates (C), followed by the glass bottom microplate (B).

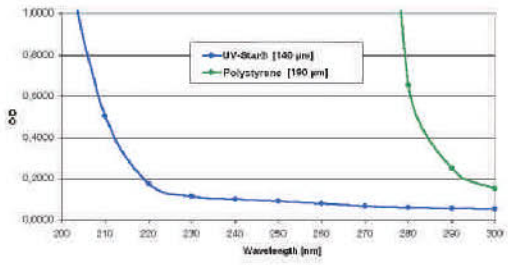


Figure 2:
Light transmission in the UV range. Comparison of polystyrene and UV-Star®

3. µClear® and UV-Star®

The move from isotopic to non-isotopic assays (fluorescence/luminescence), and new applications in high-throughput and high-content screening increased the demand for clear bottom plates, microplates with pigmented walls and thin film bottoms.
Up to now, clear bottom microplates have mostly been manufactured using a two-component injection moulding procedure by sticking or welding the components together. The development of a completely new and patented processing technique has made it possible for us to produce microplates with ultra-thin films, without the use of adhesives or solvents – the µClear® and UV-Star® products. This special method eradicates the risk of leaking wells (Fig. 3).

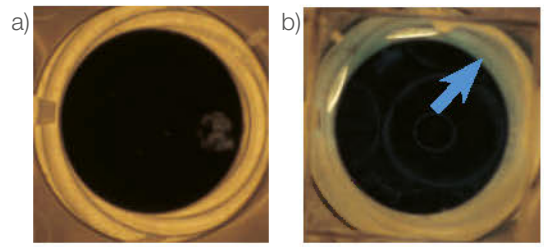


Figure 3:
Wells filled with methylene blue after threefold freezing and thawing:
a) single well of a Greiner Bio-One UV-Star® microplate
b) single well of a 96 well UV-transparent microplate of a competitor

The choice of suitable films is the decisive factor, and this will influence the quality of a clear bottom microplate. Strict controls before and during production guarantee a constant quality. Polarised light is either not depolarised (UV-Star®) or is only depolarised to a slight degree (µClear®) and the autofluorescence of the microplates is minimised (Fig. 4).

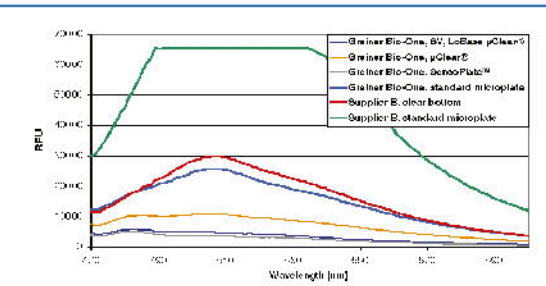


Figure 4:
Autofluorescence of different 384 well microplates at an excitation wavelength of 485 nm

The 96 well µClear® microplates and 384 well µClear® microplates have a film thickness of 190 µm +/- 20 µm. In the 1536 well microplates with a transparent bottom (µClear®) the film thickness is 75 µm +/- 10 µm. UV-Star® microplates generally have a film thickness of 135 µm +/- 10 µm.

4. SensoPlate™ Glass Bottom Microplates

SensoPlate™ glass bottom microplates consist of a black pigmented polystyrene frame on to which a 175 µm thick borosilicate glass bottom is bonded. Thanks to the high optical quality of the glass bottom as well as the minimal bending, SensoPlate™ microplates are especially recommended for fluorescence correlation spectroscopy and sophisticated microscopic applications.

5. Black or White?

White microplates are usually used for luminescence measurements (e. g. Luciferase Reporter Assays) and black microplates for fluorescence measurements (e. g. Green Fluorescence Protein). The critical properties in these methods, such as background, autofluorescence or crosstalk are considerably improved by the use of black or white pigmented microplates. The optical and physical properties of the Greiner Bio-One microplates were investigated in our laboratory. Higher pigment concentrations produced a much lower autofluorescence of the microplates. At shorter wavelengths, this influence is more pronounced than at the normal fluorescein wavelength combination of 485/520 nm (Fig. 5, 6). When comparing different white fractions, the same results were obtained for phosphorescence.

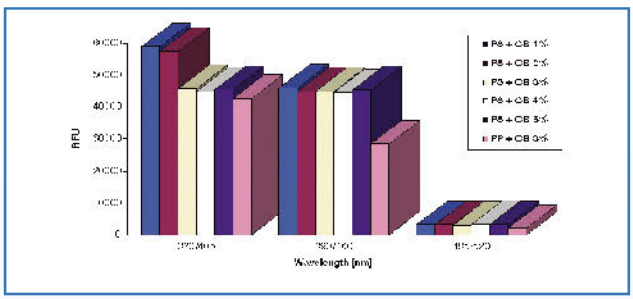


Figure 5:
Influence of the black pigment fraction and the wavelength used on the autofluorescence of 96 well microplates

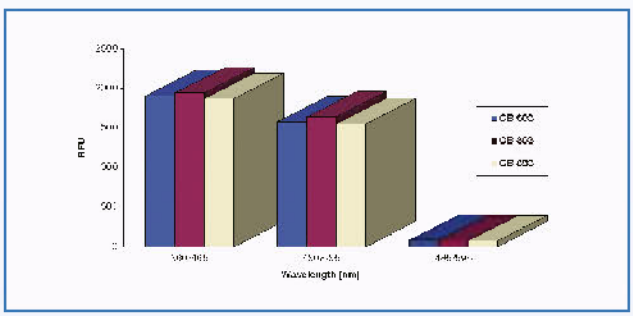


Figure 6:
Influence of different black pigments on the autofluorescence of 96 well microplates

6. MICROLON®, FLUOTRAC™, LUMITRAC™

MICROLON®, FLUOTRAC™, and LUMITRAC™ stand for the quality of our immunology products. MICROLON® are clear microplates for transmission measurements. FLUOTRAC™ are black microplates for fluorescence measurements. LUMITRAC™ are white microplates for luminescence measurements.
MICROLON® 600, FLUOTRAC™ 600 and LUMITRAC™ 600 are high binding polystyrene surfaces that have been specifically treated to provide an increased protein binding.

In general, high binding microplates are recommended for ELISAs. The protein binding to the polystyrene surface can vary greatly and depends, among other things, on properties such as charge or size.

We will be glad to supply samples for evaluation.

7. Non-binding Surfaces

Non-binding surfaces from Greiner Bio-One are characterised by their low binding capacity for biomolecules such as DNA, RNA, peptides and proteins. The repellent property of the non-binding surfaces for biomolecules can be advantageous in biochemical assays by increasing the sensitivity, reducing the background and improving the signal-to-noise ratio.

Achieved through a chemical modification of the resin rather than a resin mixture with potential to leach, the non-binding surface from Greiner Bio-One is stable under common assay conditions and does not degrade during short-term storage. The complete portfolio of non-binding microplates can be found on → p. 113–115

8. Cell Culture Products/CELLSTAR®/TC

The polystyrene surface of an untreated microplate is hydrophobic and does not offer adherent cell lines a surface conducive to growth. Cell culture microplates from the CELLSTAR® range are specifically treated. 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. CELLSTAR® products are consistently evaluated using different cell lines.
Cell culture treated microplates → chapter 1.

9. Lids for Microplates (→ chapter 12)
Four different polystyrene lid designs are available:

- High profile lids
- High profile lids with condensation rings
- Low profile lids
- Ultra low profile lids

Lids are available in two options, sterile and non-sterile. If microplates are supplied with lids, as in the case of CELLSTAR® products, the 96 well microplates always include lids with a high profile ("lid, high profile") and the 384 well microplates always include plate lids with a low profile ("lid, low profile"). In addition all products are also available without lids, which means that the type of lid can be selected as required.

Greiner Bio-One microplates:

- Are manufactured under DIN ISO 9001 guidelines
- Can be traced all the way back to production through a defined LOT number system
- Footprint compatible with automated systems
- Are free of detectable endotoxins (0.03 EU/ml) and regularly tested using an FDA-approved kinetic turbidimetric LAL-test (Limulus Amoebocyte Assay)
- Are analysed for detectable DNase, RNase and human DNA (→ Quality p. 6–7)
- Are manufactured without the use of silicone-based mould release
- Are free of biocides and antistatics
- Barcode-labelling on request (→ p. 263)

!

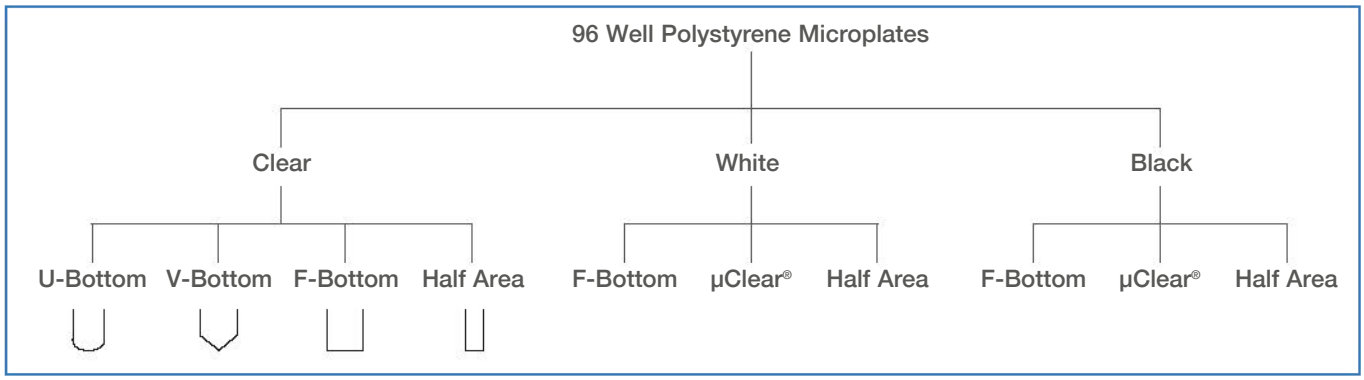
An overview of all 96 well, 384 well and 1536 well microplates listed in this catalogue can be found in the Technical Appendix → p. 265–267

Further information on microplates:
→ **www.gbo.com/bioscience/hts**
→ **Forum No. 19: Base Material and Surface Modifications of Greiner Bio-One Multiwell Plates and Microplates – An Overview** (F073793)
→ **Microplate Selection Guide** (F073048)
→ **Microplate Dimensions Guide** (F073027)

96 Well Microplates

Since its introduction in the 1960's applications for the 96 well microplate have continually increased to the extent that it is impossible to envisage modern research and industry without it today. Greiner Bio-One has been manufacturing microplates and strip microplates for diagnostics and immunological research for over 40 years. A large number of different 96 well microplates is available in a wide variety of surface treatments. The spectrum ranges from clear bottom microplates and completely black or white microplates to UV-Star® products.

96 Well Polystyrene Microplates



96 well polystyrene microplates are available in the following versions:

- Sterile or non-sterile
- Cell culture treated (→ p. 28–30)
- In medium binding or in high binding quality (→ p. 123)
- In non-binding quality (→ p. 111)
- With cell-repellent surface (→ p. 59)
- With or without lid

Well Profile

The well profile is a critical aspect in a 96 well microplate. Different well shapes are available for each application (Fig. 1 – Fig. 4):

U-Bottom

The "U" describes the round bottom shape (Fig. 1). U-bottom microplates are ideally suited for agglutination tests.

- No sharp corners to facilitate easy and residue-free pipetting
- Suitable for +/- analyses

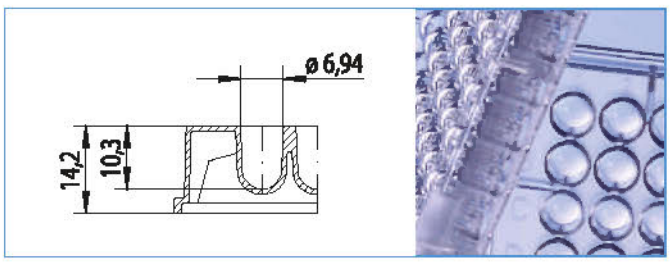


Figure 1:
Well profile: 96 well U-bottom, polystyrene
Total volume: 323 µl
Working volume: 40–280 µl

V-Bottom

The "V" stands for the conically tapered well bottom (Fig. 2). These microplates are ideally suited for applications in which the entire sample volume must be pipetted off.

- For precise pipetting
- Ideally suited for the storage of samples
- Suitable for +/- analyses

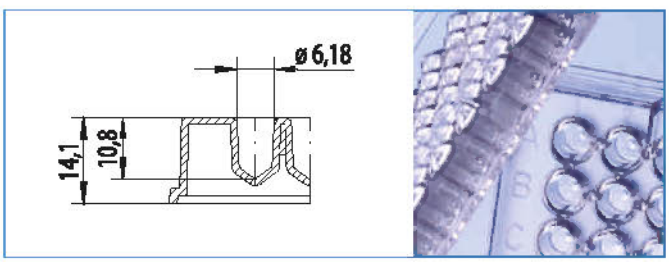


Figure 2:
Well profile: 96 well V-bottom, polystyrene
Total volume: 234 µl
Working volume: 40–200 µl

F-Bottom/Standard (ST)

The "F" refers to the flat well bottom (Fig. 3). This well type is ideal for precise optical measurements. The measuring light source is not deflected by the well profile.

- Excellent optical properties
- For precise optical measurements
- For microscopic applications (bottom reading)

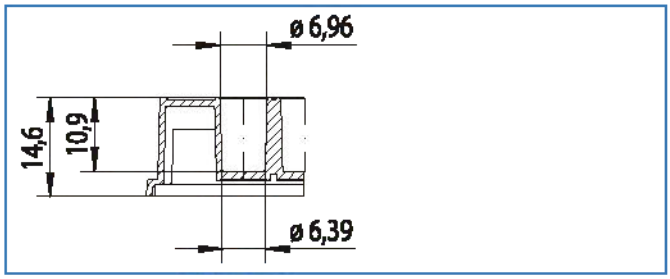


Figure 3:
Well profile: 96 well F-bottom/ST, polystyrene
Total volume: 382 µl
Working volume: 25–340 µl
Growth area: 32 mm²

F-Bottom/Chimney Well

The standard flat bottom microplate (Fig. 3) has the same well profile as the chimney well microplate (Fig. 4). The difference from the standard plate is the chimney-like arrangement of the wells. Each well stands on its own (Fig. 5). Therefore the risk of sample carryover and cross contamination is minimised.

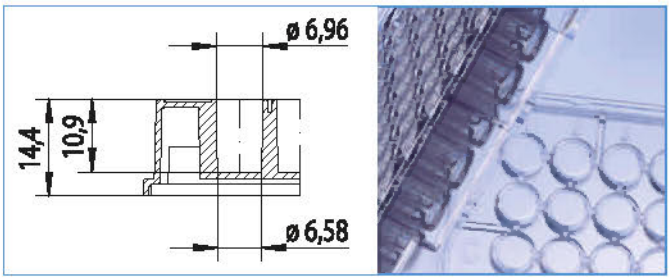


Figure 4:
Well profile: 96 well F-bottom/chimney well, polystyrene
Total volume: 392 µl
Working volume: 25–340 µl
Growth area: 34 mm²

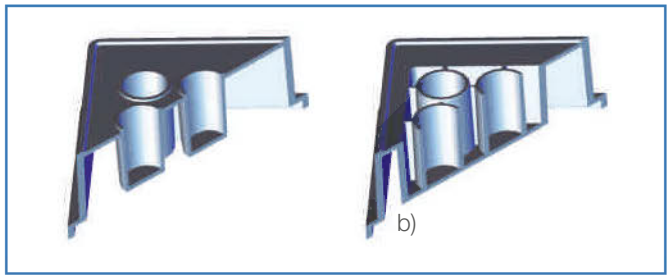
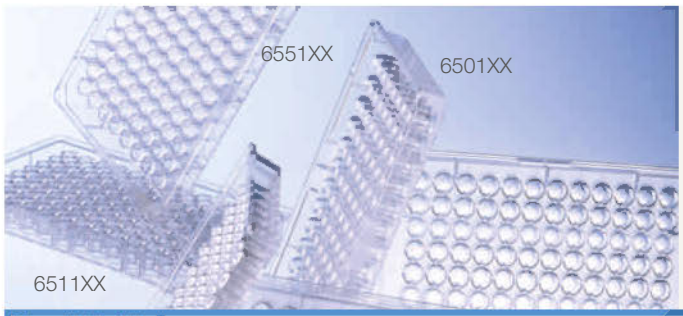


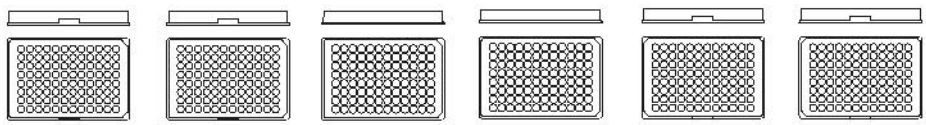
Figure 5:
a) Well profile: 96 well F-bottom/ST, polystyrene
Total volume: 382 µl
Working volume: 25–340 µl
Growth area: 32 mm²
b) Well profile: 96 well F-bottom/chimney well, polystyrene
Total volume: 392 µl
Working volume: 25–340 µl
Growth area: 34 mm²



96 Well Polystyrene Microplates
solid bottom, clear

ELISA Microplates p. 128
Cell Culture Microplates p. 28

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

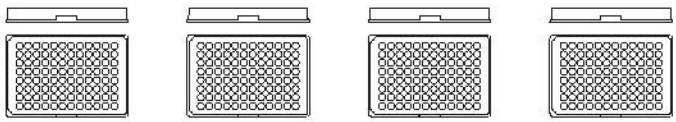


Cat.-No.	650101	650161	651101	651161	655101	655161
Well profile	U-bottom	U-bottom	V-bottom	V-bottom	F-bottom/ST	F-bottom/ST
Bottom	solid	solid	solid	solid	solid	solid
Colour	clear	clear	clear	clear	clear	clear
Binding	-	-	-	-	-	-
Sterile	-	+	-	+	-	+
Lid	-	-	-	-	-	-
Quantity per bag/case	10/100	2/100	10/100	2/100	10/100	2/100

96 Well Polystyrene Microplates
solid bottom, white/black

Cell Culture Microplates p. 29

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



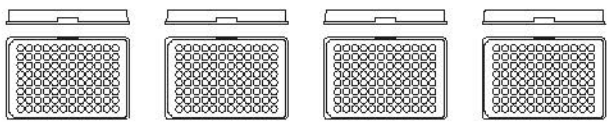
Cat.-No.	655075	655074	655077	655076
Well profile	F-bottom/ chimney well	F-bottom/ chimney well	F-bottom/ chimney well	F-bottom/ chimney well
Bottom	solid	solid	solid	solid
Colour	white	white	black	black
Binding	-	LUMITRAC™ 600 high binding	FLUOTRAC™ 600 high binding	-
Sterile	-	+	+	-
Lid	-	-	-	-
Quantity per bag/case	10/40	10/40	10/40	10/40

96 Well Polystyrene Microplates
µClear®, white/black

Cell Culture Microplates p. 30

Cat.-No. 655096 also available in cycloolefin (Cat.-No. 655809)

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



Cat.-No.	655095	655094	655097	655096
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
Binding	-	high binding	high binding	-
Sterile	-	+	+	-
Lid	-	-	-	-
Quantity per bag/case	10/40	10/40	10/40	10/40

96 Well Half Area Polystyrene Microplates

For pharmaceutical drug screening, the simplest way of reducing the sample volume is to use high-format microplates, such as the 384 well or 1536 well microplates. However, many research groups in the development field or companies in the field of ELISA diagnostics shy away from changing to high-format plates, due to the automation that this entails. The 96 well half area microplates offer an interesting alternative here. They can be pipetted manually without any problem but at the same time allow a reduction of the sample volume by up to 50 %.

! Further information on Half Area Microplates:
→ **Forum No. 16: 96 Well Half Area Microplates and their Application in Fluorescence, Luminescence and Transmission Measurements** (F073121)

Well profile (Fig. 6)

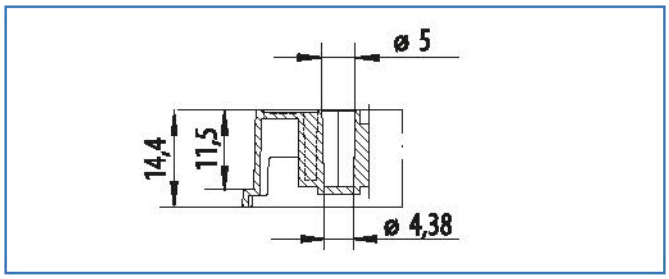


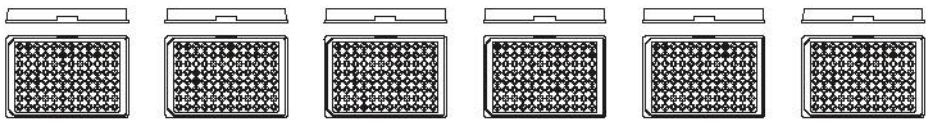
Figure 6:
Well profile: 96 well half area
Total volume: 199 µl
Working volume: 15 – 175 µl
Growth area: 15.0 mm²

96 Well Half Area Microplates

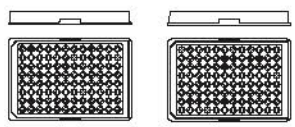
→ **Cell Culture Microplates p. 30**
→ **UV-Star® Microplates p. 119**

- Reduction of sample volume by up to 50 %
- Standardised pathlength (1 cm=170 µl, 0.5 cm=80 µl)

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

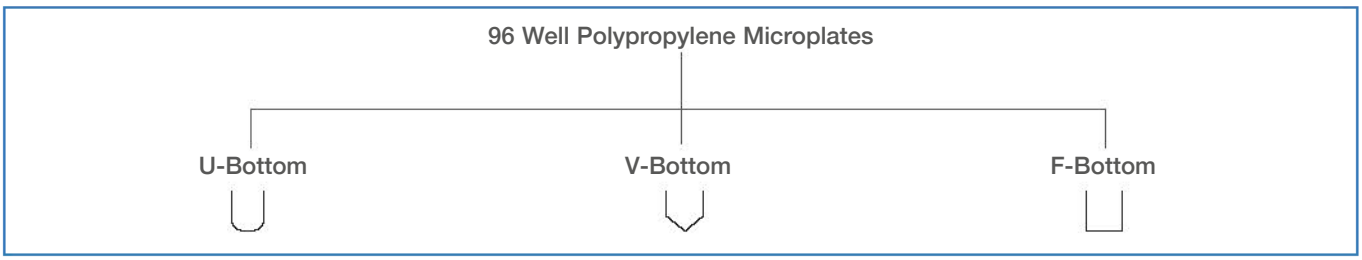


Cat.-No.	675161	675101	675074	675075	675077	675076
Well profile	half area	half area	half area	half area	half area	half area
Bottom	solid	solid	solid	solid	solid	solid
Colour	clear	clear	white	white	black	black
Binding	-	-	high binding	-	high binding	-
Sterile	+	-	+	-	+	-
Lid	-	-	-	-	-	-
Quantity per bag/case	10/40	10/40	10/40	10/40	10/40	10/40



Cat.-No.	675095	675096
Well profile	half area	half area
Bottom	µClear®	µClear®
Colour	white	black
Binding	-	-
Sterile	-	-
Lid	-	-
Quantity per bag/case	10/40	10/40

96 Well Polypropylene Microplates



Polypropylene (PP) has low biomolecular binding characteristics, a high temperature tolerance, and is resistant to many standard laboratory chemicals, such as DMSO.
From black polypropylene microplates for fluorescence polarisation to white microplates for scintillation proximity assays (SPA), the 96 well polypropylene range has all you need.

96 well polypropylene microplates are available in the following versions:
- Sterile
- Non-sterile
- Natural and black version
- Barcode-labelled on request (→ p. 243)

Polypropylene microplates are ideally suited for the following applications:
- Long-term storage of active agents
- Storage of DNA or RNA, stock cultures

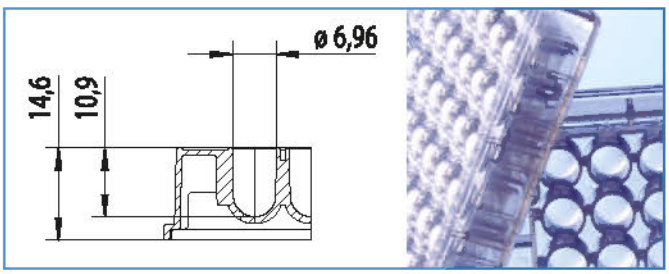


Figure 1:
Well profile: 96 well U-bottom, polypropylene
Total volume: 355 µl
Working volume: 50–300 µl

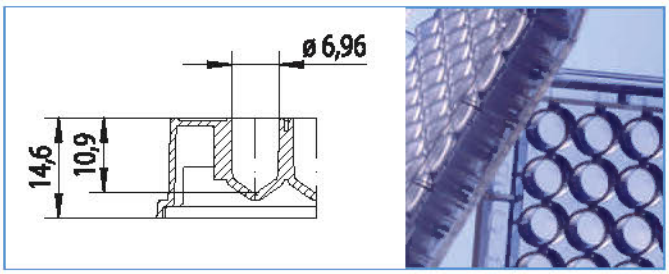


Figure 2:
Well profile: 96 well V-bottom, polypropylene
Total volume: 340 µl
Working volume: 50–335 µl

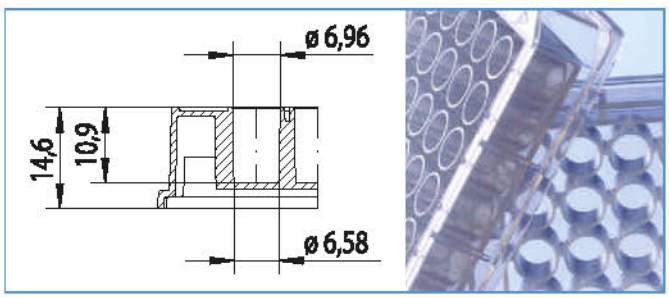
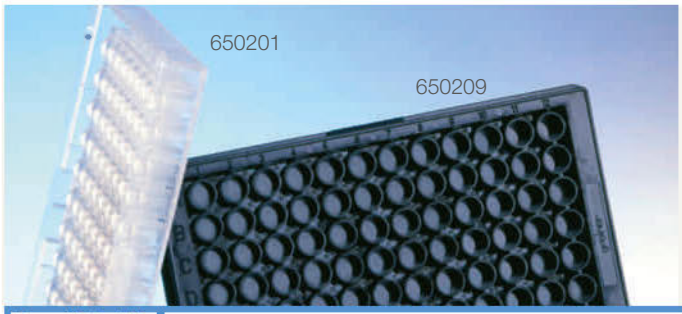


Figure 3:
Well profile: 96 well F-bottom, polypropylene
Total volume: 392 µl
Working volume: 25–370 µl

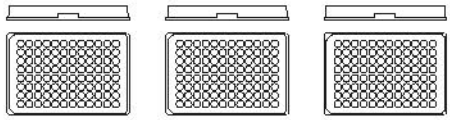


96 Well Polypropylene Microplates

U-bottom

- Uniform external dimensions
- Well-to-well spacing 9 mm
- Alphanumeric well coding
- High chemical resistance
- High temperature resistance (-196 °C to +121 °C)
- Sealable with adhesive films and heat sealer
- Sealable with CapMats (→ p. 241)

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



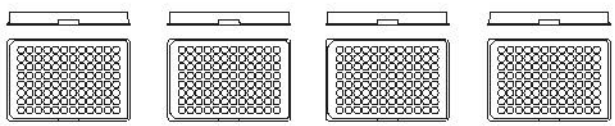
Cat.-No.	650201	650261	650209
Well profile	U-bottom/ chimney well	U-bottom/ chimney well	U-bottom/ chimney well
Bottom	solid	solid	solid
Colour	natural	natural	black
Binding	-	-	-
Sterile	-	+	-
Lid	-	-	-
Quantity per bag/case	10/100	10/100	10/100

96 Well Polypropylene Microplates

F-bottom/V-bottom

- Uniform external dimensions
- Well-to-well spacing 9 mm
- Alphanumeric well coding
- High chemical resistance
- High temperature resistance (-196 °C to +121 °C)
- Sealable with adhesive films and heat sealer
- Sealable with CapMats (→ p. 241)

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

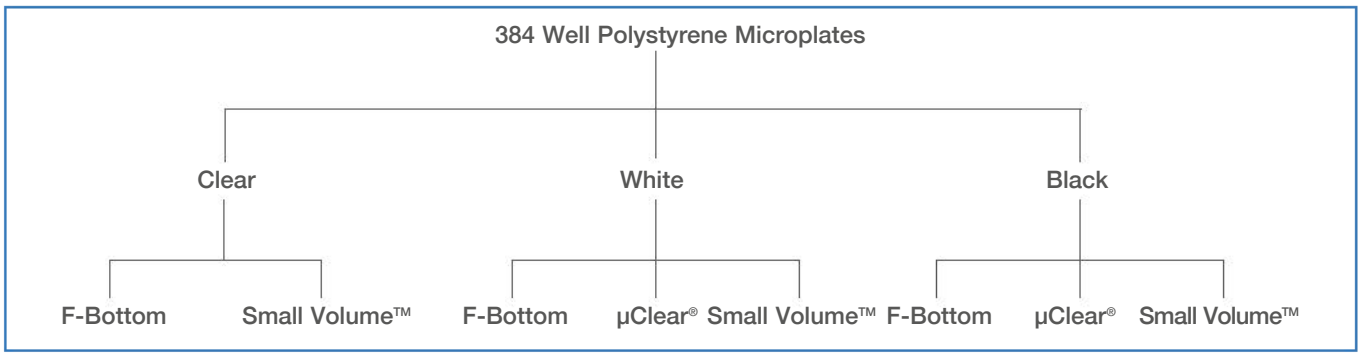


Cat.-No.	655201	655209	651201	651209
Well profile	F-bottom/ chimney well	F-bottom/ chimney well	V-bottom/ chimney well	V-bottom/ chimney well
Bottom	solid	solid	solid	solid
Colour	natural	black	natural	black
Binding	-	-	-	-
Sterile	-	-	-	-
Lid	-	-	-	-
Quantity per bag/case	10/100	10/100	10/100	10/100

384 Well Microplates

Drug screening has undergone rapid development over the past years. The number of tests with new targets and the number of active agents to be tested is constantly increasing. Volume reduction, simple testing and cost savings are some of the highest priorities and high format microplates with a low well volume are one of the most important tools in achieving this. One of the first higher format microplates was the 384 well plate, launched by Greiner Bio-One in 1994/1995. Compared with the 96 well standard microplate, the number of wells is quadrupled in this microplate, combined with a volume reduction from 382 µl to 131 µl. The well-to-well spacing is 4.5 mm (96 well plate: 9 mm). The external dimensions of the 384 well microplates are compatible with standard equipment and automated systems.
The 384 well microplates are available as black and white clear bottom plates (µClear®), in FLUOTRAC™, LUMITRAC™, MICROLON®, CELLSTAR®, UV-Star® or non-binding quality.

384 Well Polystyrene Microplates



384 well microplates are available in the following versions:
- Sterile or non sterile
- Cell culture treated (→ p. 31–32)
- Non-treated or in high binding quality
- In non-binding quality (→ p. 114)
- In UV-Star® quality (→ p. 119)
- With or without lid
- Barcode-labelled on request (→ p. 263)

Improved Rounded Square Well Design
All wells of the 384 well microplates, with the exception of the 384 well Small Volume™ microplate, are rounded square wells, i.e. they are square with rounded corners (Fig. 2).
This design combines the advantages of the square well, i.e. flexible working volume of 15–110 µl, with the advantages of a round well, such as reduced wicking and bubbling.

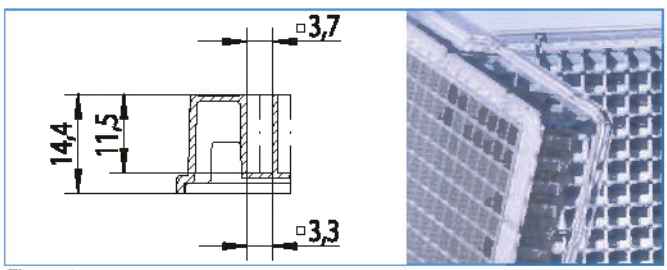


Figure 1:
Well profile: 384 well, polystyrene
Total volume: 131 µl
Working volume: 15–110 µl
Growth area: 10 mm²

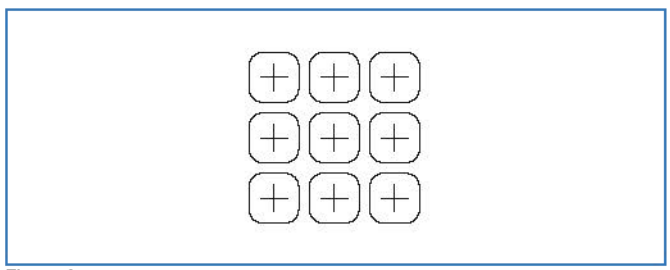
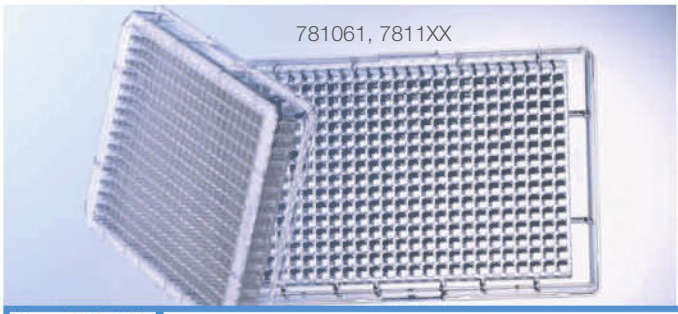


Figure 2:
Rounded square well design with improved corner radius of 1 mm

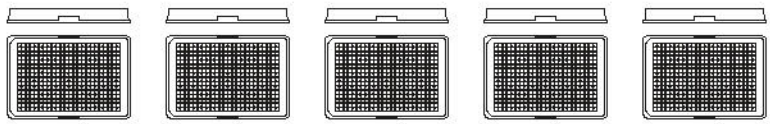


384 Well Polystyrene Microplates

solid bottom, clear

Cell Culture Microplates p. 31

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



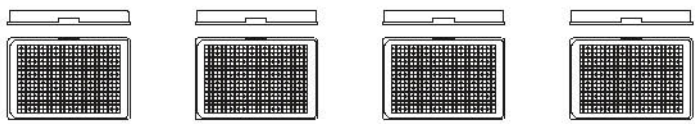
Cat.-No.	781101	781061	781162	781185	781186
Well profile	F-bottom	F-bottom	F-bottom	F-bottom	F-bottom
Bottom	solid	solid	solid	solid	solid
Colour	clear	clear	clear	clear	clear
Binding	-	high binding	-	-	-
Sterile	-	+	+	+	+
Lid	-	-	-	+	+
Quantity per bag/case	10/100	10/40	10/100	1/32	8/32

384 Well Polystyrene Microplates

solid bottom, white/black

Cell Culture Microplates p. 31

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



Cat.-No.	781074	781075	781077	781076
Well profile	F-bottom	F-bottom	F-bottom	F-bottom
Bottom	solid	solid	solid	solid
Colour	white	white	black	black
Binding	LUMITRAC™ 600 high binding	-	FLUOTRAC™ 600 high binding	-
Sterile	+	-	+	-
Lid	-	-	-	-
Quantity per bag/case	10/40	10/40	10/40	10/40

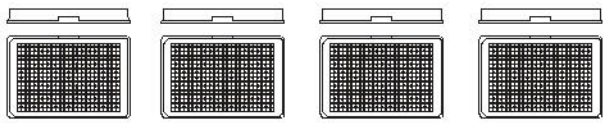
384 Well Polystyrene Microplates

µClear®, white/black

Cell Culture Microplates p. 32

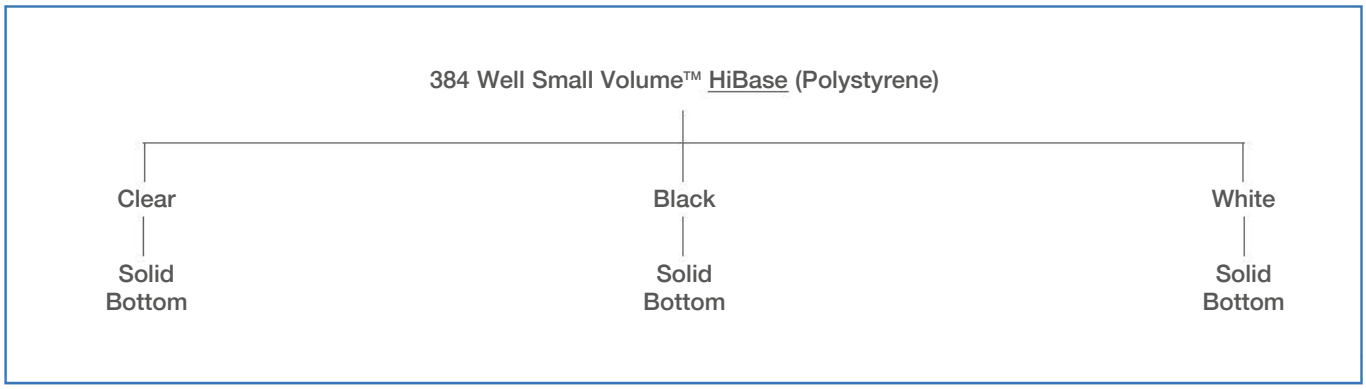
UV-Star® Microplates p. 119

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



Cat.-No.	781094	781095	781097	781096
Well profile	F-bottom	F-bottom	F-bottom	F-bottom
Bottom	µClear®	µClear®	µClear®	µClear®
Colour	white	white	black	black
Binding	high binding	-	high binding	-
Sterile	+	-	+	-
Lid	-	-	-	-
Quantity per bag/case	10/40	10/40	10/40	10/40

384 Well Small Volume™ HiBase Polystyrene Microplates



A small sample volume is an important goal in high-throughput screening. The substances to be tested and the reagents used are usually scarce, expensive and time-consuming to produce. In addition to a high degree of automation and the use of sensitive reader systems, the introduction of higher format microplates, such as the 384 well or the 1536 well microplate, has made a decisive contribution to reducing the sample volume.

The potential for savings in the 384 well microplate with an average working volume of 70–80 µl is relatively limited and successful use of 1536 well microplates requires considerable optimisation work on the instrumentation to be used.
In order to enable a savings potential in the 384 well format comparable to a 1536 well microplate, Greiner Bio-One developed a new platform with the 384 well Small Volume™ microplates. They have round wells with a conical geometry (Fig. 1). The wells have a total volume of 28 µl and a working volume of between 4 µl and 25 µl.

384 well Small Volume™ HiBase polystyrene microplates:
- Perfect for top reading even at low working volumes
- Savings in reagent similar to 1536 well microplates
- Suited for transmission, fluorescence and luminescence applications
- Excellent optical properties
- Available cell culture treated (→ p. 32)
- Available in non-binding quality (→ p. 114)

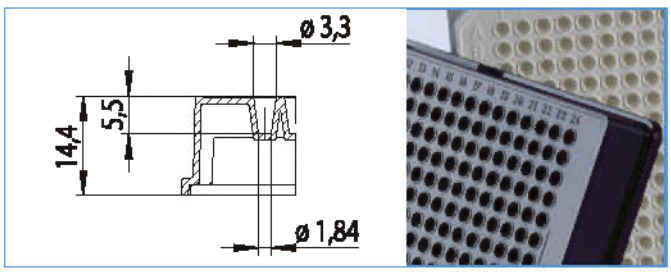
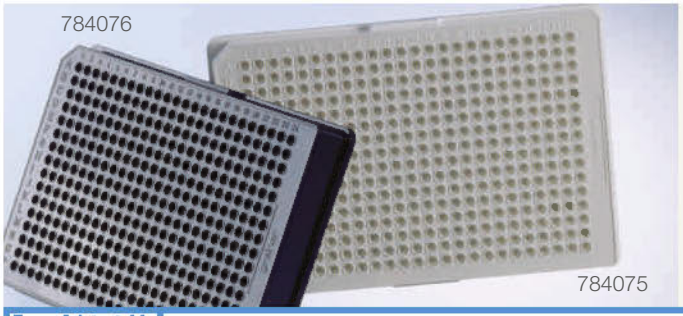


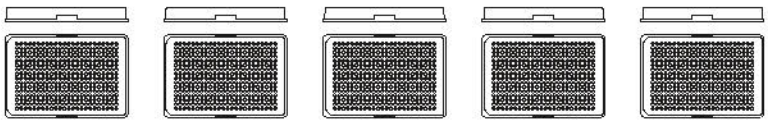
Figure 1:
Well profile: 384 well Small Volume™, HiBase
Total volume: 28 µl
Working volume: 4–25 µl
Growth area: 2.7 mm²



384 Well Small Volume™ HiBase Polystyrene Microplates

Cell Culture Microplates p. 32

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



Cat.-No.	784101	784075	784075–25	784076	784076–25
Well profile	Small Volume™	Small Volume™	Small Volume™	Small Volume™	Small Volume™
Bottom	solid	solid	solid	solid	solid
Colour	clear	white	white	black	black
Binding	-	-	-	-	-
Sterile	-	-	-	-	-
Lid	-	-	-	-	-
Quantity per bag/case	10/40	10/40	25/150	10/40	25/150
Plate design	HiBase	HiBase	HiBase	HiBase	HiBase

384 Well Polypropylene Microplates

Polypropylene (PP) has low biomolecular binding characteristics, a high temperature tolerance and is resistant to many standard laboratory chemicals, such as DMSO.
From black polypropylene microplates for fluorescence to white microplates for luminescence assays, the 384 well polypropylene programme has all you need.

384 well polypropylene microplates are available in the following versions:

- Sterile (on request)
- Non-sterile
- Natural or black version
- Barcode-labelled on request (→ p. 243)

In addition to the 384 Deep Well MASTERBLOCK® (→ p. 106), 384 well F-bottom (Fig. 1) and V-bottom (Fig. 2) polypropylene microplates extend the range of polypropylene microplates.

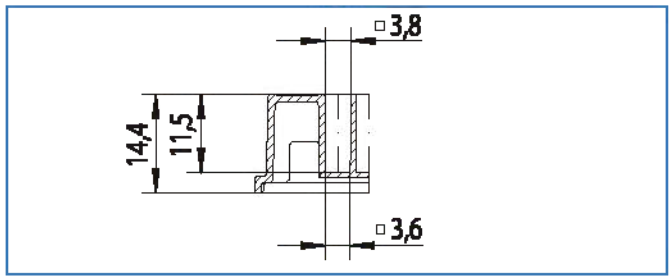


Figure 1:
Well profile: 384 well F-bottom, polypropylene
Total volume: 152 µl
Working volume: 15–145 µl

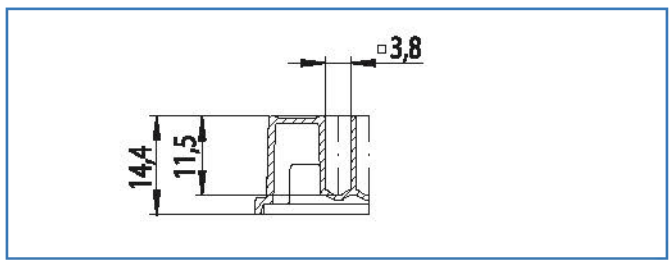
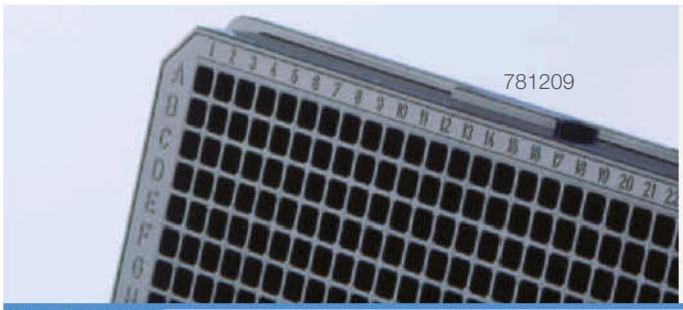
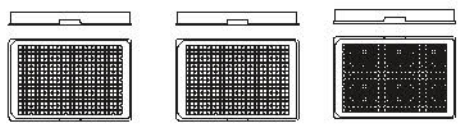


Figure 2:
Well profile: 384 well V-bottom, polypropylene
Total volume: 130 µl
Working volume: 13–120 µl



384 Well Polypropylene Microplates
solid bottom, natural/black

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



Cat.-No.	781201	781209	781280
Well profile	F-bottom	F-bottom	V-bottom
Bottom	solid	solid	solid
Colour	natural	black	natural
Binding	-	-	-
Sterile	-	-	-
Lid	-	-	-
Quantity per bag/case	10/100	10/100	10/100

384 Deep Well Small Volume™ Polypropylene Microplate

The 384 Deep Well Small Volume™ polypropylene microplate offers new possibilities for drug discovery:

- Standardised plate geometry (conform to ANSI 1–2004)
- Large working volume from 1 µl to 90 µl (Fig. 1)
- Dead volume below 1 µl
- Focused liquid samples (Fig. 2)
- No loss of valuable compounds

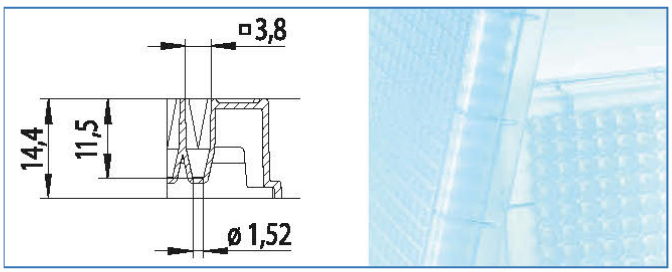


Figure 1:
Well profile: 384 Deep Well Small Volume™
Total volume: 107 µl (21 µl in the frustrum)
Working volume: 1–90 µl

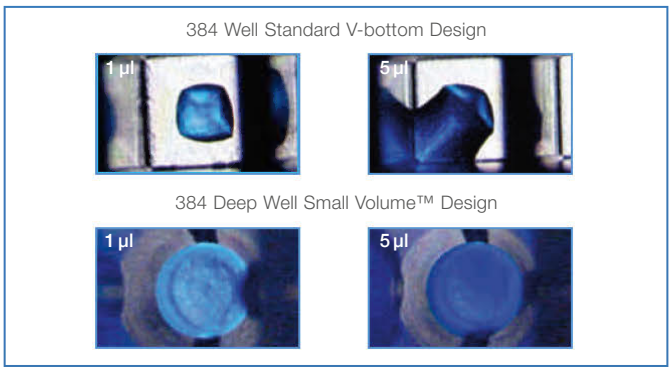


Figure 2: Location of liquid at the bottom of different microplate wells

The 384 Deep Well Small Volume™ polypropylene microplate is especially suited

- **For direct compound transfer and preparation of assay-ready plates:**
  The focused aggregation of even small sample volumes in the well centres (Fig. 2) allows the transfer of small amounts of highly concentrated compound solutions with pin tools or capillary-based liquid handling systems. Direct compound transfer of 50 nl from storage to assay plate is possible and pre-dilution of concentrated compounds becomes redundant.
- **For pre-dilutions:**
  If pre-dilution of compounds is required by the application, e. g. for sensitve cell-based assays, the working volume of 90 µl allows a high dilution under the cell toxicity level of DMSO.
- **As storage plate:**
  Polypropylene, the base polymer of the 384 Deep Well Small Volume™ microplate has low binding characteristics, a high temperature tolerance, and is resistant to many standard laboratory chemicals, such as DMSO.
- **For sealing:**
  The square well geometry at the top of the wells with pronounced sealing rims facilitates heat sealing.
- **For automation:**
  The standardised microplate footprint and well geometry enables efficient integration with automated systems.

! Further information on 384 Deep Well Small Volume™ Polypropylene Microplates
→ **Forum No. 11: 384 Well Storage Plate reducing compound consumption and supporting assay miniaturisation** (F073000)

384 Deep Well Small Volume™ Polypropylene Microplate

- White and black versions are available on request

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

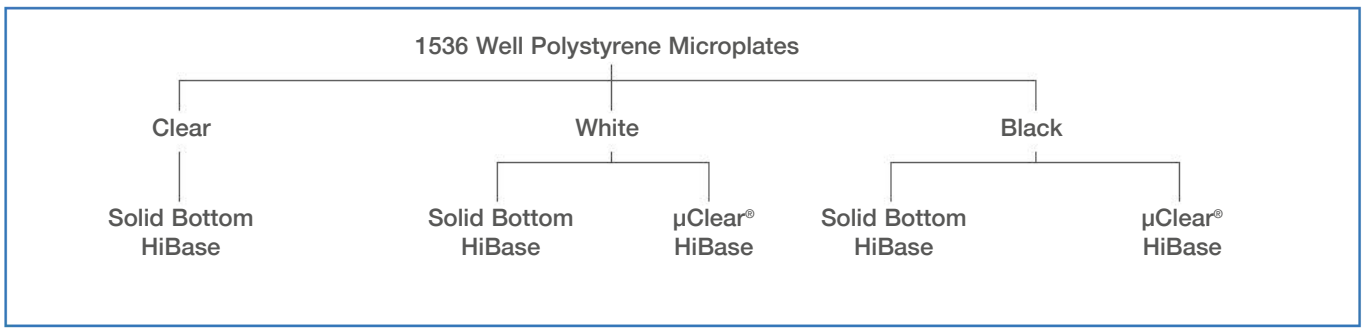
Cat.-No.	**784201**
Well profile	Small Volume™
Bottom	solid
Colour	natural
Sterile	-
Lid	-
Quantity per bag/case	10/100
Plate design	Deep Well

1536 Well Microplates

The highest possible degree of automation, optimal performance and cost savings continue to be the requirements placed on microplates for high-throughput screening. In 1997, shortly after the launch of the 384 well microplates, Greiner Bio-One was the first manufacturer to introduce another innovative microplate format – the 1536 well microplate. The external dimensions were the same as those used in the 96 well and 384 well microplates. However, to utilise the available space most efficiently, the number of wells was increased fourfold from 384 to 1536.

Close cooperation with numerous users has now led to the development of a broad product range, and the constant drive towards improvements in quality has, for example, led to a reduction in curvature of the plates to < 100 µm. The 1536 well microplates are available as clear bottom variants, in clear polystyrene and completely black or white in CELLSTAR®, LUMITRAC™, FLUOTRAC™ and non-binding quality.
The product range has been further expanded by a 1536 Deep Well polypropylene microplate (→ p. 107).

1536 Well Polystyrene Microplates



1536 well polystyrene microplates are available in the following versions:
- Sterile
- Non-sterile
- Cell culture treated (→ p. 33)
- Non-treated or in high binding quality
- With or without lid

1536 Well HiBase Microplates (Fig. 1):
- Ideally suited for top reading even at low working volumes
- Suited for transmission, fluorescence and luminescence applications
- Excellent optical properties

All wells of the 1536 well microplates are rounded square wells, i. e. they are square with rounded corners (Fig. 2). This design combines the advantages of the square well, i. e. a flexible working volume of 3 – 10 µl with the advantages of a round well, such as reduced wicking and bubbling.

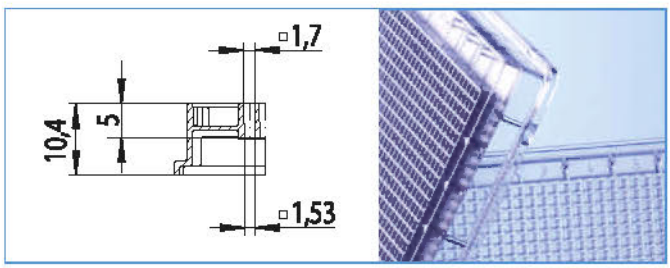


Figure 1:
Well profile: 1536 well, HiBase
Total volume: 12.6 µl
Working volume: 3 – 10 µl
Growth area: 2.3 mm²

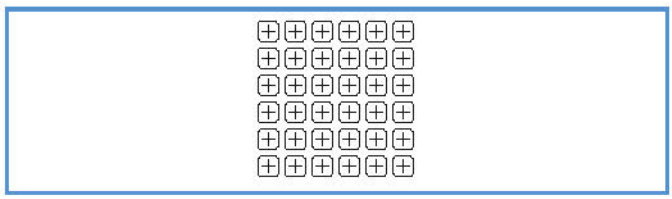
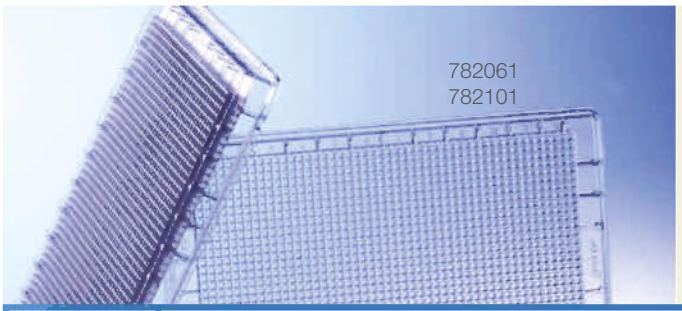


Figure 2:
The rounded square well design

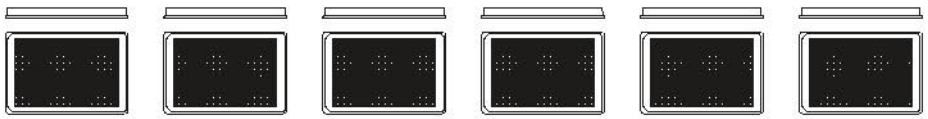


1536 Well HiBase Microplates

solid bottom, clear/white/black

Cell Culture Microplates p. 33

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



Cat.-No.	782101	782061	782075	782074	782076	782077
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
Binding	-	MICROLON® 600 high binding	-	LUMITRAC™ 600 high binding	-	FLUOTRAC™ 600 high binding
Sterile	-	+	-	+	-	+
Lid	-	-	-	-	-	-
Quantity per bag/case	15/60	15/60	15/60	15/60	15/60	15/60
Plate design	HiBase	HiBase	HiBase	HiBase	HiBase	HiBase

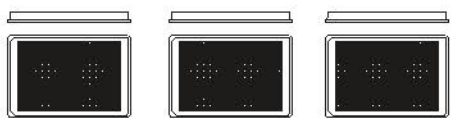
1536 Well HiBase Microplates

µClear®, white/black

Cell Culture Microplates p. 33

1536 Well SCREENSTAR Microplate p. 73

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



Cat.-No.	782095	782097	782096
Well profile	F-bottom	F-bottom	F-bottom
Bottom	µClear®	µClear®	µClear®
Colour	white	black	black
Binding	-	high binding	-
Sterile	-	+	-
Lid	-	-	-
Quantity per bag/case	15/60	15/60	15/60
Plate design	HiBase	HiBase	HiBase

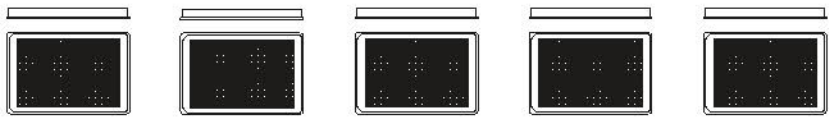
1536 Well LoBase Microplates

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

- Cell Culture Microplates p. 30
- 1536 Well SCREENSTAR Microplate p. 73

- Available in high binding quality on request

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



Cat.-No.	783101	783075	783076	783095	783096
Well profile	F-bottom	F-bottom	F-bottom	F-bottom	F-bottom
Bottom	solid	solid	solid	µClear®	µClear®
Colour	clear	white	black	white	black
Binding	-	LUMITRAC™ 200 med. binding	FLUOTRAC™ 200 med. binding	med. binding	med. binding
Sterile	-	-	-	-	-
Lid	-	-	-	-	-
Quantity per bag/case	15/60	15/60	15/60	15/60	15/60
Plate design	LoBase	LoBase	LoBase	LoBase	LoBase

1536 Well Cycloolefin Microplate

1536 Well Cycloolefin Microplate

- White 1536 Well Cycloolefin Microplate available on request
- Cell culture treated and sterile versions available on request

- Solid bottom microplate manufactured out of DMSO-resistant cycloolefin for preparation of assay ready plates in acoustic liquid handling
- Superior optical quality with low-autofluorescence background for sensitive optical measurements
- Smooth microplate top absent of alphanumeric coding facilitates flush lid mounting for use within automated systems and improves heat sealing

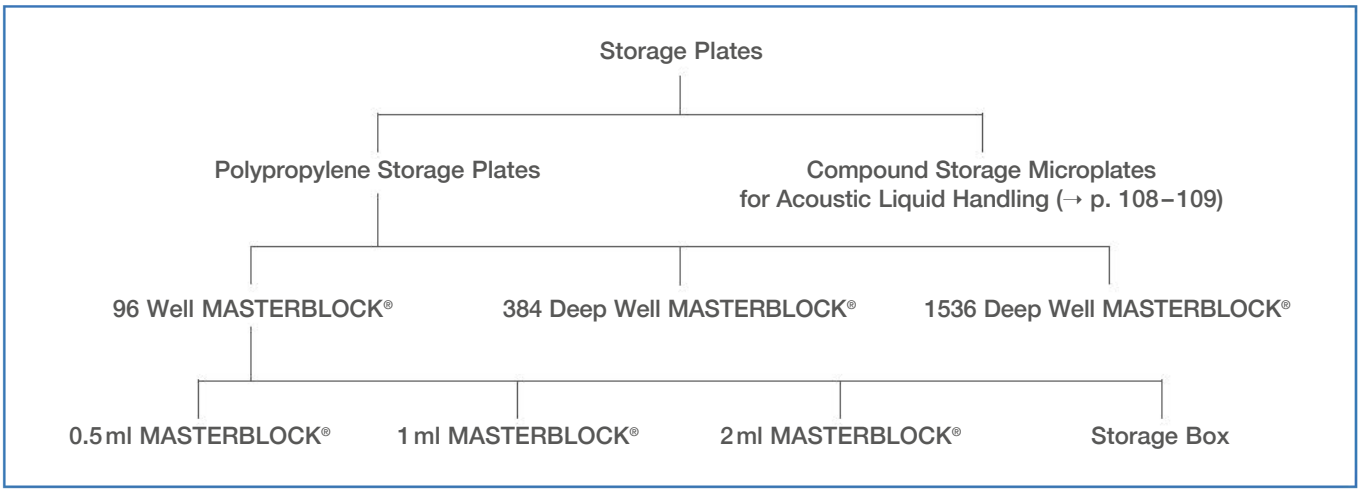
Free of detectable DNase, RNase, human DNA
non-pyrogenic

Cat.-No.	789888
Well profile	F-bottom
Bottom	solid
Colour	black
Sterile	-
Quantity per bag/case	15/60
Plate design	HiBase

Polypropylene Storage Plates

Greiner Bio-One polypropylene microplates are perfect storage plates for active agents, patient samples or biomolecules. Their most important properties are biological inertness, resistance to numerous solvents commonly used in the laboratory, such as DMSO and temperature resistance from -196 °C to +121 °C.

The footprint is compatible with automated systems. The microplates are also characterised by elevated well walls which make it possible to easily seal them.



Further 96 well polypropylene microplates can be found on p. 93

Further 384 well polypropylene microplates can be found on p. 99

Compound storage microplates can be found on p. 111

96 Well Polypropylene MASTERBLOCK®

The 0.5 ml, 1 ml, and 2 ml MASTERBLOCK® (Fig. 1–3) are ideal microplates for storing non-human sample material but are also ideal for cultivating bacteria or yeast.

- Uniform external dimensions and tolerances
- Alphanumeric well coding
- High chemical resistance
- High temperature resistance (-196 °C to +121 °C)
- Sealable with adhesive films and heat sealer
- Sealable with CapMats (→ p. 241)
- Available sterile or non-sterile
- Barcode-labelled on request (→ p. 263)

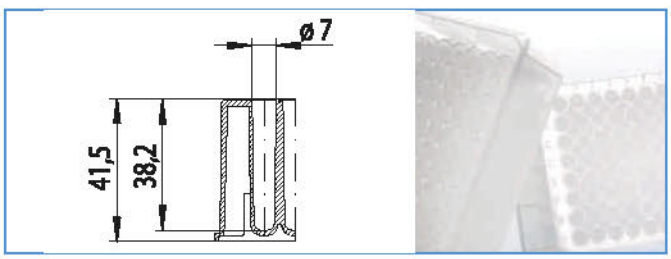


Figure 2:
Well profile: 1 ml MASTERBLOCK®, polypropylene
Total volume: 1.22 ml
Working volume: 0.05–1.1 ml (at RT)
0.05–1.0 ml (at -20°C)

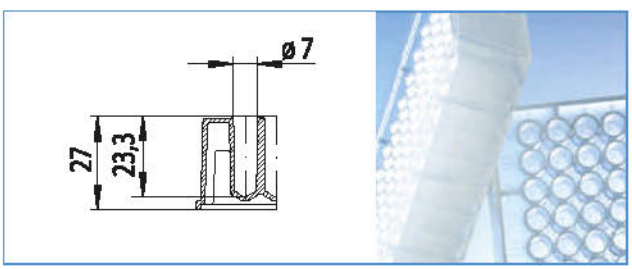


Figure 1:
Well profile: 0.5 ml MASTERBLOCK®, polypropylene
Total volume: 0.78 ml
Working volume: 0.03–0.65 ml (at RT)
0.03–0.55 ml (at -20°C)

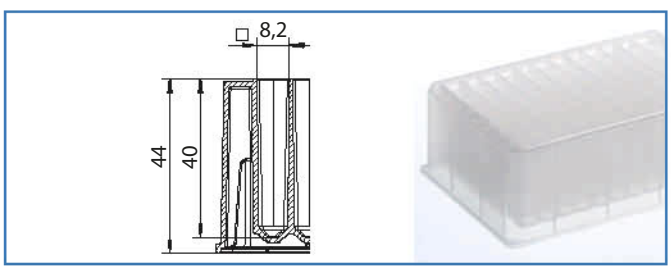


Figure 3:
Well profile: 2 ml MASTERBLOCK®, polypropylene
Total volume: 2.42 ml
Working volume: 0.1–2.1 ml (at RT)
0.1–2.0 ml (at -20°C)

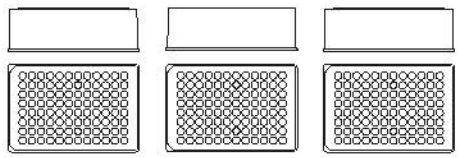
780201
780215
780261

96 Well MASTERBLOCK®
1 ml

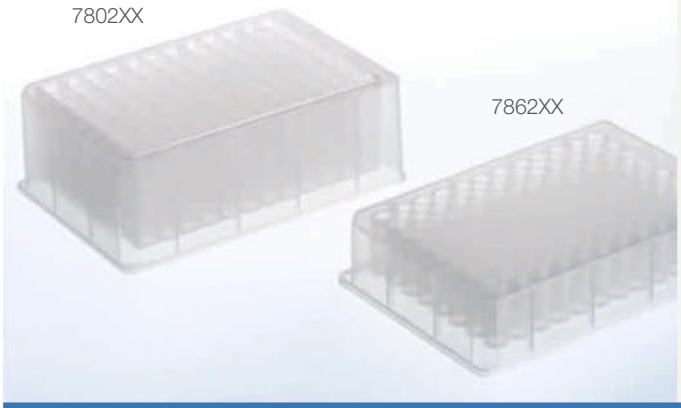
96 Well Polypropylene Microplates p. 93

CapMats p. 241

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



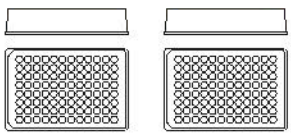
Cat.-No.	780201	780261	780215
Volume [ml]	1	1	1
Well profile	U-bottom	U-bottom	U-bottom
Bottom	solid	solid	solid
Colour	natural	natural	natural
Binding	-	-	-
Sterile	-	+	-
Suitable CapMats, Cat.-No.	381070, 381061	381070, 381061	381070, 381061
Quantity per bag/case	1/50	1/50	5/50



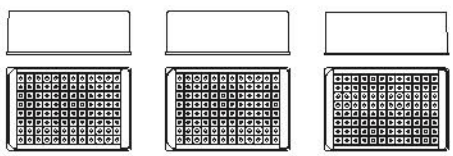
96 Well MASTERBLOCK®
0.5 ml and 2 ml

96 Well Polypropylene Microplates p. 93
CapMats p. 241

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



Cat.-No.	786201	786261
Volume [ml]	0.5	0.5
Well profile	V-bottom	V-bottom
Bottom	solid	solid
Colour	natural	natural
Binding	-	-
Sterile	-	+
Suitable CapMats, Cat.-No.	381070, 381061	381070, 381061
Quantity per bag/case	8/80	1/80



Cat.-No.	780270	780271	780285
Volume [ml]	2	2	2
Well profile	V-bottom	V-bottom	V-bottom
Bottom	solid	solid	solid
Colour	natural	natural	natural
Binding	-	-	-
Sterile	-	+	-
Suitable CapMats, Cat.-No.	381080, 381081	381080, 381081	381080, 381081
Quantity per bag/case	1/50	1/50	5/50

96 Well Storage Box

The Greiner Bio-One storage box system in microplate format comes with a coding card which enables proper storage of samples, and the temperature resistance of the polypropylene vessels from -80 °C to +121 °C provides for a broad range of applications. All components of the storage box are autoclavable. The box has space for 96 vessels with a capacity of 1.3 ml each.

The individual vessels are made of biologically inert polypropylene, while the storage box itself is made of polycarbonate (PC). The storage box comes with a lid, ID-card and with/without 96 PP-vessels with mounted adhesive strips, and can be supplied both sterile and non-sterile.

96 Well Storage Box

Tubes for Storage Box p. 148

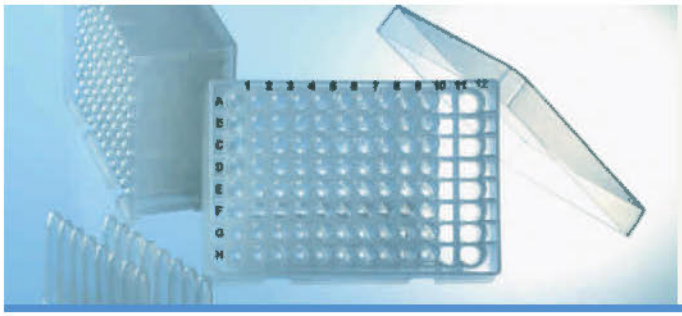
Cat.-No.	975502	975561	975570
Material	PC	PC	PC
Incl. 96 polypropylene vessels, inserted	-	+	+
Sterile	-	+	-
ID card	+	+	+
Quantity per bag/case	1	1	1

Storage Box Tubes

Cat.-No.	102201	102261	102270
Material	PP	PP	PP
Pre-assembled with caps	-	+	+
Sterile	-	+	-
Quantity per bag/case	1000	1000	1000

Storage Box 8-Cap Strips

Cat.-No.	365261	365270
Material	Si	Si
Sterile	+	-
Quantity per bag/case	120	120



96 Well MicroRack II Storage Box

- Cost-effective, inert polypropylene storage rack
- Will withstand temperature extremes
- Available as loose components or pre-assembled

MicroRack II Pre-assembled Racks

Cat.-No.	975270	975275	975271	975276	975272	975277
Material	PP	PP	PP	PP	PP	PP
Pre-assembled with tubes	individual	individual	8-tube strips	8-tube strips	12-tube strips	12-tube strips
Sterile	-	+	-	+	-	+
Racks per case	10	10	10	10	10	10

MicroRack II Tubes

Cat.-No.	102280	102285	102250
Material	PP	PP	PP
Tube arrangement	individual	8-tube strips	12-tube strips
Sterile	-	-	-
Quantity per case	1000	125	80

MicroRack II Caps

Cat.-No.	365280	365281	365250	365251
Material	PP	PP	PP	PP
Cap arrangement	8-cap strips	8-cap strips	12-cap strips	12-cap strips
Sterile	-	+	-	+
Quantity per case	125	125	80	80

384 Deep Well Polypropylene MASTERBLOCK®

In addition to the 384 well polypropylene microplates with F-bottom and V-bottom, a 384 well MASTERBLOCK® extends the range of polypropylene microplates.
The innovative design of the Deep Well MASTERBLOCK® enables numerous applications in which larger volumes are required. The MASTERBLOCK® is ideal for compound libraries and the storage of samples in general. The conical shape of the wells (Fig. 1 and 2) enables precise pipetting down to the last drop. The standardised external dimensions and the tight tolerances make liquid handling easier for robotics. The MASTERBLOCK® is also available barcode-labelled on request (→ p. 243).

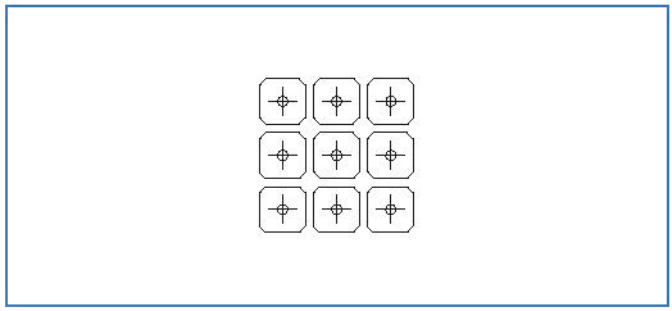


Figure 2:
Rounded square well design

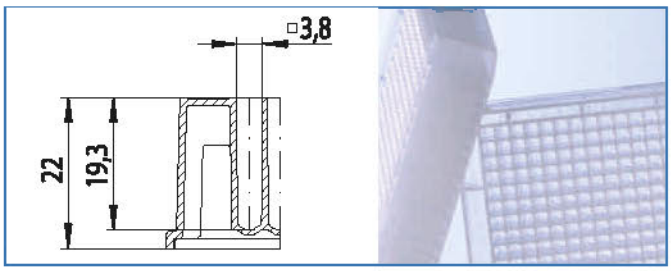


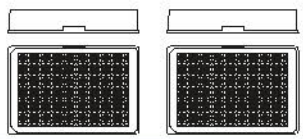
Figure 1:
Well profile: 384 Deep Well MASTERBLOCK®, polypropylene
Total volume: 240 µl
Working volume: 20–225 µl

384 Deep Well MASTERBLOCK®

384 Well Polypropylene Microplates p. 99

- Alphanumeric well coding
- High chemical resistance
- High temperature resistance (-196 °C to +121 °C)
- Sealable with adhesive films and heat sealer

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



Cat.-No.	781270	781271
Well profile	V-bottom	V-bottom
Bottom	solid	solid
Colour	natural	natural
Binding	-	-
Sterile	-	+
Lid	-	-
Quantity per bag/case	6/60	6/60
Plate design	Deep Well	Deep Well

1536 Deep Well Polypropylene Microplates

The product range of the 1536 well polystyrene microplates is extended by a polypropylene storage plate (Deep Well microplate) with a total volume of 18 µl. The working volume of this plate is between 3 and 15 µl (Fig. 1).

- Uniform external dimensions and tolerances
- Alphanumeric well coding
- High chemical resistance
- High temperature resistance (-196 °C to +121 °C)
- Sealable with adhesive films and heat sealer

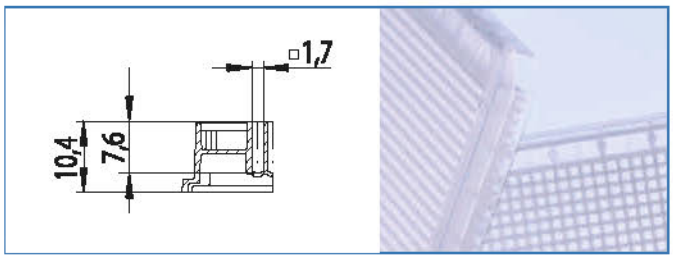
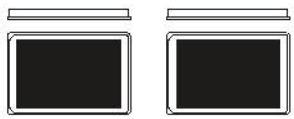


Figure 1:
Well profile: 1536 Deep Well Microplate, polypropylene
Total volume: 18 µl
Working volume: 3–15 µl

1536 Deep Well Polypropylene Microplates

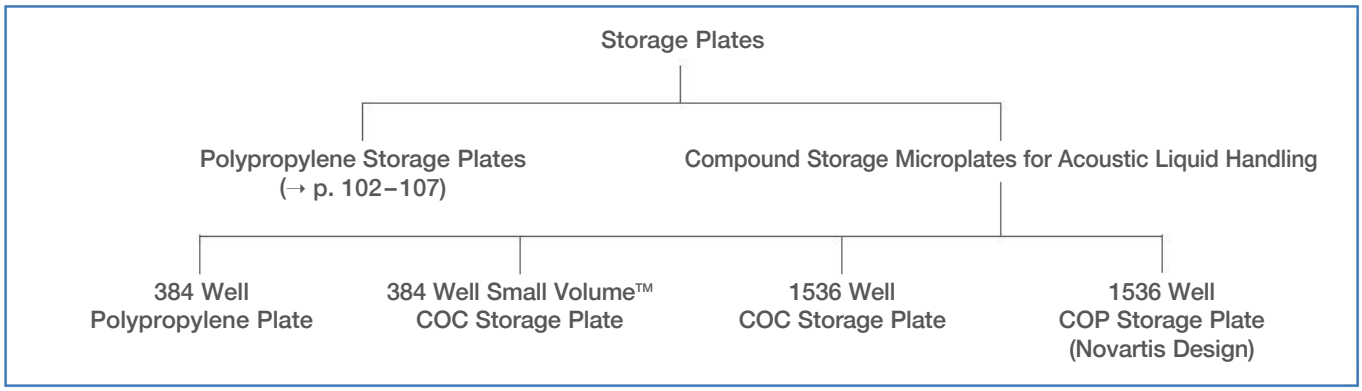
Free of detectable DNase, RNase, human DNA
non-pyrogenic



Cat.-No.	782261	782270
Well profile	V-bottom	V-bottom
Bottom	solid	solid
Colour	natural	natural
Sterile	+	-
Lid	-	-
Quantity per bag/case	15/60	15/60
Plate design	Deep Well	Deep Well

Compound Storage Microplates for Acoustic Liquid Handling

384 Well and 1536 Well Microplates for Compound Storage



Polypropylene is still the material of choice for storage plates, but the material class of cycloolefins is becoming more routinely used because of its unsurpassed performance for a wide range of applications. In compound storage, plates made from cycloolefins offer the best combination of chemical resistance to polar solvents, like DMSO, and optical clarity. In addition, the dimensional stability and glass-like optical properties make this material ideally suited for plates in fully automated systems.
(Detailed listing of the physical properties of cycloolefins → Technical Appendix).

Microplates made from cycloolefin offer the following advantages in compound storage:
- Resistant against polar solvents such as DMSO
- Excellent water and vapour barrier function to minimise evaporation
- Nearly no extractables minimise leaching to avoid compound contamination
- Low biomolecule binding reduces the loss of compounds in storage and screening assays
- Glass-like optical properties for sensitive transmission and fluorescence measurements
- Superior mechanical stability and bottom thickness uniformity

Further information on Compound Storage Microplates:
→ **Brochure "Performance. Throughput. Reliability. – Intelligent Solutions for Sample Storage"** (F073917)
→ **Forum No. 20: 1536 Well CO Microplate for Compound Storage and Acoustic Liquid Handling** (F073795)

384 Well Polypropylene Storage Plate

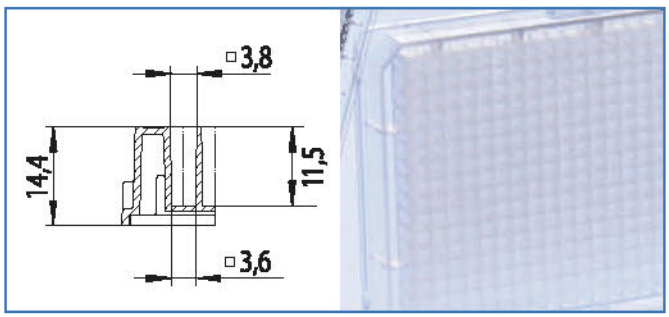


Figure 1:
Well profile: 384 well polypropylene storage plate
Total volume: 152 µl
Working volume: 15 – 145 µl

The 384 well polypropylene microplates for acoustic liquid handling are the classic storage plates. They can be easily sealed using commercially available heat sealers and bind negligible amounts of proteins or active substances (Fig. 1).

384 Well Small Volume™ COC Storage Plate

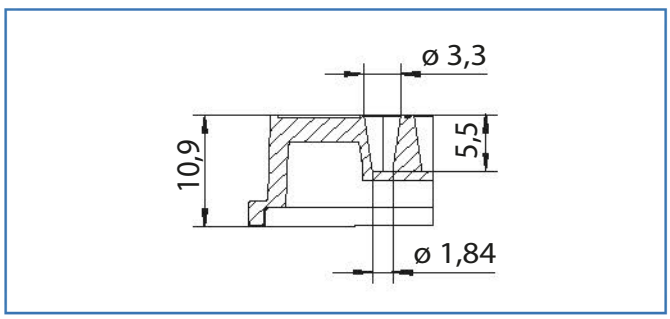


Figure 2:
Well profile: 384 well Small Volume™ COC storage plate
Total volume: 28 µl
Working volume: 4 – 25 µl

The 384 well Small Volume™ COC microplate reduces the dead volume in acoustic liquid handling. (Fig. 2). The standard 384 well grid of the microplate facilitates manual processing and visual control of individual operations.

1536 Well COC Storage Plate

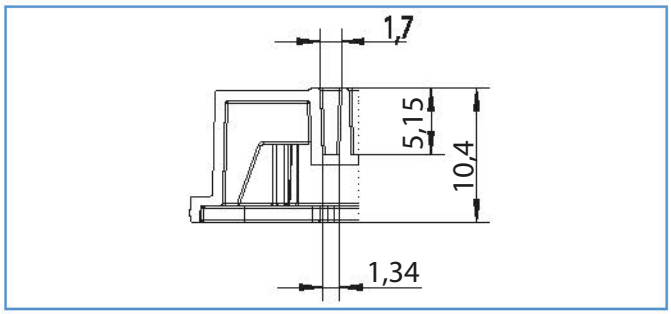


Figure 3:
Well profile: 1536 well COC storage plate
Total volume: 12 µl
Working volume: 1 – 10 µl

The 1536 well COC storage plate allows the storage of non-human sample material in the 1536 well format and reduces the dead volume in acoustic liquid handling. With a working volume of 1 – 10 µl this microplate is ideal for working with minimal sample volumes (Fig. 3).

1536 Well COP Storage Plate with Optimised Geometry for Low Evaporation

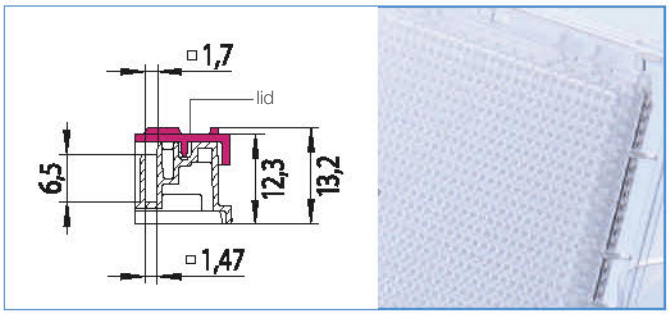


Figure 4:
Well profile: 1536 well COP storage plate with optimised geometry and lid
Total volume: 16 µl
Working volume: 1 – 14 µl

The 1536 well COP storage plate with optimised geometry was developed in collaboration with Novartis AG, Basel, CH. The microplate features a continuous groove around the edges of the plate, in which a matching cycloolefin plate lid fits (Fig. 4). This prevents evaporation and minimises edge effects.

INFORMATION

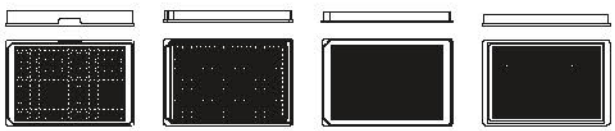
Watch our video
„High Performer, Screener, Classics – Microplates for Intelligent Storage of Active Ingredients and Samples“

384 and 1536 Well Microplates for Compound Storage

UV-Star® Microplates p. 119

- Stringent production specifications for a constant bottom quality
- Microplates are deionised and packed in antistatic bags

Free of detectable DNases, RNases, human DNA
non-pyrogenic



Cat.-No.	781201 – 906	793855	782855	792870 – 906
Well format	384 well	384 well	1536 well	1536 well
Well profile	F-bottom	Small Volume™	F-bottom	F-bottom
Material	polypropylene	COC	COC	COP
Bottom	solid	solid	solid	solid
Colour	natural	clear	clear	clear
Sterile	-	-	-	-
Lid	-	-	-	Cat.-No. 792891
Quantity per bag/case	10/100	15/60	15/60	15/60

Non-binding Microplates

Microplates with Non-Binding Surface Properties for Sensitive Biochemical Assays

High quality microplates with well-defined properties are essential prerequisites for reproducible results in advanced drug discovery. In addition to format and pigmentation, determining the best microplate surface for use within a specific application is a critical factor for successful high-throughput screening.

Polystyrene microplates with medium binding surfaces are commonly used for homogeneous biochemical HTS assays. Manufactured of carefully selected raw material batches, medium binding microplates demonstrate low reproducible biomolecule binding. As medium binding microplate surfaces are not physically modified, their surface characteristics are representative of pure polystyrene.

However, even low amounts of biomolecular binding (e. g. DNA, RNA, proteins, peptides) can cause an undesirable increase in background, resulting in decreased signal-to-noise ratio. Greiner Bio-One's non-binding microplate surfaces prevent unwanted non-specific binding, especially advantageous for sensitive biochemical assays.

Characterised by low protein, DNA, RNA and peptide binding properties (Fig. 1, Fig. 2) the non-binding surfaces significantly increase assay sensitivity by reducing background and improving signal-to-noise ratio (Fig. 3).

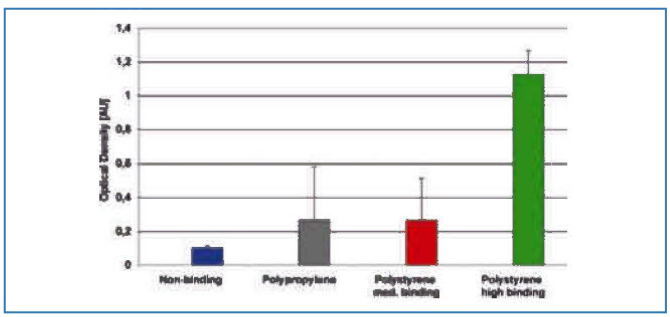


Figure 1:
Peptide binding (5.8 kDa) on different surfaces

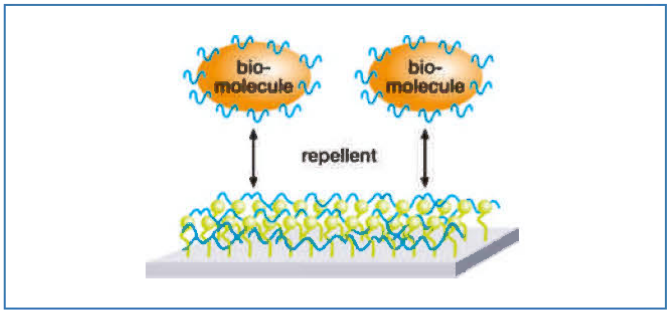


Figure 2:
Technology of the non-binding surface.
The hydrate layer, created by covalently linked functional groups, enables biomolecules to remain in solution, thereby preventing their binding to the surface.

Non-binding surfaces from Greiner Bio-One are achieved through a stable chemical modification to covalently link functional groups with the base polystyrene polymer. Under aqueous assay conditions a hydrate layer forms, preventing dissolved biomolecules from binding to the microplate surface (Fig. 2). As the non-binding surface is stable under common assay conditions (Fig. 4), there is no potential for degradation or leaching and resultant assay interference.

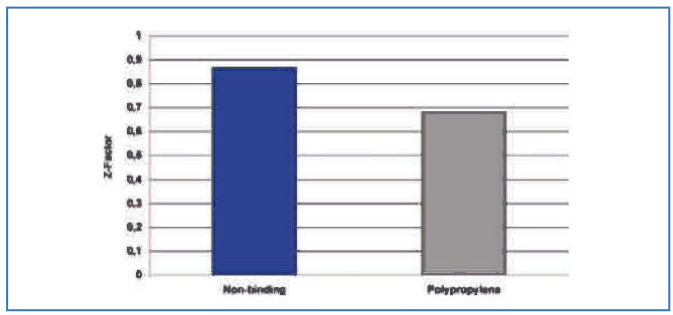


Figure 3:
Z-factor of a biochemical assay (Perkin Elmer TruPoint™ Caspase-6 assay). Comparison of non-binding versus polypropylene microplates. (The z-factor defines the precision of an assay; a factor of 1 represents the highest precision possible.) [1]

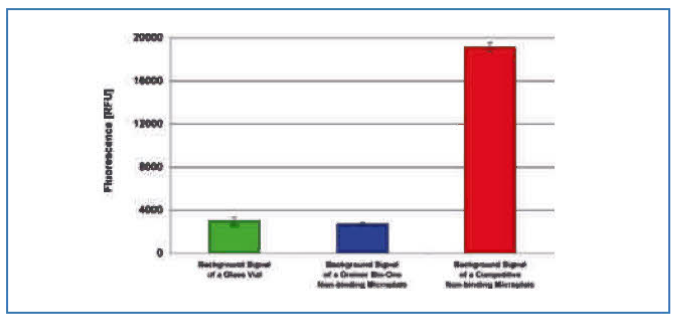


Figure 4:
Background signal using Quanti-iT™ Protein Detection Kit from Molecular Probes (Cat.-No. Q33210). The dye of the Quant-iT™ kit stains proteins as well as detergents. In the absence of protein, a high fluorescence signal indicates the presence of high amounts of dissolved detergents that have leached from the vessel surface.

Non-binding microplates are featured in 96, 384 and 1536 well formats in black, white and clear, including solid and µClear® film well bottoms.

Characteristic features of the non-binding surface are:
- Ultra low non-specific biomolecular binding properties (proteins, DNA, RNA)
- Long-term surface stability without degradation or leaching
- Higher assay sensitivity with reduced background

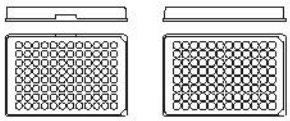
[1] Zhang et al.: Journal of Biomolecular Screening, Vol. 4 No. 2 (1999); 67–73

96 Well Non-binding Microplates

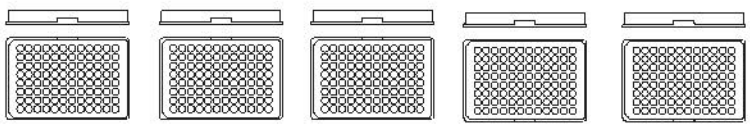
96 Well Non-treated and High Binding Microplates p. 90

New: Clear 96 well microplates (F-bottom/chimney well) now with black printing for easy plate identification (→ p. 27)

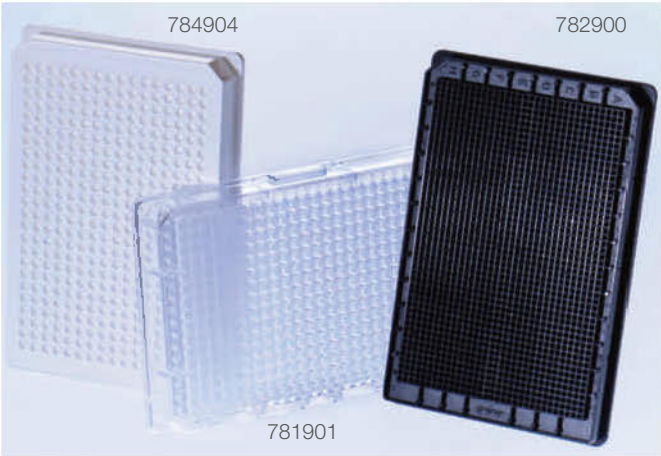
Free of detectable DNase, RNase, human DNA
non-pyrogenic



Cat.-No.	650901	651901
Well format	96 well	96 well
Well profile	U-bottom	V-bottom
Bottom	solid	solid
Colour	clear	clear
Binding	non-binding	non-binding
Sterile	-	-
Lid	-	-
Quantity per bag/case	10/40	10/40



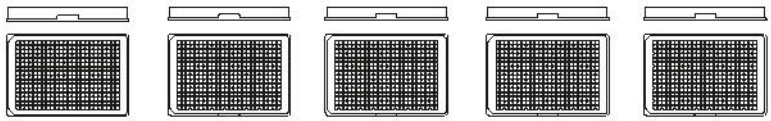
Cat.-No.	655901	655904	655900	655903	655906
Well format	96 well	96 well	96 well	96 well	96 well
Well profile	F-bottom/ chimney well	F-bottom/ chimney well	F-bottom/ chimney well	F-bottom/ chimney well	F-bottom/ chimney well
Bottom	solid	solid	solid	µClear®	µClear®
Colour	clear	white	black	white	black
Binding	non-binding	non-binding	non-binding	non-binding	non-binding
Sterile	-	-	-	-	-
Lid	-	-	-	-	-
Quantity per bag/case	10/40	10/40	10/40	10/40	10/40



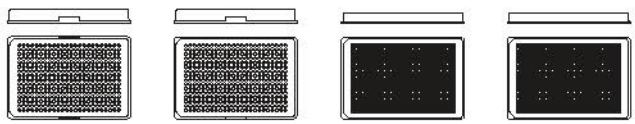
384, 1536 Well Non-binding Microplates

384 Well Non-treated and High Binding Microplates p. 95–96
1536 Well Non-treated and High Binding Microplates p. 102

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



Cat.-No.	781901	781904	781900	781903	781906
Well format	384 well	384 well	384 well	384 well	384 well
Well profile	F-bottom	F-bottom	F-bottom	F-bottom	F-bottom
Bottom	solid	solid	solid	µClear®	µClear®
Colour	clear	white	black	white	black
Binding	non-binding	non-binding	non-binding	non-binding	non-binding
Sterile	-	-	-	-	-
Lid	-	-	-	-	-
Quantity per bag/case	10/40	10/40	10/40	10/40	10/40



Cat.-No.	784904	784900	782904	782900
Well format	384 well	384 well	1536 well	1536 well
Well profile	Small Volume™	Small Volume™	F-bottom	F-bottom
Bottom	solid	solid	solid	solid
Colour	white	black	white	black
Binding	non-binding	non-binding	non-binding	non-binding
Sterile	-	-	-	-
Lid	-	-	-	-
Quantity per bag/case	10/40	10/40	15/60	15/60
Plate design	HiBase	HiBase	HiBase	HiBase

Streptavidin-coated Microplates

Streptavidin-coated solid phases serve as reliable binding surfaces for all types of biotinylated molecules. Numerous ligands can be biotinylated simply and due to the low molecular weight of biotin (244 Da) the functionality of the molecules is normally not impaired.
Thus streptavidin-coated solid phases make it possible to rapidly isolate, determine and quantify components from a reaction mixture. By immobilising the biotinylated substance, it is also possible to reproduce complete reaction chains on a streptavidin solid phase, e.g. enzyme immunoassays, enzyme activity assays, DNA hybridisation techniques, quantification of PCR products and receptor/ligand studies.
The high-purity streptavidin is bound to the plate surface in a uniform and stable layer.
The coefficient of variation from well to well is under 5% for 96 well microplates and under 8% for 384 well microplates.

The streptavidin solid phase is treated with an additional blocking step in order to minimise any unspecific binding, therefore, „pre-blocking" of plates is not necessary. The high stability of the coating and the high affinity between streptavidin and biotin enables unusually stringent washing conditions, which have a positive effect on the signal-to-noise ratio of the measurement.

- Shelf-life: 3 years at room temperature
- Pre-blocking: All plates are pre-blocked and ready-to-use

	96 Well Microplate	384 Well Microplate
Streptavidin-coating (in relation to volume)	300 µl	90 µl
Biotin binding capacity*)	> 5 ng/well or > 20 pmol/well	> 1.5 ng/well or > 6 pmol/well

*) Biotin binding capacity determined by competition test

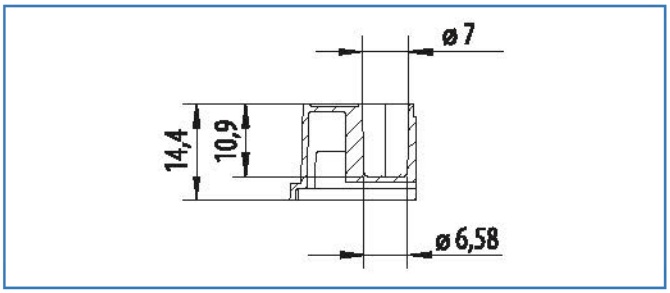
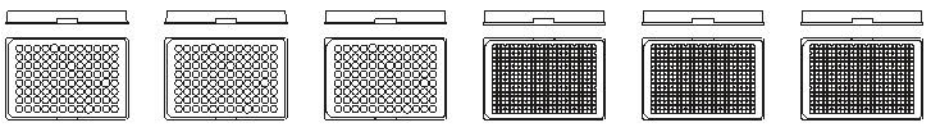


Figure 1:
Well profile: 96 well, C-bottom, polystyrene

96, 384 Well Streptavidin-coated Microplates
solid bottom, clear/white/black

- Further streptavidin-coated microplates are available on request



Cat.-No.	655990	655995	655997	781990	781995	781997
Well format	96 well	96 well	96 well	384 well	384 well	384 well
Well profile	C-bottom	C-bottom	C-bottom	F-bottom	F-bottom	F-bottom
Bottom	solid	solid	solid	solid	solid	solid
Colour	clear	white	black	clear	white	black
Streptavidin-coating	+	+	+	+	+	+
Sterile	-	-	-	-	-	-
Lid	-	-	-	-	-	-
Quantity per bag/case	5/40	5/40	5/40	5/40	5/40	5/40

SensoPlate™

Glass Bottom Microplates

The research of biomolecular processes on the level of single molecules and in volume ranges equivalent to the size of a single bacterium is of immense importance, both in basic research and in industrial high-throughput screening. The combination of modern confocal optics, new fluorescent dyes, sensitive photomultipliers and improved data processing has revolutionised the technique of fluorescence correlation spectroscopy (FCS) (Fig. 1). Over the past few years this has led to its widespread application, and alongside the technological advances in hardware development, Greiner Bio-One worked hand-in-hand with customers and instrument suppliers to develop the glass bottom microplates. These better satisfy the requirements of fluorescence correlation spectroscopy with regard to optical clarity and deformation when compared to standard polystyrene plates.

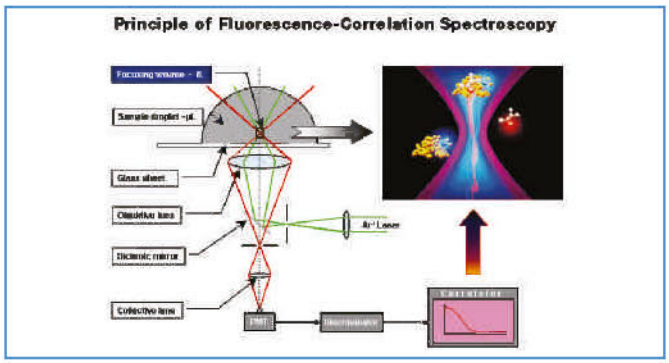


Figure 1:
The principles of fluorescence correlation spectroscopy

The **SensoPlate™** family was developed in a complete product line consisting of 24, 96, 384 and 1536 well glass bottom formats. All plates consist of an optically clear borosilicate glass bottom with a light path of 175 +/- 15 µm and a black polystyrene frame. The glass bottom allows transmission measurements in the wavelength range above 350 nm. For mounting the glass bottom plates an adhesive with the lowest possible autofluorescence is used.

In addition to fluorescence correlation spectroscopy, microscopic applications such as confocal microscopy are a potential area of application for glass bottom microplates. The 175 µm thick glass bottom of the SensoPlate™ is equivalent to the light path of standard coverslips. The SensoPlate™ family is available sterile with lid.

The footprint of all glass bottom microplates is conform to the ANSI 1–2004 standard.

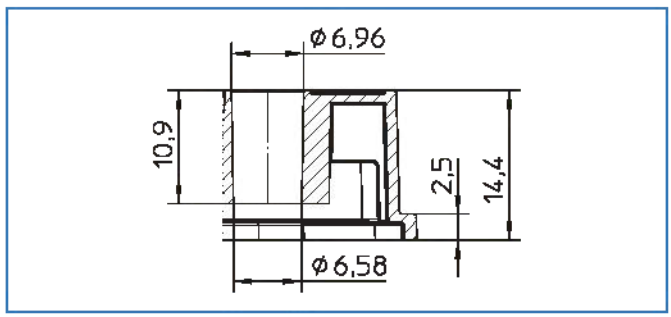


Figure 2:
Well profile: 96 well SensoPlate™
Total volume: 392 µl
Working volume: 25–340 µl

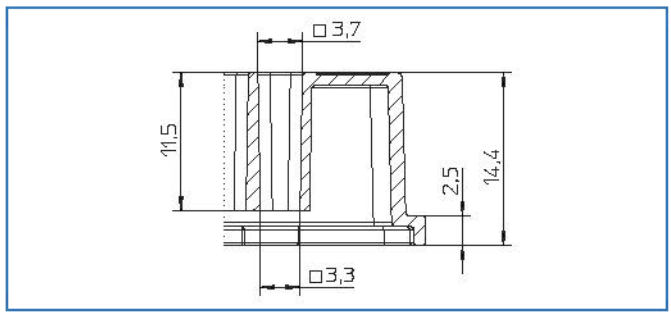


Figure 3:
Well profile: 384 well SensoPlate™
Total volume: 138 µl
Working volume: 10–130 µl

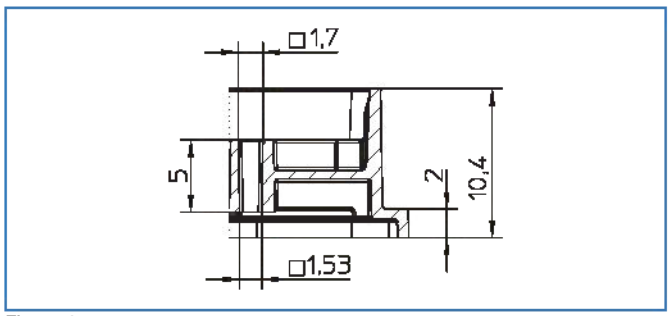
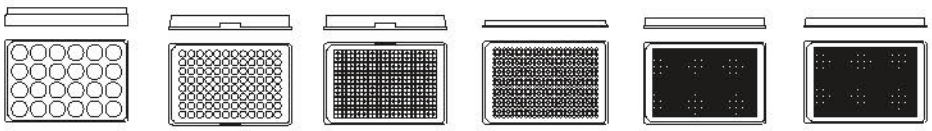


Figure 4:
Well profile: 1536 well SensoPlate™
Total volume: 12.6 µl
Working volume: 3–10 µl

SensoPlate™

24, 96, 384, 1536 Well SensoPlate™



	662892	655892	781892	788896	782892	783892
Cat.-No.						
Well format	24 well	96 well	384 well	384 well	1536 well	1536 well
Well profile	F-bottom	F-bottom	F-bottom	Small Volume™	F-bottom	F-bottom
Bottom	glass	glass	glass	glass	glass	glass
Colour	black	black	black	black	black	black
Sterile	+	+	+	+	+	+
Lid	+	+	+	-	+	+
Quantity per bag/case	1/12	1/16	1/16	1/16	1/16	1/16
Plate design				LoBase	HiBase	LoBase

UV-Star® Microplates

UV/VIS spectroscopy is a classical analytical method for determining the chemical constitution of a substance and its concentration in aqueous solution. UV/VIS spectroscopy is usually conducted in quartz glass cuvettes. However, cuvettes do not provide sufficient throughput when dealing with large amounts of samples, and microplates can be used to speed up work.

Standard polystyrene microplates are only partially suitable for transmission measurements in the UV. Polystyrene absorbs UV especially in the short-wavelength range (< 320 nm). µClear® microplates with a thin polystyrene film base already have much lower background values and can be used up to 340 nm without any problem. The adaptation of the patented µClear® process technology to a new, innovative UV-transparent material has made it possible to produce microplates that extend the transmission range up to 230 nm (Fig. 1, Table 1).

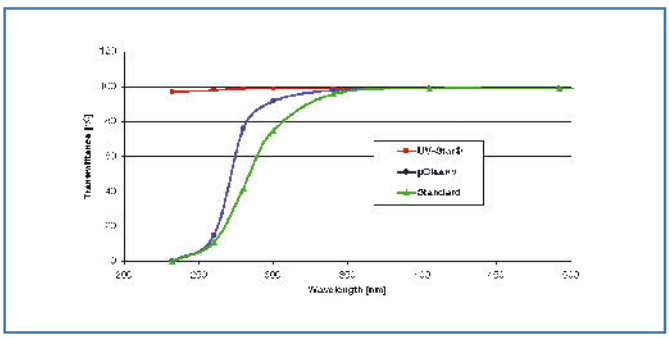


Figure 1:
Light transmission of UV-Star® and µClear® microplates compared with a conventional microplate

For the determination of nucleic acid and protein concentrations at 260 nm or 280 nm without background interference UV-Star® microplates are the ideal alternative to expensive and fragile quartz glass plates or cuvettes. UV-Star® plates are also DMSO-resistant and can be stored at -20 °C without any problem.

	Transparent standard polystyrene microplates with solid bottom	Black/white polystyrene microplates with film bottom (µClear®)	UV-Star® Microplates
Wavelength	For optical measurements above 400 nm	For optical measurements above 340 nm	For optical measurements between 230 and 340 nm

Table 1:
Guideline for the selection of the most suitable microplate for optical measurements

In accordance with Lambert Beer's Law, the amount of absorbed light in a sample is proportional to the concentration and layer thickness (i.e. pathlength) of the substance to be measured (Fig. 2).

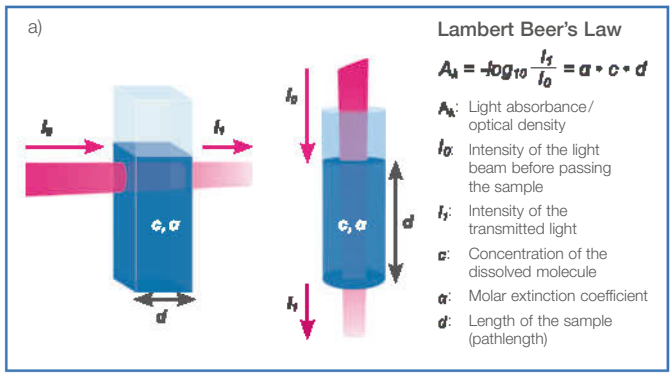


Figure 2:
Lambert Beer's Law.
Fixed pathlength in a cuvette (a) compared to a variable pathlength in a microplate well (b).

In classical spectral photometry with quartz glass cuvettes, measurement is made horizontally with a set pathlength of usually 1 cm. Given a known coefficient of extinction and a standardised distance of travel, the concentration of a substance can be determined without standards, although a large amount of sample is required to completely fill a cuvette.
After measurement, the sample measured is only of limited further use as a result of the risk of contamination. In the case of concentration determinations in microplates, the measurement is made vertically and the layer thickness of the sample to be measured is dependent on the sample volume (Fig. 2).
Even with smaller sample volumes, the resulting layer thicknesses are sufficient for precise measurement. At a constant sample volume, concentrations can be determined with the aid of a calibration curve. In the case of a varying sample volume, the layer thickness can either be calculated mathematically (→ Technical Appendix) or determined optically taking into account the absorption of water in the infrared range [1].

[1] Rieger, A., Hale, P.D.: Übertragung spektralphotometrischer Daten von Küvetten auf Microplatten [Transmission of spectral photometric data from cuvettes to microplates]. LaborPraxis, 05 (2002): 72–76

!

Further information on UV/VIS spectroscopy
→ **Application Note "UV/VIS Spectroscopy"** (F073041)

UV-Star® Microplates have also become increasingly important for sophisticated technologies such as acoustic liquid handling.
→ **Brochure „Performance. Throughput. Reliability. – Intelligent Solutions for Sample Storage"** (F073917)

Well Profile

Well profile of a standard 96 and 384 well UV-Star® microplate (Fig. 3 and Fig. 4) and well profile of 96 well half area UV-Star® microplate (Fig. 5):

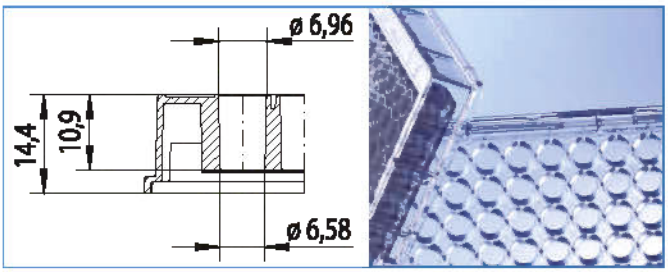


Figure 3:
Well profile: 96 well UV-Star® microplate
Total volume: 392 µl
Working volume: 25–340 µl

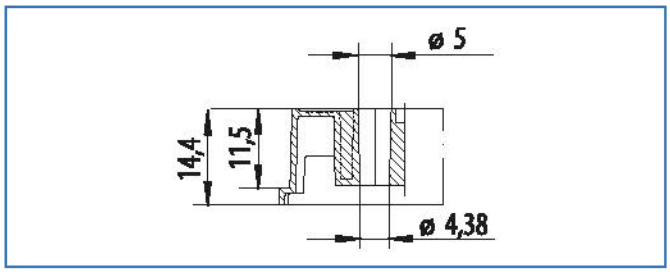


Figure 5:
Well profile: 96 well half area UV-Star® microplate
Total volume: 199 µl
Working volume: 15–175 µl
Standardised pathlength (1 cm = 170 µl, 0.5 cm = 80 µl)

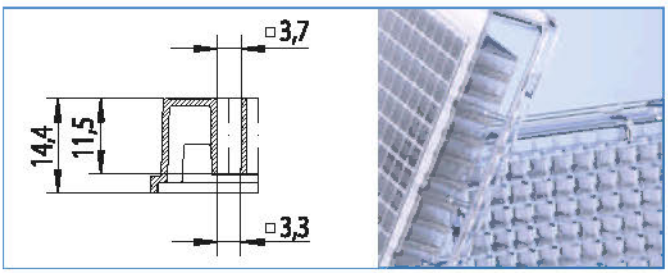


Figure 4:
Well profile: 384 well UV-Star® microplate
Total volume: 131 µl
Working volume: 15–110 µl

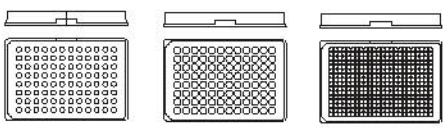
96, 384 Well UV-Star® Microplates

96, 384 Well UV-Star® Microplates

Compound Storage Microplates for Acoustic Liquid Handling p. 111

- Optical window down to 230 nm ideal for nucleic acid determinations at 260 nm/280 nm
- For measurements of protein concentration at 280 nm

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



Cat.-No.	675801	655801	781801
Well format	96 well	96 well	384 well
Well profile	half area	F-bottom/ chimney well	F-bottom
Bottom	film bottom	film bottom	film bottom
Colour	clear	clear	clear
Sterile	-	-	-
Lid	-	-	-
Quantity per bag/case	10/40	10/40	10/40

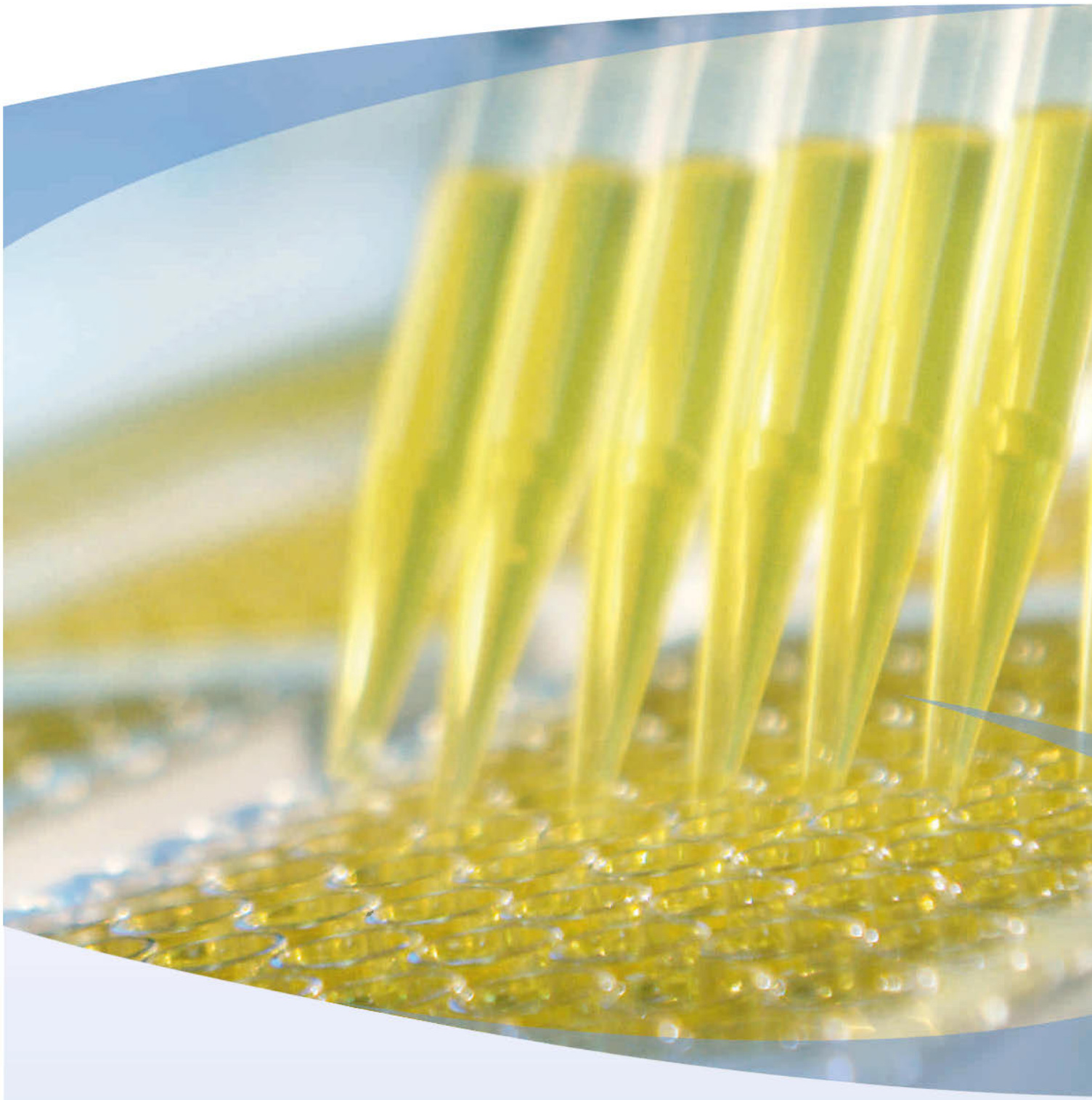
Sample Management

see page 219

Biobanking and Low Volume Sample Storage

- *Low Volume Sample Management Products*
- *Traditional Cryo.s™*
- *Cryo.s™ with Datamatrix for Biobanking/Low Volume Sample Storage*
- *8-Channel Handheld Capper/Decapper*
- *A range of Rack Scanners*
- *Storage Boxes and Sample Tracking Racks*

Contact us: Tel: **01453 825255** email: **info.uk@gbo.com**



3 Immunology / HLA

Immunology

ELISA (Enzyme-Linked Immunosorbent Assay) is probably the most widely used biochemical method in laboratory analysis and diagnostics. Analytes such as peptides, proteins, antibodies and hormones can be detected selectively in low concentrations among a multitude of other substances and be quantified. Additionally, ELISAs are rapid, sensitive, cost-effective and can be performed in a high-throughput manner.

ELISA is used in a variety of different assay types (e. g. direct ELISA, indirect ELISA, sandwich ELISA, competitive ELISA). Nevertheless, all ELISA variants are based on the same principle (Fig. 1), the binding of one assay component – antigen or specific antibody – to a solid surface and the selective interaction between both assay components. Molecules not specifically interacting with the assay component bound to the solid surface are washed away during the assay.

For detection of the interaction the antibody or antigen is labelled or linked to an enzyme (direct ELISA; Fig. 2a). Alternatively, a secondary antibody conjugate can be used (indirect ELISA; Fig. 2b). The assay is processed by adding an enzymatic substrate to produce a measurable signal (colorimetric, fluorescent or luminescent). The strength of the signal indicates the quantity of analytes in the sample.

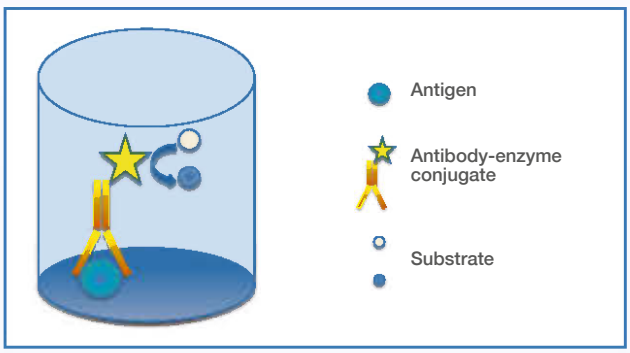


Figure 1: ELISA principle

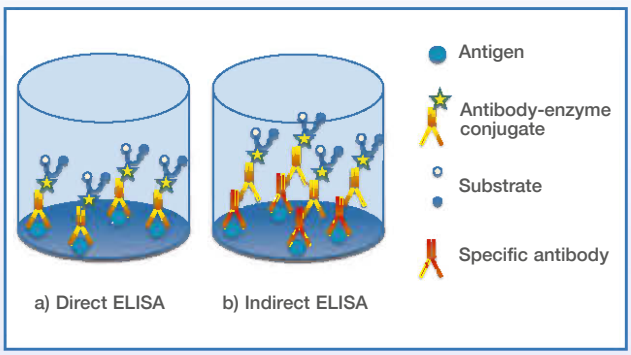


Figure 2: Direct and indirect ELISA

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Further information on ELISA

→ **Forum No. 9: Microplates for enzyme-linked immunosorbent assays (ELISA)** (F073004)
→ **Application Note "Insulin ELISA on high binding MICROLON® 600 and CELLSTAR® microplates"** (F073106)
→ **Application Note "Influence of coating buffer and incubation conditions on ELISA performance"** (F073118)

INFORMATION

Watch our video
„Step by Step to a Leading High-Quality Product: High-Quality Microplates for Immunological Assays"

Surface Properties and Microplate Colour

A key step in ELISA is the binding of one assay component – antigen or antibody – to the solid surface by passive adsorption. Therefore, the features of this surface are crucial for the performance of the assay. All ELISA microplates from Greiner Bio-One are made out of high-quality virgin polystyrene. The resin is highly transparent and therefore ideally suited for optical measurements. Due to its chemical nature polystyrene is a hydrophobic compound. Hydrophilic groups can be introduced to polystyrene surfaces by physical treatment. Greiner Bio-One offers two surface qualities for ELISA microplates: the hydrophilic **high binding** products and the less hydrophilic **medium binding** products.

Since attachment to a solid surface based upon passive adsorption depends as well on the properties of the molecule to be bound, it is therefore advisable to compare the performance of high binding and medium binding products when developing a new assay.

Beside products made of clear polystyrene for colorimetric measurements, Greiner Bio-One offers a wide variety of black and white ELISA microplates for luminescence and fluorescence measurements. Colour and surface properties can be deduced from the respective brand name of our products (Table 1).

Brand name	Surface property	Colour
MICROLON® 200	Medium binding	clear
MICROLON® 600	High binding	clear
FLUOTRAC™ 200	Medium binding	black
FLUOTRAC™ 600	High binding	black
LUMITRAC™ 200	Medium binding	white
LUMITRAC™ 600	High binding	white

Table 1: Assignment of brand names and properties of ELISA microplates

Quality aspects

We set high standards on the quality of our immunological products, especially on consistency and reproducibility of binding properties. As the raw material has a major influence on the binding properties of the final product, the incoming raw material used for ELISA microplates is routinely monitored for identity and immunological quality. Sample plates are tested with an immunoassay (ELISA, LIA or FIA, depending on their applications) and must fulfil the following criteria:

- For intra-plate homogeneity the coefficient of variation (CV) must not exceed 5 % for colorimetric or 10 % for fluorescence and luminescence assays.
- For all immunological products, to provide constant binding properties, the CV for five tested plates must not exceed 10 %. Additionally, the ratio of new sample plates to reference plates has to be in the range of 100 +/-10 %.

The main criterion for our ELISA microplates is a stable coefficient of variation (CV) from batch to batch which is monitored over a long period (Fig. 3).

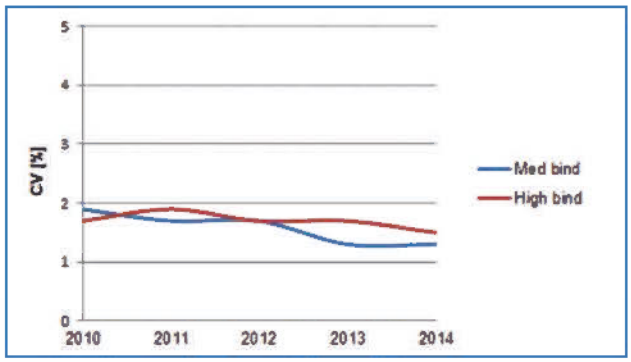


Figure 3: Coefficient of variation (CV) of tested raw material batches from 2010 to 2014 for transparent microplates (med. and high binding)

If the criteria have been met, the raw material batch is approved and released for the production of ELISA microplates.

The number of the raw material batch used can be found on the package box, alongside the shelf life, the lot number, a consecutive box number and an in-process control number.

96 Well ELISA Microplates

Greiner Bio-One has been manufacturing microplates for diagnostics and immunological research for over 30 years. A wide variety of microplates with different surface treatments and well profiles is available. The microplate footprint is compatible with automated systems.

Further information on immunological 96 well microplates (FLUOTRAC™ and LUMITRAC™ microplates) and higher format immunological microplates (384 and 1536 well microplates)
→ chapter 2 p. 90–99, 95–96, 103

Well Profile

The well profile is a key feature in a 96 well microplate. Five different well profiles are available:

1. U-Bottom (Fig. 1)

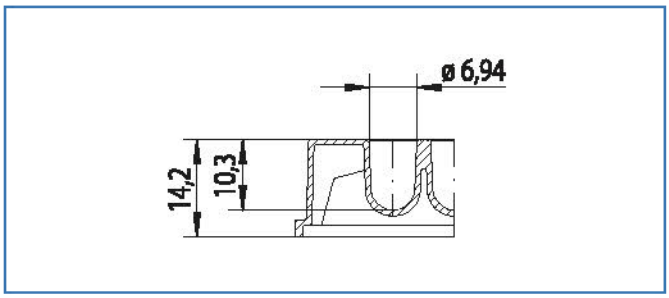


Figure 1:
Well profile: U-bottom
Total volume: 323 µl
Working volume: 40–280 µl

2. V-Bottom (Fig. 2)

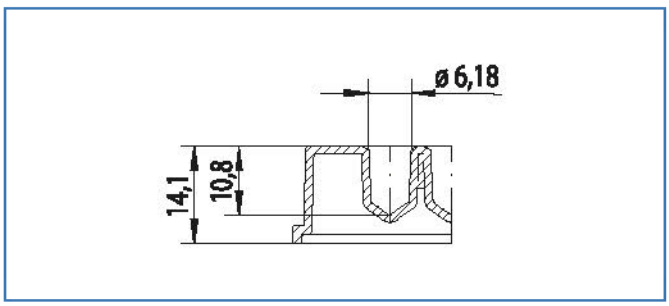


Figure 2:
Well profile: V-bottom
Total volume: 234 µl
Working volume: 40–200 µl

3. F-Bottom/Standard (ST) (Fig. 3)

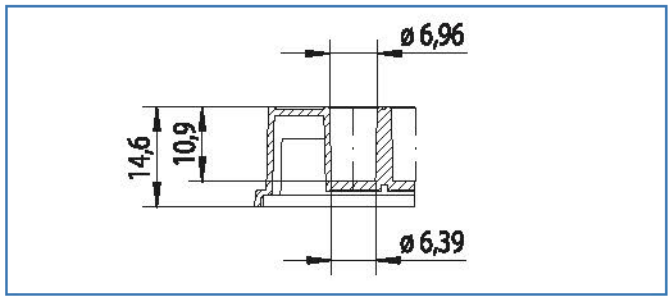


Figure 3:
Well profile: F-bottom/ST
Total volume: 382 µl
Working volume: 25–340 µl

4. F-Bottom/Chimney Well (Fig. 4)

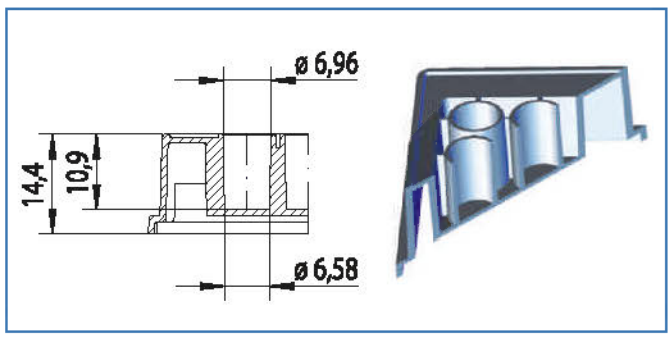


Figure 4:
Well profile: F-bottom/chimney well
Total volume: 392 µl
Working volume: 25–340 µl

5. Half Area (Fig. 5)

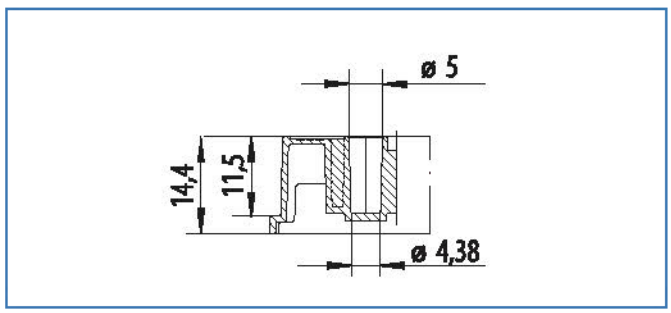
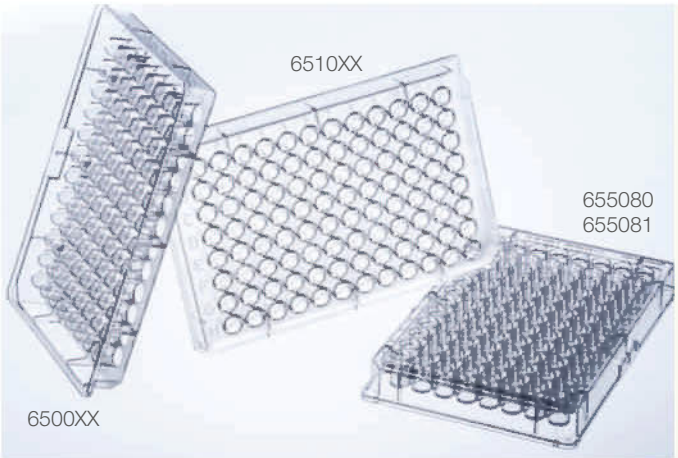


Figure 5:
Well profile: Half area
Total volume: 199 µl
Working volume: 15–175 µl

Further information on well profiles → p. 88–89.

Detailed information about wetted surface and surface/volume ratios
→ Technical Appendix p. 286–287

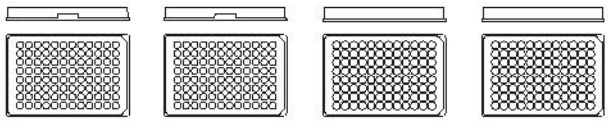


96 Well ELISA Microplates
U-Bottom/V-Bottom/F-Bottom Half Area

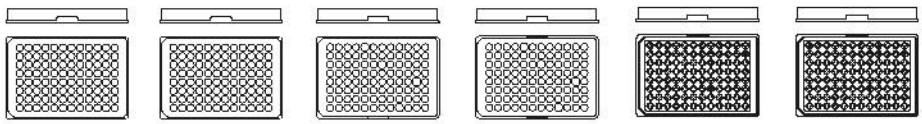
Microplate Centrifuge p. 251

- Manufactured from crystal clear polystyrene
- **New:** Clear 96 well microplates (F-bottom/chimney well) now with black printing for easy plate identification (→ p. 27)

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



Cat.-No.	650001	650061	651001	651061
Well format	96 well	96 well	96 well	96 well
Well profile	U-bottom	U-bottom	V-bottom	V-bottom
Binding	MICROLON® 200 med. binding	MICROLON® 600 high binding	MICROLON® 200 med. binding	MICROLON® 600 high binding
Colour	clear	clear	clear	clear
Lid	-	-	-	-
Quantity per bag/case	10/40	10/40	10/40	10/40



Cat.-No.	655001	655061	655080	655081	675001	675061
Well format	96 well	96 well	96 well	96 well	96 well	96 well
Well profile	F-bottom/ST	F-bottom/ST	F-bottom/ chimney well	F-bottom/ chimney well	half area	half area
Binding	MICROLON® 200 med. binding	MICROLON® 600 high binding	MICROLON® 200 med. binding	MICROLON® 600 high binding	MICROLON® 200 med. binding	MICROLON® 600 high binding
Colour	clear	clear	clear	clear	clear	clear
Lid	-	-	-	-	-	-
Quantity per bag/case	10/40	10/40	10/40	10/40	10/40	10/40

96 Well ELISA Strip Plates

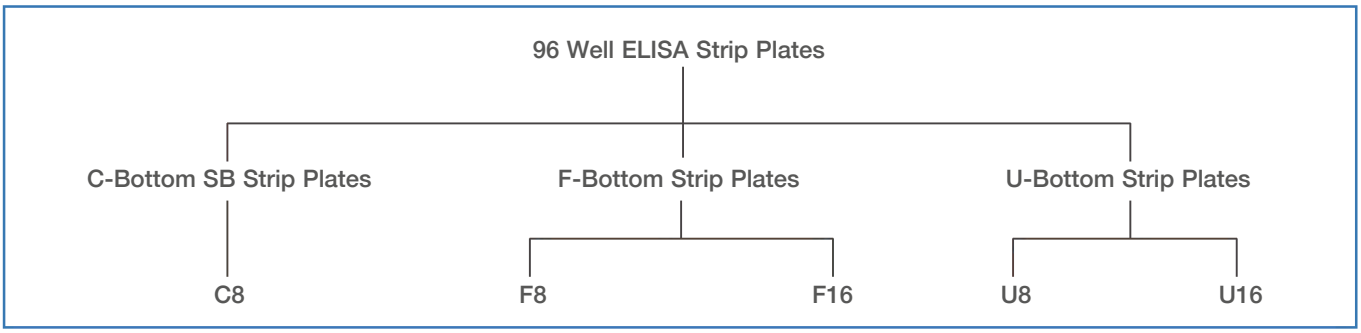


Figure 1:
Overview of the microplates available in strip format

Microplates in strip format offer the advantage of greater flexibility in diagnostics. Individual strips can be removed from the support frame so that the number of tests to be performed can be adjusted to the number of samples, and is not predetermined by the microplate format used. In addition, the individual strips of a microplate can be subjected to a wide variety of different test conditions. An overview of the available microplates in strip format is provided in Fig. 1.

Well Profile

Detailed information about wetted surface and surface / volume ratios
→ Technical Appendix p. 286–287

1. C-Bottom SB (Single-break) Strip Plates

The "C" describes a flat-bottom profile with rounded corners (Fig. 2). The rounded corners mean that the individual wells can be pipetted without leaving a residue, and the flat bottom still enables precise optical measurements. C-bottom SB strips are supplied as twelve 8 well strips, in a support frame with 96 spaces (12 x 8 matrix). The individual wells can be broken off separately ("single-break" option) and the number of tests performed can thus be precisely adjusted to the number of samples. C-bottom SB strip plates are available in clear polystyrene and additionally with a red, green, blue or yellow colour coding on the well rim.

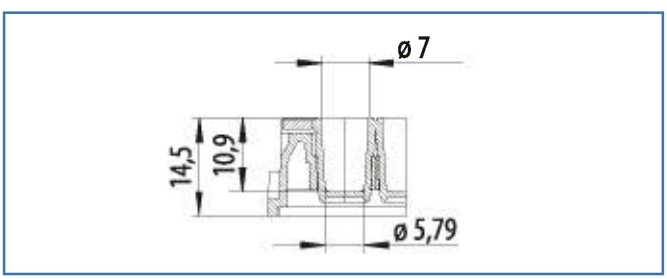


Figure 2:
Well profile: C-bottom
Total volume: 346 µl
Working volume: 20–300 µl

2. U-Bottom Strip Plates

96 well strip plates with a round bottom (U-bottom, Fig. 3) are available as both 8 well and 16 well strips. The "U" describes the round bottom form. U-bottom strip plates are ideally suited for agglutination tests.

- No corners, therefore simple and clean pipetting
- Suitable for +/- analyses

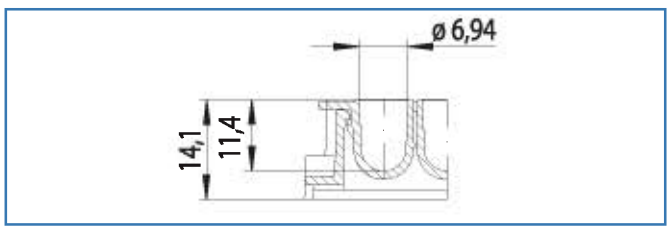


Figure 3:
Well profile: U-bottom
Total volume: 312 µl
Working volume: 50–280 µl

3. F-Bottom Strip Plates

96 well strip plates with a flat bottom (F-bottom, Fig. 4) are available

- as 8 well strips
- as 16 well strips

The "F" stands for the flat bottom of the wells. This well type is ideal for the most precise optical measurements as the measuring light beam is not deflected by the well profile. F-bottom strip plates are available in clear polystyrene (MICROLON®) and additionally in black (FLUOTRAC™) and white (LUMITRAC™).

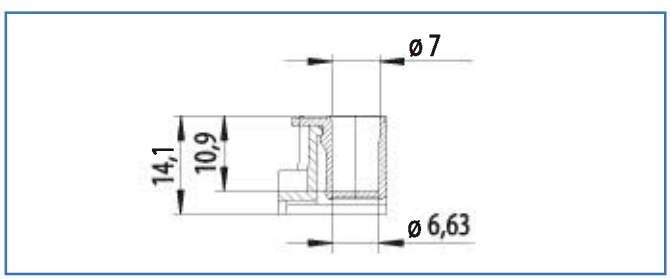
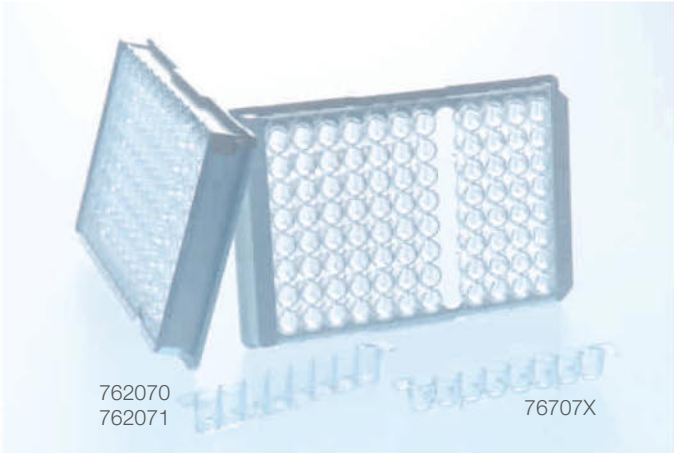


Figure 4:
Well profile: F-bottom
Total volume: 388 µl
Working volume: 20–350 µl

U8 and F8 Strip Plates



U8 and F8 Strip Plates
U8 clear
F8 clear/white/black

- Strips mounted in frame

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

Cat.-No.	767070	767071
Description	strip plate	strip plate
Quantity x strip design	12 x U8 strips	12 x U8 strips
Well profile	U-bottom	U-bottom
Binding	MICROLON® 200 med. binding	MICROLON® 600 high binding
Colour of strips	clear	clear
Quantity per bag/case	10/100	10/100

Cat.-No.	762070	762071	762075	762074	762076	762077
Description	strip plate	strip plate	strip plate	strip plate	strip plate	strip plate
Quantity x strip design	12 x F8 strips	12 x F8 strips	12 x F8 strips	12 x F8 strips	12 x F8 strips	12 x F8 strips
Well profile	F-bottom	F-bottom	F-bottom	F-bottom	F-bottom	F-bottom
Binding	MICROLON® 200 med. binding	MICROLON® 600 high binding	LUMITRAC™ 200 med. binding	LUMITRAC™ 600 high binding	FLUOTRAC™ 200 med. binding	FLUOTRAC™ 600 high binding
Colour of strips	clear	clear	white	white	black	black
Quantity per bag/case	10/100	10/100	10/100	10/100	10/100	10/100

F16 and U16 Strip Plates

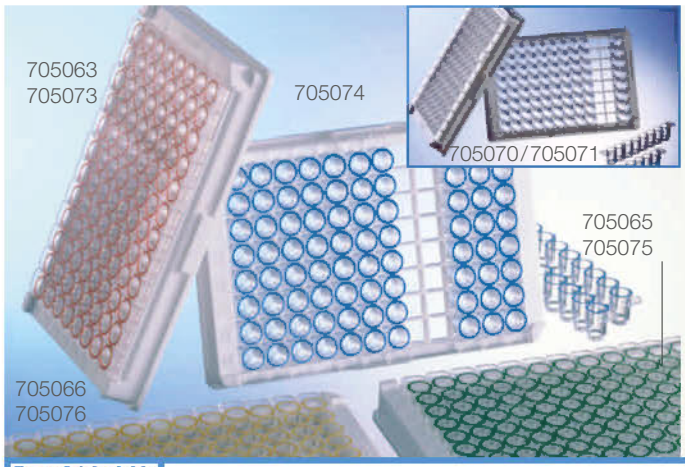
F16 and U16 Strip Plates
clear

- Black and white F16 Strip Plates on request
- Black and white U16 Strip Plates on request
- Strips mounted in frame

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

Cat.-No.	756070	756071	754070	754061
Description	strip plate	strip plate	strip plate	strip plate
Quantity x strip design	6 x F16 strips	6 x F16 strips	6 x U16 strips	6 x U16 strips
Well profile	F-bottom	F-bottom	U-bottom	U-bottom
Binding	MICROLON® 200 med. binding	MICROLON® 600 high binding	MICROLON® 200 med. binding	MICROLON® 600 high binding
Colour of strips	clear	clear	clear	clear
Quantity per bag/case	10/100	10/100	10/100	10/100

Single-break Strip Plates



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

C8 Single-break Strip Plates

Clear with/without Colour Coding

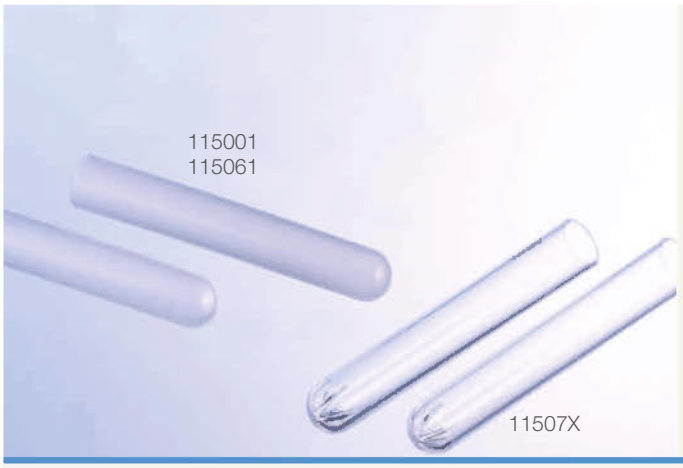
C8 Single-break Strip Plates without colour coding cell culture treated on request

- Strips mounted in frame

Cat.-No.	705070	705071	705063	705073	705074
Description	SB strip plate	SB strip plate	SB strip plate	SB strip plate	SB strip plate
Quantity x strip design	12 x C8 strips	12 x C8 strips	12 x C8 strips	12 x C8 strips	12 x C8 strips
Well profile	C-bottom	C-bottom	C-bottom	C-bottom	C-bottom
Binding	MICROLON® 200 med. binding	MICROLON® 600 high binding	MICROLON® 200 med. binding	MICROLON® 600 high binding	MICROLON® 600 high binding
Colour of strips	clear	clear	clear	clear	clear
Colour coding on the well rim	-	-	red	red	blue
Quantity per bag/case	10/100	10/100	10/100	10/100	10/100

Cat.-No.	705065	705075	705066	705076
Description	SB strip plate	SB strip plate	SB strip plate	SB strip plate
Quantity x strip design	12 x C8 strips	12 x C8 strips	12 x C8 strips	12 x C8 strips
Well profile	C-bottom	C-bottom	C-bottom	C-bottom
Binding	MICROLON® 200 med. binding	MICROLON® 600 high binding	MICROLON® 200 med. binding	MICROLON® 600 high binding
Colour of strips	clear	clear	clear	clear
Colour coding on the well rim	green	green	yellow	yellow
Quantity per bag/case	10/100	10/100	10/100	10/100

Immuno Tubes



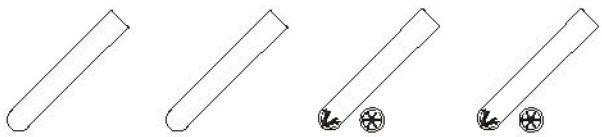
Immuno Tubes

Tubes p. 147–156
Cell Culture Tubes p. 35

- Manufactured from crystal clear polystyrene

Immuno tubes are often used for determining hormone levels, for example TSH (thyroid stimulating hormone). With a length of 75 mm and a diameter of 12 mm with and without a "star", they are available in both MICROLON® 200 and MICROLON® 600 quality.

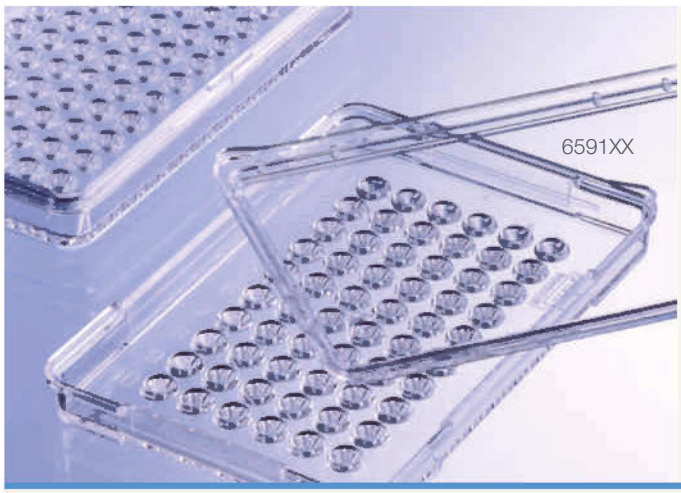
The so-called "star" at the bottom of the tubes serves to increase the surface and thus makes it possible to bind larger amounts of antigens or antibodies.



Cat.-No.	**115001**	**115061**	**115070**	**115071**
Bottom design	round	round	round with star	round with star
ø [mm] x height [mm]	12x75	12x75	12x75	12x75
Volume [ml]	5	5	5	5
Binding	MICROLON® 200 med. binding	MICROLON® 600 high binding	MICROLON® 200 med. binding	MICROLON® 600 high binding
Quantity per bag/case	250/2000	250/2000	250/2000	250/2000

Terasaki Plates

60 Well and 72 Well Terasaki Plates



Terasaki Plates

Microscopic coverslip for Terasaki plates
Cat.-No. 653081

- Manufactured from crystal clear polystyrene

Terasaki Plates
The human leucocyte antigen (HLA) system is the major histo-compatibility complex (MHC) of humans and is composed of the two polymorphic classes HLA-I (A, B, and C) and HLA-II (DR, DQ, and DP). Basically, four different areas of indication can be distinguished for HLA typing:

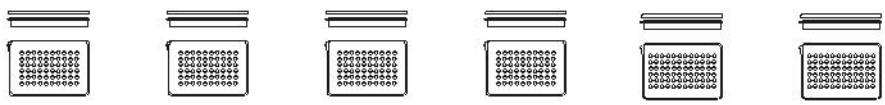
- Transplantation
- Transfusion
- Disease association
- Forensic

The serological determination of HLA proteins of the HLA-A, -B, -C and -DR genetic positions is primarily performed with the complement-dependent microlymphocytotoxicity test (LCT) or Terasaki test, which has been standardised since 1964. The basis for this test method is the cytolysis of the lymphocytes to be tested, which is caused by the antibody-antigen mediated activation of the complement system. Permeabilised lymphocytes are generally stained with chromophores or fluorophores and evaluated microscopically.

Greiner Bio-One Terasaki plates are suitable for all applications for serological determination of HLA antigens. The plates are supplied either with 60 or 72 wells, the plate dimensions stay the same. The individual wells have a volume of 10 µl.

Cat.-No. 659180 contains one lid per bag.

We provide Terasaki plates with 1 years' stability on the surface treatment.



Cat.-No.	653180	653190	659180	659190	654180	769190
Well format	60 well	60 well	60 well	60 well	72 well	72 well
Working volume per well [µl]	10	10	10	10	10	10
Max. volume per well [µl]	11.5	11.5	11.5	11.5	11.5	11.5
Stackable	-	-	+	+	-	+
TC surface treatment	+	+	+	+	+	+
Lid	+	+	+	+	+	+
Quantity per bag/case	10/270	120*)/480	10/200	150*)/1200	10/270	150*)/1200
		*) folding carton		*) folding carton		*) folding carton

4 Microbiology / Bacteriology

Petri Dishes

Petri dishes are one of the most important products in a bacteriological laboratory and within Greiner Bio-One they are produced in sizes of 35, 60, 94, 100 and 145 mm. Manufactured from high-grade polystyrene the petri dishes have exceptional optical clarity for microscopic analysis as well as heat resistance for use with hot agar. The dishes are available in both vented and non-vented design and the standard round design is supplemented by a square-profile dish and the OneWell Plate™.

To enable parallel testing of a single sample using different agars, divided dishes with two or three compartments are available. The product range is completed by contact dishes and graduated germ count dishes.

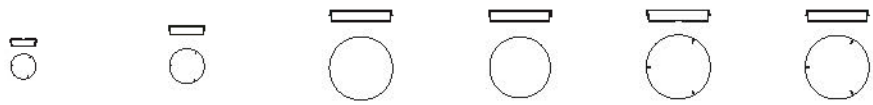
For exact dimensions of our petri dishes, please refer to the product data sheets on our website.

Petri Dishes

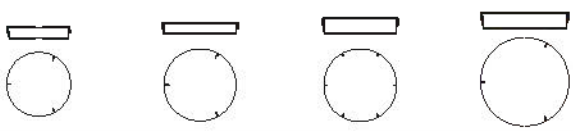
Petri Dishes

Cell Culture Dishes p. 20

- Available in different nominal sizes
- Easy stacking
- Vented for improved gas exchange and non-vented for long incubation period
- Sterilised dishes available on request
- Manufactured from crystal clear polystyrene

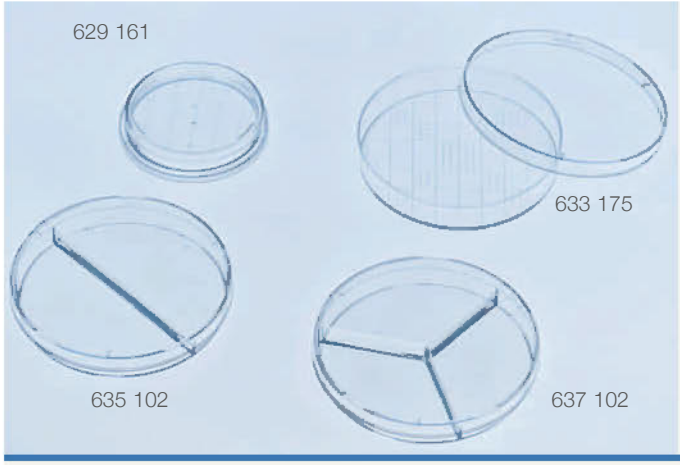


Cat.-No.	627102	628102	632180	632102	633185	633180
Description	petri dish	petri dish	petri dish	petri dish	petri dish	petri dish
Nominal size ø x height [mm]	35 x 10	60 x 15	94 x 16	94 x 16	94 x 15	94 x 16
Vents	+	+	-	-	+	+
Heavy design	-	-	-	+	-	-
Quantity per bag/case	10/740	20/600	20/480	20/480	20/480	20/480



Cat.-No.	633102	663102	664102	639102
Description	petri dish	petri dish	petri dish	petri dish
Nominal size ø x height [mm]	94 x 16	100 x 15	100 x 20	145 x 20
Vents	+	+	+	+
Heavy design	+	+	+	-
Quantity per bag/case	20/480	20/420	15/360	15/120

Petri Dishes – Special Models



Petri Dishes – Special Models
Germ Count Dish
Contact Dishes

Cell Culture Dishes p. 20

- Manufactured from crystal clear polystyrene

Petri Dishes – Special Models
- Divided dishes for comparative measurements/conditions or different agar systems
- Sterile dishes available on request
- Vented design
- Easy stacking

Germ Count Dish
- Graduation and division into 10 mm squares to enable quick and easy analysis (Fig. 1)
- Vented design
- Easy stacking

Contact Dishes
Contact dishes are used in hygiene monitoring including detection of microorganisms and testing the effectiveness of cleaning and disinfection on flat surfaces by means of contact cultures. Particularly in the pharmaceutical and food industries, analysis of germ count and germ species on surfaces is of major importance to detect and identify possible sources of contamination.

- Sterilised by irradiation
- Vented and non-vented options
- Graduation and division into 10 mm squares to enable quick and easy analyses (Fig. 2)

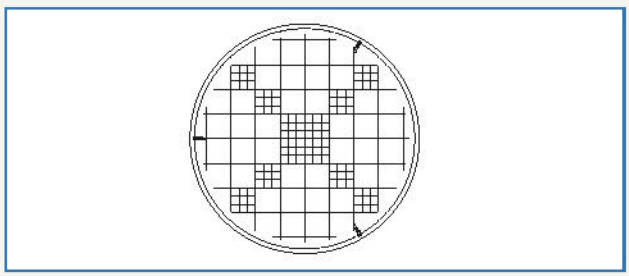


Figure 1:
Graduation of the germ count dish

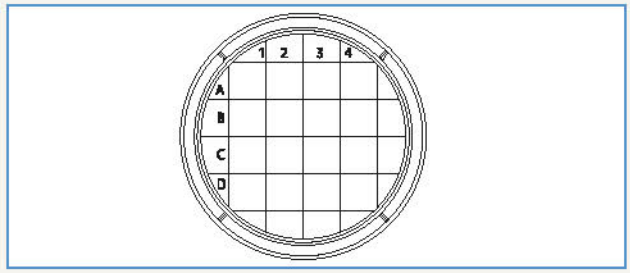
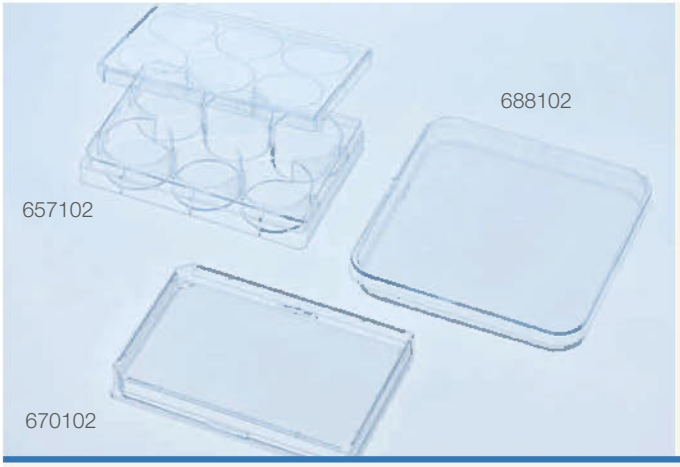


Figure 2:
Graduation of the contact dish

Cat.-No.	635102	637102	633175	629161	629180
Description	petri dish	petri dish	germ count dish	contact dish	contact dish
Special feature	2 compartments	3 compartments	graduated	graduated	graduated
Nominal size ø x height [mm]	94 x 15	94 x 15	94 x 16	65 x 15	65 x 15
Volume/well [ml]	20	12	-	-	-
Vents	+	+	+	-	+
Sterile	-	-	-	+	+
Quantity per bag/case	20/480	20/480	20/480	20/600	20/600



Macroplate
Square Petri Dish
CELLSTAR® OneWell Plate™

CELLSTAR® OneWell Plate™ for cell culture applications p. 25

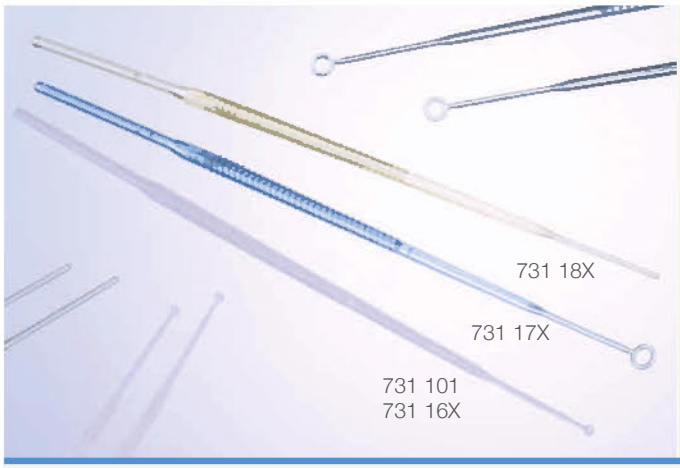
- Manufactured from crystal clear polystyrene

Macroplate
- 35 mm diameter per well
- Practical and space-saving alternative to six standard petri dishes
- Numeric coding allows easier identification of wells

CELLSTAR® OneWell Plate™
Filled with agar, the OneWell Plate™ can be used as an HTS petri dish for the cultivation and screening of bacteria. With an area of 95 cm^2, the OneWell Plate™ also fills the gap between the petri dishes Cat.-No. 664102 (58 cm^2) and Cat.-No. 639102 (143 cm^2)/688102 (144 cm^2). 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.
Beside general bacteriological applications, the 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). For dot blotting and hybridisation the OneWell Plate™ can be used as a membrane holder and storage device.

Cat.-No.	657102	688102	670102
Description	macroplate with lid	petri dish	OneWell Plate™
Special feature	6 well plate	square	microplate format
Length x width [mm]	127.8 x 85.5	120 x 120	127.8 x 85.5
Volume/well [ml]	16	-	-
Vents	+	+	+
Sterile	-	-	-
Quantity per bag/case	2/100	10/240	8/32

Disposable Inoculation Loops / Needles



Disposable Inoculation Loops / Needles / Spreaders

- Sterilised by irradiation
- Needles ideal for picking single colonies
- Flexible loops for easier collection and inoculation
- Colour coding for volume differentiation
- Single and bulk packaging options

Cat.-No.	731101	731161	731165	731170	731171	731175
Description	inoculation loop	inoculation loop	inoculation loop	inoculation loop	inoculation loop	inoculation loop
Volume [µl]	1	1	1	10	10	10
Length [mm]	200	200	200	200	200	200
Colour	white	white	white	blue	blue	blue
Sterile	+	+	+	+	+	+
Quantity per bag/case	50/2000	1/600	10/3000	50/2000	1/600	10/3000

Cat.-No.	731180	731181	731185	730190	730191	730192
Description	inoculation needle	inoculation needle	inoculation needle	L- shaped spreader	L- shaped spreader	Y- shaped spreader
Length [mm]	200	200	200	-	-	180
Colour	yellow	yellow	yellow	blue	blue	blue
Sterile	+	+	+	+	+	+
Quantity per bag/case	50/2000	1/600	10/3000	20/500	5/500	1/250

Faeces / Urine Containers

Faeces / Urine Containers

Further Containers see page 157–160

- Available in different sizes
- Range of caps and spoons
- Easy and safe handling
- CE-marked
- Bottom part of containers manufactured from crystal clear polystyrene

CE



Cat.-No.	201151	201180	443103
Description	universal container	boric acid urine container	faeces container with fixed spoon
Cap colour	white	red	blue
Printed label	+	+	+
Volume [ml]	30	30	30
Quantity per case	400	400	400

Swab Tubes / Swabs

Swab Tubes / Swabs

- Suitable for collection and transport of non-human bacteriological and cytological samples
- Sterilised by irradiation
- Swabs are made of cotton

Swab tubes are suitable for taking non-human bacteriological, serological or cytological samples in veterinary research. They are also useful for hygienic controls in food industry as well as in environmental sampling.

Cat.-No.	SWA5	SWA6
Description	plain swab wooden stem cotton tip	plain swab wooden stem cotton tip
Transport Media	-	-
Sterile	+	+
Individually wrapped	-	+
Quantity per bag/case	100/1000	1/1000

Square 'Honey' Jars

Square 'Honey' Jars

- Large mouth storage container
- Secure screw lid
- Ideal for dry powders and other solid materials

Cat.-No.	261170	261171	261180	261181
Volume [ml]	375	375	375	375
Label	-	-	+	+
Sterile	-	+	-	+
Quantity per case	100	100	100	100

Water Sample Bottles

Water Sample Bottles

- Designed for sampling from water supplies
- Manufactured from chemically inert polyethylene
- Available with or without Sodium Thiosulphate pentahydrate dosing
- Available in a range of sizes

Cat.-No.	210390	210395	230390	230395	250390	250395
Volume [ml]	300	300	500	500	1000	1000
Pre-dosed	+	-	+	-	+	-
Label	+	+	+	+	+	+
Sterile	+	+	+	+	+	+
Quantity per case	86	86	52	52	30	30

CELLdisc™ / CELLswing™

see pages 42 - 44

Designed to simplify Mass Cell Culture

CELLdisc™

- *Innovative design simplifies your workflow, eliminates multiple working steps and reduces the risk of contamination*
- *Compact single use cell culture device*
- *Predictable scale-up from 1,000cm² - 10,000cm²*
- *Optimised ventilation system with the option of active gassing*
- *Tissue Culture and* Advanced TC™ *surface treatments available*
- *USP Class VI certified*

CELLswing™

- *An automation solution for CELLdisc™*
- *Removes operator variability for a consistent result*
- *Minimises the risk of spillage and cross contamination*
- *Reduces the liklihood of RSI*

Contact us: Tel: **01453 825255** email: **info.uk@gbo.com**

5 Tubes / Beakers

Tubes/Multipurpose Beakers

The range of Greiner Bio-One tubes and multipurpose containers/beakers is very versatile and meets a wide variety of different demands.

Tubes

Tubes are made of the following materials:

Polystyrene: Is ideally suited for optical measurements as a result of its high clarity.

Polypropylene: Displays high thermal, mechanical and chemical resistance. It is therefore recommended for the storage of chemical and biological samples.

Polyethylene: Is characterised by high thermal and chemical resistance.

The range of tubes available:

- with round or conical bottom
- with or without skirt
- in sterile or non-sterile version

In addition, it is possible to order appropriate closures in the form of grip stoppers and screw caps. The product range is completed by tubes with a two-position vent stopper. This special stopper enables ventilation or an airtight closure of the tube, depending on the position of the stopper.

Please refer to the Technical Appendix for information on the max. relative centrifugal force (RCF) and chemical and thermal resistance of our tubes.

!

Transportation by aircraft
Polypropylene tubes with Cat.-No. 188261/188271/227261/227270 meet the pressure requirements for transportation by aircraft. Hydrostatic pressure testing was performed according to the ICAO. IATA DGR guidelines. A certificate of conformity may be provided on request.

Multipurpose Containers/Beakers

Multipurpose containers are supplied in different sizes and the following materials:

- Polystyrene for high clarity
- Polypropylene for high thermal, mechanical and chemical resistance

Depending on the application and requirements, it is possible to choose between different closures (plastic, metal) and labels (without, plain, printed).

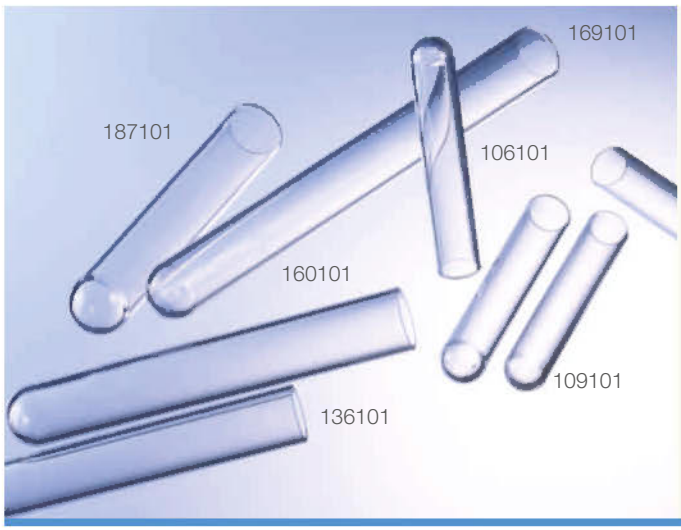
The product range is rounded off by containers for plant tissue culture and *Drosophila melanogaster* breeding.

!

The dimensions and volumes of our tubes and beakers are only nominal sizes. For exact dimensions and volumes, please refer to the product data sheets on our website www.gbo.com/bioscience.

Tubes

Tubes with Round Bottom



Polystyrene Tubes
Round Bottom

- Cell Culture Tubes p. 35
- Closures p. 161
- Mini Block Heater p. 254
- Overview: See Technical Appendix for max. relative centrifugal force (RCF)

- Appropriate grip stoppers for each tube are listed in the table with their Cat.-No.
- Available in different sizes
- High clarity
- Available in different packaging units

Cat.-No.	103101	106101	109101	112101	115101	136101
ø [mm] x height [mm]	10.5x40	11x63	11x70	12x55	12x75	14x100
Nominal volume [ml]	2	3.5	4	4	5	10
Working volume [ml]	1.5	3	3.5	3	4	8
Sterile	-	-	-	-	-	-
Grip stopper, Cat.-No.	301321	302321	302321	303321	303321	307321
Quantity per bag/case	500/3000	250/3000	240/2880	240/3600	250/2000	1400

Cat.-No.	160101	187101	169101
ø [mm] x height [mm]	16x100	17x100	16x152
Nominal volume [ml]	12	14	20
Working volume [ml]	10.5	12	18
Sterile	-	-	-
Grip stopper, Cat.-No.	310321	318321	310321
Quantity per bag/case	1600	1500	1500

Polypropylene Tubes
Round Bottom

Closures p. 161
Mini Block Heater p. 254

- Polypropylene tubes have particularly good thermal, chemical and mechanical stability
- Material is ideally suited for the storage of samples
- Available in different sizes
- Appropriate grip stoppers for each tube are listed in the table with their Cat.-No.

Cat.-No.	112201	115201	160201	187201
ø [mm] x height [mm]	12x55	12x75	16x100	17x100
Nominal volume [ml]	4	5	12	14
Working volume [ml]	3	4	10	12
Sterile	-	-	-	-
Grip stopper, Cat.-No.	303321	303321	310321	318321
Quantity per bag/case	240/3600	250/2000	1600	1500

Polypropylene Tubes
Round Bottom
For Storage Box Cat.-No. 975502

Storage Box p. 107
Strip Cap Cat.-No. 365270 and 365261 (sterile)

Cat.-No.	102201	102261	102270
ø [mm] x height [mm]	8.5x44	8.5x44	8.5x44
Nominal volume per tube [ml]	1.3	1.3	1.3
Working volume per tube [ml]	1	1	1
Sterile	-	+	-
Tube chain with attached strip cap	-	+	+
Quantity per bag/case	1000	1000	1000

Polyethylene Tubes
Round Bottom

Closures p. 161
Mini Block Heater p. 254

- Available in two different sizes
- Polyethylene tubes are characterised by good thermal and chemical resistance


Cat.-No.	112301	115301
ø [mm] x height [mm]	12x55	12x75
Nominal volume [ml]	4	5
Working volume [ml]	3	4
Sterile	-	-
Grip stopper, Cat.-No.	303321	303321
Quantity per bag/case	240/3600	250/2000

Tubes with Conical Bottom

Polystyrene Tubes
Conical Bottom

Closures p. 161
Overview: See Technical Appendix for max. relative centrifugal force (RCF)

- High clarity
- Available with appropriate grip stoppers
- Ideal for small volumes and valuable sample material, since the sample collects at the conical bottom of the tube

Cat.-No.	172101
ø [mm] x height [mm]	16.5x103
Nominal volume [ml]	13
Working volume [ml]	11
Sterile	-
Grip stopper, Cat.-No.	317321
Quantity per bag/case	1500

Tubes with Screw Cap

Polystyrene Tubes

Screw Cap, Conical/Round Bottom

Further Closures p. 161
Cell Culture Tubes p. 34
Mini Block Heater p. 254

Tube No. 163177 also available as polypropylene version with white screw cap (Cat.-No. 163270)

Overview: See Technical Appendix for max. relative centrifugal force (RCF)



Cat.-No.	164180	164161	163177
Bottom design	conical	conical	conical
ø [mm] x height [mm]	16.8x100	16.8x100	17x100
Nominal volume [ml]	12	12	12
Working volume [ml]	12	12	12
Sterile	-	+	-
Screw cap	-	-	black
Bayonet cap*)	white	blue	-
Graduation	-	-	-
Writing area	-	-	-
Support skirt	+	+	-
Quantity per bag/case	1300	25/1000	900

*) open by a 1/3 turn




Cat.-No.	188161	188171	186161	186171
Bottom design	conical	conical	round	round
ø [mm] x height [mm]	17x120	17x120	17x120	17x120
Nominal volume [ml]	15	15	15	15
Working volume [ml]	14	14	15	15
Sterile	+	+	+	+
Screw cap	blue	blue	blue	blue
Graduation	+	+	-	-
Writing area	+	+	-	-
Support skirt	-	-	-	-
Quantity per bag/case	50*)/500	100/1000	50*)/500	100/1000

*) box

*) box

CELLSTAR® Polypropylene Tubes
15 ml, Screw Cap, Conical Bottom

Cat.-No. 188271 also available triple-packed p. 214

TRI

CELLSTAR® CELLreactor™
(polypropylene tube with filter screw cap) p. 36

New 5 ml Tube for perfect handling of intermediate volumes (1 ml to 5 ml) p. 245

Lab Equipment p. 250–254

Overview: See Technical Appendix for max. relative centrifugal force (RCF)

- Optimal mechanical, thermal and chemical stability
- White cap version for best cap labelling contrast

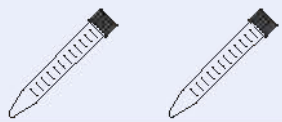
Free of detectable DNase, RNase, human DNA
non-pyrogenic
non-cytotoxic

Cat.-No.	188261	188271	188281	188285
Bottom design	conical	conical	conical	conical
ø [mm] x height [mm]	17 x 120	17 x 120	17 x 120	17 x 120
Nominal volume [ml]	15	15	15	15
Working volume [ml]	14	14	14	14
Sterile	+	+	+	+
Tube colour	natural	natural	natural	natural
Screw cap colour	blue	blue	white	white
Graduation	blue	blue	blue	blue
Writing area	white	white	white	white
Support skirt	-	-	-	-
Quantity per bag/case	50*)/500	100/1000	50*)/500	100/700

*) box

*) box

Light Protection Tubes



Cat.-No.	188283	188280
Bottom design	conical	conical
ø [mm] x height [mm]	17 x 120	17 x 120
Nominal volume [ml]	15	15
Working volume [ml]	14	14
Sterile	+	+
Tube colour	brown	brown
Screw cap colour	blue	blue
Graduation	blue	blue
Writing area	white	white
Support skirt	-	-
Quantity per bag/case	50*)/500	100/1000

*) box

CELLSTAR® Polypropylene Tubes

50 ml, Screw Cap, Conical Bottom

TRI

Cat.-No. 227261 also available triple-packed p. 214

CELLSTAR® CELLreactor™ (polypropylene tube with filter screw cap) p. 36

Lab Equipment p. 250–254

Overview: See Technical Appendix for max. relative centrifugal force (RCF)

- Optimal mechanical, thermal and chemical stability
- Light protection tubes for light-sensitive materials and reactions
- Available in different packaging units and types
- White cap version for best labelling contrast

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


Cat.-No.	210261	210270
Bottom design	conical	conical
ø [mm] x height [mm]	30x115	30x115
Nominal volume [ml]	50	50
Working volume [ml]	50	50
Sterile	+	+
Tube colour	natural	natural
Screw cap colour	blue	blue
Graduation	blue	blue
Writing area	white	white
Support skirt	+	+
Quantity per bag/case	25/450	25*)/300

*) box

Light Protection Tubes






Cat.-No.	227261	227270	227285	227281	227283	227280
Bottom design	conical	conical	conical	conical	conical	conical
ø [mm] x height [mm]	30x115	30x115	30x115	30x115	30x115	30x115
Nominal volume [ml]	50	50	50	50	50	50
Working volume [ml]	50	50	50	50	50	50
Sterile	+	+	+	+	+	+
Tube colour	natural	natural	natural	natural	brown	brown
Screw cap colour	blue	blue	white	white	blue	blue
Graduation	blue	blue	blue	blue	blue	blue
Writing area	white	white	white	white	white	white
Support skirt	-	-	-	-	-	-
Quantity per bag/case	20/500	25*/300	20/500	25*)/300	25*)/300	20/500

*) box *) box *) box

Polypropylene Microcentrifuge Tubes & Caps

Polypropylene Microcentrifuge Tubes

- Exceptional clarity coupled to a wide thermal range
- Minimal non-sprecific binding due to highly polished surfaces
- Inert polypropylene for safe, long term storage
- May be centrifuged to 25,000 x g
- Leak-free performance
- Extensive range of tube types, cap colours and sterility options

Greiner Bio-One Bio Tubes are more than just microcentrifuge tubes. They offer high performance in the most demanding molecular biology applications.

Free of detectable DNase, RNase
non-pyrogenic

Bio Tubes

Cat.-No.	693201	692201	717201	716201	723201	722201
Volume [ml]	0.5	0.5	1.5	1.5	2.0	2.0
Skirt	+	-	+	-	+	-
Sterile	-	-	-	-	-	-
Quantity per bag/case	500	500	500	500	500	500

Free of detectable DNase, RNase
non-pyrogenic

Caps for Bio Tubes

Cat.-No.	366380	366350	366381	366351	366382	366352
Colour	natural	natural	white	white	orange	orange
Tethered	-	+	-	+	-	+
Sterile	-	-	-	-	-	-
Quantity per bag/case	500	500	500	500	500	500

Cat.-No.	366383	366353	366384	366354	366385	366355
Colour	red	red	blue	blue	green	green
Tethered	-	+	-	+	-	-
Sterile	-	-	-	-	-	-
Quantity per bag/case	500	500	500	500	500	500

Cat.-No.	366386	366356	366387	366357
Colour	yellow	yellow	violet	violet
Tethered	-	+	-	+
Sterile	-	-	-	-
Quantity per bag/case	500	500	500	500

Reaction Tubes

Reaction Tubes

Overview: Max. Centrifuge Capacity in Technical Appendix

Lab Equipment p. 250–254

- High chemical and temperature resistance
- Available in different sizes
- Available for Eppendorf, Vitatron and Roche systems
- Brown reaction tube for light-sensitive materials
- Cat.-No. 616 2XX features a flat lid surface for easy labelling

New: 5 ml tubes for perfect handling of intermediate volumes (1 to 5 ml)

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

Cat.-No.	667201	742270	616201	616261	616283	618201
Description	reaction tube	“Cobas” cup	reaction tube	reaction tube	reaction tube	reaction tube
Colour	natural	blue	natural	natural	brown	natural
Volume [ml]	0.5	0.7	1.5	1.5	1.5	1.5
Graduation	-	-	+	+	+	-
Cap, attached	+	+	+	+	+	-
Suitable for	Vitatron	Roche	Eppendorf	Eppendorf	Eppendorf	Eppendorf
Sterile	-	-	-	+	-	-
Quantity per bag/case	1000/10000	500/15000	500/4000	500/4000	500/4000	500/3000

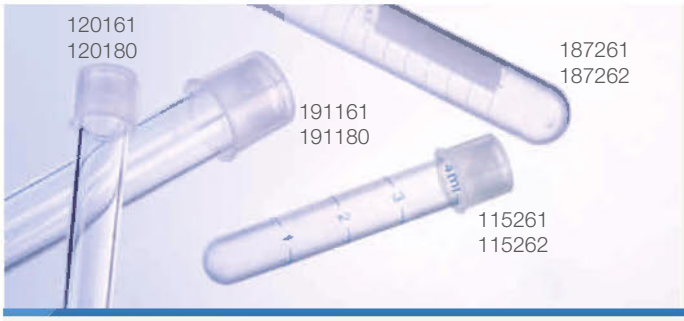
Cat.-No.	623201	725201	622201
Description	reaction tube	reaction tube	reaction tube
Colour	natural	natural	natural
Volume [ml]	2.0	5.0	5.0
Graduation	+	+	+
Cap, attached	+	+	+
Suitable for	Eppendorf	universal	universal
Sterile	-	-	-
Quantity per bag/case	500/4000	100/500	100/1000
		New	New

Free of detectable DNase, RNase
non-pyrogenic

Pre-assembled Tubes, sterile

Cat.-No.	693261	692261	717261	716261	723261	722261
Volume [ml]	0.5	0.5	1.5	1.5	2.0	2.0
Description	pre-capped	pre-capped	pre-capped	pre-capped	pre-capped	pre-capped
Cap colour	white	white	white	white	white	white
Sterile	+	+	+	+	+	+
Skirt	+	-	+	-	-	+
Quantity per bag/case	50/500	50/500	50/500	50/500	50/500	50/500

Tubes with Two-position Vent Stopper



Polystyrene Tubes
Polypropylene Tubes
Two-position Vent Stopper

Cell Culture Tubes p. 35

- Available in different sizes and packaging units
- Also available with graduation

Two-position vent stopper fulfils two functions (Fig. 1):
1. When attached lightly, this enables a uniform ventilation of the tube contents
2. When attached firmly by pressing in the stopper further, an airtight closure of the tube is achieved

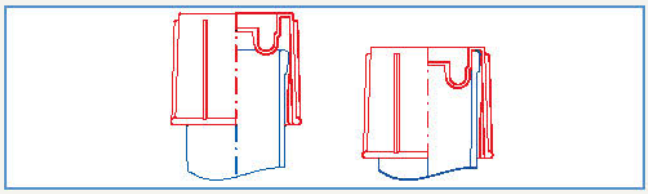


Figure 1:
Cross-section of a two-position vent stopper

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

Cat.-No.	120161	120180	191161	191180
Bottom design	round	round	round	round
Material	polystyrene	polystyrene	polystyrene	polystyrene
ø [mm] x height [mm]	12.4x75	12.4x75	18x95	18x95
Nominal volume [ml]	4.5	4.5	14	14
Working volume [ml]	4	4	12.5	12.5
Sterile	+	+	+	+
Two-position vent stopper	+	+	+	+
Graduation	-	-	-	-
Writing area	-	-	-	-
Quantity per bag/case	1/1000	25/2000	1/750	25/1000

Cat.-No.	115261	115262	187261	187262
Bottom design	round	round	round	round
Material	polypropylene	polypropylene	polypropylene	polypropylene
ø [mm] x height [mm]	12x75	12x75	18x95	18x95
Nominal volume [ml]	5	5	14	14
Working volume [ml]	4	4	12	12
Sterile	+	+	+	+
Two-position vent stopper	+	+	+	+
Graduation	+	+	+	+
Writing area	-	-	+	+
Quantity per bag/case	1/1000	25/2000	1/800	25/1000

Multipurpose Containers/Beakers

Polystyrene Containers for Plant Culture

Polystyrene Containers for Plant Culture

These containers are specially suited for plant culture. The use of a very clear material ensures maximum light transmission and thus rapid and successful growth.

These culture containers are not only suitable for the proliferation of plant cultures but can also be used as transport containers and are available with or without lids.

Cat.-No.	**960177**	**960161**	**967177**	**967169**	**968177**	**968162**
Description	container, bottom part	container	container, bottom part	container	container, bottom part	container
ø [mm] x height [mm]	53x100	53x100	68x66	68x66	68x100	68x100
Nominal volume [ml]	175	175	190	190	330	330
Working volume[ml]	150	150	150	150	300	300
Sterile	-	+	-	+	-	+
Closure, Cat.-No.	**960178**	+	**967178**	+	**967178**	+
Quantity per bag/case	315	4/300	320	1/256	192	1/168

Drosophila Containers

Drosophila Containers

- Ideally suited for the cultivation of *Drosophila melanogaster*
- Choice of different sizes
- Bottom part of container made of polystyrene
- Can be supplied with a separately orderable ceaprene stopper. This stopper is gas-permeable and made of water-repellent material

Cat.-No.	**199101**	**205101**	**217101**	**960177**
ø [mm] x height [mm]	22x63	27x64	36x82	53x100
Nominal volume [ml]	16	28	68	175
Ceaprene stopper, Cat.-No.	**323070**	**354070**	**330070**	**332070**
Quantity per bag/case	1500	1500	605	315

Polystyrene Multipurpose Containers

Polystyrene Multipurpose Containers

- High clarity
- Can be used universally for in vitro uses
- Available in different sizes
- With or without plain or printed label

- All containers are manufactured aseptically in a Class II Clean Room environment – irradiated options are also available
- Plastic or metal cap

Cat.-No.	189170	189171	189175	189176
ø [mm] x height [mm]	17 x 49	17 x 49	17 x 49	17 x 49
Volume [ml]	7	7	7	7
Label	-	-	plain	plain
Sterility	as	ir	as	ir
Screw cap (white)	plastic	plastic	plastic	plastic
Bottom design	flat	flat	flat	flat
Support skirt	-	-	-	-
Quantity per bag/case	700	700	700	700

as = aseptically produced; ir = irradiated

Cat.-No.	201150	201170	201152	201172	201151	201171
ø [mm] x height [mm]	24 x 90	24 x 90	24 x 90	24 x 90	24 x 90	24 x 90
Volume [ml]	30	30	30	30	30	30
Label	-	-	plain	plain	printed	printed
Sterility	as	ir	as	ir	as	ir
Screw cap, white	plastic	plastic	plastic	plastic	plastic	plastic
Bottom design	concical	conical	conical	conical	conical	conical
Support skirt	+	+	+	+	+	+
Quantity per bag/case	400	400	400	400	400	400

as = aseptically produced; ir = irradiated

Polystyrene Multipurpose Containers

Cat.-No.	219102	219155	219190	224170	224180	224185
ø [mm] x height [mm]	40 x 60	40 x 60	40 x 60	48 x 78	48 x 78	48 x 78
Volume [ml]	60	60	60	100	100	100
Label	-	plain	printed	-	plain	printed
Sterility	as	as	as	as	as	as
Screw cap	metal	metal	metal	metal	metal	metal
Quantity per bag/case	30/300	30/300	30/300	20/160	20/160	20/160

as = aseptically produced; st = sterile/irradiated

Cat.-No.	225170	225180	225185	229170	229180
ø [mm] x height [mm]	49 x 107	49 x 107	49 x 107	58 x 121	58 x 121
Volume [ml]	150	150	150	250	250
Label	-	plain	printed	-	plain
Sterility	as	as	as	as	as
Screw cap	metal	metal	metal	metal	metal
Quantity per bag/case	20/120	20/120	20/120	12/48	12/48

Polypropylene Multipurpose Beakers/Containers

724461

Polypropylene Multipurpose Beakers

Further Containers p. 157–159

- Can be used universally for academic and non-human medical purposes
- Optimal mechanical, thermal and chemical stability
- Further information about Cat.-No. 724170 → p. 151

- Multipurpose beakers can be supplied with or without screw cap
- The integrity seal screw cap ensures sterility and intactness of the product. The beaker is unbreakable and resistant against many chemical influences
- Cat.-No., lot number and expiry date are printed on the base of the beaker to provide additional information and improve traceability

Cat.-No.	724402	724461	724401	724170
Description	multipurpose beaker with cap	multipurpose beaker with cap	multipurpose beaker without cap	screw cap for **724401**
ø [mm] x height [mm]	61 x 71	61 x 71	61 x 71	ø [mm] 61
Screw cap	natural	natural	See Cat.-No. **724170**	natural
Nominal volume [ml]	100	100	100	-
Working volume [ml]	100	100	100	-
Sterile	-	+	-	-
Graduation	+	+	+	-
Quantity per bag/case	300	300	720	720

Cat.-No.	219170	219175	224170
Beaker ø [mm] x height [mm]	40 x 62	40 x 62	49 x 77
Nominal volume [ml]	60	60	100
Working volume [ml]	50	50	80
Label	-	plain	-
Sterile	as	as	as
Screw cap	plastics (white)	plastics (white)	metal
Quantity per bag/case	30/300	30/300	20/160

as = aseptically produced

Caps

Tube/Beaker Caps

- Caps are made of high-grade polyethylene
- Designed to have a tight fit to matching tube/beaker

Cat.-No.	301321	302321	303321	307321
Description	grip stopper	grip stopper	grip stopper	grip stopper
Material	PE	PE	PE	PE
Colour	natural	natural	natural	natural
Suitable for tube-ø [mm]	10.5	11	12	14
Suitable for tube Cat.-No.	**103XXX**	**106XXX, 109XXX**	**112XXX, 115XXX**	**130XXX, 136XXX**
Quantity per bag/case	1000/30000	500/25000	500/20000	100/10000

Cat.-No.	310321	310379	317321	318321
Description	grip stopper	grip stopper	grip stopper	grip stopper
Material	PE	PE	PE	PE
Colour	natural	white	natural	natural
Suitable for tube-ø [mm]	16	16	16.5	17
Suitable for tube Cat.-No.	**160XXX, 169XXX**	**160XXX**	**175XXX**	**184XXX, 187XXX**
Quantity per bag/case	100/8000	11000	10000	250/8000

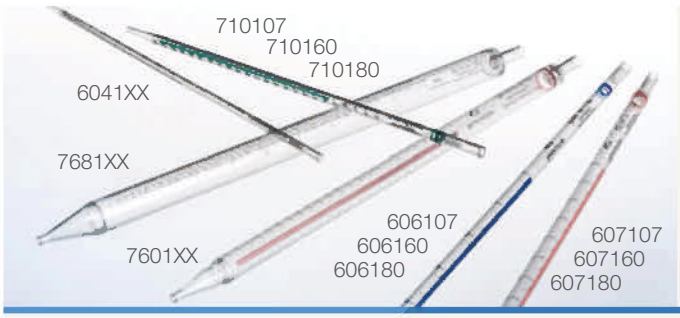
Cat.-No.	724170
Description	screw cap
Material	PE
Colour	natural
Suitable for tube-ø [mm]	61
Suitable for tube Cat.-No.	**7244XX**
Quantity per bag/case	720


reiner bio-one

6 Liquid Handling

Pipettes

CELLSTAR® Serological Pipettes



Serological Pipettes 1 to 50 ml

Cat.-No. 604160/710160/606160/607160/760160/768160 also available triple-packed p. 214

TRI

Sapphire MaxiPette p. 166

- Sterile
- High optical clarity
- Maximum accuracy
- Drop-free pipetting
- Clear, easily legible graduation
- 1/2/5/10/25 ml pipettes with vertical Schellbach stripe for easier volume identification

- Increased volume from negative graduations
- Pipette colour code according to international standards
- Maximum clarity from high-grade polystyrene
- Lot number and expiry date on each bag
- All pipettes are supplied with a filter for protection against the suction of liquid into the pipetting device
- Short-format pipettes **(shorties)** permit back-saving work

Packaging options
- Individually wrapped pipettes in **plastic/plastic-packaging** with peel-off function
- **Paper/plastic-packaging** with peel-off function and additional break-through function
- **Plastic bulk packs**

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

Cat.-No.	604107	604181	604160	710107	710180	710160
Description	1 ml pipette	1 ml pipette	1 ml pipette	2 ml pipette	2 ml pipette	2 ml pipette
Graduation	1/100	1/100	1/100	1/100	1/100	1/100
Sterile	+	+	+	+	+	+
Packaging	bulk	paper/plastic	plastic/plastic	bulk	paper/plastic	plastic/plastic
Quantity per bag/case	25/1000	1/1000	1/1000	25/1000	1/1000	1/1000

Cat.-No.	606107	606180	606160	607107	607180	607160
Description	5 ml pipette	5 ml pipette	5 ml pipette	10 ml pipette	10 ml pipette	10 ml pipette
Graduation	1/10	1/10	1/10	1/10	1/10	1/10
Sterile	+	+	+	+	+	+
Packaging	bulk	paper/plastic	plastic/plastic	bulk	paper/plastic	plastic/plastic
Quantity per bag/case	25/500	1/200	1/200	25/500	1/200	1/200

Cat.-No.	760107	760180	760160	768180	768160
Description	25 ml pipette	25 ml pipette	25 ml pipette	50 ml pipette	50 ml pipette
Graduation	2/10	2/10	2/10	1/2	1/2
Sterile	+	+	+	+	+
Packaging	bulk	paper/plastic	plastic/plastic	paper/plastic	plastic/plastic
Quantity per bag/case	25/200	1/200	1/200	1/100	1/100

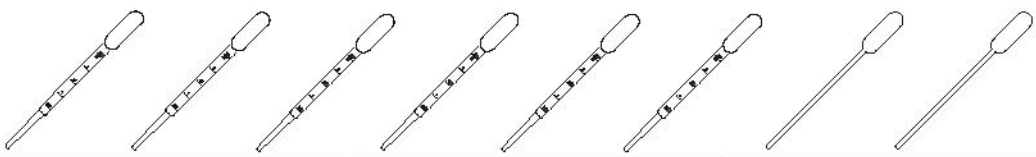
Shorties and Special Models

Cat.-No.	710183	606190	607190
Description	2 ml aspiration	5 ml pipette	10 ml pipette
Special feature	no plug	shorty	shorty
Graduation	-	1/10	2/10
Sterile	+	+	+
Packaging	paper/plastic	plastic	plastic
Quantity per bag/case	1/1000	1/200	1/200

Pasteur/Serum Pipettes

Pasteur/Serum Pipettes

- Ideally suited for the rapid transfer of liquids
- Available sterile or non-sterile



Cat.-No.	612302	612399	612382	612301	612398	612381	700370	700361
Description	1 ml	1 ml	1 ml	3.5 ml	3.5 ml	3.5 ml	0.1 ml capillary pipette	
Length [mm]	153	153	153	153	153	153	153	153
Graduation	+	+	+	+	+	+	-	-
Sterile	-	+	+	-	+	+	-	+
Quantity per bag/case	500	1/500	20/500	500	1/500	20/500	500	25/1000

Sapphire MaxiPette

The Sapphire MaxiPette pipette controller is lightweight and designed to fit comfortably in either hand. It features an ergonomic shape with computer-balanced weight distribution and low-pressure fingertip controls. The lithium battery keeps the MaxiPette running for up to 8 hours or 2500 pipettings on a single two-hour charge. The Sapphire MaxiPette is compatible with pipette sizes from 1 ml to 100 ml.

MaxiPette

CELLSTAR® Serological Pipettes p. 164
Further Lab Equipment p. 250

- Ergonomic design for easy pipetting
- Variable speed control
- Cordless and rechargeable
- Up to eight hours of continuous operation
- Compatible with Greiner Bio-One serological pipettes

Cat.-No.	847060
Description	MaxiPette
Contents	Pipette controller Charger Benchtop stand Extra filter Replaceable lithium battery
Operating environment [°C]	4–45
Quantity per bag/case	1

Sapphire Pipettes

The Sapphire pipette combines state of the art engineering and design in the ultimate instrument for modern liquid handling. The ergonomic design coupled with minimal pipetting forces and the use of modern lightweight materials deliver a pipette which is robust, lightweight and easy to use. Volume setting is easy with the digital micrometer and the innovative adjustable ejector button enables use by right or left handed users. The colour coded push button allows for the easier identification of the relevant tips.

Designed for optimal operation with Greiner Bio-One pipette tips, each unit is also fully autoclavable.

8 x single-channel models (0.2 µl – 10 ml)
4 x 8-channel models (0.5 µl – 300 µl)
4 x 12-channel models (0.5 µl – 300 µl)

Servicing and Calibration

As a precision instrument it is essential to keep your Sapphire pipette in good working order. Regular maintenance and calibration should be undertaken to ensure this. Our highly experienced and knowledgeable technicians provide a full maintenance and calibration service to ensure your Sapphire pipette always performs to specification.
We offer 3 service levels:

- Bronze
- Gold
- Platinum

For more information about servicing and calibration call us on 01453 825255

89000020

New

Single-Channel Pipettes

Sapphire Pipette Tips p. 171
Classic Pipette Tips p. 175

Single-Channel Pipettes:

- Light and comfortable design
- Low pipetting forces for ease of use
- Digital volume setting
- Colour-coded for volume identification
- Optimised for use with Greiner Bio-One tips
- Fully autoclavable

Cat.-No.	89000002	89000010	89000020	89000100	89000200	89001000	89000500	89010000
Description	single-channel pipette	single-channel pipette	single-channel pipette	single-channel pipette	single-channel pipette	single-channel pipette	single-channel pipette	single-channel pipette
Volume range [µl]	0.2–2	1.0–10	2–20	10–100	20–200	100–1000	500–5000	1000–10000
Colour code	orange	red	light yellow	pink	yellow	blue	violet	light blue
Quantity per pack	1	1	1	1	1	1	1	1

New

8-Channel Pipettes

Sapphire Pipette Tips p. 171
Classic Pipette Tips p. 175

Multi-Channel Pipettes:

- Light and comfortable design
- Low pipetting forces for ease of use
- Digital volume setting
- Colour-coded for volume identification
- Optimised for use with Greiner Bio-One tips
- Fully autoclavable

Cat.-No.	89000810	89000820	89008200	89008300
Description	8-channel pipette	8-channel pipette	8-channel pipette	8-channel pipette
Volume range [µl]	0.5–10	2–20	20–200	20–300
Colour code	red	light yellow	yellow	green
Quantity per pack	1	1	1	1

New

12-Channel Pipettes

Sapphire Pipette Tips p. 171
Classic Pipette Tips p. 175

Multi-Channel Pipettes:

- Light and comfortable design
- Low pipetting forces for ease of use
- Digital volume setting
- Colour-coded for volume identification
- Optimised for use with Greiner Bio-One tips
- Fully autoclavable

Cat.-No.	89001210	89001220	89012200	89012300
Description	12-channel pipette	12-channel pipette	12-channel pipette	12-channel pipette
Volume range [µl]	0.5–10	2–20	20–200	20–300
Colour code	red	light yellow	yellow	green
Quantity per pack	1	1	1	1

New

Pipette Carrousel

Holds up to 7 pipettes
Robust and space-saving
Heavy base for stability
Holds single and multi-channel pipettes

Cat. No.	89000099
Description	Pipette Carrousel
Quantity per pack	1

New

Pipette Holder

Wall mounted single pipette holder
Keeps pipette within reach
Robust and space-saving
Self adhesive or screw fix

Cat. No.	89000098
Description	Pipette Holder
Quantity per pack	1

New

Personal ID Clips

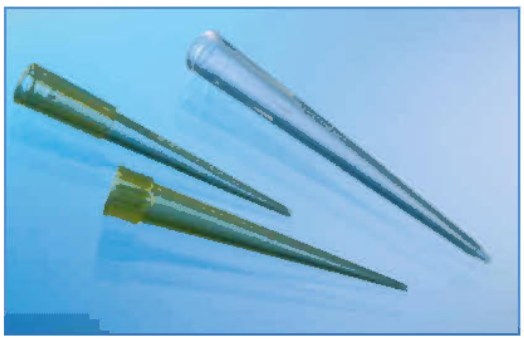
For identification/personalisation of your pipette
Clips into place to help avoid mix-ups
Writeable with permanent ink
5 colours available

Cat. No.	89019801	89019803	89019804	89019805	89019806	89019809
Description	ID clip	ID clip	ID clip	ID clip	ID clip	ID clip
Colour	white	red	blue	green	yellow	assorted
Quantity per pack	10	10	10	10	10	10

Pipette Tips

Pipette Tips from Greiner Bio-One

Pipette tips are a key component in day to day life science research and need to be of a high quality to ensure confidence and consistency in pipetting results. Our tips are manufactured from high grade polypropylene to give the optimum in performance and fit.
Additionally polypropylene has a high breaking strength, is dimensionally stable, heat-resistant up to approx. 140 °C, i.e. is autoclavable, and cold-resistant down to -190 °C.



Tip Choices and Options

The ***Sapphire*** Tip range

- Available in 10µl, 20µl, 200µl, 300µl and 1250µl sizes
- Racked and refill versions
- Filter tips
- Graduated for improved visual control of the liquid transfer
- Universal fit and secure seal for precise pipetting
- Free of detectable DNase, RNase, human DNA and non-pyrogenic for racked and refill versions
- Low retention tips for high pipetting accuracy

!

Visual Identification System
The boxes are transparent with coloured rack inserts based on the volume of the relevant tip:

10 µl:	red rack insert
20 µl / 100µl / 200 µl:	yellow rack insert
300 µl:	green rack insert
1250 µl:	blue rack insert

The *'Classic'* Tip range

- Micro tips (0.5 – 20 µl)
- 200 µl tips (pipette range from 10 – 200 µl)
- 1000 µl tips (pipette range from 100 – 1000 µl)
- Macro tips (5 ml)
- Gel-load tips
- Filter tips

Sapphire Pipette & Filter Tips

Greiner Bio-One offers a premium range of pipette and filter tips. The product family Sapphire comprises standard pipette tips, standard filter tips, low retention pipette tips and low retention filter tips. All tips are transparent, graduaded, allow precise and comfortable pipetting with maximal recovery and are free of detectable DNase, RNase, human DNA and are non-pyrogenic. The Sapphire pipette and filter tips can be used with all common pipettors.

Sapphire Pipette Tips

Pipette Tips

Table of Compatibility, Technical Appendix see p. 276

- Graduation for perfect visual control of the liquid transfer
- Thin-walled top of the tips for reliable fit and optimal seal
- Tips and racks are autoclavable
- Extended 10 µl tip for better recovery of small sample volumes
- User-friendly and stackable racks
- Coloured box inserts for easy volume identification

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

Cat.-No.	**771254**	**771257**	**737254**	**737257**
Volume [µl]	10	10	20 – 200	20 – 200
Colour	natural	natural	natural	natural
Graduation	+	+	+	+
Sterile	-	-	-	-
Rack insert colour	red	red	yellow	yellow
Quantity per case	10 x 96	10 x 96	10 x 96	10 x 96
Packaging unit	rack	refill unit	rack	refill unit
Matching rack	-	Cat.-No. 970 310	-	Cat.-No. 970 320

Cat.-No.	**738254**	**738257**	**750254**	**750257**
Volume [µl]	20 – 300	20 – 300	1250	1250
Colour	natural	natural	natural	natural
Graduation	+	+	+	+
Sterile	-	-	-	-
Rack insert colour	green	green	blue	blue
Quantity per case	10 x 96	10 x 96	8 x 96	8 x 96
Packaging unit	rack	refill unit	rack	refill unit
Matching rack	-	Cat.-No. 970 330	-	Cat.-No. 970 350

Sapphire Low Retention Pipette Tips

The Sapphire Low Retention Pipette Tips feature specially optimised surface properties for maximum precision. Because no liquid remains in the tip, pipetting is virtually residue-free. This boosts precision and the usable volume. It also prevents the wasting of valuable sample material.

Low Retention Pipette Tips

Table of Compatibility, Technical Appendix see p. 276

- Low retention surface properties for high recovery rate and maximum precision
- Graduation for perfect visual control of the liquid transfer
- Thin-walled top of the tips for reliable fit and optimal seal
- Tips and racks are autoclavable
- Extended 10 µl tip for better recovery of small sample volumes
- User-friendly and stackable racks

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

Cat.-No.	771255	771258	737255	737258
Volume [µl]	10	10	20 – 200	20 – 200
Special feature	low retention	low retention	low retention	low retention
Colour	natural	natural	natural	natural
Graduation	+	+	+	+
Sterile	-	-	-	-
Rack insert colour	red	red	yellow	yellow
Quantity per case	10 x 96	10 x 96	10 x 96	10 x 96
Packaging unit	rack	refill unit	rack	refill unit
Matching rack	-	Cat.-No. 970 310	-	Cat.-No. 970 320

Cat.-No.	738255	738258	750255	750258
Volume [µl]	20 – 300	20 – 300	1250	1250
Special feature	low retention	low retention	low retention	low retention
Colour	natural	natural	natural	natural
Graduation	+	+	+	+
Sterile	-	-	-	-
Rack insert colour	green	green	blue	blue
Quantity per case	10 x 96	10 x 96	8 x 96	8 x 96
Packaging unit	rack	refill unit	rack	refill unit
Matching rack	-	Cat.-No. 970 330	-	Cat.-No. 970 350

Sapphire Filter Tips

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

Filter Tips
Low Retention Filter Tips

Table of Compatibility, Technical Appendix see p. 276

- Prevent contamination with liquids and aerosols during pipetting
- Are recommended for work with DNA, RNA, and when handling radioactive material
- Graduation for perfect visual control of the liquid transfer
- Thin-walled top of the tips for reliable fit and optimal seal
- Low retention tips for high recovery rate and maximum precision

Sapphire Filter Tips

Cat.-No.	771261	773261	737261	738261	750261
Volume [µl]	10	20	100	300	1250
Colour	natural	natural	natural	natural	natural
Graduation	+	+	+	+	+
Sterile	+	+	+	+	+
Rack insert colour	red	yellow	yellow	green	blue
Quantity per case	10 x 96	10 x 96	10 x 96	10 x 96	8 x 96
Packaging unit	rack	rack	rack	rack	rack

Sapphire Low Retention Filter Tips

Cat.-No.	771265	773265	772265	737265	738265	750265
Volume [µl]	10	20	100	200	300	1250
Special feature	low retention	low retention	low retention	low retention	low retention	low retention
Colour	natural	natural	natural	natural	natural	natural
Graduation	+	+	+	+	+	+
Sterile	+	+	+	+	+	+
Rack insert colour	red	yellow	yellow	yellow	green	blue
Quantity per case	10 x 96	10 x 96	10 x 96	10 x 96	10 x 96	8 x 96
Packaging unit	rack	rack	rack	rack	rack	rack

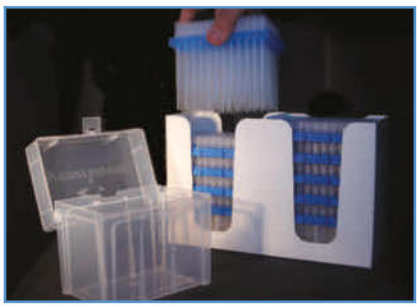
Empty Racks for the *Sapphire* Refill System

- Stackable
- Double hinged lid for smooth opening/closing action
- Lids are reversible to enable 'push fit' opening/closing action

Sapphire Refill System

The refill option offers the opportunity to re-use racks and so reduce the impact on the environment by producing the minimum of waste.

1



2

3

Cat.-No	970310	970320	970330	970350
Description	Empty rack for refill system	Empty rack for refill system	Empty rack for refill system	Empty rack for refill system
For use with rack insert colour	red	yellow	green	blue
For use with tip volume (µl)	10	20 – 200	20 – 300	1250
Capacity per rack (no. of tips)	96	96	96	96
Quantity (racks per case)	10	10	10	8

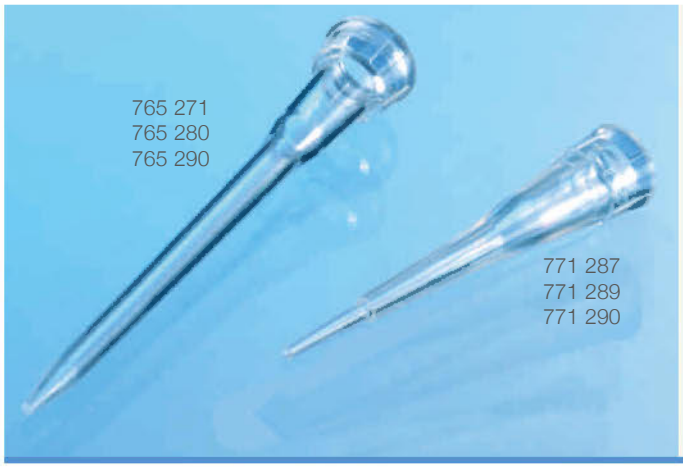
Classic Pipette & Filter Tips

The Classic pipette tip range from Greiner Bio-One comprises of standard pipette tips and standard filter tips. Tips are available in 10 µl, 200 µl, 1000 µl and 5000 µl volumes and are provided in both racked, bulk and EasyLoad® formats.

EasyLoad® is a simple time and space saving refill system for 10 µl, 200 µl and 1000 µl tips.
Gel loading and gel loading filter tips are also available.

Micro Pipette Tips (0.5 – 20 µl)

Micro pipette tips with a pipetting volume of up to 20 µl are suitable for the precise pipetting of the smallest possible liquid volumes as a result of their small size and thus small dead volume. Greiner Bio-One currently offers three types of micro pipette tips (micro tip P10, micro tip P10 graduated, crystal tip).



Micro Pipette Tips (0.5 – 20 µl)

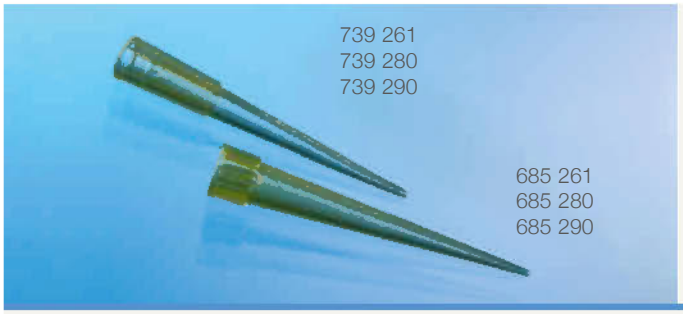
20 µl Crystal Tips for Eppendorf® Pipettors

10 µl Micro Tips for Gilson® Pipettors

Table of Compatibility, Technical Appendix see page 274

Cat.-No.	765290	765280	765271	771290	771287	771289
Description	crystal tip	crystal tip	crystal tip	P10 standard	P10 standard	P10 standard
Pipette compatibility	ideally suited for **Eppendorf®** Reference, Research pro			ideally suited for **Gilson®** Pipetman P2, P10, U10. Sapphire		
Volume [µl]	0.5 – 20	0.5 – 20	0.5 – 20	0.5 – 10	0.5 – 10	0.5 – 10
Colour	natural	natural	natural	natural	natural	natural
Graduation	-	-	-	-	-	-
Sterile	-	-	+	-	-	+
Quantity per case	1000	10 x 96	50 x 96	1000	10 x 96	10 x 96
Packaging unit	bulk	racked	racked	bulk	racked	racked
Matching rack for bulkware tips	Cat.No. 973 272	-	-	Cat. No. 973 276	-	-

200 µl Pipette Tips (10 – 300 µl)



200 µl Pipette Tips

Table of Compatibility, Technical Appendix see p. 274

200 µl Eppendorf® style tips
This pipette tip is recommended for Eppendorf® pipettors. It has a bevelled edge, which increases pipetting accuracy. The pipette tip can be easily distinguished from the pipette tip recommended for Gilson® pipettors due to its shorter tip collar.

200 µl Gilson® style tips
This pipette tip was developed for Gilson® pipettors. Its liquid end is bevelled, the contact surface of the pipetted liquids is reduced and the pipetting accuracy increases, since less liquid can remain on the pipette tip.



Cat.-No.	**685294**	**685280**	**685261**
Pipette compatibility	ideally suited for **Eppendorf®** Reference, Research, Research pro		
Volume [µl]	10 – 200	10 – 200	10 – 200
Colour	yellow	yellow	yellow
Graduation	-	-	-
Sterile	-	-	+
Quantity per case	5000	50 x 96	50 x 96
Packaging unit	bulk	racked	racked
Matching rack for bulkware tips	Cat.No. 973 202	-	-




Cat.-No.	**739295**	**739280**	**739281**	**739261**
Pipette compatibility	ideally suited for **Gilson®** Pipetman P20, P100, P200, F5, F10, F25, F50, F200, U200. , Sapphire			
Volume [µl]	10 – 200	10 – 200	10 – 200	10 – 200
Colour	yellow	yellow	yellow	yellow
Graduation	-	-	-	-
Sterile	-	-	-	+
Quantity per case	5000	50 x 96	10 x 96	50 x 96
Packaging unit	bulk	racked	racked	racked
Matching rack for bulkware tips	Cat.No. 973 270	-	-	-

1000 µl Pipette Tips (100 – 1000 µl) and Macro Pipette Tips

1000 µl Pipette Tips

Table of Compatibility, Technical Appendix see p. 274

1000 µl Eppendorf® style tips
Like the 200 µl tip, the 1000 µl tip recommended for Eppendorf® pipettors is distinguished particularly by a shorter tip collar. It can be used for volumes between 100 and 1000 µl.

1000 µl Gilson® style tips
This tip is ideally suited for Gilson® pipettors with a volume of 200 – 1000 µl and is only available in blue.

Cat.-No.	686294	686280	686271
Pipette compatibility	ideally suited for **Eppendorf®** Reference, Research, Research pro		
Volume [µl]	100 – 1000	100 – 1000	100 – 1000
Colour	blue	blue	blue
Graduation	-	-	-
Sterile	-	-	+
Quantity per case	2000	40 x 60	40 x 60
Packaging unit	bulk	racked	racked
Matching rack for bulkware tips	Cat.No. 974 280	-	-

Cat.-No.	740295	740280	740274
Pipette compatibility	ideally suited for **Gilson®** Pipetman, Sapphire P20, P100, P200, F5, F10, F25, F50, F200, 200, 1000		
Volume [µl]	200 – 1000	200 – 1000	blue
Colour	blue	blue	-
Graduation	-	-	+
Sterile	-	-	40 x 60
Quantity per case	2000	40 x 60	racked
Packaging unit	bulk	racked	-
Matching rack for bulkware tips	Cat.No. 974 290	-	

5 & 10 ml Macro Pipette Tips

Cat.-No.	745290	745280	745281	750280	750290
Description	macro pipette tip	macro pipette tip	macro pipette tip	macro pipette tip	macro pipette tip
Suitable for	Gilson®, Sapphire	Gilson®, Sapphire	Gilson®, Sapphire	Gilson®, Sapphire	Gilson®, Sapphire
Volume [ml]	1 – 5	1 – 5	1 – 5	5–10	5–10
Colour	natural	natural	natural	natural	natural
Sterile	-	-	+	-	-
Quantity per case	2500	500	500	10 x 25	1000

Gel-Load Pipette Tips

Gel-Load Pipette Tips

Table of Compatibility, Technical Appendix see p. 274

- Characterised by an elongated end
- Ideal for numerous molecular biological applications, especially for filling the slots of sequencing, PCR and protein electrophoresis gels

Cat.-No.	770290	770280	775288	773288
Description	gel-load	gel-load	gel-load filter tip	gel-load filter tip
Suitable for	universal fit	universal fit	universal fit	universal fit
Volume [µl]	10 – 200	10 – 200	20	100
Colour	natural	natural	natural	natural
Sterile	-	-	+	+
Free of detectable RNase, DNase and human DNA	+	-	+	+
Quantity per case	1000	10 x 96	10 x 96	10 x 96
Packaging unit	bulk	racked	racked	racked

Filter Tips

Filter Tips

Table of Compatibility, Technical Appendix see p. 274

Pipette tips with filter inserts prevent contamination with liquids and aerosols during the pipetting process.
In combination with conventional pipettors, Greiner Bio-One filter tips prevent the aspiration of particles into the interior of the pipettor. This minimises the danger of unwanted cross-contamination. The special ultra-micro filter made of hydrophobic polyethylene has a pore size of approx. 10 microns and acts as a reliable barrier against the transfer of aerosols into the shaft of the pipettor.
Greiner Bio-One filter tips:

- Are recommended for work with DNA and RNA, and when handling radioactive material
- Are available in the volume ranges 0.5 µl to 1000 µl
- Can be used with all standard pipettors
- Are free of detectable DNase / RNase and are **sterilised by irradiation**
- Are available in boxes of 96 pieces (Fig. 5) or 60 pieces in the case of 1000 µl tips
- Produced and certified according to DIN ISO 8655

Micro Filter Tips 0.5 – 20 µl
Micro tips with a pipetting volume of up to 20 µl are suitable for the precise pipetting of the smallest possible liquid volumes as a result of their small size and thus small dead volume.

Filter Tips 10 – 200 µl
These tips can be used for pipetting volumes of 10 – 200 µl.

Filter Tips 200 – 1000 µl
These tips can be used for pipetting volumes of 200 – 1000 µl.

PCR | Free of detectable DNase, RNase, human DNA, non-pyrogenic | non-cytotoxic

	0.5 – 10 µl		2 – 20 µl
			
Cat.-No.	765288	771288	774288
Description	micro crystal tip	micro tip P10	standard tip
Ideally suited for	Eppendorf®	Gilson®	universal
	Eppendorf® Reference Eppendorf® Research Eppendorf® Research pro	Gilson® Pipetman P2, P10, U10 Sapphire	Brand®; Biohit®; Eppendorf®; Gilson®; Socorex® Sapphire
Volume [µl]	10	10	20
Colour	natural	natural	natural
Graduation	-	-	-
Sterile	+	+	+
Quantity per case	10 x 96	10 x 96	10 x 96
Packaging unit	racked	racked	racked

10 – 200 µl

Cat.-No.	**772288**	**739288**
Description	filter tip	universal filter tip
Volume [µl]	100	200
Suitable for	Brand®; Biohit®; Eppendorf®; Gilson®; Socorex® , Sapphire	Brand®; Biohit®; Eppendorf®; Gilson® Sapphire
Colour	natural	natural
Graduation	-	+
Sterile	+	+
Quantity per case	10 x 96	10 x 96
Packaging unit	racked	racked

100 – 1000 µl

Cat.-No.	**750288**	**740288**
Description	filter tip	universal filter tip
Ideally suited for	**Eppendorf®**	**Gilson®**
Suitable for	Biohit® Finnpipette®; Gilson®; Socorex® , Sapphire	Finnpipette®; Gilson® Sapphire
Volume [µl]	1000	1000
Colour	natural	natural
Graduation	-	-
Sterile	+	+
Quantity per case	10 x 60	10 x 60
Packaging unit	racked	racked

EasyLoad®

EasyLoad®

- Autoclavable EasyLoad® racks
- Sterile and non-sterile option
- Racks are stackable
- Colour-coded boxes
- Positioning guides make it easier to place the EasyLoad® refill units on the racks

EasyLoad® is a simple, time- and space-saving refill system for standard pipette tips.
- EasyLoad® 10 (micro 10 µl, graduated)
- EasyLoad® 200 (universal 200 µl, thin-walled, graduated)
- EasyLoad® 1000 (universal 1000 µl, thin-walled, graduated)

! The design of the rack's interior increases stability during autoclaving and when pipette tips are being used with multi-channel pipettors.

Cat.-No.	741015	741020	741000	741061	741065
Description	EasyLoad® 10	EasyLoad® 10	EasyLoad® 200	EasyLoad® 200	EasyLoad® 200
Volume [µl]	10	10	200	200	200
Suitable for single-channel pipettors	Gilson®	Gilson®	Sapphire; Brand®; Eppendorf®; Finnpipette®; Gilson®; Socorex®		
Suitable for multi-channel pipettors			Sapphire; Brand®; Gilson®; Eppendorf®; Socorex®		
Colour	natural	natural	natural	natural	yellow
Graduation	+	+	+	+	+
Sterile	-	+	-	+	-
Quantity per refill box/case	960/5760	960/5760	960/5760	960/5760	960/5760
Matching EasyLoad® rack, Cat.-No.	941 300	941 300	941 310	941 310	941 310

Cat.-No.	741070	741010	741040	741045	741050
Description	EasyLoad® 200	EasyLoad® 200, starter kit	EasyLoad® 1000	EasyLoad® 1000	EasyLoad® 1000
Volume [µl]	200	200	100 – 1000	100 – 1000	100 – 1000
Suitable for single-channel pipettors					
Suitable for multi-channel pipettors					
Colour	yellow	yellow	natural	blue	blue
Graduation	+	+	+	+	+
Sterile	+	-	+	-	+
Quantity per refill box/case	960/5760	2 boxes EasyLoad® 200, 10 EasyLoad® 200 racks	360/2160	360/2160	360/2160
Matching EasyLoad® rack, Cat.-No.	941 310		941 320	941 320	941 320

7 Molecular Biology

Sapphire Thin Wall PCR Tubes

Sapphire PCR Tubes/ Tube Strips

The Sapphire PCR range is manufactured from virgin polypropylene and has a product for all applications, including 0.2 ml and 0.5 ml tubes with domed or flat caps, PCR tube strips with 8 or 12 tubes, as well as PCR microplates.

The thin wall construction optimises the heat transfer from the block to the reaction solution.

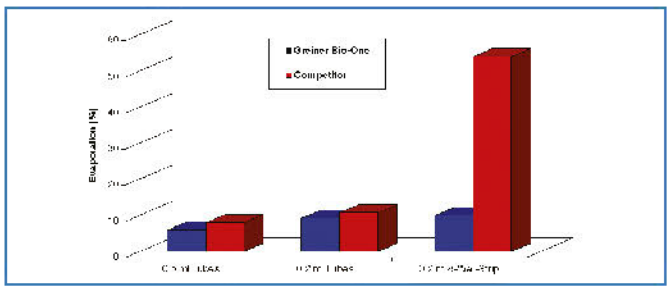


Figure 1: Evaporation in PCR tubes filled with H_2O measured according to the weight loss after 2 hours' incubation at 100 °C.

PCR Tubes

Standard Reaction Tubes see p. 245

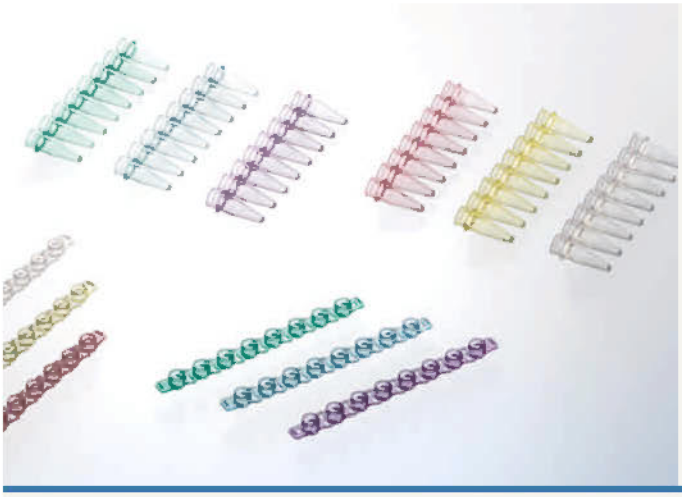
- Thin wall for optimal heat transfer
- Other colours available by special order

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

Description	tubes	tubes	tubes	tubes
Volume [ml]	0.2	0.2	0.5	0.5
Cap, attached	domed	flat	domed	flat
Quantity per bag/case	500 / 1000	500 / 1000	500 / 1000	500 / 1000

COLOUR						
	Natural	Cat.-No.	671201	683201	672201	682201
	Red	Cat.-No.	671273	683273	-	682273
	Blue	Cat.-No.	671274	683274	-	682274
	Green	Cat.-No.	671275	683275	-	682275
	Yellow	Cat.-No.	671276	683276	-	682276
	Violet	Cat.-No.	671277	683277	-	682277
	Assorted	Cat.-No.	671281	683271	-	682281

Sapphire PCR 8-tube Strips / PCR 8-cap Strips



PCR 8-tube Strips
PCR 8-cap Strips

Standard Reaction Tubes see p. 245

PCR Microplates see p. 188, 193

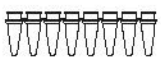
- Thin wall for optimal heat transfer
- Low evaporation rate in PCR (Fig. 1)

Cap Strips for Real Time PCR
All Real Time PCR cap strips (Cat.-No. 373 250 and 652 258) have a flat lid and are made of highly transparent polypropylene. These are ideal for Real Time PCR applications, and are compatible with most Real Time PCR devices. (For compatibility with 8-tube strips and PCR microplates see table below.)

Figure 2: 8-cap strips for Real Time PCR

PCR | Free of detectable DNases, RNases, human DNA | non-pyrogenic

Description	8-tube strips without cap	Cap strips for 8-tube strips	Cap strips for 8-tube strips
Suitable for Cat.-No.		6732XX	6732XX
Volume [ml]	0.2	-	-
Special feature	-	-	for qPCR see page 170
Quantity per case	125	125	125



COLOUR					
	Natural	Cat.-No.	673210	373270	373250
	Red	Cat.-No.	673273	373273	-
	Blue	Cat.-No.	673274	373274	-
	Green	Cat.-No.	673275	373275	-
	Yellow	Cat.-No.	673276	373276	-
	Violet	Cat.-No.	673277	373277	-
	Assorted	Cat.-No.	673271	373281	-

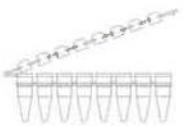
Sapphire PCR 8-tube Strips with Attached Caps

PCR 8-tube Strips with Attached Caps

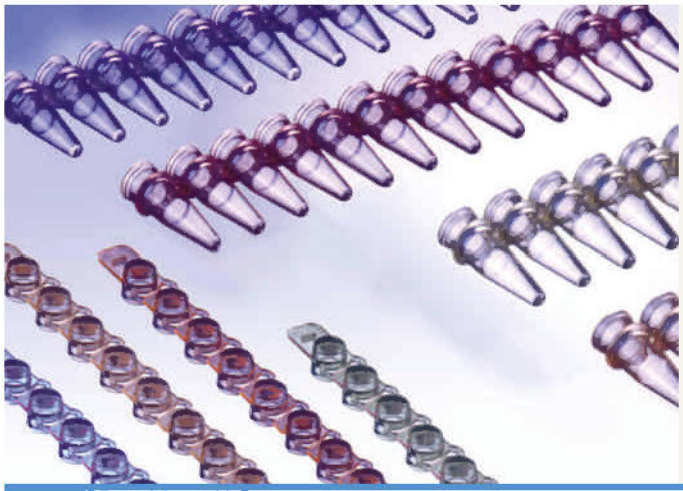
Standard Reaction Tubes see p. 245

- Thin wall for optimal heat transfer
- Low evaporation rate in PCR (Fig. 1, p. 184)
- Attached caps to minimise cross contamination

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

Description		8-tube strips	8-tube strips
Volume [ml]		0.2	0.2
Cap		hinged at one end	individually attached
Quantity per case		125	120
			
COLOUR	Natural	Cat.-No.	608201	608281
	Red	Cat.-No.		608283
	Blue	Cat.-No.		608284
	Green	Cat.-No.		608285
	Yellow	Cat.-No.		608286
	Violet	Cat.-No.		608287

Sapphire PCR 12-tube Strips



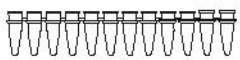
PCR 12-tube Strips

Standard Reaction Tubes see p. 245

- Thin wall for optimal heat transfer
- Low evaporation rate in PCR (Fig. 1, p. 184)

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

Description	12-tube strips	Cap strips for 12-tube strips
Volume [ml]	0.2	
Cap	-	
Suitable for	-	Cat.-No. 674XXX
Quantity per case	80	80



COLOUR		12-tube strips	Cap strips for 12-tube strips
Natural	Cat.-No.	674201	374270
Red	Cat.-No.	674273	374273
Blue	Cat.-No.	674274	374274
Green	Cat.-No.	674275	374275
Yellow	Cat.-No.	674276	374276
Violet	Cat.-No.	674277	374277

Sapphire PCR Microplates

96 and 384 Well Polypropylene Microplates for PCR

The use of the 96 well format allows the scale up of basic PCR work, while the 384 well format is ideal for high-throughput screening projects. All microplates are made of thin-walled polypropylene. This optimises the heat transfer from the thermoblock to the reaction solution. Our heat-resistant sealers AMPLIseal™, VIEWseal™ and SILVERseal™ (see page 213-214) are ideal for sealing the microplates during PCR, and the 96 well microplate may also be sealed with 8-cap strips (see page 163).

96 Well Polypropylene Microplates for PCR

1. Non-skirted microplates
Non-skirted microplates may be used in all commonly available thermocyclers with a 96 well block.

1a) Non-skirted microplate with raised well rims (Fig. 1a)

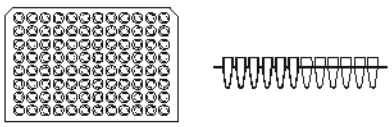


Figure 1a: View of a non-skirted microplate with raised well rims

1b) Non-skirted microplate with flat surface (Fig. 1b)
Black alphanumeric coding enables a quick identification of samples

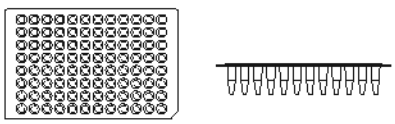


Figure 1b: View of a non-skirted microplate with flat surface

2. Half-skirted microplates

2a) Half-skirted microplate with one notch suitable for Real Time PCR systems such as LightCycler® 480 (Fig. 2a)
- Maximal pigmented white polypropylene and therefore most suitable for sensitive Real Time PCR reactions
- Black alphanumeric coding enables a quick identification of samples
- Notches in the rim facilitate automation due to better gripping in robotic systems

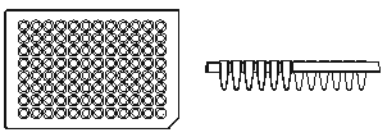


Figure 2a: View of a half-skirted microplate with one notch suitable for Real Time PCR systems such as LightCycler® 480 from Roche

2b) Half-skirted microplate with one notch suitable for ABI (Fig. 2b)

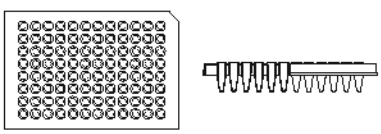


Figure 2b: View of a half-skirted microplate with one notch suitable for ABI

2c) Half-skirted microplate with two notches (Fig. 2c)
- 96 well standard design with two notches

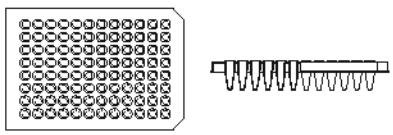


Figure 2c: View of a half skirted microplate with two notches

2d) Half-skirted microplate, recessed rim, ABI design with one notch (Fig. 2d)

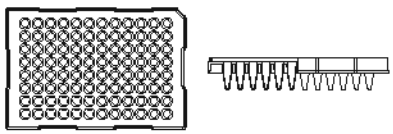


Figure 2d: View of a half-skirted microplate, recessed rim, ABI design with one notch

3. Full-skirted microplate with one notch (Fig. 3)

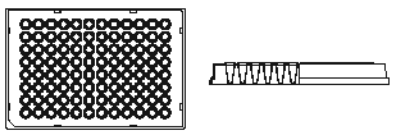


Figure 3: View of full-skirted microplate with one notch

384 Well Polypropylene Microplates for PCR

The 384 well PCR microplates from Greiner Bio-One are manufactured in an advanced injection moulding process following stringent quality criteria. Minimal distortion and sagging curvature, homogeneous heat transfer and sealing of the individual wells are essential quality criteria here. The footprint of all 384 well PCR microplates is compatible with automated systems.

1. Full-skirted 384 well microplate with one notch suitable for ABI (Fig. 4)

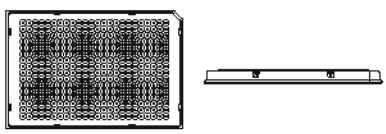


Figure 4: Full-skirted 384 well microplate with one notch and alphanumeric coding suitable for ABI

2. Full-skirted 384 well microplate with two notches (Fig. 5)

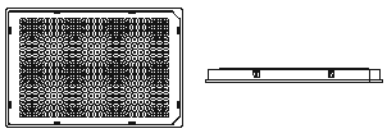


Figure 5: Full-skirted 384 well microplate with two notches and alphanumeric coding

3. Full-skirted 384 well microplate with two notches for Real Time PCR systems such as LightCycler® 480 (Fig. 6)
- White pigmentation boosts Real Time PCR signal
- Black alphanumeric coding enables a quick identification of samples

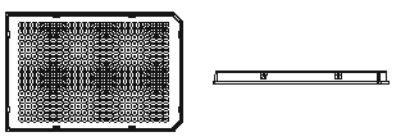


Figure 6: Full-skirted 384 well microplate with two notches for Real Time PCR systems such as LightCycler® 480 from Roche

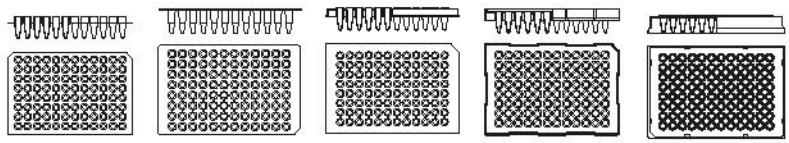
Sapphire 96 Well Polypropylene Microplates for PCR

Table of Compatibility see p. 190 – 191

Barcode Labelling see p. 263

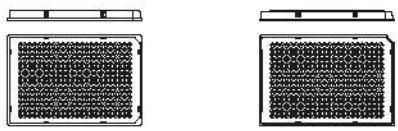
- Ultra thin polypropylene for optimal heat transfer
- Sealable with sealers SILVERseal™, VIEWseal™ and AMPLIseal™ (see p. 237 – 238) or with compatible 8-cap strips (see p. 185)

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



Cat.-No.	652201	652250	652290	652260	652270
Well format	96 well	96 well	96 well	96 well	96 well
Volume per well [ml]	0.2	0.2	0.2	0.2	0.2
Skirt	without skirt	without skirt	half-skirt	half-skirt	full-skirt
Special feature	-	flat, universal	suitable for ABI	ABI design	-
Colour	natural	natural	natural	natural	natural
Sterile	-	-	-	-	-
Suitable 8-cap strip Cat.-No.	373 270	652 258	373 270	373 270	373 270
Quantity per bag/case	10/40	25/100	10/40	10/40	10/40

384 Well Polypropylene Microplates for PCR



Cat.-No.	785201	785290
Well format	384 well	384 well
Volume per well [µl]	25	25
Skirt	full-skirt	full-skirt
Special feature	-	suitable for ABI
Colour	natural	natural
Alphanumeric coding	blue	blue
Sterile	-	-
Quantity per bag/case	15/60	15/60

Table of Compatibility for *Sapphire* PCR Microplates

	652201	652250	652260	652270	652290	785201	785290
Amersham Biosciences / GE							
MegaBACE 500				•			
MegaBACE 1000				•			
MegaBACE 4000						•	•
Agilent							
SureCycler 8800	•			•		•	
Applied Biosystems							
ABI PRISM® 2700	•	•	•		•		•
ABI PRISM® 2720	•	•	•		•		•
ABI PRISM® 310		•	•		•		
ABI PRISM® 3100	•	•	•		•		•
ABI PRISM® 3130	•	•	•		•		•
ABI PRISM® 3700	•	•	•		•	•	•
ABI PRISM® 3730/3730x	•	•	•		•	•	•
ABI PRISM® 7000	•	•	•		•	•	
ABI PRISM® 7300		•	•		•		
ABI PRISM® 7500		•	•		•		
ABI PRISM® 7700	•	•	•		•		
ABI PRISM® 7900 HAT			•		•		•
GeneAmp® PCR System 2700			•				
GeneAmp® PCR System 7500			•				
GeneAmp® PCR System 9600	•	•	•		•		
GeneAmp® PCR System 9700	•	•	•		•	•	•
3500			•				•
5700			•				
6100			•				
ProFlex™ PCR System	•						
QuantStudio™ 12K Flex	•		•				•
Veriti®	•		•			•	•
ViiA™ 7	•		•				•
Analytik Jena / Biometra							
FlexCycler	•					•	
qTOWER	•						
SpeedCycler	•						
T1 Thermal Cycler	•	•		•	•	•	•
T3000		•		•			•
TGradient	•	•	•	•	•		
TPersonal	•						
TOptical	•	•		•			•
TProfessional	•	•		•		•	•
TRobot	•	•		•	•	•	•
UNO	•	•		•	•		
UNO II	•	•		•	•	•	•
Axygen							
MaxyGene™ II	•			•			
Bio-Rad /MJ Research							
BaseStation				•			
C1000/S1000	•	•		•		•	•
CFX 384						•	•
CFX 96	•			•			
CFX Connect	•			•			
Chromo 4	•			•			
DNA Engine family	•	•		•		•	•
Dyad Disciple	•	•		•	•		•
Gene Cycler		•	•				
iCycler	•	•	•	•	•		•
iQ5	•			•	•		
iQ™ 5	•	•		•			
Mini Gradient		•					
MiniOpticon™							
MyCycler	•	•		•	•		
MyIQ	•			•			
Opticon		•		•			
Opticon 2		•		•			
Personal		•					
PTC-100	•	•		•	•		•
PTC-200	•	•	•	•	•		•
PTC-225 Tetrad	•	•	•	•	•		•
T100	•	•		•			

This compatibility chart is a general guide only and subject to error and modifications. We cannot accept any liability or responsibility for the above information.
The registered trademarks of the mentioned manufacturers belong to the above mentioned companies.
Table is subject to error and technical modifications.

Cat.-No.	652201	652250	652260	652270	652290	785201	785290
Corbett Research							
Palm-Cycler™ 96				•	•		
Palm-Cycler™ 384						•	•
Eppendorf							
Mastercycler Nexus	•			•			
Mastercycler Nexus Eco	•			•			
Mastercycler Nexus Gradient	•			•			
Mastercycler Pro	•			•		•	•
Mastercycler Pro 384							
Mastercycler®	•	•		•	•		
Mastercycler® ep	•			•	•		
Mastercycler® ep realplex	•			•			•
Mastercycler® Gradient		•	•	•	•		
Mastercycler® M384						•	•
Ericom							
Deltacycler I	•	•			•		
Deltacycler II		•					
Power Block I		•					
SingleBlock	•	•			•		
TwinBlock	•	•			•		
Esco							
Gene	•	•		•			•
Genius	•	•		•			
Swift	•	•					•
Flexi							
Gene	•			•	•		•
Genius	•			•	•		
G-Storm							
GS1	•	•	•		•		
GS2	•	•	•		•		
GS4	•	•	•		•		
GSX	•	•	•		•		
GSXs	•	•	•		•		
MWG							
Primus 96	•	•		•	•		
Primus 384						•	•
Roche							
LightCycler® 96							
LightCycler® 384							•
Stratagene							
Gradient Temp. Cycler		•	•				
Mx3000P/4000	•	•					
Mx4000 and Mx3005P	•	•	•		•		
RoboCycler				•			
RoboCycler 96	•	•					
RoboCycler Gradient	•	•	•		•		
TaKaRa							
TP 240				•			
TP 3000	•	•	•	•	•		
Techne							
Cyclogene	•	•	•		•		
Flexigene	•	•	•	•	•		•
Genius	•	•	•	•	•	•	
Genius (TC412)	•	•	•	•	•		
Genius Quad	•	•	•		•		
Quantica				•			
Touchgene	•	•			•		
Touchgene Gradient	•	•	•	•	•	•	•
Touchgene X		•		•	•	•	•
Thermo Hybaid							
Multiblock System	•	•	•	•	•	•	•
OMN-E	•	•	•	•	•		•
Omnigene	•	•	•	•	•	•	•
PCR Express	•	•	•	•	•	•	•
PCR Sprint	•	•	•	•	•		
PxE / Px2	•	•	•	•	•	•	•
Touchdown	•	•	•	•	•	•	•
Transgenomic							
WAVE®				•			

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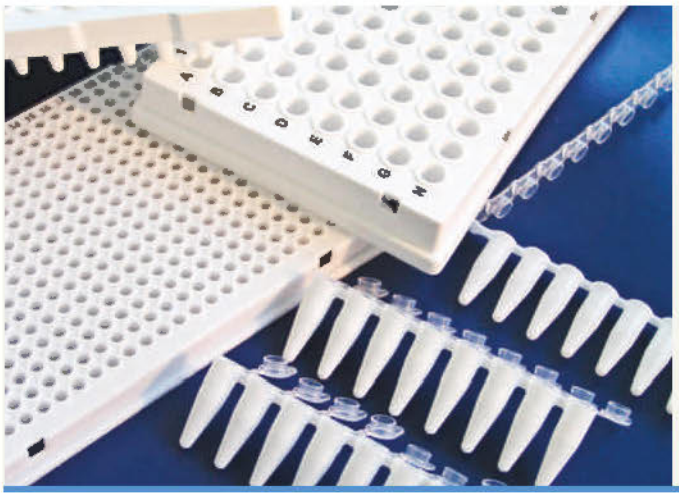
Table is subject to error and technical modifications.

Sapphire qPCR Tube Strips and Microplates



White qPCR Tube Strips, 96 and 384 Well Microplates

Plate compatibility guide see p. 194

- White polyproylene ideally suited to qPCR
- Ultra thin tube walls ensure efficient thermal transfer and thus maximum yield
- Free of detectable DNase, RNase and human DNA
- Greater reflection from white surface enhances signal detection
- An advantage in very low signal situations

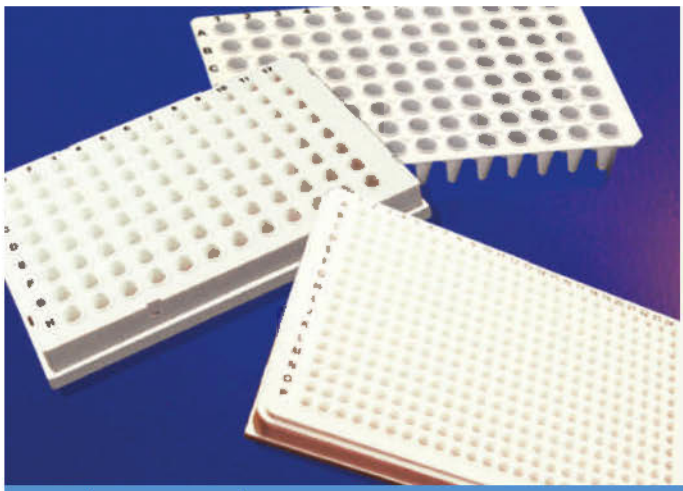
Sapphire White qPCR 8- and 12- Tube Strips and Caps

- Standard and low profile tubes
- Strips of flat caps
- Optically clear caps ideal for qPCR
- Caps supplied as separate strips, attached strips or individually hinged caps

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

Cat.-No.	671271	671241	671231	671221	671251
Tubes per strip	8	8	8	8	12
Volume per tube [ml]	0.2	0.2	0.2	0.1	0.2
Well profile	standard	standard	standard	low profile	standard
Tube colour	white	white	white	white	white
Sterile	-	-	-	-	-
Caps	separate cap strip	hinged cap strip	individually hinged caps	individually hinged caps	separate cap strip
Quantity per case	125	125	120	120	80

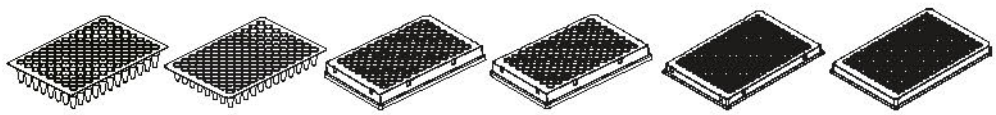
Sapphire White qPCR 96 and 384 Well Microplates



- 96 and 384 well profiles
- Standard and low profile wells
- Non-skirted, half-skirted and fully skirted versions
- Sealable with Greiner Bio-One sealers
- White polypropylene

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

Cat.-No.	669235	669285	669225	669255	669245
Well format	96 well	96 well	96 well	96 well	96 well
Volume per well [ml]	0.1	0.1	0.2	0.1	0.2
Skirt	half-skirt	half-skirt	half-skirt	half-skirt	half-skirt
Well profile	low profile	low profile	standard	low profile	standard
Special feature	ABI suitable	Lightcycler® suitable	-	raised rim	raised rim
Corner notch	A12	H12	A12	A1	A12
Sterile	-	-	-	-	-
Suitable 8-cap strip Cat.-No.	373 260	373 260	373 260	373 260	373 260
Quantity per case	10	10	10	10	10



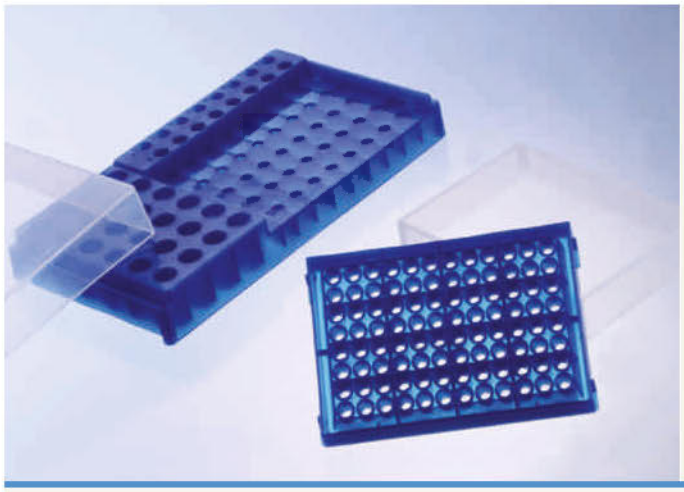
Cat.-No.	669205	669215	669265	669275	785235	785225
Well format	96 well	96 well	96 well	96 well	384 well	384 well
Volume per well [ml]	0.2	0.1	0.1	0.1	0.025	0.025
Skirt	without skirt	without skirt	full-skirt	full-skirt	full-skirt	full-skirt
Well profile	standard	low profile	low profile	low profile	standard	standard
Special feature	-	-	-	MegaBACE™ suitable	-	-
Corner notch	A12	A12	A12	H1	A24	A24 & P24
Sterile	-	-	-	-	-	-
Suitable 8-cap strip Cat.-No.	373 260	373 260	373 260	373 260	-	-
Quantity per case	10	20	10	10	10	10

Table of compatibility for *Sapphire* White qPCR Microplates

		669205	669215	669225	669255	669245	669235	669285	669265	669275	785235	785225
Applied Biosystems	7300	•		•		•	•					
	7500	•		•		•	•					
	7500 FAST				•							
	7700	•		•		•						
	7900HT	•		•		•	•					
	7900HT FAST				•							
	7900HT 384										•	
	StepOnePlus™				•							
	ViiA™ 7					•						
	ViiA™ 7 (0.1mL)				•							
	ViiA™ 7 (384 well)										•	
	QuantStudio™ 3/5/6/7/12K, ViiA™ 7, 7900HT, 12K Flex					•						
	QuantStudio™ 3/5/6/7/12K, ViiA™ 7, 7900HT, 12K Flex 0.1ml				•							
	QuantStudio™ 12K Flex (384 well)				•							
BIO-RAD	Opticon® / Opticon® 2	•	•						•			
	Chrome 4		•						•			
	iCycler®	•							•			•
	iCycler® 384										•	
	MyiQ™	•							•			
	IQ™5	•							•			
	CXF Connect™		•									
	CFX96™								•			
	CFX384™											•
Eppendorf	Mastercycler® ep realplex								•			
Roche	LightCycler® 96							•				
	LightCycler® 96 (384 well)											•
	LightCycler® 480							•				
	LightCycler® 480 (384 well)											•
Stratagene	Mx3005P			•		•	•					
	Mx4000			•		•						
	AriaMx	•										
Techne	Quantica®		•									
Amersham	MegaBACE™ 500								•	•		
	MegaBACE™ 1000								•	•		

This table is a guide for best fit only, Greiner Bio-One does not guarantee perfect compatibility. Trade names and registered trademarks are the property of their respective owners.

PCR Workstation with Work-up Rack



PCR Workstation with Work-up Rack

The PCR Work Up Rack and the 96 well Work Up Rack are multifunctional workstations and ideal platforms for sample preparation for PCR and numerous other applications.

PCR Workstation
- 24 positions for 1.5 / 2.0 ml tubes
- 16 positions for 0.5 ml tubes
- 32 positions for 0.2 ml tubes
- Thermal resistance down to -80 °C
- Labelling fields on the side
- Alphanumeric coding of the tube positions

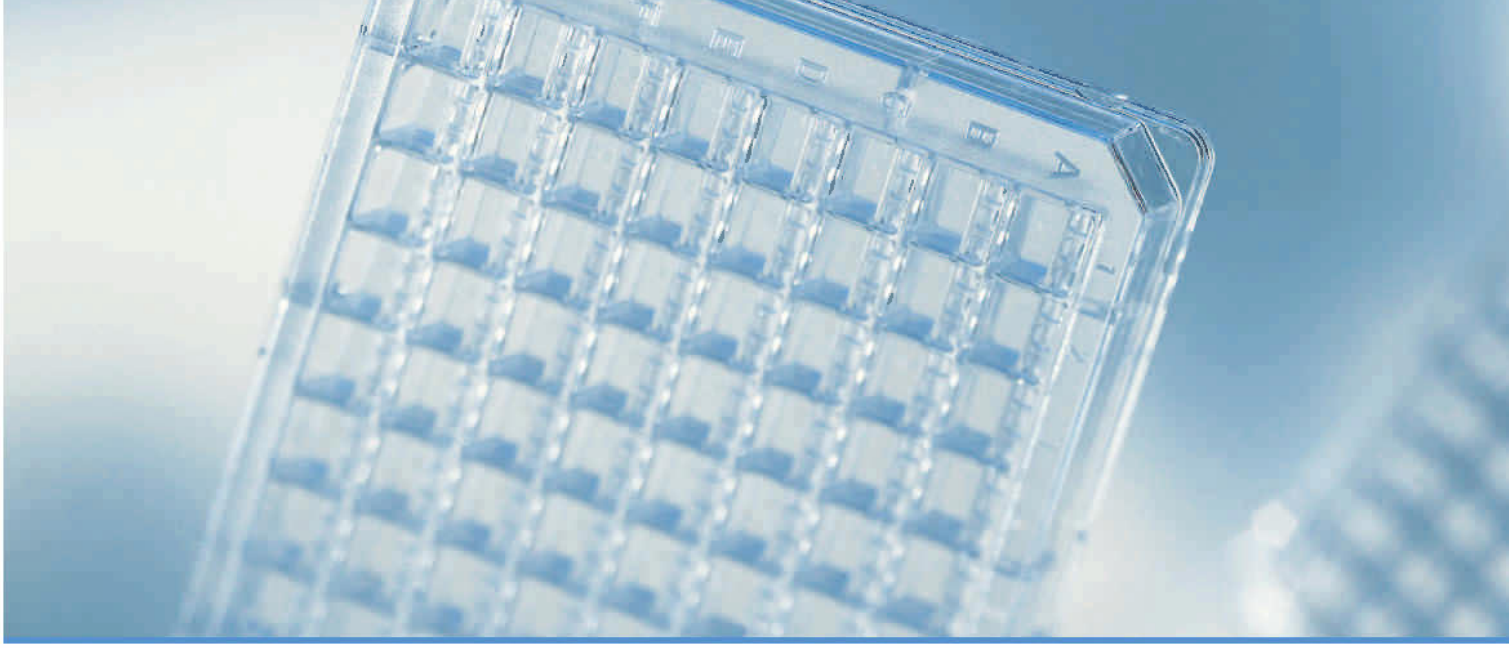
96 Well Work Up Rack
- 96 positions
- Arranged in 96 well format
- For 0.2 ml reaction tubes and 8-tube strips
- Can be firmly located in the PCR Work Up Rack
- Thermal resistance down to -80 °C
- Alphanumeric coding of the tube positions

PCR

Description		PCR workstation	96 well PCR work up rack
Quantity per bag		1	1
COLOUR			
Blue	Cat.-No.	879070	880070
Orange	Cat.-No.	879071	880071
Green	Cat.-No.	879072	880072
Yellow	Cat.-No.	879073	880073
Pink	Cat.-No.	879074	880074


1
2
3
4
A
B
A

8 Protein Crystallisation



Protein Crystallisation

An important method for the determination of protein structures is x-ray analysis of protein crystals. The determination of the three-dimensional structure of proteins has contributed towards major advances in basic research, particularly in the fields of structural genomics and structure-based drug design.

The most commonly used method for the crystallisation of proteins is vapour diffusion which comprises both the sitting drop and hanging drop methods (Fig. 1a and Fig. 1b). One drop of protein solution is mixed with one drop of reagent solution and incubated together with a larger volume of reagent solution in a sealed well. Concentration gradients between the sample drop and the reservoir solution are balanced out by diffusion, which induces the crystallisation process if the correct conditions have been selected.

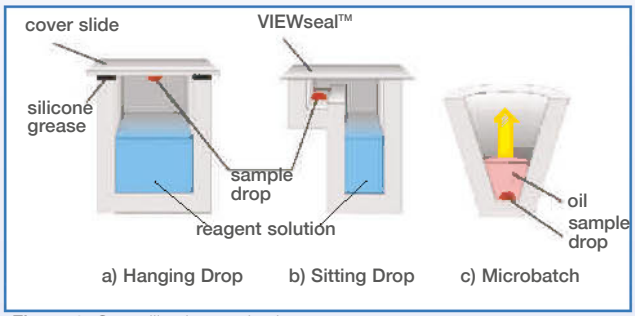


Figure 1: Crystallisation methods
a) Hanging Drop b) Sitting Drop c) Microbatch

The microbatch method (Fig. 1c) in which the sample drop is covered with oil is also widely used, and in this technique the choice of oil determines the rate of diffusion of the water in the sample drop through the oil.

Numerous factors affect the crystallisation of proteins. Since the optimal crystallisation conditions generally cannot be predicted, a large number of attempts is often necessary in order to determine and optimise the appropriate conditions. Protein crystallisation therefore still represents a major bottleneck in structure analysis. The use of high-throughput technologies, such as pipetting robots and standardised microplates, makes it possible to test a large number of crystallisation conditions in a short period of time and with relatively small amounts of protein.
The **CrystalStar™** product range from Greiner Bio-One is a family of crystallisation plates and accessories designed specifically for high-throughput crystallisation.

Format

We place great value on the suitability of our protein crystallisation plates for use with automated systems. Therefore, with the exception of Terasaki plates, all crystallisation plates have a footprint conforming to the ANSI 1-2004 standard.

Barcode Labelling
Customer-specific barcode labelling is available on request for all crystallisation plates, with the exception of Terasaki plates.

Material

All Greiner Bio-One protein crystallisation plates, with the exception of the LBR plates (see below), are made from polystyrene. This is characterised by high clarity and excellent optical properties.

Hydrophobic Plates

Plates with a hydrophobic surface are particularly well suited for nanolitre crystallisation of membrane proteins. The surface properties of hydrophobic plates efficiently counteract the spreading of detergent-containing drops, respectively of drops with surfactant precipitants, such as MPD (Fig. 2). Moreover, the meniscus of the screening solution in the reservoir is substantially reduced, so that contamination through creeping of the screening solution into the crystallisation well are avoided.

LBR Plates for Polarised Light and UV-Light Detection

LBR (low birefringence) plates are specifically designed for the use of polarised light. LBR plates for sitting drop applications are made from polyolefin which is characterised by very low birefringence in comparison with polystyrene plates (Fig. 3). Extreme transparency, high chemical resistance and low water absorption are further characteristics of LBR plates. In addition to providing low birefringent background, the LBR plates also exhibit extremely low autofluorescence. This feature makes them suitable for crystal detection with UV-light.

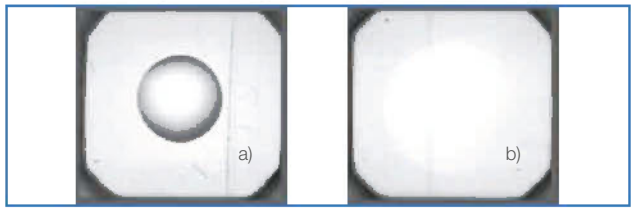


Figure 2: Comparison of (a) CrystalQuick™Plus (hydrophobic surface) and (b) CrystalQuick™ standard. Images of 100 nl drops containing 50 mM n-Octyl-Glucoside are courtesy of Karl Harlos, The Wellcome Trust Centre for Human Genetics, Oxford, UK.

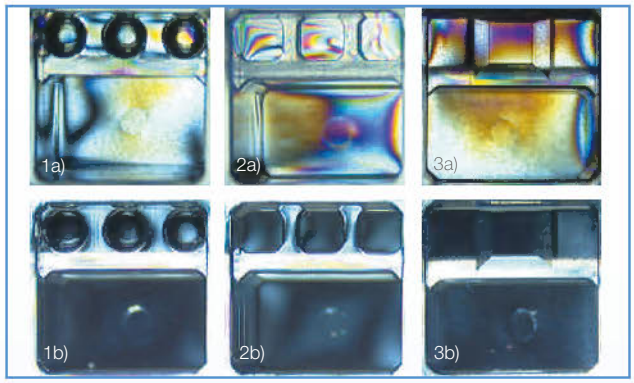


Figure 3: CrystalQuick™ plates in polarised light: (a) Standard versions with strong birefringence, (b) LBR versions with lower birefringence.
(1) CrystalQuick™ RW (2) CrystalQuick™ SW (3) CrystalQuick™ LP

Further information on protein crystallisation

→ **Forum No. 7: Advanced high-throughput platforms for protein crystallisation** (F073016)

Cat.-No.	Description	Number of sample wells	Number of reservoirs	Special features
	Vapour Diffusion			
662150	ComboPlate™	–	24	–
609101	CrystalQuick™ SW (Square Wells)	288	96	–
609801	CrystalQuick™ SW (Square Wells)	288	96	LBR
609130	CrystalQuick™ Plus SW (Square Wells)	288	96	hydrophobic
609830	CrystalQuick™ Plus SW (Square Wells)	288	96	LBR, hydrophobic
609120	CrystalQuick™ RW (Round Wells)	288	96	–
609820	CrystalQuick™ RW (Round Wells)	288	96	LBR
609171	CrystalQuick™ LP (Low Profile)	96	96	–
609871	CrystalQuick™ LP (Low Profile)	96	96	LBR
609180	CrystalQuick™ Plus LP (Low Profile)	96	96	hydrophobic
	Microbatch			
653102	Terasaki Plate	60	–	–
654102	Terasaki Plate	72	–	–
	Accessories			
676070	VIEWseal™	–	–	–
676040	AMPLIseal™	–	–	–
662145	CrystalBridge™	–	1	–
501870	Coverslip, 18 mm ø, thickness 2 (0.19–0.22 mm)	–	–	glass, siliconised
503870	Coverslip, 22 mm ø, thickness 2 (0.19–0.22 mm)	–	–	glass, siliconised
503850	Coverslip, 22 mm ø, thickness 5 (0.5–0.6 mm)	–	–	glass, siliconised

Table 1: Overview of CrystalStar™ crystallisation plates and accessories.

Vapour Diffusion Applications

96 Well CrystalQuick™ Plates for Sitting Drop Applications

In cooperation with the Genomics Institute of the Novartis Research Foundation (GNF) in San Diego (USA), the Max-Planck Institute (MPI) and the Protein Structure Factory (PSF) in Berlin, Greiner Bio-One has developed a family of 96 well crystallisation plates for sitting drop applications. Each of the 96 reservoirs contains an elevated platform with either one or three crystallisation wells. The plates are optimised for sealing with VIEWseal™ and AMPLIseal™ adhesive film (→ p. 224–225). The external dimensions and tolerances of the CrystalQuick™ plates are suitable for automated applications. All CrystalQuick™ plates are available in an LBR version for the use of polarised light. Plates with a hydrophobic surface can be found in the table under CrystalQuick™ Plus plates.

CrystalQuick™ SW (Square Wells Fig. 1, Fig. 2)

With three crystallisation wells per reservoir, CrystalQuick™ SW makes it possible to test 288 samples per plate. The flat bottom of the wells provides for good optical properties. The maximum volume of the crystallisation drops is 4 µl (US Patent No. 7005008 B2).

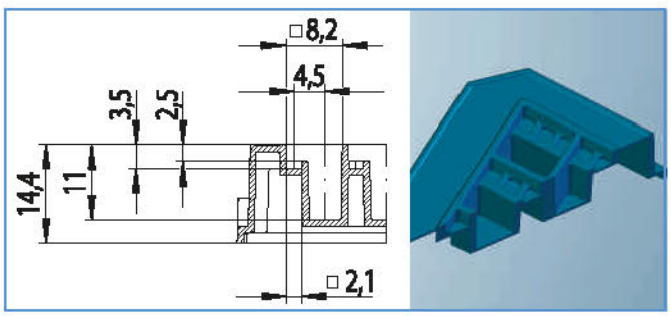


Figure 1: Well profile, CrystalQuick™ SW

Figure 2: Crystallisation of lysozyme in CrystalQuick™ SW

CrystalQuick™ RW (Round Wells Fig. 3, Fig. 4)

With three round crystallisation wells per reservoir, CrystalQuick™ RW makes it possible to test 288 samples per plate. The bottom of the crystallisation wells is concave. The maximum volume of the crystallisation drops is 1.9 µl.

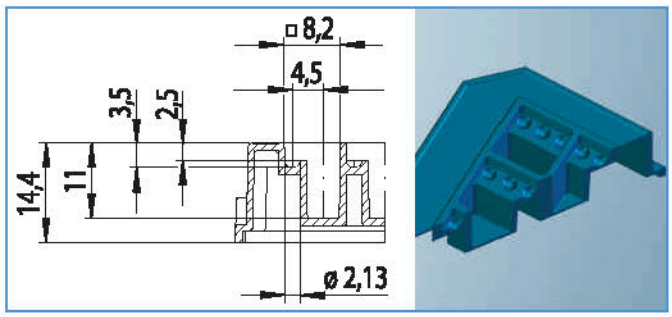


Figure 3: Well profile, CrystalQuick™ RW

Figure 4: Protein crystal in CrystalQuick™ RW, the image was kindly supplied by B. Blattmann, NCCR Structural Biology, Switzerland

CrystalQuick™ LP (Low Profile Fig. 5, Fig. 6)

CrystalQuick™ LP (low profile) crystallisation plates are characterised by excellent optical properties. Crystal harvesting is made easier by the angled walls of the crystallisation wells. The low profile reduces space requirements for storage.

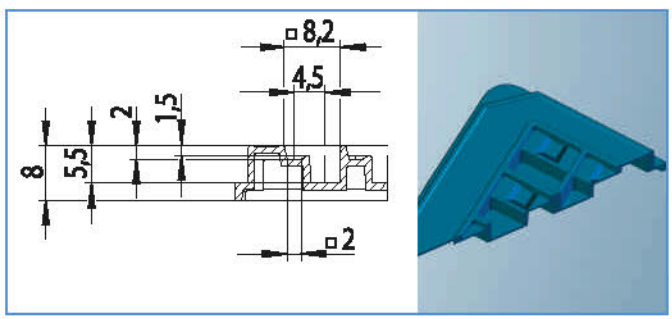


Figure 5: Well profile, CrystalQuick™ LP

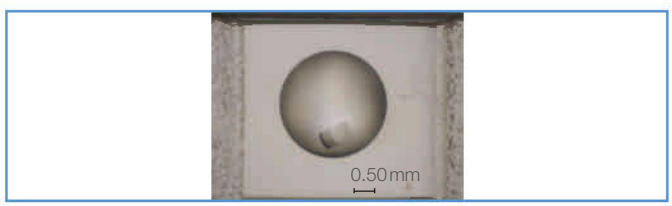
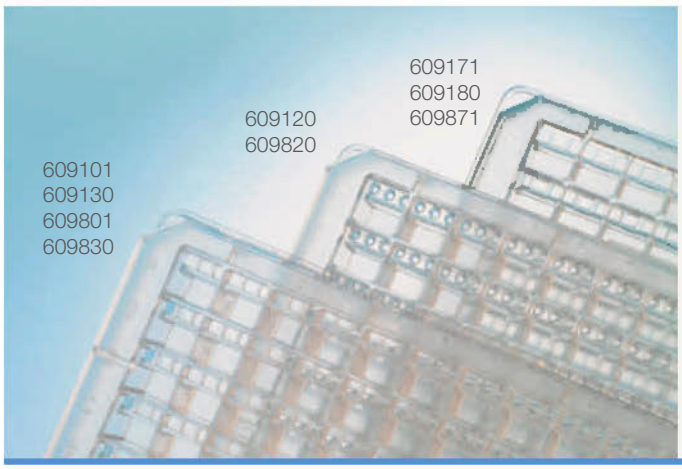


Figure 6: Crystallisation of lysozyme in CrystalQuick™ LP, RoboDesign International Inc., Carlsbad (USA)

! All CrystalQuick™ plates feature an alphanumeric well coding.

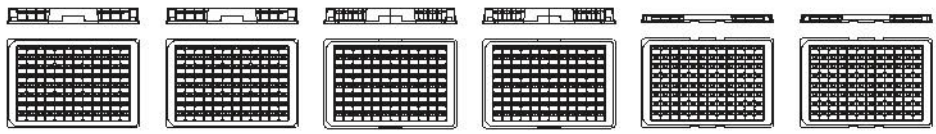


96 Well CrystalQuick™
96 Well CrystalQuick™ Plus

Lids and Sealers p. 236–241

- Crystallisation plates for sitting drop applications with different well profiles and material properties
- Alphanumeric well coding

CrystalQuick™



Cat.-No.	609101	609801	609120	609820	609171	609871
Description	CrystalQuick™	CrystalQuick™	CrystalQuick™	CrystalQuick™	CrystalQuick™	CrystalQuick™
Material properties	standard	LBR	standard	LBR	standard	LBR
Well profile	square (SW)	square (SW)	round (RW)	round (RW)	square (LP)	square (LP)
Well bottom	flat	flat	concave	concave	flat	flat
Well per reservoir	3	3	3	3	1	1
Max. well volume [µl]	4.1	4.1	1.9	1.9	3.9	3.9
Volume per reservoir [µl]	320	320	320	320	140	140
Height [mm]	14.4	14.4	14.4	14.4	8.0 (low profile)	8.0 (low profile)
Quantity per bag/case	10/40	10/40	10/40	10/40	20/80	20/80

CrystalQuick™ Plus

Cat.-No.	609130	609830	609180
Description	CrystalQuick™ Plus	CrystalQuick™ Plus	CrystalQuick™ Plus
Material properties	hydrophobic	LBR, hydrophobic	hydrophobic
Well profile	square (SW)	square (SW)	square (LP)
Well bottom	flat	flat	flat
Well per reservoir	3	3	1
Max. well volume [µl]	4.1	4.1	3.9
Volume per reservoir [µl]	320	320	140
Height [mm]	14.4	14.4	8.0 (low profile)
Quantity per bag/case	10/40	10/40	20/80

24 Well ComboPlate™, CrystalBridge™ and Coverslips

24 Well ComboPlate™, CrystalBridge™ and Coverslips

Lids and Sealers p. 236–241

- Universal 24 well crystallisation plate
- Siliconised coverslips available

ComboPlate™
The ComboPlate™ was developed as universal platform for crystallisation in the 24 well format in cooperation with Hampton Research (Fig. 7). Clear polystyrene in combination with a flat, distortion-free bottom offers excellent optical properties.
A flattened, raised ring around each well reduces the risk of cross-contamination and makes it possible to seal the wells with silicone grease and coverslips (ø 18 mm) or VIEWseal™ sealer (Cat.-No. 676070). A slightly raised lid protects the coverslips and sealer during transportation and storage.

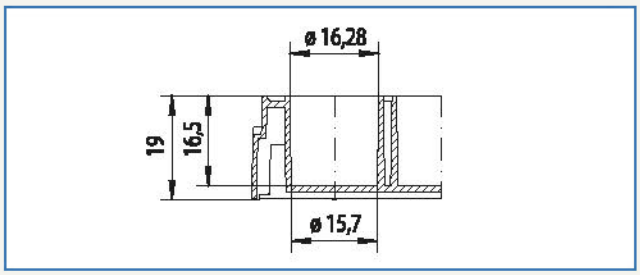
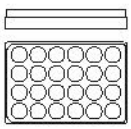
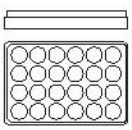
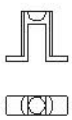


Figure 7: Well profile, 24 well ComboPlate™

As an accessory for the ComboPlate™ Greiner Bio-One offers siliconised coverslips (round, ø 18 mm) (Fig. 8). Siliconised coverslips for Linbro plates (round, ø 22 mm) can also be found in our product line.

Figure 8: ComboPlate™ sealed with coverslips

CrystalBridge™
Sitting drop experiments are possible using the CrystalBridge™ inserts which fit exactly into the wells of the ComboPlate™.
The well with a concave bottom integrated into the CrystalBridge™ has a volume of 45 µl. If necessary, CrystalBridge™ inserts can be transferred to another well during the course of an experiment.

Cat.-No.	**662150**	**662050**	**662145**
Description	ComboPlate™	ComboPlate™	CrystalBridge™
Material properties	-	pre-greased	-
Format	24 well	24 well	1 well
Well bottom	flat	flat	concave
ø Well [mm]	16.3	16.3	4.6
Max. well volume [µl]	3300	3300	45
Lid	+	+	-
Quantity per bag/case	6/24	6/24	250

Cat.-No.	**501870**	**503870**	**503850**
Description	round coverslips	round coverslips	round coverslips
Material properties	siliconised glass	siliconised glass	siliconised glass
ø [mm]	18	22	22
Thickness [mm]	0.19 – 0.22	0.19 – 0.22	0.5 – 0.6
Quantity per box/case	100/1000	100/1000	25/1000

Microbatch under Oil Applications

60 Well and 72 Well Terasaki Plates

60 Well/72 Well Terasaki Plates

Surface-treated Terasaki Plates p. 133

60 Well and 72 Well Terasaki Plates
Terasaki plates are widely used for microbatch crystallisation. The crystallisation drop is localised centrally as a result of the conical well geometry, and the flat well bottom makes for optimal monitoring (Fig. 1). The rim of the Terasaki plates makes it possible to fill all of the wells with oil at the same time. As a result of the small external dimensions and the low profile of the Terasaki plates, the space required for storage is relatively small. Terasaki plates are supplied with a fitting lid.
The plates are also supplied with surface treatment (→ p. 129). The treatment of the plates influences the sticking of the crystallisation drop to the bottom of the well.

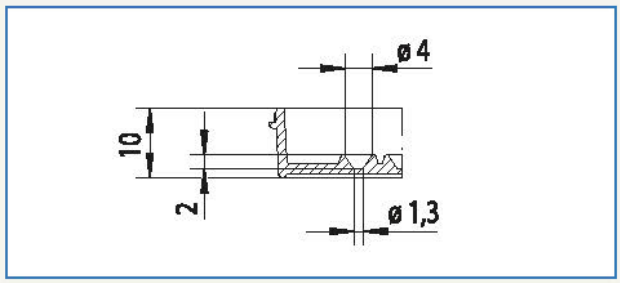
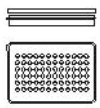
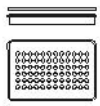


Figure 1: Well profile, Terasaki plate





Cat.-No.	653102	654102
Description	Terasaki plate	Terasaki plate
Format	60 well	72 well
Well profile	conical	conical
Well bottom	flat	flat
ø Well bottom [mm]	1.3	1.3
Working volume per well [µl]	10	10
Max. volume per well [µl]	11.5	11.5
Length [mm] x width [mm] x height [mm]	83.3x58x10	83.3x58x10
Surface treatment	-	-
Quantity per bag/case	10/580	10/270

9 Separation

Separation

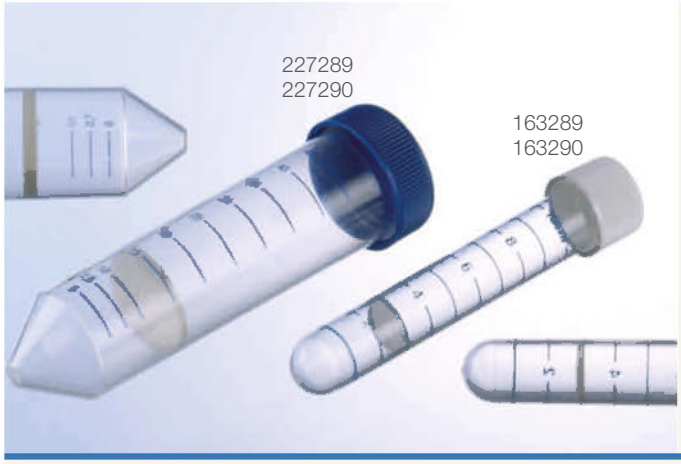
Different separation techniques can be used to enrich certain particles (DNA, RNA, proteins, organelles, vesicles, micelles, cells etc.) specifically from complex biological mixtures such as cell and tissue homogenates, blood, urine and other body fluids, so that they can then be selectively investigated. Separation of these types of particles can be based either on the different sedimentation rates of different particles in a fluid, or on their different densities. **Density gradient centrifugation** (also referred to as band, equilibrium or isopycnic centrifugation), exploits the principle that particles of a certain density migrate into a density gradient until they reach an equilibrium density layer. The first applications of density gradient centrifugation were reported in the early 1950s. Back then, cell organelles were enriched with the aid of buffered saccharose gadients and it is uncontested that the knowledge gained with these enriched materials made a contribution to modern molecular biology.

Soon it was discovered that the enrichment of mammalian cells requires more complex separation media, particularly due to their sensitivity towards osmotic fluctuation. Noble and Boyum described methods for separating mono-nuclear cells from whole blood and bone marrow as early as 1967 and 1968. Based on this pioneering scientific work, numerous applications in today‘s biomedical research and routine diagnostics require highly enriched, viable and functionally intact cell populations as the starting material. The separation of such cells by density gradient centrifu-gation has proven to be the most often used method due to its uncomplicated and robust nature.

With **Leucosep™**, Greiner Bio-One optimised density gradient centrifugation whilst making it user-friendly. Alongside this, **OncoQuick®** was developed to extend the spectrum of applications to deal specifically with oncological targets.

Leucosep™

12 ml and 50 ml Leucosep™ Tubes



Leucosep™

Efficient separation of lymphocytes and mononuclear cells from peripheral blood and bone marrow

Features:

- Enrichment directly from whole blood
- Simplified filling through porous barrier
- Rapid separation in 15 minutes at room temperature
- No additional laboratory equipment required
- Removal of erythrocytes and granulocytes
- No recontamination with erythrocytes
- No blocking of marker molecules
- **Pre-filled option** with Leucosep™ separation medium
- Available unfilled for usage of different separation media

Leucosep™ was developed for optimal separation of lymphocytes and peripheral mononuclear cells (so-called PBMCs) from human whole blood and bone marrow. The key feature of Leucosep™ is the porous barrier incorporated into the centrifuge tube made of highly translucent polypropylene. This barrier consists of high-grade polyethylene. It shows a precisely controlled pore size and does away with the time-consuming and laborious overlaying of the sample material. Anticoagulated blood or bone marrow can simply be poured directly from the blood sampling tube into the Leucosep™ tube. The porous barrier prevents mixture of the sample material with the separation medium. During centrifugation, lymphocytes and PBMCs are separated from unwanted erythrocytes and granulocytes on the basis of their density, and enriched in an interphase above the separation medium. When separation is complete, the barrier prevents recontamination of the enriched cell fraction during harvest.

Leucosep™ may be used in combination with all common separation media for PBMC separation. For maximum convenience Leucosep™ tubes are available as pre-filled tubes. The contained Leucosep™ separation medium has a density of 1.077 g/ml and yields excellent separation results.

Typical separation results with Leucosep™ separation medium:	
Vitality	
Viable cells [%]	95 ± 5
Cell yield	
Lymphocytes [% of original number]	60 ± 20
Composition of enriched cell fraction	
Mononuclear cells [%]	95 ± 5
Granulocytes [%]	5 ± 5
Erythrocytes [%]	< 1
Composition of lymphocyte fraction	
T cells [%]	83 ± 3
B cells [%]	6 ± 3
NK cells [%]	11 ± 2

non-cytotoxic | non-pyrogenic






Cat.-No.	163288	163289	163290	227288	227289	227290
Description	Leucosep™ tubes with porous barrier	Leucosep™ tubes with porous barrier	Leucosep™ tubes with porous barrier	Leucosep™ tubes with porous barrier	Leucosep™ tubes with porous barrier	Leucosep™ tubes with porous barrier
Volume [ml]	12	12	12	50	50	50
Separation medium	**+/ pre-filled with Leucosep™ separation medium**	–	–	**+/ pre-filled with Leucosep™ separation medium**	–	–
Sterile	as	–	+	as	–	+
Sample volume	3–8 ml blood	3–8 ml blood	3–8 ml blood	15–30 ml blood	15–30 ml blood	15–30 ml blood
Quantity per box/case	50/500	50/500	50/500	25/250	25/300	25/300

as = aseptically produced

Instruction Manual Leucosep™

The Method

Leucosep™ has been developed for optimal separation of lymphocytes and peripheral mononuclear cells (so-called PBMCs) from human whole blood and bone marrow by means of density gradient centrifugation. The key feature of Leucosep™ is the porous barrier incorporated into the centrifuge tube made of highly translucent polypropylene. This barrier consists of high-grade polyethylene. It does away with the time-consuming and laborious overlaying of the sample material. Anticoagulated blood or bone marrow can simply be poured directly from the blood sampling tube into the Leucosep™ tube. The porous barrier prevents mixture of the sample material with the separation medium. During centrifugation, lymphocytes and PBMCs are separated from unwanted erythrocytes and granulocytes on the basis of their buoyant density, and enriched in an interphase above the separation medium. When separation is complete, the barrier prevents recontamination of the enriched cell fraction during harvest.

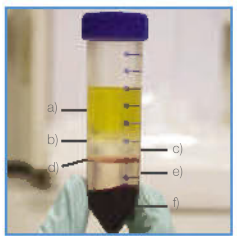
Preparation

- Warm up separation medium to room temperature (RT) protected from light.
- Fill the Leucosep™ tube with separation medium: 3 ml when using tubes Cat.-No. 163289 or 163290; 15 ml when using tubes Cat.-No. 227289 or 227290.
- Close the tubes containing the separation medium with the screw cap and centrifugate for 30 sec. at 1000 x g and RT. The separation medium is now located below the porous barrier.
- When using tubes that are prefilled with separation medium (Cat.-No. 163288 or 227288) the aforementioned steps can be cancelled. Simply warm up the tubes to RT.
- The tubes are now ready for filling with anticoagulated blood or bone marrow aspirate. Dilution of the sample material with balanced salt solution is not implicitly necessary, but it can help to improve the result of the separation. For blood a dilution ratio of 1 : 2, for bone marrow a ratio of 1 : 4 is recommended.

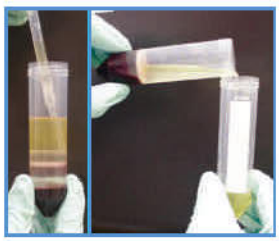
Procedure

1) Filling with sample material

2) Before centrifugation



3) After centrifugation



4) Harvest by means of a Pasteur pipette or by decanting into another centrifugation tube

1) Pour the anticoagulated sample material (blood or bone marrow aspirate, diluted with balanced salt solution if necessary) directly from the blood sampling tube carefully into the Leucosep™ tube: 3–8 ml of sample material when using tubes Cat.-No. 163288, 163289 or 163290; 15–30 ml of sample material when using tubes Cat.-No. 227288, 227289 or 227290.

2) Centrifugate 10 minutes at 1000 x g and RT or 15 minutes at 800 x g and RT in a swinging bucket rotor. Switch off brakes of the centrifuge.

3) After centrifugation the sequence of layers occurs as follows (seen from top to bottom): a) Plasma – b) enriched cell fraction (interphase consisting of lymphocytes/PBMCs) – c) separation medium – d) porous barrier – e) separation medium – f) pellet (erythrocytes and granulocytes). Collection and discarding of the plasma layer fraction up to a minimum remnant of 5 to 10 mm above the interphase helps to prevent contamination of the enriched cells with platelets.

4) Harvest the enriched cell fraction (lymphocytes/PBMCs) by means of a Pasteur pipette or by pouring the supernatant above the porous barrier from the Leucosep™ tube into another centrifugation tube. The porous barrier effectively avoids recontamination with pelleted erythrocytes and granulocytes.

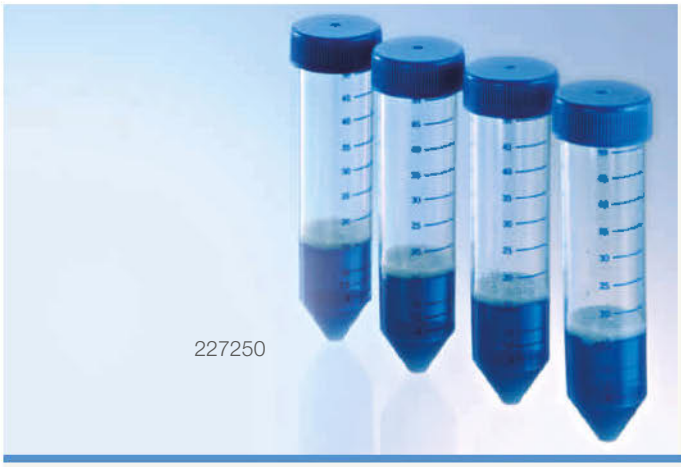
5) Wash the enriched cell fraction (lymphocytes/PBMCs) with 10 ml of phosphate-buffered saline (PBS), subsequently centrifugate for 10 minutes at 250 x g.

6) Repeat washing step twice, resuspend the cell pellet with 5 ml of PBS.

Caution

Handle all biological samples and blood collection lancets, needles, and blood collection sets in accordance with the policies and procedures of your facility. In case of any exposure or contamination with blood or other biological samples (e. g. accidental puncture injury) initiate appropriate medical treatment as such material has to be considered potentially infective with HBV, HCV (hepatitis), HIV (AIDS), or other infective agents.

OncoQuick®



227250

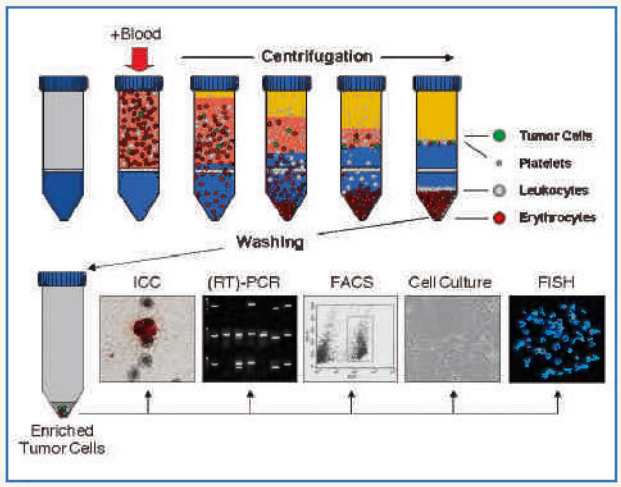
OncoQuick®

Enrichment of disseminated, circulating tumour cells from peripheral blood

Features:

- Time request approx. 45 minutes
- Reproducible recovery: > 70 %
- Depletion of blood cells by up to 6 log units
- No additional laboratory equipment required
- No need for magnetic beads
- No blocking of marker molecules
- Enrichment directly from whole blood

OncoQuick® is a simple-to-use, rapid and efficient system for the enrichment of circulating tumour cells that are released into the blood by a solid epithelial tumour or malignant melanoma. OncoQuick® combines the advantages of cell separation by density gradient centrifugation (rapid, reproducible and cost-effective) with recovery rates that are comparable with immunobead methods.
OncoQuick® consists of a sterile 50 ml polypropylene tube with a porous barrier which is inserted above the specially developed separation medium. Up to 30 ml of anticoagulated whole blood is directly filled into the OncoQuick® tube and centrifugated. Apart from erythrocytes and granulocytes, the separation medium also allows the elimination of lymphocytes and mononuclear cells to a wide extent. The disseminated tumour cells are enriched in the interphase. After harvesting, the enriched cell fraction is washed. The tumour cells are then available for all standard research methods. OncoQuick® was developed in a cooperation between Hexal Gentech and Greiner Bio-One and is intended for use for research purposes only!



Instructions for using OncoQuick® as well as further information can be found under www.gbo.com/bioscience.

non-cytotoxic non-pyrogenic

Cat.-No.	227255*)	227250
Description	OncoQuick® tubes with porous barrier and separation medium	OncoQuick® tubes with porous barrier and separation medium
Sterile	as	as
Sample volume	15–30 ml blood	15–30 ml blood
Quantity per case	4	10

*) sample package with special price available only once

as = aseptically produced

10 Triple-Packed Products

Triple-Packed Products for Clean Room Applications

The **G**ood **M**anufacturing **P**ractice (GMP) guidelines are fundamental to defining quality standards in the manufacture of pharmaceuticals and to ensure that their production and control is done appropriate to their intended use. GMP production is required by the marketing authorisation of medicines. All medicines and active ingredients manufactured or imported, including medicines for export and those intended for clinical trials should be manufactured in accordance with the principles and guidelines of GMP.

Hence, GMP is a system for ensuring that products are consistently produced and controlled according to quality standards. It is designed to minimise the risks involved in any pharmaceutical production that cannot be eliminated through testing the final end product. The main risks are: unexpected contamination of products, causing damage to health or even death; incorrect labels on containers, which could mean that patients receive the wrong medicine; insufficient or too much active ingredient, resulting in ineffective treatment or adverse effects.

GMP covers all aspects of production; from the starting materials, premises, and equipment to the training and personal hygiene of employees. Detailed, written procedures are essential for each process that could affect the quality of the final end product. There must be systems to provide documented proof that correct procedures are consistently followed at each step in the manufacturing process – every time a product is made.

In a pharmaceutical sense, cleanrooms are those rooms that meet the code of GMP requirements as defined in the sterile code of GMP, i. e. Annex 1.

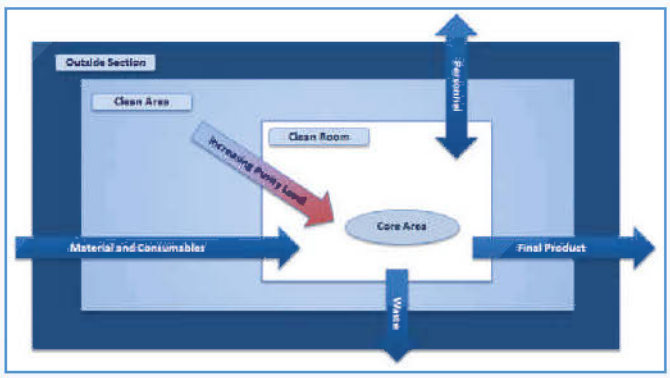


Figure 1: Characteristic for the GMP clean room concept is the hierarchy of the clean room zones including material and man lock (e. g. personnel air shower) and a pressure gradient to separate the external environment from the critical core area.

Triple-Packed Products

Greiner Bio-One's triple-packed products meet stringent clean room requirements and provide a high degree of safety for such applications.
Triple-packed products are used where sterile transfer of products is essential. With single packaging, contamination adhering to the outside of the bag can be carried into clean room areas. Therefore all single-packed materials must be wiped clean with 70 % alcohol or other disinfectant. Triple packed products eliminate the need for such cleaning procedures, prevent contamination from reaching highly sensitive production areas, simplify handling and reduce processing time. Greiner Bio-One triple-packed products are packed in three individual peel bags. The inner bag is labelled with the relevant product information, batch number and expiry date. The peel bags are increasing in size, to prevent double weld seams and damage of the next inner bag during handling. To guarantee maximal sterility, all Greiner Bio-One triple-packed products are sterilised with an SAL of 10^{-6}.

Figure 2: Triple-packed 50 ml CELLSTAR® Polypropylene Tubes

Features:

- Three individual peel bags
- Inner bag labelled with relevant product information, batch number and expiry date
- Peel bags are increasing in size to prevent double weld seams and damage of the next inner bag during handling.
- High sterilisation level (SAL 10^{-6}) for maximum security
- Convenient and easy clean room handling
- No need for alcohol wipe downs or cleaning processes
- Adequate packaging units
- Global availability

! All standard products that are also available triple-packed are marked with a TRI-Icon in our catalogue. The Cat.-No. of triple-packed products is composed of the standard Cat.-No. plus **–TRI** (e.g. 604160-TRI). In general, all Greiner Bio One cell culture products can be produced triple-packed. Please contact your Greiner Bio-One sales representative regarding customised triple-packed products.

TRI

The GMP guideline and its annexes regulate the production of pharmaceuticals. Disposables applied for their preparation are only described indirectly.

EU GMP Guidelines; Chapter 3 Premise and Equipment, section 3.39:
Production equipment should not present any hazard to the products. The parts of the production equipment that come into contact with the product must not be reactive, additive or absorptive to such an extent that it will affect the quality of the product and thus present any hazard.

EU GMP Guidelines; Annex 1 section 81:
Components, containers, equipment and any other article required in a clean area where aseptic work takes place should be sterilized and passed into the area through double-ended sterilizers sealed into the wall, or by a procedure which achieves the same objective of not introducing contamination.

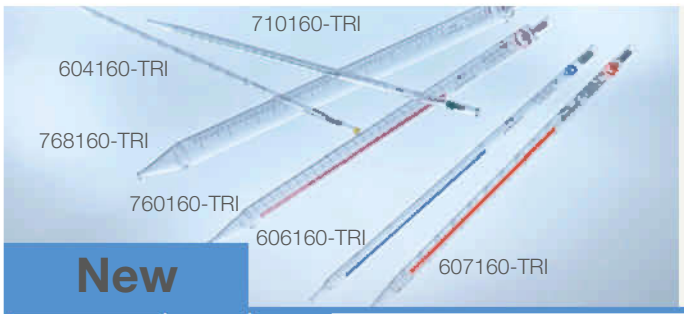
Code of Federal Regulations 21 CFR; Part 211.94 (a):
Drug product containers and closures shall not be reactive, additive, or absorptive so as to alter the safety, identity, strength, quality or purity beyond the official or established requirements.

As all Greiner Bio-One cell culture devices are guaranteed to be sterile (SAL 10^{-6}), non-pyrogenic, non-cytotoxic and free of detectable DNase, RNase and human DNA, the basic disposables fulfill the demands based on GMP guidelines.

Figure 3: Triple-packed 50 ml CELLSTAR® Serological Pipettes

Triple-Packed Products

CELLSTAR® Serological Pipettes



New

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

Serological Pipettes 1 to 50 ml

Further Serological Pipettes p. 164–165

- Sterile
- Triple-packed
- High optical clarity
- Maximum accuracy
- Drop-free pipetting
- Clear, easily legible graduation
- 1/2/5/10/25 ml pipettes with vertical Schellbach stripe for easier volume identification

Cat.-No.	604160-TRI	710160-TRI	606160-TRI	607160-TRI	760160-TRI	768160-TRI
Description	1 ml pipette	2 ml pipette	5 ml pipette	10 ml pipette	25 ml pipette	50 ml pipette
Graduation	1/100	1/100	1/10	1/10	2/10	1/2
Sterile	+	+	+	+	+	+
Triple-Packed	+	+	+	+	+	+
Quantity per bag/case	10/100	10/100	10/100	10/100	10/100	10/100

CELLSTAR® Polypropylene Tubes

New

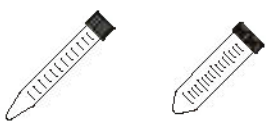
Free of detectable DNase, RNase, human DNA
non-pyrogenic
non-cytotoxic
TRI

Polypropylene Tubes 15 ml/50 ml

Further Polypropylene Tubes p. 151–152

Overview: See Technical Appendix for max. relative centrifugal force (RCF)

- Triple-packed
- Optimal mechanical, thermal and chemical stability



Cat.-No.	188271-TRI	227261-TRI
Description	15 ml tube	50 ml tube
Bottom design	conical	conical
ø [mm] x height [mm]	17x120	30x115
Nominal volume [ml]	15	50
Working volume [ml]	14	50
Sterile	+	+
Triple-packed	+	+
Colour	natural	natural
Quantity per bag/case	5/500	5/250

Cryo.s™

New

CE | IVD | Free of detectable DNase, RNase, human DNA | non-pyrogenic | non-cytotoxic | TRI

Cryo.s™ 1 ml/2 ml

Further Cryo.s™ p. 221 - 222

Freezing Protocol, Technical Appendix

- Triple-packed & CE-marked
- Cryo.s™ with internal thread have a silicone gasket
- Leachable-free, USP class VI certified medical grade polypropylene

Cat.-No.	123263-TRI	122263-TRI	126263-TRI
Description	1 ml Cryo.s™	2 ml Cryo.s™	2 ml Cryo.s™
Working volume [ml]	up to 1.2	up to 2.0	up to 2.2
ø [mm] x height*) [mm]	12.5 x 42	12.5 x 48	12.4 x 47
Starfoot bottom	conical	round	round
Thread	internal	internal	external
Sterile/Triple-packed	+/+	+/+	+/+
Quantity per bag/case	10/200	10/200	10/200

*) total height incl. lid

CELLSTAR® Cell Culture Dishes

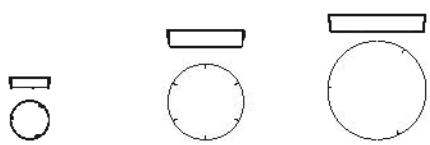
New

Free of detectable DNase, RNase, human DNA | non-pyrogenic | non-cytotoxic | TRI

Cell Culture Dishes

Further Cell Culture Dishes p. 24

- Triple-packed
- Improved cell adhesion through physical surface treatment
- Vents ensure optimal gas exchange
- Easy stacking
- Maximal transparency for excellent microscopic analysis



Cat.-No.	628160-TRI	664160-TRI	639160-TRI
Description	60 mm dish	100 mm dish	145 mm dish
Nominal size Ø x height [mm]	60 x 15	100 x 20	145 x 20
Growth area [cm²]	21	58	143
Total volume [ml]	28	100	240
Working volume [ml]	6–7	16–17	25–27
Vents	+	+	+
TC surface treatment/Sterile	+/+	+/+	+/+
Triple-packed	+	+	+
Quantity per bag/case	10/300	15/180	5/120

CELLSTAR® Standard Cell Culture Flasks

New

Free of detectable DNases, RNases, human DNA
non-pyrogenic
non-cytotoxic
TRI

Cell Culture Flasks

Further Cell Culture Flasks p. 20

- Triple-packed
- Improved cell adhesion through physical surface treatment
- Cell culture flasks with standard screw cap (without filter)
- Canted neck
- Graduation on both sides

Cat.-No.	690160-TRI	658170-TRI	660160-TRI
Flask design	-	-	flat
Growth area [cm²]	25	75	175
Total volume [ml]	50	250	550
Working volume [ml]	5–10	15–38	20–45
TC surface treatment/Sterile	+/+	+/+	+/+
Triple-packed	+	+	+
Standard screw cap	red	red	red
Quantity per bag/case	10/130	5/90	5/40

CELLSTAR® Filter Cap Cell Culture Flasks

New

Free of detectable DNases, RNases, human DNA
non-pyrogenic
non-cytotoxic
TRI

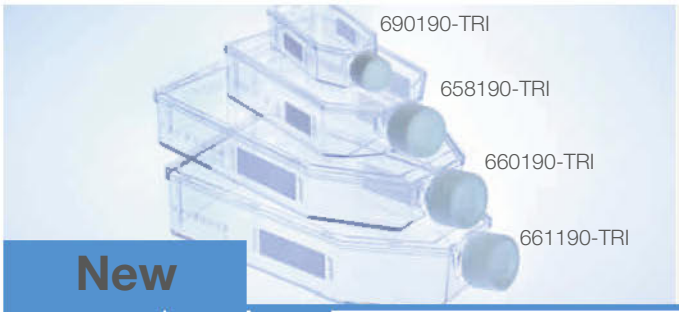
Filter Cap Cell Culture Flasks

Further Filter Cap Cell Culture Flasks p. 21

- Triple-packed
- Improved cell adhesion through physical surface treatment
- Cell culture flasks with filter screw cap
- Canted neck
- Graduation on both sides

Cat.-No.	690175-TRI	658175-TRI	660175-TRI
Flask design	-	-	flat
Growth area [cm²]	25	75	175
Total volume [ml]	50	250	550
Working volume [ml]	5–10	15–38	20–45
TC surface treatment/Sterile	+/+	+/+	+/+
Triple-packed	+	+	+
Filter screw cap	red	red	red
Quantity per bag/case	10/130	5/90	5/40

CELLSTAR® Suspension Culture Flasks



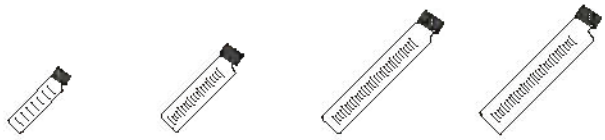
New

Free of detectable DNases, RNases, human DNA
non-pyrogenic
non-cytotoxic
TRI

Standard Suspension Culture Flasks

Further Suspension Culture Flasks p. 22

- Triple-packed
- Hydrophobic surface, ideal for suspension cultures, hybridoma and embryonic stem cells
- Suspension culture flasks with standard screw cap (without filter)
- Canted neck
- Graduation on both sides



Cat.-No.	690190-TRI	658190-TRI	660190-TRI	661190-TRI
Flask design	-	-	flat	high
Volume [ml]	50	250	550	650
TC surface treatment	-/suspension	-/suspension	-/suspension	-/suspension
Sterile	+	+	+	+
Triple-packed	+	+	+	+
Standard screw cap	white	white	white	white
Quantity per bag/case	10/130	5/90	5/40	4/28

CELLSTAR® Filter Cap Suspension Culture Flasks

New

Free of detectable DNases, RNases, human DNA
non-pyrogenic
non-cytotoxic
TRI

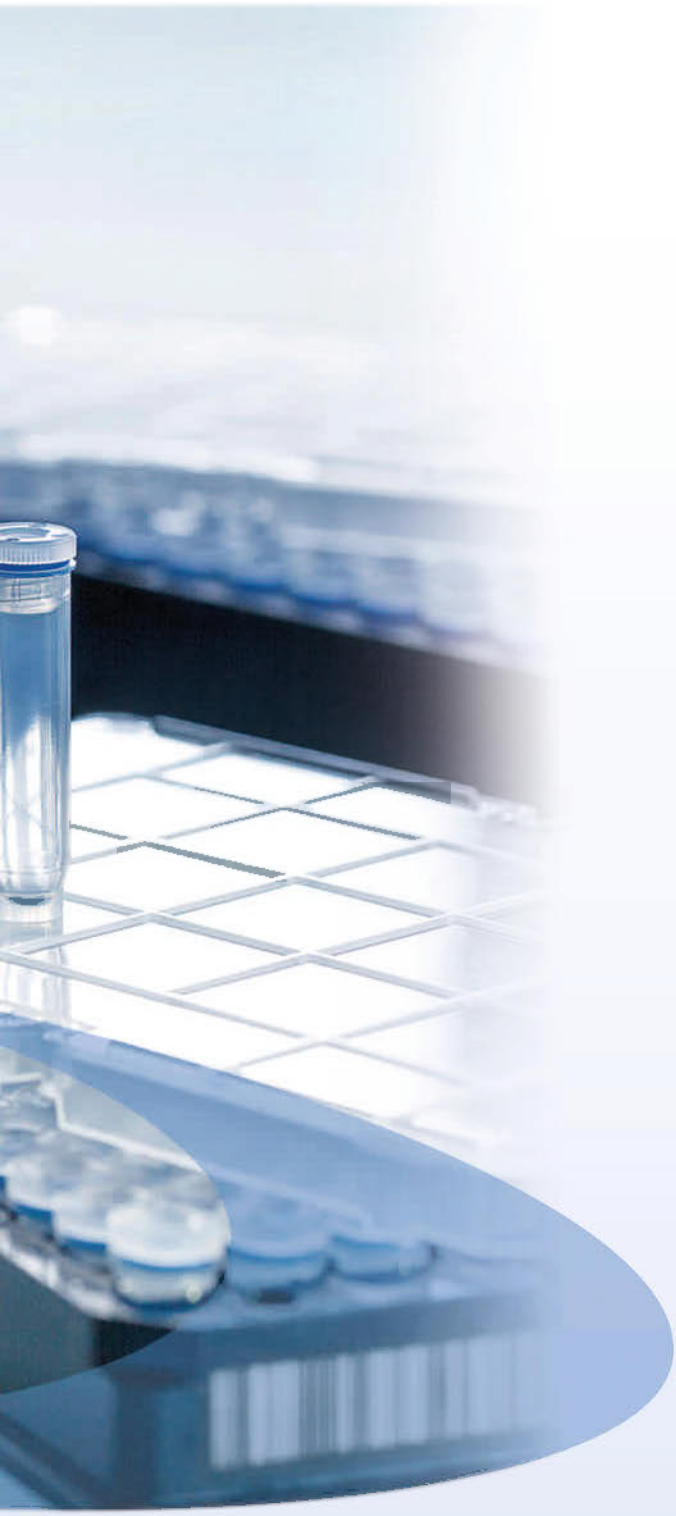
Filter Cap Suspension Culture Flasks

Further Filter Cap Suspension Culture Flasks p. 22

- Triple-packed
- Hydrophobic surface, ideal for suspension cultures, hybridoma and embryonic stem cells
- Suspension culture flasks with filter screw cap
- Canted neck
- Graduation on both sides

Cat.-No.	690195-TRI	658195-TRI	661195-TRI
Flask design	-	-	high
Volume [ml]	50	250	650
TC surface treatment	-/suspension	-/suspension	-/suspension
Sterile	+	+	+
Triple-packed	+	+	+
Filter screw cap	white	white	white
Quantity per bag/case	10/130	5/90	4/28

11 Sample Management



Sample Management

Greiner Bio-One offers a comprehensive product portfolio for sample freezing and storage. Included within this portfolio are Cryo.s™ tubes and racks as well as Decappers and solutions for sample tracking.

The portfolio of Cryo.s™ tubes includes cryogenic tubes covering the range of 1.0 to 5.0ml. They are supplied with two different base forms as well as several cap colours. Cryo.s™ offer several options for the identification and labelling of individual samples, including coloured screw caps, a white, scratch-resistant writing area and linear barcodes. In addition, white cap inserts are available in each box of Cryo.s™, allowing for the labelling of the top of the screw cap. Benchtop working racks (→ p. 223) and storage boxes (→ p. 223–224) complete the Cryo.s™ portfolio.

Cryo.s™ with Datamatrix (→ p. 225) offer a solution for semi-automated and automated sample handling and storage for sample volumes in the range of 1.0 – 5.0ml. 48, 81 and 96 position racks are available for subsequent storage
(→ p. 232 – 233).

Cryo.s™ Biobanking Tubes (→ p. 227 – 228) represent perfect solutions for the space-efficient storage of biological samples in scalable biorepositories. Cryo.s™ Biobanking Tubes are available with working volumes of 235 µl, 580 µl and 975 µl and in highly automation-friendly racks.

Cryo.s™, Cryo.s™ with Datamatrix and Cryo.s™ Biobanking Tubes are for storage of tissue, cells, fungi, bacteria, spores, cellular extracts or body fluids at ultra-low temperature for research and development purposes. They can only be stored in the gas phase of liquid nitrogen and not the liquid phase and are not intended for use in applications associated with reproductive medicine.

All Cryo.s™ are manufactured from USP class VI certified, medical grade polypropylene which maintains the integrity of the sample.
A sterility level of SAL 10-6 is achieved through an irradiation process that is complaint with ISO 11137 requirements.

!

Please apply the following good practice and safety measures when working with Cryo.s™, Cryo.s™ with Datamatrix and Cryo.s™ Biobanking Tubes:
1. Do not exceed working volumes specified for each tube type. Working volumes indicate the maximum volume of sample which may be frozen in the tube without the risk of excessive pressure inside the tube.
2. Never submerse Cryo.s™ products into liquid nitrogen. Cryo.s™ products are only suited for storage in the vapour phase above liquid nitrogen and in -80 °C freezers.
3. When working with Cryo.s™ and Cryo.s™ with Datamatrix, follow the freezing and thawing protocol as well as safety advisory (→ p. 265).
4. For work with Cryo.s™ Biobanking Tubes and accessory equipment please refer to the instructions for use provided within each package.

Air Shipment
Cryo.s™ meet the pressure requirements for transportation by aircraft. Hydrostatic pressure testing was performed according to the ICAO. IATA DGR guidelines.

IATA Certification

To download copies of the current IATA certification please visit the Cryo.s™ and Biobanking tube section of our website **www.gbo.com**

IATA Certification for Cryo.s™

IATA Certification for Cryo.s™ Biobanking Tubes

Cryo.s™

Cryo.s™ 1 ml and 2 ml

Cryo.s™
1 ml and 2 ml

- Cryo.s™ with Datamatrix and Linear Barcode p. 225
- Cat.-No. 123263/122263/126263 also available triple-packed p. 215 TRI
- Freezing Protocol, Technical Appendix
- Mini Block Heater p.254

- CE-marked
- High thermal resistance
- Cap inserts Cat.-No. 304171 (50 pieces per bag)
- Cryo.s™ with internal thread have a silicone gasket
- USP class VI certified medical grade polypropylene low in leachables
- Sterilised applying an ISO 11137 validated irradiation procedure yielding an SAL level of 10^{-6}

CE | IVD | Free of detectable DNase, RNase, human DNA | non-cytotoxic

	Description	Cryo.s™ 1 ml	Cryo.s™ 2 ml	Cryo.s™ 2 ml	Cryo.s™ 2 ml
	Working volume [ml]	up to 1.2	up to 2.0	up to 2.0	up to 2.2
	ø [mm] x height*) [mm]	12.5x42	12.5x48	12.5x48	12.4x47
	Starfoot	+	-	+	+
	Bottom	conical	round	round	round
	Thread	internal	internal	internal	external
	Sterile	+	+	+	+

*) total height incl. cap

COLOUR	Natural,	without writing area	Cat.-No.	123261	121261	122261	126261
	Natural,	with writing area	Cat.-No.	123263	121263	122263	126263
	Green,	with writing area	Cat.-No.	123277	121277	122277	126277
	Yellow,	with writing area	Cat.-No.	123278	121278	122278	126278
	Blue,	with writing area	Cat.-No.	123279	121279	122279	126279
	Red,	with writing area	Cat.-No.	123280	121280	122280	126280

with 150 inserts per case

Quantity per bag/case per Cat.-No.: 100/500

Cryo.s™ 4 ml and 5 ml

Cryo.s™
4 ml and 5 ml

Cryo.s™ with Datamatrix and Linear Barcode p. 225
Freezing Protocol, Technical Appendix
Mini Block Heater p.254

- CE-marked
- High thermal resistance
- Cap inserts Cat.-No. 304171 (50 pieces per bag)
- Cryo.s™ with internal thread have a silicone gasket
- USP class VI certified medical grade polypropylene low in leachables
- Sterilised applying an ISO 11137 validated irradiation procedure yielding an SAL level of 10^{-6}

CE | IVD | Free of detectable DNase, RNase, human DNA, non-pyrogenic | non-cytotoxic

Description	Cryo.s™ 4 ml	Cryo.s™ 5 ml
Working volume [ml]	up to 4.0	4.5 – 5.0 **)
ø [mm] x height *) [mm]	12.4 x 83	12.5 x 86
Starfoot	+	-
Bottom	round	round
Thread	external	internal
Sterile	+	+

*) total height incl. cap

**) Maximum working volume for freezing of aqueous solutions: 4.5 ml

COLOUR					
	Natural,	without writing area	Cat.-No.	127261	124261
	Natural,	with writing area	Cat.-No.	127263	124263
	Green,	with writing area	Cat.-No.	127277	124275
	Yellow,	with writing area	Cat.-No.	127278	124276
	Blue,	with writing area	Cat.-No.	127279	124274
	Red,	with writing area	Cat.-No.	127280	124273

with 100 inserts per case

Quantity per bag/case per Cat.-No.: 50/300

Support Rack and Storage Boxes

Cryo.s™ Support Rack

- Suitable for Cryo.s™ with starfoot base (Cat.-No. 122XXX, 123XXX, 126XXX, 127XXX)
- Improved handling since the tubes can be opened with one hand
- Rubber base to prevent slipping
- Offers space for up to 40 Cryo.s™

Cat.-No.	802501
Description	support rack for one-hand operation
Width [mm] x length [mm] x height [mm]	100 x 200 x 22
Material	polycarbonate
Colour	blue
Quantity per bag/case	1

Cryo.s™ Storage Boxes

The Cryo Storage Box is a helpful accessory for storing Cryo.s™ sample tubes at low and ultra-low temperatures. Available with 50, 81 and 100 positions the box material polypropylene is very temperature and shock-resistant, thus allowing storage temperatures as low as -90 °C.

CryoBox 50

- 50 position cryogenic storage box
- Versatile storage from freezer to bench
- Dimensions:139 x 86 x 54 mm
- Hinged lid
- Stores up to 2.0 ml tubes
- Suitable for temperatures as low as -90°C
- High contrast alphanumeric indexing
- Available in a range of colours
- Made from temperature-resistant polypropylene

Cryo.s™ p. 221–222

Cat.-No.	802210	802214	802211	802213	802212	802216
Description	50 position	50 position	50 position	50 position	50 position	50 position
Colour	natural	blue	green	pink	orange	yellow
Quantity	1	1	1	1	1	1

828 202

CryoBox 81

- 81 position cryogenic storage box
- Versatile storage from freezer to bench
- Dimensions:125 x 125 x 45 mm*)
- Separate lid included (natural)
- Stores up to 2.0 ml tubes
- Suitable for temperatures as low as -90°C
- High contrast alphanumeric indexing
- Available in a range of colours
- Made from temperature-resistant polypropylene

Cryo.s™ p. 221 – 222

The CryoBox 81 fits all 1 and 2 ml Cryo.s™ with internal and external threat (Cat.-No. 121 2XX, 122 2XX, 123 2XX and 126 2XX).

It is compatible with standard LN2 containers and metal racks.

Cat.-No.	802202	828204	828208	828206
Description	81 position	81 position	81 position	81 position
Rack colour	natural	blue	black	yellow
Lid colour	natural	natural	natural	natural
Quantity	1	1	1	1

Cat.-No.	828205	828202	828200
Description	81 position	81 position	81 position
Rack colour	green	orange	pink
Lid colour	natural	natural	natural
Quantity	1	1	1

*) The indicated height refers to the Cryo Storage Box filled with 2 ml Cryo.s™ and covered with a lid.

CryoBox 100

- 100 position cryogenic storage box
- Versatile storage from freezer to bench
- Dimensions:151 x 139 x 54 mm
- Hinged lid
- Stores up to 2.0 ml tubes
- Suitable for temperatures as low as -90°C
- High contrast alphanumeric indexing
- Available in a range of colours
- Made from temperature-resistant polypropylene

Cryo.s™ p. 221-222

Cat.-No.	828210	828214	828215	828211	828212	828216
Description	100 position	100 position	100 position	100 position	100 position	100 position
Colour	natural	blue	green	pink	orange	yellow
Quantity	1	1	1	1	1	1

Cryo.s™ with Datamatrix and Biobanking/Low Volume Storage Tubes

Cryo.s™ with Datamatrix
Cryo.s™ with Linear Barcode

Cryo.s™ p. 221–222

81-position Datamatrix Cryo Rack p. 232

Barcoded Cryo.s™

Combination of linear code, Datamatrix code and human readable representation of code content on individual tubes, additional graduation

- Unique coding presented as both linear (1D) and Datamatrix codes (2D) on each tube
- Barcode type 128 on tube side, additional representation of the code content as human readable text
- Datamatrix code ECC200 on the tube bottom with reliable Reed-Solomon error correction
- Application of barcodes and Datamatrix codes by means of innovative laser technology
- Highest code resistance against chemicals, mechanical stress and extremely low storage temperatures (down to -196 °C)
- 100 % controlled code readability
- Pre-defined, unique number ranges from stock or customer-specific code sequences produced on request (to be specified in **order form F071004**)
- Coded tubes are suitable for airfreight (IATA conformity)
- USP Class VI certified, medical grade polypropylene with very low additive content
- Products sterilised using irradiation, sterility assurance level 10^{-6}
- CE-marked for application in diagnostics
- Free of detectable DNase, RNase and human DNA as well as endotoxins; non-cytotoxic
- Datamatrix coding only available for Cryo.s™ with starfoot base (Cat.-No. 123263, 122263, 127263, 126263 and coloured versions of these products)

CE | IVD | Free of detectable DNase, RNase, human DNA non-pyrogenic | non-cytotoxic

Preproduced tubes with unique codes

Cat.-No.	123263–2DG	122263–2DG	126263–2DG	127263–2DG
Description	1 ml Cryo.s™	2 ml Cryo.s™	2 ml Cryo.s™	4 ml Cryo.s™
Working volume [ml]	up to 1.2	up to 2.0	up to 2.2	up to 4.0
Thread	internal	internal	external	external
Screw cap*)	natural	natural	natural	natural
Sterile	+	+	+	+
Coding	Preproduced tubes with unique **Datamatrix code** ECC 200 with 14x14 matrix on tube bottom, additional **linear barcode** type 128 with human readable text on tube side			
Quantity per bag/case	100/500	100/500	100/500	50/300

*) Other screw cap colours on request.

Client customisable coded tubes

	Datamatrix and linear codes				Linear codes	
						
Cat.-No.	**123263–2D3**	**122263–2D3**	**126263–2D1**	**127263–2D1**	**121263–128**	**124263–128**
Description	1 ml Cryo.s™	2 ml Cryo.s™	2 ml Cryo.s™	4 ml Cryo.s™	2 ml Cryo.s™	5 ml Cryo.s™
Working volume [ml]	up to 1.2	up to 2.0	up to 2.2	up to 4.0	up to 2.0	up to 4.5
Thread	internal	internal	external	external	internal	internal
Screw cap*)	natural	natural	natural	natural	natural	natural
Sterile	+	+	+	+	+	+
Coding	Customised **Datamatrix code** ECC 200 with 14 x 14 dots on tube bottom, additional customised **linear barcode** type 128 with human readable text on tube side as specified in **order form F071004**				Customised **linear barcode** type 128 with human readable text on tube side as specified in **order form F071004**	
Quantity per bag/case	100/500	100/500	100/500	50/300	50/300	50/300

*) Other screw cap colours on request.

Additional coding option:
Customised **Datamatrix code** ECC 200 with 14 x 14 dots on rack bottom, additional customised **linear barcode** with human readable text on rack side as specified in **order form F010898**

Cryo.s™ Biobanking/Low Volume Storage Tubes and 96-position Datamatrix Cryo Rack with ANSI footprint

With the Cryo.s™ Biobanking/Low Volume Sample Storage Tubes, Greiner Bio-One offers an ideal solution for the efficient storage of biological samples in scalable biorepositories. Cryo.s™ Biobanking Tubes are available with working volumes of 235 µl, 580 µl and 975 µl and offered in highly automation-friendly 96-position racks. The innovative design of tubes and racks allows for a very space-efficient storage with better utilisation of storage space in freezers or liquid nitrogen tanks. In addition, Cryo.s™ Biobanking Tubes are optimised for sample storage at extremely low temperatures (-80 °C, -150 °C and in the vapour phase above liquid nitrogen) over long periods of time.
Cryo.s™ Biobanking Tubes are made of high-quality polypropylene with low leachable content. With the excellent purity of Cryo.s™ Biobanking Tubes and their innovative, space-saving and automation-friendly design Greiner Bio-One sets standards in the field of sample tubes for biobanking.

Follow the instructions for use provided within each box.

Further information on Cryo.s™ Biobanking Tubes and compatible automated equipment

→ **Cryo.s™ with Datamatrix Code – Intelligent Solutions for Biobanking** (F073788)

→ **Forum No. 21: Sample Storage Tubes as Quality-Critical Components in Biobanking** (F073072)

Cryo.s™ Biobanking/Low Volume Storage Tubes

- Cryo.s™ 8-Channel Handheld Capper/Decapper p. 229
- Cryo.s™ Rack Scanners p. 230
- Manual decapper p. 229

Cryo.s™ Biobanking/Low Volume Sample Storage Tubes

- Coloured screw cap option with eight different colours available.
- Height-reduced screw cap conserving freezer space
- Ultra-sharp Datamatrix code
- Laser-written Datamatrix for improved durability and resistance to chemicals
- 100 % production control of readability and uniqueness of Datamatrices
- ECC200 Datamatrix code with Reed-Solomon algorithm for error correction
- Preproduced, unique Datamatrix codes off the shelf or customised code sequences on request **(order formF071003)**
- Medical grade and USP class VI certified polypropylene low in leachables
- Medical grade silicone gasket providing optimum seal
- Suitable for air shipment (IATA conformity)
- ANSI 1 – 2004 standard footprint rack for automated handling
- Manual capping aid for contamination-free manual capping and decapping
- Linear barcode 128 and corresponding Datamatrix code on each rack providing unique rack identification
- Sterile product versions are applying an ISO 11137 validated irradiation procedure yielding an SAL level of 10^{-6}

CE IVD Free of detectable DNase, RNase, Human DNA non-pyrogenic non-cytotoxic

INFORMATION

Watch our videos
about Cryo.s™ biobanking tubes on our video channel.

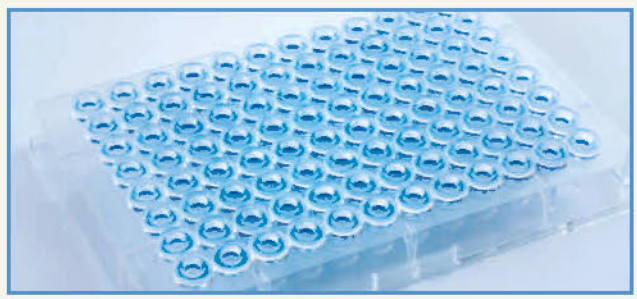


Figure 2: Cap carrier: 96 well microplate with 96 pre-installed screw caps (one per well). The cap carrier may be used as a depot for screw caps in automated capping/de-capping devices (e.g. LabElite DeCapper from Hamilton). The cap carrier may also serve as a convenient screw cap supply for manual work with uncapped tubes.

Cryo.s™ Biobanking/Low Volume Storage Tubes

Description	300 µl Cryo.s™ Tube with screw cap	600 µl Cryo.s™ Tube with screw cap	1000 µl Cryo.s™ Tube with screw cap	96 screw caps in cap carrier
Working volume [µl]	235	580	975	-
ø x height [mm]	8.8 x 18.7	8.8 x 33.3	8.8 x 50.8	-
Total rack height with lid on [mm]	21.6	36.2	53.9	-
Thread	internal	internal	internal	-
Material	polypropylene	polypropylene	polypropylene	polypropylene
Quantity per packaging unit/case	960 tubes/10 racks or 480/960 bulk	960 tubes/10 racks or 192/960 bulk	960 tubes/10 racks or 192/960 bulk	960 caps/10 cap carriers
Coding option	Preproduced unique **Datamatrix code** on tube, Datamatrix code and linear barcode on rack			-

Pre-racked tubes

CAP COLOUR	Description	300 µl tube, pre-racked, sterile	300 µl tube, pre-racked, non-sterile	600 µl tube, pre-racked, sterile	600 µl tube, pre-racked, non-sterile	1000 µl tube, pre-racked, sterile	1000 µl tube, pre-racked, non-sterile	96 screw caps in cap carrier, non-sterile
	Non-capped	-	976570	-	977570	-	978570	-
	Natural	976561	976580	977561	977580	978561	978580	385270
	Green	976566	976586	977566	977586	978566	978586	385276
	Yellow	976565	976585	977565	977585	978565	978585	385275
	Blue	976564	976584	977564	977584	978564	978584	385274
	Red	976563	976583	977563	977583	978563	978583	385273
	Pink	976568	976588	977568	977588	978568	978588	385278
	Brown	976569	976589	977569	977589	978569	978589	385279
	Black	976567	976587	977567	977587	978567	978587	385277

Bulk-packed tubes

Cat.-No.	131202	131263	132202	132263	133202	133263
Description	300 µl tube, bulk, non-sterile	300 µl tube, bulk, sterile	600 µl tube, bulk, non-sterile	600 µl tube, bulk, sterile	1000 µl tube, bulk, non-sterile	1000 µl tube, bulk, sterile
Cap Colour	natural	natural	natural	natural	natural	natural
Quantity per bag/case	480/960	480/960	192/960	192/960	192/960	192/960

Cryo.s™ Capper/Decappers

The Cryo.s™ 8-Channel Handheld Decapper is a state-of the-art precision instrument for the electronic opening and closing of micro-tubes. At the core of the device an innovative microchip controls the movement and the precise application of pre-defined torque values for tube closure. Unlike comparable products, it utilises eight electric motors which drive individual spindles allowing for a highly precise processing of eight tubes in parallel. There is no risk of overtightening screw caps or screwing them too loosely onto tubes. An integrated rechargeable battery provides the convenience of wireless operation of the device. The Cryo.s™ 8-Channel Handheld Decapper is ergonomically designed and functions intuitively.

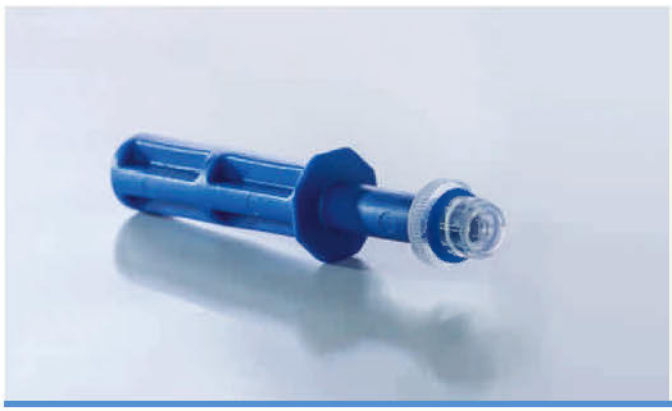
8-Channel, Wireless, Handheld Capper/Decapper

- Wireless
- Reliably decaps and caps eight Cryo.s™ Biobanking/Low Volume Storage tubes in parallel
- Stand for storage of device and contamination-free parking of screw caps
- Eight individual motors for precise application of 6 Ncm torque for tube closure
- Power-saving mode for longer operating time in wireless mode

Cryo.s™ Biobanking/Low Volume Storage Tubes p. 227–228

Cat.-No.	852070
Description	Cryo.s™ 8-Channel Handheld Decapper
Power supply input	100 to 240 V, AC ~ 50/60 Hz, 0.35 A
Rotation speed of bits	100 – 200 rotations/min.
Preset torque value [mNm]	60 +/- 10
Box contents	1 capper/decapper, power cable, stand, user manual

Cryo.s™ Low Throughput Capper/Decapper



Manual Decapper

For manual contamination-free application and removal of screw caps and picking of individual tubes from rack.

Cryo.s™ Biobanking/Low Volume Storage Tubes p. 227–228

Datamatrix Cryo Racks p. 232–233

Cat.-No.	979199
Description	Manual decapper
Colour	blue
Quantity per bag/case	1

Cryo.s™ Scanners

The CMOS Camera based range of scanners (Single tube, Flex-Camera and ANSI-Camera) from Greiner Bio-One provide a high speed, easy to use and box-ready solution for two-dimensional/Datamatrix sample tracking.
Greiner Bio One CMOS Camera based scanners provide a greatly improved speed of rack scan when compared with flat-bed scanner based image capture. Each scanner also comes with an enhanced glass coating to reduce the action of condensation upon the scanning surface during everyday use with frozen samples. Thus, helping to shorten the process time from taking the samples from frozen storage to the interpretation of coding.
Flex-Camera and ANSI-Camera are easily integrated into common automation systems due their compact design and multiple output avenues. Both are supplied with intuitive code acquisition software enhancing the scanning process with workflow attributes such as specific user identification and multiple output/collaboration formats such as XML, Text, Excel, JSON, XML and image files.

Cryo.s™ Single Tube Scanner

Ideal for single tube data input or secondary storages checks for audit purposes from existing large collections. Merely place the tube, with its coded surface, above the scanning window for the code to be added to your application, when in keyboard board, or instantly displayed within the stand-alone software option.

Single Tube Scanner

Cryo.s™ Biobanking/Low Storage Tubes p. 227–228

- Universal tube code recognitions
- No additional hardware required
- Ongoing free software updates
- Single USB cable combines power source and data transfer
- Easy installation
- Exports immediately to open software portal – e.g: Excel cell, database field or word processor document
- 5 year warranty

Cat.-No.	849082
Description	Compact Single Tube Scanner
Dimensions L x W x H [mm]	90 x 60 x 60
Box contents	Scanner with cable, software, User Guide

Cryo.s™ Flex-Camera Rack Scanner

The Flex-Camera Rack scanner represents the most comprehensive offering from within the Greiner Bio One scanner range due to its ability to scan a vast range of racks types from SBS/ANSI (24, 48, 96, 240, 384 tube position) to legacy box formats (81 and 100 position). The innovative software supplied with this model allows for automatic rack-type identification or user directed rack format scanning SBS/ANSI and legacy rack formats.

Flex-Camera Rack Scanner

Cryo.s™ Biobanking/Low Storage Tubes p. 227–228

- Single rack scanning time; 2 seconds
- Export formats: XML, text, Excel, JSON, XML & image files
- Scanner area condensation reduction glass coating as standard
- Optional One-dimensional barcode attachment scanner
- 5 year warranty

Cat.-No.	849081
Description	Camera based Flexible Rack Scanner
Dimensions L x W x H [mm]	174 x 152 x 146
Box contents	Scanner, software, power cable, USB cable, User Guide

Cryo.s™ ANSI-Camera Rack Scanner

The ANSI-Camera Scanner provides a compact solution to users looking to scan racks within the SBS/ANSI standard dimensions. This includes, 24, 48, 96, 240 and 384 well racks. The reduced profile and recent product improvements make the ANSI-Camera Scanner an excellent replacement for flat-bed scanner based legacy scanners while remaining cost effective.
The innovative software supplied with this model allows for automatic rack-type identification or user directed rack format scanning within available SBS/ANSI racks formats.

ANSI-Camera Rack Scanner

Cryo.s™ Biobanking/Low Storage Tubes p. 227–228

- Single rack scanning time; 2 seconds
- Suitable for standard SBS/ANSI format racks in 24, 48, 96 240, and 384 positions
- Export formats: XML, text, Excel, JSON, XML and image files
- Scanner area condensation reduction glass coating as standard
- Optional One-dimensional barcode attachment scanner on request
- 5 year warranty

Cat.-No.	849080
Description	Camera based SBS Rack scanner
Dimensions L x W x H [mm]	208 x 135 x 80
Box contents	Scanner, software, power cable, USB cable, User Guide

Cryo.s™ Rack Scanner

The Cryo.s Rack Scanner is a flat-bed scanner based scanner only for use with SBS/ANSI format racks. In addition to the ability to scan SBS/ANSI racks this model incorporates the inbuilt capability to offer single tube scanning as a useful on-screen QC or auditing check.

- Scanning of 2D barcodes on tubes and racks, output of decoded barcode and rack ID
- Rescan or manually edit barcode data
- Single tube scan displays 2D code on screen
- Customisable data output files (e. g. .csv format)

Rack Scanner

Cryo.s™ Biobanking/Low Storage Tubes p. 227–228

- Single tube scan feature
- Easy one-touch button for initiation of scan
- Single rack scanning time; 8 to 10 seconds
- Small footprint
- 5 year warranty

Cat.-No.	849070
Description	Rack Scanner EU/UK edition
Dimensions L x W x H [mm]	310 x 195 x 70
Box contents	Scanner, power cables, USB cables, drivers, User Guide

Cryo.s™ Sample Tracking Racks

81-position Datamatrix Cryo Rack

With the 81-position storage box for Cryo.s™ with Datamatrix, Greiner Bio-One provides an optimal solution for the storage of Cryo.s™ in freezers and liquid nitrogen tanks set up for the classic cryo box format of 133x133mm. Scanning windows underneath each tube position enable readability of all tube IDs in a single scan. The storage box for Cryo.s™ with Datamatrix is made of high-quality polycarbonate, thus endowing the product with highly shock-proof and temperature-resistant characteristics. Each box offers space for 81 Cryo.s™ with Datamatrix. For box closure optional lids for small (1 or 2ml working volume) and large (4ml working volume) Cryo.s™ are available. Rotation stoppers at the bottom of each tube position prepare the box for usage with customised automated de-/recapping devices.

802576

81-position Datamatrix Cryo Rack

Cryo.s™ p. 221–222

- Footprint 133mm x 133mm
- Shock-proof and temperature-resistant polycarbonate
- Choice between two lid types:
  Low profile for 1 and 2ml Cryo.s™
  High profile for 4ml Cryo.s™
- Scanning windows at bottom of each tube position
- Stacking feature and rotation stoppers

Additional coding option:
Customised **Datamatrix code** ECC 200 with 14x14 dots on rack bottom, additional customised **linear barcode** with human readable text on rack side as specified in **order form F010898**

Cat.-No.	802576	802506	802576-128	802506-128
Description	Datamatrix Cryo Rack	Datamatrix Cryo Rack	Datamatrix Cryo Rack	Datamatrix Cryo Rack
Capacity	81 tubes	81 tubes	81 tubes	81 tubes
Compatible for Cryo.s™	1/2ml	4ml	1/2ml	4ml
Width x length x height*) [mm]	133x133x52	133x133x88	133x133x52	133x133x88
Material	polycarbonate	polycarbonate	polycarbonate	polycarbonate
Rack colour	black	black	black	black
Coding	-	-	Predefined unique Datamatrix code	Predefined unique Datamatrix code
Lid profile	low (natural)	high (natural)	low (natural)	high (natural)

*) including lid

48-position Datamatrix Cryo Rack



Cat.-No.	803277	803202	803270
Description	Datamatrix Cryo Rack	Datamatrix Cryo Rack	Datamatrix Cryo Rack
Capacity	48 tubes	48 tubes	48 tubes
Compatible for Cryo.s™	1/2/4/5 ml	1/2 ml	4/5 ml
Width x length x height*) [mm]	127.8x85.5x30.0	127.8x85.5x52.5	127.8x85.5x88.5
Material	polypropylene	polypropylene	polypropylene
Rack colour	black	black	black
Lid profile	w/o lid	low (natural)	high (natural)
Quantity per bag/case	5/20	20	15

Cat.-No.	803202-012	803270-012
Description	Datamatrix Cryo Rack	Datamatrix Cryo Rack
Capacity	48 tubes	48 tubes
Compatible for Cryo.s™	1/2 ml	4/5 ml
Width x length x height*) [mm]	127.8x85.5x52.5	127.8x85.5x88.5
Material	polypropylene	polypropylene
Rack colour	black	black
Lid profile	low (natural)	high (natural)
Coding	Predefined unique Datamatrix code	Predefined unique Datamatrix code
Quantity per bag/case	20	15

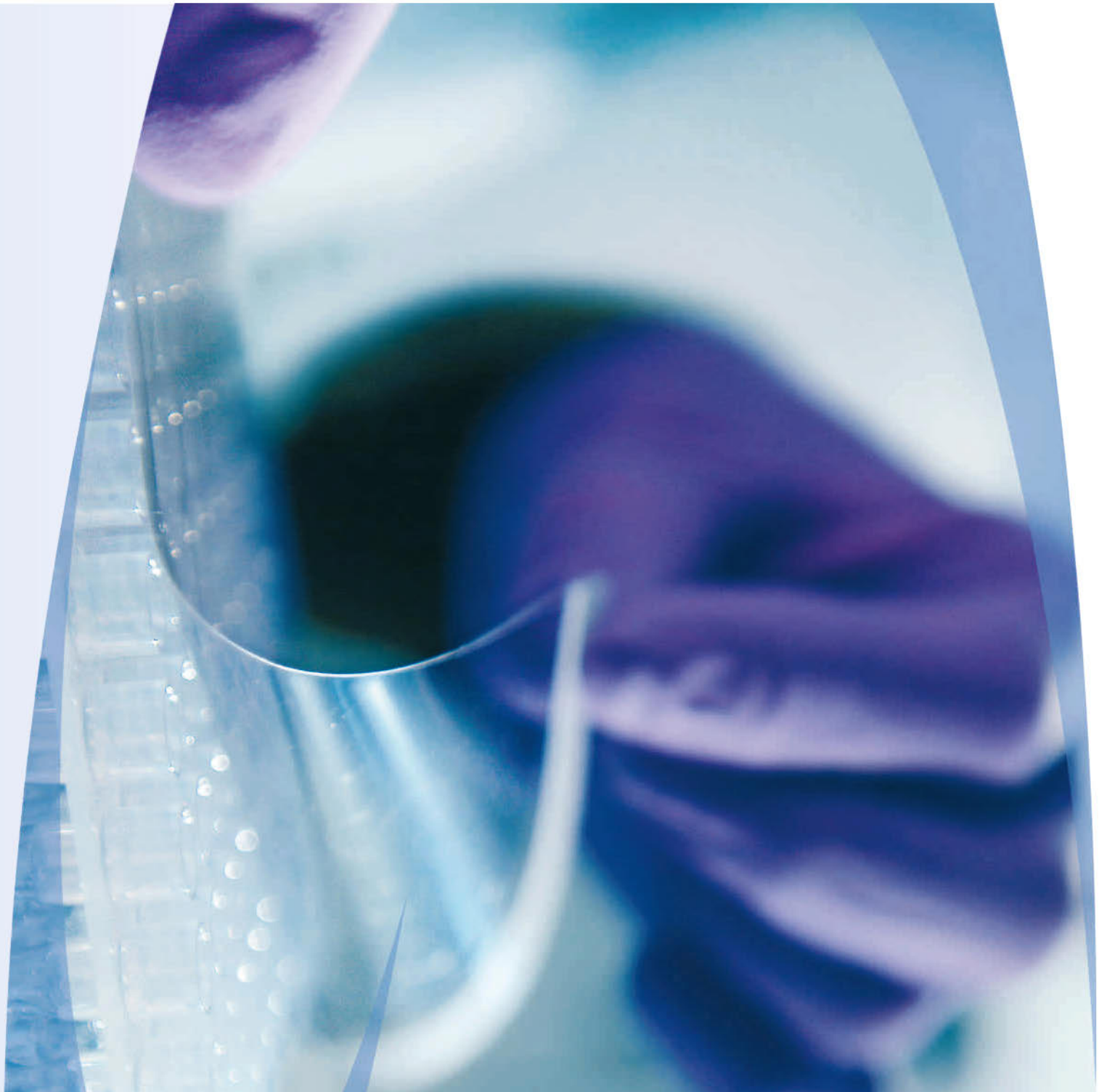
*) including lid

96-position Datamatrix Cryo Rack & Cap Carrier



Cat.-No.	976501	977501	978501
Description	Datamatrix Cryo Rack	Datamatrix Cryo R ack	Datamatrix Cryo Rack
Capacity	96 tubes	96 tubes	96 tubes
Compatible with Cryo.s™	300 µl	600 µl	1000 µl
Height*) [mm]	19.1	33.7	51.4
Material	polycarbonate	polycarbonate	polycarbonate
Colour	black	black	black
Lid	+	+	+
Coding	Predefined unique **Datamatrix code** ECC 200 and **linear barcode** type 128		
Quantity per case	10	10	10

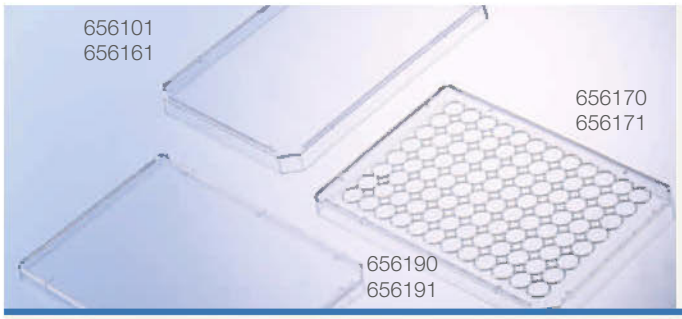
*) Height of rack without lid including tubes



12 Lids / Sealers / CapMats

Lids

Polystyrene Lids



Polystyrene Lids

High Profile/Low Profile/Ultra Low Profile

Cell Culture Microplates p. 28–33

HTS Microplates p. 83–120

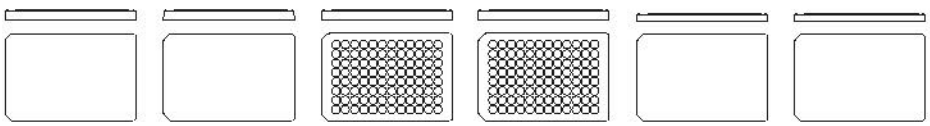
- All sterile lids are non-cytotoxic

Lids offer protection against contamination and evaporation during sample storage and cell cultivation. Four different polystyrene lids are available:

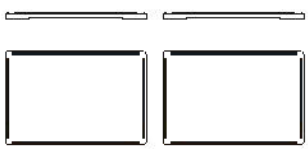
1. High profile lids (9 mm)
High profile without condensation rings is mainly used for non TC-treated 96 well microplates.
2. High profile lids (9 mm) with condensation rings
High profile with condensation rings is recommended for cell culture applications, since it ensures an optimum oxygen supply to cultivated cells due to improved gas exchange.
3. Low profile lids (6 mm)
Low profile is particularly recommended for 384 well standard microplates as the well contents are protected against evaporation and contamination, and the covered microplates can be easily gripped on the side in automated processes.

4. Universal ultra low profile lids
The ultra low profile lid has a universal design, and is compatible with a whole range of different microplates. In particular high-format low profile microplates, such as the 384 well Small Volume™ LoBase or the 1536 well microplate can be sealed with the ultra low profile lid. This lid provides the greatest possible protection against evaporation, and is also suitable for use in automated systems. Recesses in the edge of the lid improve the readability of barcodes, and sealed microplates can be easily gripped from the side and transported without problem.

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



Cat.-No.	656101	656161	656170	656171	656190	656191
Description	lid	lid	lid	lid	lid	lid
Lid profile/height [mm]	high/9	high/9	high/9	high/9	low/6	low/6
Condensation rings	–	–	+	+	–	–
Sterile	–	+	–	+	–	+
Quantity per bag/case	1/100	1/100	1/100	1/100	20/200	20/200



Cat.-No.	691101	691161
Description	lid	lid
Lid profile	ultra low	ultra low
Condensation rings	–	–
Sterile	–	+
Quantity per bag/case	5/100	5/100

Sealers

Many applications in immunology, molecular biology, high-throughput screening or cell culture require tightly sealed microplates. Adhesive sealers are an interesting alternative to heat sealing systems or CapMats. They are easy to use and there is a lower risk of cross-contamination because they are used as disposable products.

Five different sealers are available which can be divided into two different classes on the basis of the adhesive used.

The classical sealers such as EASYseal™, AMPLIseal™, SILVERseal™ and BREATHseal™ are coated with an acrylate adhesive. The advanced sealer VIEWseal™ is coated with a pressure-sensitive silicone adhesive.

Further information on sealers

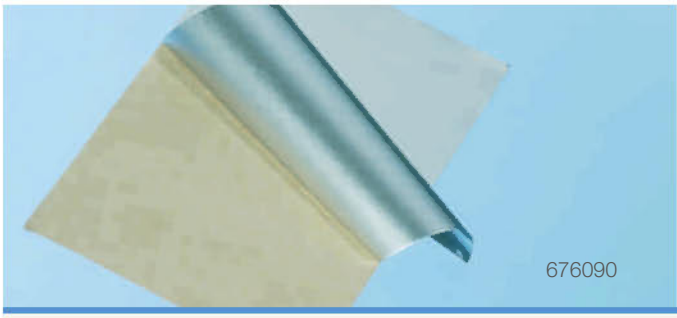
→ **Forum No. 6: Sealers for microplates and their areas of application in molecular biology and cell culture** (F073013)

EASYseal™ and SILVERseal™

EASYseal™

- Coverage/storage of microplates
- Protection against evaporation/contamination
- Suitable for optical measurements

Cat.-No.	676001
Special feature	transparent
Sterile	–
Quantity per bag/case	100



SILVERseal™

- Pierceable aluminium foil coated with an acrylate adhesive
- Temperature-resistant from -80 °C to +110 °C
- Ideal for PCR applications
- Ideal for short-term storage of sample material and active agents

SILVERseal™ is coated with an acrylate adhesive (Fig. 1) which remains flat when removed from its paper backing, and can thus be easily applied to all microplate types. A double perforation makes it possible to tear off the projecting adhesive sealer and thus improves the stacking of sealed microplates.

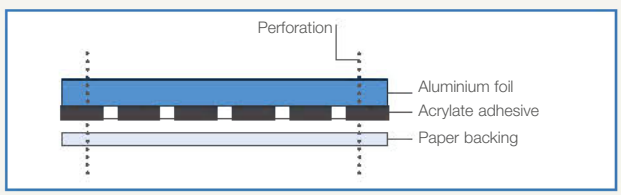
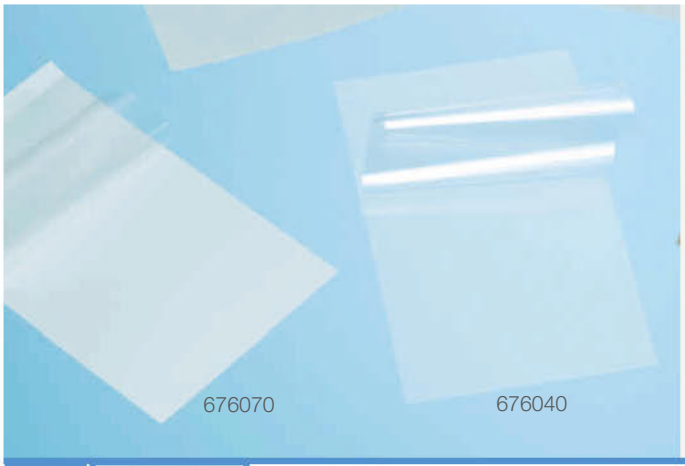


Figure 1:
Structure of SILVERseal™

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

Cat.-No.	676090
Special feature	aluminium foil
Sterile	–
Quantity per bag/case	100

VIEWseal™ and AMPLIseal™



VIEWseal™ and AMPLIseal™

- Cell Culture Microplates p. 28–33
- HTS Microplates p. 83–120
- PCR Microplates p. 188–194

VIEWseal™
- Highly transparent film for precise optical measurements
- Ideally suited for protein crystallography

AMPLIseal™
- Highly transparent film with minimal autofluorescence
- Ideal for Real Time PCR

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

Cat.-No.	676070	676040
Description	VIEWseal™	AMPLIseal™
Special feature	transparent	transparent
Sterile	–	–
Quantity per bag/case	100	100

VIEWseal™

VIEWseal™ (Fig. 2 and Fig. 3) is an adhesive sealing film coated with a silicone adhesive which only sticks when the film surface is pressed on. Thus the sealing film is easy to work with, even when wearing gloves (The film does not adhere to gloves). Substances in powder form and biological model organisms like *Drosophila melanogaster* or *Caenorhabditis elegans* also do not stick to vessels sealed with VIEWseal™.

VIEWseal™ withstands heating at +100 °C and tolerates cold temperatures down to -70 °C and is therefore suitable for PCR applications (Fig. 4) and sample storage.

VIEWseal™ stands out over EASYseal™ and AMPLIseal™ through its exceptionally high optical transparency also in the shorter wavelength range (< 340 nm) (Fig. 6). The transparency of VIEWseal™ is accompanied by minimal autofluorescence. VIEWseal™ is thus especially well suited for microscopic applications, such as the detection of protein crystals in protein crystallography.

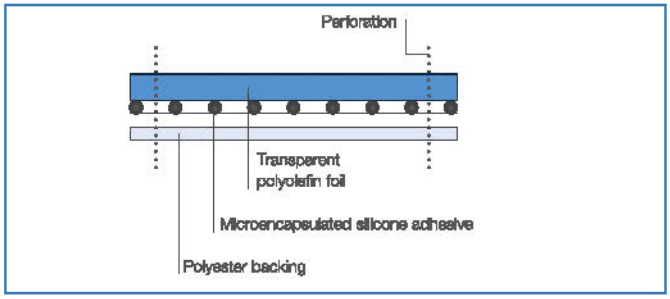


Figure 2:
Structure of VIEWseal™

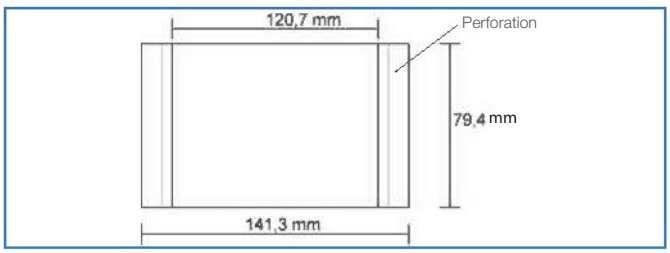


Figure 3:
External dimensions of SILVERseal™, VIEWseal™ and AMPLIseal™

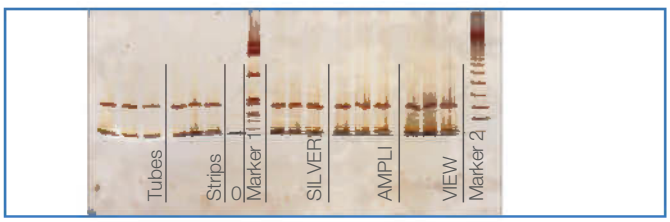


Figure 4:
Comparison of PCR products from classical thin wall tubes (tubes/strips) with PCR products from 96 well polypropylene microplates covered with a sealer

AMPLIseal™

AMPLIseal™ is a self-adhesive sealing film notable for its low autofluorescence, in particular in the wavelength range critical for Real Time PCR (Fig. 7). AMPLIseal™ consists of a 51 µm thick polypropylene film coated with a highly transparent acrylate adhesive. The adhesive layer is protected by a peelable polyester film. The strongly adhering acrylate adhesive provides a reliable sealing of the microplate, thereby minimising evaporation but without influencing the PCR reactions or the fluorescence measurements. AMPLIseal™, with external dimensions of 141.3 mm x 79.4 mm, covers PCR microplates with a skirt and all other microplates with a standard microplate footprint. Protruding extra film can be removed without problem with a double perforation.

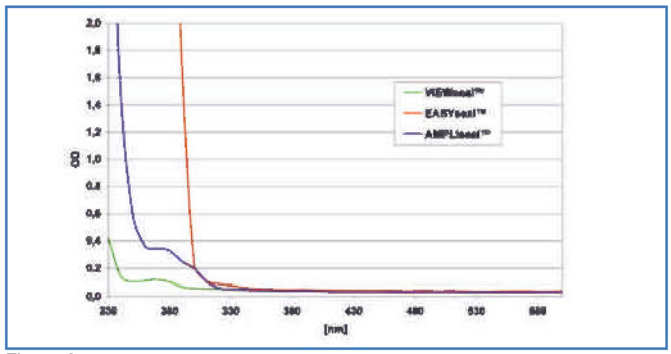


Figure 6:
Light absorption of VIEWseal™, EASYseal™ and AMPLIseal™

Figure 5:
Microscopic detection of protein crystals with polarised light through AMPLIseal™

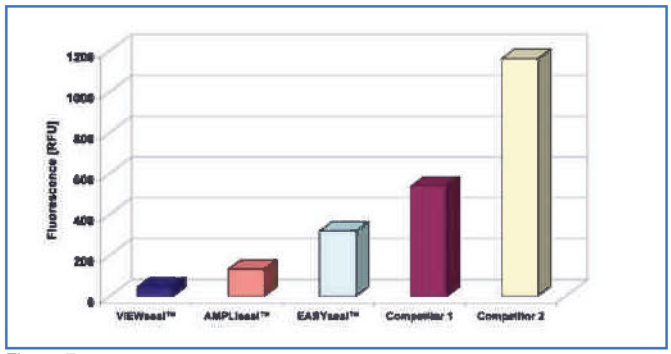


Figure 7:
Autofluorescence of AMPLIseal™ compared to VIEWseal™ and other sealing films. The wavelength combination used (479 nm / 520 nm) corresponds to the excitation and emission maximum of SybrGreen

BREATHseal™

BREATHseal™

Cell Culture Microplates p. 28–33

HTS Microplates p. 83–120

- Gas-permeable, pierceable membrane coated with acrylate adhesive
- Ideal for cultivating bacteria, yeast or cells
- Available non-sterile or sterile

BREATHseal™ is a gas-permeable membrane coated with acrylate adhesive, consisting of heat-sealed rayon fibres. The pore size varies between 10 and 50 µm (Fig. 8). The pores are layered in such a way that the membrane acts as a filter, reliably ensuring that the contents of the wells are protected against airborne bacteria, while maintaining optimal oxygen supply.
BREATHseal™ is suitable for cultivating bacteria, yeast or cells in microplates. For a high cell yield, which in turn means a high DNA or protein yield, it is necessary that the organisms are optimally supplied with oxygen. The oxygen supply is limited in microplates sealed with a lid. The use of a gas-permeable sealer such as BREATHseal™ significantly improves cell growth (Fig. 9).

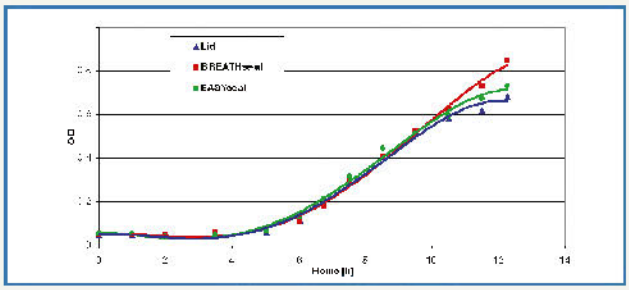


Figure 9:
Growth of *Escherichia coli* at 37 °C in MASTERBLOCK® sealed with BREATHseal™, EASYseal™ and lids

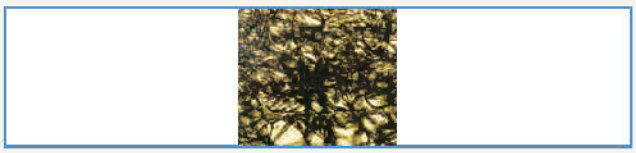


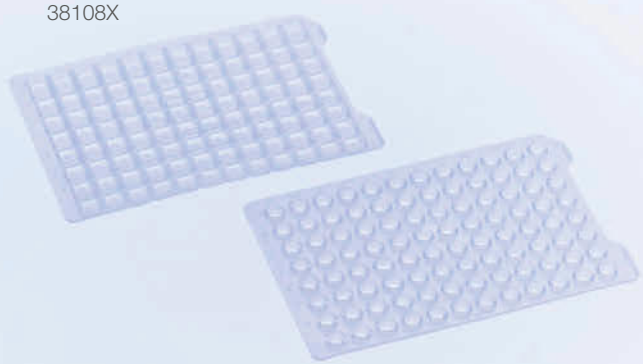
Figure 8:
Microscopic image of BREATHseal™ (10-fold magnification)

Cat.-No.	676050	676051
Special feature	gas-permeable	gas-permeable
Sterile	–	+
Quantity per bag/case	50/500	50/500

CapMats

Ethyl Vinyl Acetate CapMats

38108X



381061
381070

Ethyl Vinyl Acetate CapMats

HTS Microplates p. 83–120

- Available for 96 well microplates and MASTERBLOCK®
- Available non-sterile or sterile

An alternative method for sealing 96 well plates are CapMats. The 96 well CapMats are made of ethyl vinyl acetate (EVA). They are resistant to DMSO and can be used in a temperature range between -20 °C and +60 °C.

- 96 well CapMats with **round** naps (Cat.-No. 381070, 381061) Both are suitable for sealing the 1 ml and 0.5 ml 96 well MASTERBLOCK®, in addition to standard 96 well polypropylene microplates. The 96 well F-, U- and µClear®-bottom polystyrene microplates may also be sealed (except 96 well V-bottom polystyrene microplates). These CapMats are not pierceable.
- 96 well CapMats with **square** naps (Cat.-No. 381080, 381081) Both are suitable for the 2 ml 96 well MASTERBLOCK®. These CapMats are not pierceable.

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

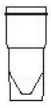
Cat.-No.	381070	381061	381080	381081
Description	96 well CapMat	96 well CapMat	96 well CapMat	96 well CapMat
Nap shape	round	round	square	square
Material	EVA	EVA	EVA	EVA
Pierceable	–	–	–	–
Sterile	–	+	–	+
Quantity per bag/case	10/50	1/50	10/50	1/50

13 Reaction Tubes / Analyser Cups

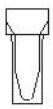
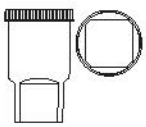
Analyser Cups

Analyser Cups

- For handling and analysis of chemical and biological samples
- Available for numerous established analytical systems, such as Technicon, Gemsaec, Hitachi, Coulter and Hycel analysers


Cat.-No.	620101	621171	624101
Description	analyser cup	analyser cup	analyser cup
Material	polystyrene	polystyrene	polystyrene
Bottom design	conical	conical	conical
Support skirt	+	+	+
Volume [ml]	1.5	4	0.5
Cap, Cat.-No.	-	-	-
Suitable for	Technicon	Technicon	Gemsaec
Quantity per bag/case	500/6000	250/5000	500/6000

Cat.-No.	729101	668102
Description	analyser cup	analyser cup
Material	polystyrene	polystyrene
Bottom design	conical	flat
Support skirt	+	-
Volume [ml]	1.7	25
Cap	-	+
Suitable for	Hitachi	Coulter/Hycel
Quantity per bag/case	250/5000	250/1250

Reaction Tubes

Reaction Tubes

Overview: Max. Centrifuge Capacity in Technical Appendix

Lab Equipment p. 250–254

- High chemical and temperature resistance
- Available in different sizes
- Available for Eppendorf, Vitatron and Roche systems
- Brown reaction tube for light-sensitive materials
- Cat.-No. 616 2XX features a flat lid surface for easy labelling

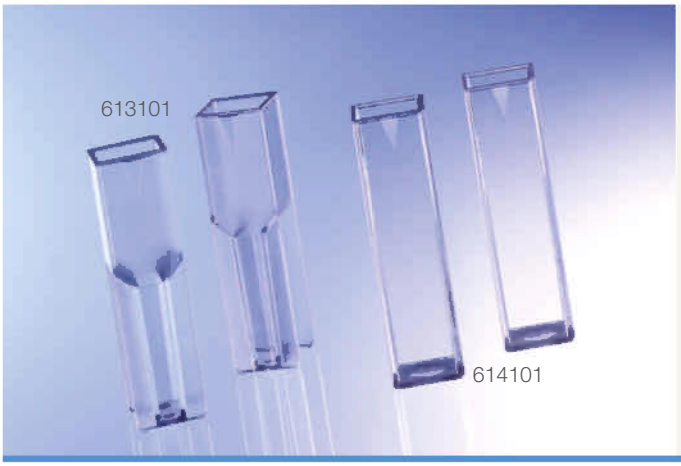
New: 5 ml tubes for perfect handling of intermediate volumes (1 to 5 ml)

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

Cat.-No.	667201	742270	616201	616261	616283	618201
Description	reaction tube	“Cobas” cup	reaction tube	reaction tube	reaction tube	reaction tube
Colour	natural	blue	natural	natural	brown	natural
Volume [ml]	0.5	0.7	1.5	1.5	1.5	1.5
Graduation	-	-	+	+	+	-
Cap, attached	+	+	+	+	+	-
Suitable for	Vitatron	Roche	Eppendorf	Eppendorf	Eppendorf	Eppendorf
Sterile	-	-	-	+	-	-
Quantity per bag/case	1000/10000	500/15000	500/4000	500/4000	500/4000	500/3000

Cat.-No.	623201	725201	622201
Description	reaction tube	reaction tube	reaction tube
Colour	natural	natural	natural
Volume [ml]	2.0	5.0	5.0
Graduation	+	+	+
Cap, attached	+	+	+
Suitable for	Eppendorf	universal	universal
Sterile	-	-	-
Quantity per bag/case	500/4000	100/500	100/1000
		New	New

Semi-micro / Macro Cuvette



Semi-micro / Macro Cuvette

UV-Star® microplate for transmission range up to 230 nm p. 119–120

- Ideal for enzymatic determinations, since the very thin walls enable rapid and uniform equilibration
- Manufactured from crystal clear polystyrene
- Characterised by minimal light scatter but high transmission rate
- Applicable wavelength range from 340 to 900 nm

Cat.-No.	613101	614101
Description	semi-micro cuvette	macro cuvette
Total volume [ml]	1.6	4
Minimum working volume [ml]	0.95	2.5
Material	polystyrene	polystyrene
Outer dimensions: Length x width x height [mm]	12.5 x 12.5 x 45	12.5 x 12.5 x 45
Pathlength [mm]	10	10
Quantity per box / case	100 / 1000	100 / 1000

Our Clinical Division

VACUETTE®

Request our Preanalytics Catalogue or visit **www.gbo.com/preanalytics**

A world leader in sample collection, our Preanalytics portfolio combines efficiency and safety in the clinical environment.

- ***Blood Collection Range***
- ***Safety Products to help Prevent Needlestick Injury***
- ***Paediatric Blood Collection***
- ***Urine Collection Range***
- ***Saliva Collection Range***
- ***Transport Line***
- ***For Clinical and Veterinary Applications***

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14 Lab Equipment & Accessories

Lab Equipment

Greiner Bio-One, a leading provider of labware, now offers compatible equipment as part of its product portfolio. Whether a start-up or established laboratory, we make it easier for you to order what you need from one supplier. We continue to look for synergies with compatible products to simplify processes and deliver high quality products to your door easily.

Mini Centrifuge

Ideal for quick spin-downs of microtubes and PCR tubes. Braking system is activated when the lid is opened, smoothly decelerating to a complete stop in just one second. An 8-position microtube rotor is included, as well as a rotor with increased capacity for 0.2 ml PCR strips or 0.2 ml PCR tubes which is conveniently located in the bottom of the centrifuge. Simply remove and attach rotors by hand, pushing or pulling gently onto motor shaft.

Mini Centrifuge

Sapphire PCR Tubes p. 184
Sapphire PCR 8-Cap Strips p. 186
Reaction Tubes p. 245

- Ideal for quick spin downs of microtubes and PCR tubes
- Rotor instantly reaches 6,000 rpm
- Storage compartment for PCR tube rotor
- Decelerates in just one second
- Compatible with all Greiner Bio-One PCR and reaction tubes

Cat.-No.	843060
Description	Mini Centrifuge
Width x depth x height [cm]	11.4x15x11.4
Weight [kg]	1
Speed [rpm]	6,000
Capacity	8x1.5/2.0ml tubes 4 x PCR strips (8x0.2ml) 32x0.2ml PCR tubes
Electrical [V/Hz]	100–240/50–60
Max. radius [cm]	4.9
Operating environment [°C]	4–45
Quantity per bag/case	1

Microplate Centrifuge

Two plates can be inserted confidently without lid or seal. Upon closing the lid of the centrifuge, the rotor accelerates and centrifugal force 'swings' the plates into a horizontal position. With a g-force power of 2,550 rpm, most samples can be spun down in 20 seconds or less. Simply open the lid and the automatic electric brake brings the rotor to a smooth stop in about 7 seconds. Plates can then easily be removed.

846060

New

Microplate Centrifuge

- CELLSTAR® Cell Culture Microplates p. 27–30
- 96 Well Microplates p. 88–92
- Sapphire PCR Microplates p. 188

- Rapid spin down of microplates with 2,550 rpm
- Unique rotor design holds 2 plates without spillage
- 50 % smaller than traditional centrifuges
- Compatible with most Greiner Bio-One microplates

Filling volume for Microplate Centrifuge

Cat.-No.	650XXX	651XXX	652XXX	655XXX	785XXX
Max. volume [µl]	150	120	200	170	25

Cat.-No.	846060
Description	Microplate Centrifuge
Width x depth x height [cm]	23x26x19.7
Weight [kg]	4.1
Capacity	2x96 well microplates 2x96 well PCR microplates
Electrical [V/Hz]	120/60, 230/50
Max. radius [cm]	8
Operating environment [°C]	4–45
Quantity per bag/case	1

Mini Vortex Mixer

With a 4 mm orbit and fixed speed of 2,800 rpm, even the largest samples are vortexed instantly. Despite its powerful motor, it has a size smaller than 10 x 10 cm, allowing it to fit on even the most crowded bench. Operation is activated by pressure and is smooth, quiet and efficient. When pressure is removed, operation immediately ceases. A unique head design prevents liquids from entering the housing, prolonging motor life.

845060

New

Mini Vortex Mixer

CELLSTAR® Polypropylene Tubes p. 151–152
Sapphire PCR Tubes p. 184
Reaction Tubes p. 245

- Powerful, quiet vortexing for tubes up to 50 ml
- Instant pressure-activated operation
- Compact, fits in the palm of your hand
- Compatible with all Greiner Bio-One tubes

Cat.-No.	845060
Description	Mini Vortex Mixer
Mode	TOUCH mix
Head	Rubber cap standard for single tube mixing
Width x depth x height [cm]	9.4 x 9.9 x 6.6
Weight [kg]	0.4
Orbit [mm]	4
Electrical [V/Hz]	10–240/50–60
Operating environment [°C]	4–45
Quantity per bag/case	1

Vortex Mixer

The Greiner Bio-One Vortex Mixer provides smooth instant vortexing of even the largest samples. The unique counter balance system allows maximum vortexing action, while minimising noise along with excess vibration. Other features include suction feet to eliminate “walk” and cold room/incubator compatibility.

844060

New

Vortex Mixer

CELLSTAR® Polypropylene Tubes p. 151–152

Sapphire PCR Tubes p. 184

Reaction Tubes p. 245

- Powerful motor for instant vortexing of up to 50 ml tubes
- Dynamic balance system to minimise noise and vibration
- Touch or continuous operation
- Variable speed control from 200 to 3,200 rpm
- Compatible with all Greiner Bio-One tubes

Cat.-No.	**844060**
Description	Vortex Mixer
Mode	ON (continuous), OFF and TOUCH mix
Head	Rubber cap standard for single tube mixing
Feet	Four no-walk suction cups
Width x depth x height [cm]	13x16x17
Weight [kg]	3.8
Orbit [mm]	3
Electrical [V/Hz]	120/60, 230/50
Operating environment [°C]	4–45
Quantity per bag/case	1

Mini Block Heater

Compact construction, broad temperature range and multiple block options make the Mini Block Heater the perfect tool for laboratory incubations. Seven accessory blocks are available for use with a wide range of tubes. The simple touch pad control and digital display provide for "set and walk away" temperature selection and maximum accuracy. Please refer to the product compatibility chart for block and tube type matching (→ Technical Appendix, p. 260)

New

Mini Block Heater

CELLSTAR® Polypropylene Tubes p. 151–152
Sapphire PCR Tubes p. 184
Sapphire PCR 8-Cap Strips p. 185
Reaction Tubes p. 245

- Simple touchpad operation
- Easy-to-read digital display
- Compact, fits in the palm of your hand
- Exchangeable blocks for tubes from 0.2 to 50 ml

Cat.-No.	848060
Description	Mini Block Heater (without insert)
Width x depth x height [cm]	11.2 x 15 x 10
Weight [kg]	0.9
Temperature range [°C]	Ambient 5–100
Temperature accuracy [°C]	+/- 0.5
Temperature increments [°C]	0.1
Temperature uniformity [°C]	0.2
Block construction	high grade aluminium
Electrical [V/Hz]	100–240/50–60
Operating environment [°C]	4–45
Quantity per bag/case	1

Inserts for Mini Block Heater (not included)

Cat.-No.	848916	848923	848902	848913	848921	848915	848950
Suitable for	1.5 ml reaction tube, 0.5 ml PCR tube	1.5/2 ml reaction tube, 0.5 ml PCR tube	0.2 ml PCR tube, PCR 8-tube strip	4/5 ml Cryo.s™, 4.5/5/7 ml tube	1/2 ml Cryo.s™, 4 ml tube	15 ml conical tube, 12/14/20 ml tube	50 ml conical tube
No. of tubes per insert	15	15	40	15	15	4	2
Quantity per bag/case	1	1	1	1	1	1	1

Disposal Bags

Disposal Bags

- Ideal for the hygienic disposal of contaminated laboratory items.
- Disposal bags are made of polypropylene foil for sterilisation of items in a steam autoclave.
- For users of hot-air sterilisers, disposal bags are made of polyamide and are usable up to a temperature of +160 °C.

Cat.-No.	BAG1*)	BAG2*)	BAG3*)
Description	polypropylene	polypropylene	polypropylene
Width [mm] x length [mm]	310 x 660	405 x 610	610 x 810
Foil thickness [mm]	0.05	0.05	0.05
Nominal capacity [l]	10	30	65
Suitable for steam autoclaves	+	+	+
Quantity per case	200	200	200

*) Pre-printed with Biohazard symbol

Cat.-No.	643201	644201	646201	649201
Description	polypropylene	polypropylene	polypropylene	polypropylene
Width [mm] x length [mm]	300 x 500	400 x 780	600 x 780	700 x 1100
Foil thickness [mm]	0.05	0.05	0.05	0.05
Nominal capacity [l]	10	30	65	130
Suitable for steam autoclaves	+	+	+	+
Quantity per case	500	500	500	350

Cat.-No.	643401	644401	646401	649401
Description	polyamide	polyamide	polyamide	polyamide
Width [mm] x length [mm]	300 x 500	400 x 780	600 x 780	700 x 1100
Foil thickness [mm]	0.05	0.05	0.05	0.05
Nominal capacity [l]	10	30	65	130
Suitable for hot-air sterilisers	+	+	+	+
Quantity per case	500	500	300	200

Media Bottles

Media Bottles

- Made of polyethylene terephthalate (PET)
- Available in three sizes
- Sterilised by irradiation
- With graduation
- Triple-packed for GMP-compliant workflow

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

non-cytotoxic

Cat.-No.	951700	950700	952700
Description	media bottle	media bottle	media bottle
Design	tetragonal	tetragonal	tetragonal
Volume [ml]	100	500	1000
Sterile	+	+	+
Quantity per bag/case	100	50	24

Permanent Marker Pens

Permanent Marker Pens

- Water-resistant, quick-drying special marker pens, ideal for labelling of all plastic articles and glassware
- Available in four colours and two writing thicknesses (super fine and medium)

Cat.-No.	840063	840064	840065	840067
Writing thickness	super fine	super fine	super fine	super fine
Colour	red	blue	green	black
Quantity	10	10	10	10

Hypodermic Syringes / Needles

Hypodermic Syringes / Needles

- For clinical and research use
- Individually packed and sterile
- 2 ml, 5 ml, 10 ml and 20 ml Luer Lock versions are available (to order add LL suffix to Cat.-No.) case sizes are consistent with Luer Slip versions

Hypodermic Syringes

Cat.-No.	SYR1	SYR2	SYR5	SYR10
Volume [ml]	1	2.5	5	10
Type	luer slip	luer slip	luer slip	luer slip
Position of tip	concentric	concentric	concentric	concentric
Quantity per case	100	100	100	100

Cat.-No.	SYR20	SYR30	SYR50	SYR50LS
Volume [ml]	20	30	50	50
Type	luer slip	luer slip	luer lock	luer slip
Position of tip	eccentric	eccentric	concentric	eccentric
Quantity per case	50	50	25	25

Hypodermic Needles – Luer fitting

Cat.-No.	N1950	N1938	N2138	N2316
Type	19 g x 2"	19 g x 1¼"	21 g x 1½"	23 g x 5/8"
Quantity per case	100	100	100	100

Cat.-No.	N2325	N2332	N2516	N2525
Type	23 g x 1"	23 g x 1¼"	25 g x 5/8"	25 g x 1"
Quantity per case	100	100	100	100

Tube Racks

Specialised applications require specialist racks –
Greiner Bio-One can provide racks to suit most applications and in an array of colours for easy identification.

Handyrack 32

- 32 (+8) position reversible rack for use with 0.5 and 1.5 ml microtubes
- One side has 32 wells for 0.5 ml type tubes with 8 larger positions for 1.5 or 2.0 ml tubes
- Flip side has the opposite configuration: 32 positions for 1.5 ml or 2.0 ml tubes with 8 smaller positions
- Both sides have moulded indexing
- Lid needs to be ordered separately

Cat.-No.	999241	999244	999245	999246
Description	rack	rack	rack	rack
Colour	natural	blue	green	yellow
Quantity	5	5	5	5

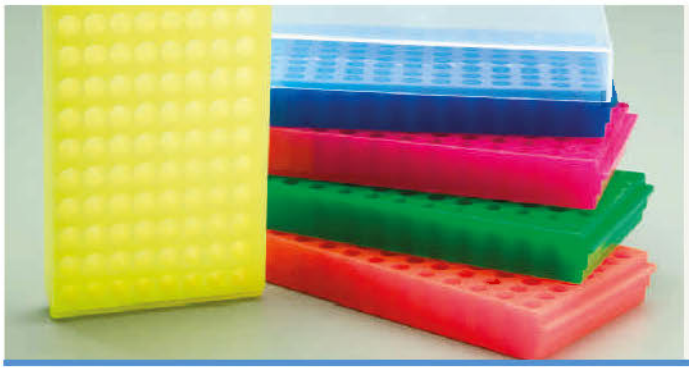
Cat.-No.	999242	999248	999249
Description	rack	rack	lid
Colour	orange	black	natural
Quantity	5	5	5

Handyrack 64

- 64 position reversible rack for use with 0.5 and 1.5 ml microtubes
- 8 rows 8 columns
- An ideal replacement for card or metal freezer racks
- Moulded indexing is featured for easy reference
- Lid needs to be ordered separately

Cat.-No.	999231	999234	999235	999236	999232
Description	rack	rack	rack	rack	rack
Colour	natural	blue	green	yellow	orange
Quantity	5	5	5	5	5

Cat.-No.	999238	999237	999233	999239
Description	rack	rack	rack	lid
Colour	black	violet	red	natural
Quantity	5	5	5	5

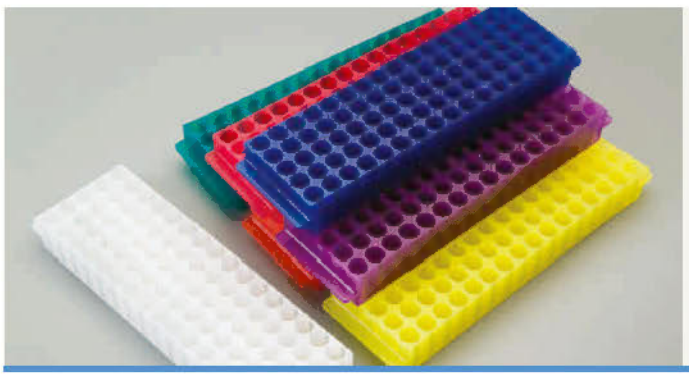


Handyrack 96

- 96 position reversible rack for use with 0.5 ml and 1.5 ml microtubes
- 8 rows 12 columns with moulded indexing for easy reference
- Ideal for pipetting to and from 96-well microplates
- Lid needs to be ordered separately

Cat.-No.	999201	999204	999205	999206	999202
Description	rack	rack	rack	rack	rack
Colour	natural	blue	green	yellow	orange
Quantity	5	5	5	5	5

Cat.-No.	999208	999207	999203	999209
Description	rack	rack	rack	lid
Colour	black	violet	red	natural
Quantity	5	5	5	5



Handyrack 80

- General purpose 80 position laboratory rack
- Designed for 1.5 ml and 2ml microtubes and skirted 0.5ml microtubes

Cat.-No.	999291	999294	999295	999296	999292
Description	rack	rack	rack	rack	rack
Colour	natural	blue	green	yellow	orange
Quantity	5	5	5	5	5

Cat.-No.	999298	999297	999293
Description	rack	rack	rack
Colour	black	violet	red
Quantity	5	5	5

CryoBox 50 & 100

- 50 & 100 position cryogenic storage box
- Versatile storage
- Hinged lid
- Stores up to 2.0 ml tubes
- Suitable for temperatures as low as -90°C
- High contrast alphanumeric indexing
- Available in a range of colours
- Made from temperature-resistant polypropylene
- Dimensions: Cryobox 50: 139 x 86 x 54 mm.
  Cryobox 100: 151 x 139 x 54 mm

Cat.-No.	802210	802214	802211	802213	802212	802216
Description	50 position	50 position	50 position	50 position	50 position	50 position
Colour	natural	blue	green	pink	orange	yellow
Quantity	1	1	1	1	1	1

Cat.-No.	828210	828214	828215	828211	828212	828216
Description	100 position	100 position	100 position	100 position	100 position	100 position
Colour	natural	blue	green	pink	orange	yellow
Quantity	1	1	1	1	1	1

828 202

CryoBox 81

- 81 position cryogenic storage box
- Separate lid included (natural)
- Stores up to 2.0 ml tubes
- Suitable for temperatures as low as -90°C
- High contrast alphanumeric indexing
- Available in a range of colours
- Made from temperature-resistant polypropylene
- Dimensions: (125 x 125 x 45 mm (height is when filled with 2 ml Cryo.s™ and covered with lid.)

The CryoBox 81 fits all 1 and 2 ml Cryo.s™ with internal and external threat (Cat.-No. 121 2XX, 122 2XX, 123 2XX and 126 2XX).

It is compatible with standard LN2 containers and metal racks.

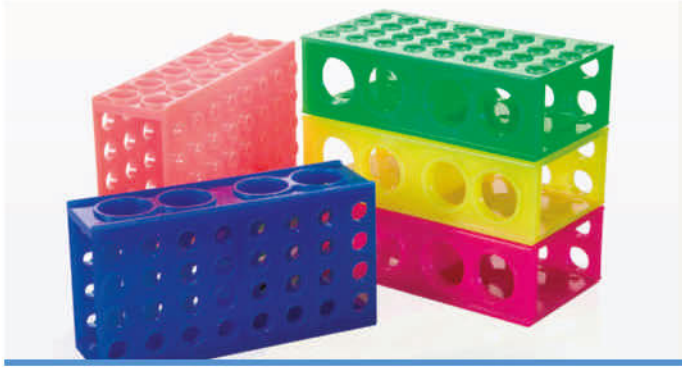
Cat.-No.	802202	828204	828208	828206
Colour	natural	blue	black	yellow
Quantity	1	1	1	1

Cat.-No.	828205	828202	828200
Colour	green	orange	pink
Quantity	1	1	1

CryoRack 40

- 40 position 'keyed' rack for single handed tube removal

Cat.-No.	802501
Colour	blue
Quantity	1



Quatrorack 4

- Multi format rack
- Ideal for a variety of sizes of containers and tubes
- Capable of supporting vessels up to 30 mm in diameter ie: 50 ml centrifuge tubes

Cat.-No.	999251	999254	999255	999257
Colour	natural	blue	green	yellow
Quantity	1	1	1	1

Cat.-No.	999252	999258	999250
Colour	orange	black	pink
Quantity	1	1	1

Quatrorack 8

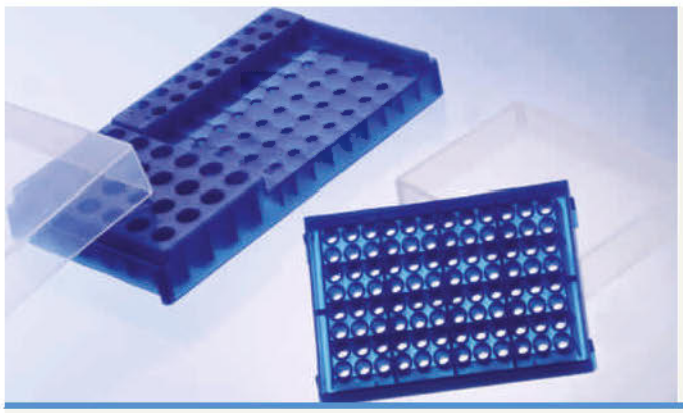
- Multi format rack
- Ideal for a variety of sizes of containers and tubes
- Capable of supporting vessels up to 30 mm in diameter ie: 50 ml centrifuge tubes
- Also Available in a range of colours – Call 01453 825255

Cat.-No.	999281
Colour	natural
Quantity	1

TempGuard Racks

- Maintains low temperatures for up to 3 hours
- **Reversible rack:** One side holds up to 20 x 2 ml tubes. Flip side holds up to 20 x 0.5 ml tubes
- Blue unit: -20 °C Maintains a temperature of between -10 °C and -20 °C for up to 3 hours
- White unit: 0 °C Maintains a temperature of 0 °C for a minimum of 5 hours

Cat.-No.	978203	978204
Colour	blue	white
Temperature	-20 °C for 3 hours	0 °C for 5 hours
Quantity	1	1



PCR Workstation with Work-up Rack

The PCR Work Up Rack and the 96 well Work Up Rack are multifunctional workstations and ideal platforms for sample preparation for PCR and numerous other applications.

PCR Workstation
- 24 positions for 1.5 / 2.0 ml tubes
- 16 positions for 0.5 ml tubes
- 32 positions for 0.2 ml tubes
- Thermal resistance down to -80 °C
- Labelling fields on the side
- Alphanumeric coding of the tube positions

96 Well Work Up Rack
- 96 positions
- Arranged in 96 well format
- For 0.2 ml reaction tubes and 8-tube strips
- Can be firmly located in the PCR Work Up Rack
- Thermal resistance down to -80 °C
- Alphanumeric coding of the tube positions

PCR

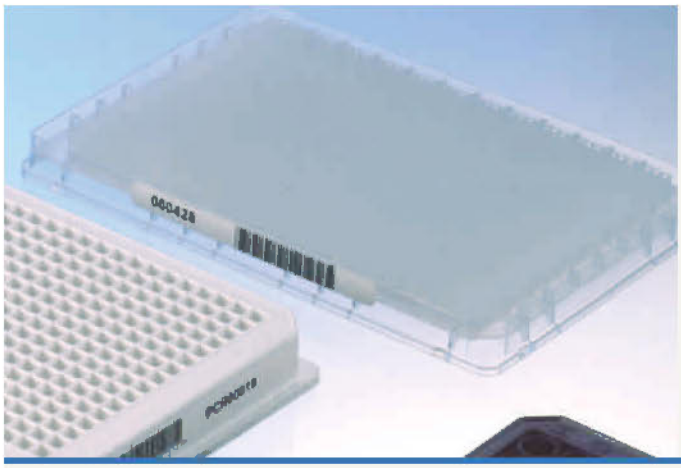
Description	PCR workstation	96 well PCR work up rack
Quantity per bag	1	1

COLOUR				
Blue	Cat.-No.	879070	880070
Orange	Cat.-No.	879071	880071
Green	Cat.-No.	879072	880072
Yellow	Cat.-No.	879073	880073
Pink	Cat.-No.	879074	880074

Barcode Service

Linear Barcode Labelling of Microplates

When large quantities of samples and information are being processed, automated identification offers an efficient means of organisation and management. The application of individual linear barcodes on microplates represents a rapid and easy method to facilitate identification, handling and storage of biological and medical samples. Machine-readable labels with linear barcodes can be implemented in any workflow system, thereby decreasing the risk of manual transcription errors as well as the time and cost involved with sample management.



Microplates with Linear Barcodes

Cell Culture Microplates p. 28–33

Microplates p. 84–120

Barcoded Microplates:

- Adhesive labels in different sizes
- Automated processes can be used to attach labels at given specifications on outer perimeter microplate sidewalls
- Product options include 96, 384 or 1536 well microplates made of polypropylene, polystyrene, COC, and other materials
- Pre-printed barcode labels can also be supplied in rolls
- Labels are resistant to solvents, temperature fluctuations and smudging. Reading accuracy is ensured
- Low minimum order requirement

! To obtain the order form for microplates with barcodes, please call us on (+49) 7022–948–0 or download them directly from the Download Center on our homepage www.gbo.com

Cat.-No.	F071085	F073015
Description	Barcode ABC	order form microplates with barcode

Technical Appendix

Quality Standards at Greiner Bio-One

Greiner Bio-One is certified according to the international standards DIN EN ISO 9001 and EN ISO 13485 for Medical Devices. Since 2013, Greiner Bio-One Frickenhausen (Germany) is also certified according to DIN EN ISO 50001 (systematic energy management). On the right you can find the corresponding certificates.

DIN EN ISO 9001 Certification

EN ISO 13485 Certification


DIN EN ISO 50001 Certification

Technical appendix is subject to error and technical modifications.

Catalogue Overview Microplates

All Greiner Bio-One microplates listed in this catalogue are summarised with their respective page number below.

96 Well Microplates

Bottom	Colour	Well profile	Optical bottom base		Surface Quality											
			µClear® bottom base	glass bottom base	TC treated, sterile	Advanced TC™, sterile	sterile	non-treated	med. binding	high binding, sterile	non-binding	cell-repel-lent	Strepta-vidin-coated	Poly-D-Lysine	Poly-L-Lysine	Collagen Type I
Polystyrene																
solid	clear	U			28		28, 88	88	123	123	117	59				
		V			28		88	88	123	123	117	59				
		F standard					88	88	123	123						
		F chimney			28	48	28		123	123	117	59		53	53	50
		F half area			30		90	90	123	123						
		C											119			
	white	F chimney			29			88		88	117					
		F half area			30			90		90						
		C											119			
	black	F chimney			29			88		88	117					
		F half area			30			90		90						
		C											119			
optical	white	F chimney	•		30	48		88		88	117			53		
		F half area	•		30			90								
	black	F chimney	•		30	48		88		88	117	59		53	53	50
		F half area	•		30			90								
		F chimney		•	70	70	115									
UV-Star®																
optical	clear	F chimney	film					117								
		F half area	film					117								
Polypropylene																
solid, standard microplate	natural	U chimney					91	91								
		F chimney						91								
		V chimney						91								
	black	U chimney						91								
		F chimney						91								
		V chimney						91								
solid, MASTERBLOCK® 0.5 ml	natural	V					104	104								
solid, MASTERBLOCK® 1 ml	natural	U					105	105								
solid, MASTERBLOCK® 2 ml	natural	V					106	106								
Cycloolefin																
optical	black	F chimney	CO film		72											

384 Well Microplates

Bottom	Colour	Well profile	Optical bottom base												
			µClear® bottom base	glass bottom base	TC-treated, sterile	Advanced TC™, sterile	sterile	non-treated	high binding, sterile	non-binding	cell-repellent	Strepta-vidin-coated	Poly-D-Lysine	Poly-L-Lysine	Collagen Type I
Polystyrene															
solid	clear	U-bottom									59				
		F-bottom			31		94	94	94	112	59	119	52	54	50
		Small Volume™ HiBase						96							
	white	F-bottom			31			94	94	112		119	52		
		Small Volume™ HiBase			32			96		112					
	black	F-bottom			31			94	94	112		119			
		Small Volume™ HiBase			32			96		112			52		
optical	white	F-bottom	•		32	48		94	94	112	59		52	54	50
		Small Volume™ LoBase	•		32										
	black	F-bottom	•		32	48		94	94	112	59		52	54	50
		F-bottom		•			115								
		F-bottom extra LoBase		•		70									
UV-Star®															
optical	clear	F-bottom	film					117							
Polypropylene															
solid, standard microplate	natural	F-bottom						97							
		V-bottom						97							
		Deep Well Small Volume™						98							
	black	F-bottom						97							
solid, MASTERBLOCK®	natural	V-bottom, Deep Well					109	109							
solid, deionised storage plate	natural	F-bottom						109							
Cycloolefin															
solid	clear	Small Volume™						109							
optical	black	F-bottom	CO film		72										

Technical appendix is subject to error and technical modifications.

1536 Well Microplates

Bottom	Colour	Well profile	Optical bottom base		Surface Quality					
			µClear® bottom base	glass bottom base	TC treated, sterile	sterile	non-treated	high binding, sterile	non-binding	Poly-D Lysine
Polystyrene										
solid	clear	F-bottom HiBase			33		102	102		
	white	F-bottom HiBase			33		102	102	112	
	black	F-bottom HiBase			33		102	102	112	
optical	white	F-bottom HiBase	•		33		102			
	black	F-bottom HiBase	•		33		102	102		52
		F-bottom LoBase		•		115				
Polypropylene										
	natural	V-bottom, Deep Well				107	107			
Cycloolefin										
solid	clear	F-bottom					109			
		F-bottom (Novartis Design)					109			
	black	F-bottom HiBase					101			
optical	black	F-bottom	CO film		72					

General Information for the Lab

Chemical Resistance of Various Materials

	PS 20 °C	PS 50 °C	PP 20 °C	PP 50 °C	HDPE 20 °C	HDPE 50 °C	LDPE 20 °C	LDPE 50 °C	PC 20°	PC 50°
Acetic acid 10 %	1	1	1	1	1	1	1	1	1	2
Acetic acid 50 %	2	2	1	1	1	1	1	1	1	2
Acetic acid 90 %	4	4	1	2	1	1	1	2	4	4
Acetone	4	4	1	3	1	1	3	3	4	4
Acetonitrile	4	4	3	4	1	1	1	1	4	4
Ammonia 25 %	2	2	1	1	1	1	1	1	4	4
Ammonium acetate	1	1	1	1	1	1	1	1	1	1
Amyl alcohol	1	1	1	1	1	1	1	2	1	-
Ascorbic acid	-	-	1	1	1	-	1	-	2	2
Benzene	4	4	4	4	4	4	4	4	4	4
Benzyl alcohol	4	4	4	4	3	4	4	4	4	4
Boric acid 10 %	1	1	1	1	1	1	1	1	1	1
Carbon tetrachloride	4	4	4	4	3	4	4	4	4	4
Carbonic acid	1	1	1	1	1	3	1	1	1	-
Chloroform 100 %	4	4	3	4	3	-	3	-	4	4
Citric acid 10 %	1	1	1	1	1	1	1	1	1	2
Cyclohexanol	3	3	1	3	1	1	1	1	3	-
Detergents	-	-	1	1	-	-	-	-	-	-
Dichloroacetic acid	-	-	1	1	1	1	-	-	4	4
Diethyl ether	4	4	4	4	3	4	4	4	4	4
Dimethyl acetamide	4	4	1	1	1	1	3	4	-	-
Dimethylsulfoxide (DMSO)	1	2	1	1	1	1	1	1	4	4
Emulsifier	-	-	1	1	-	-	-	-	-	-
Ethanol 50 %	1	1	1	-	1	1	1	2	1	1
Ethanol 96 %	1	1	1	1	1	-	1	-	1	3
Ether	4	4	4	4	3	4	4	4	4	4
Formaldehyde 10 %	3	4	1	1	1	1	1	1	1	2
Formaldehyde 40 %	4	4	1	2	1	2	2	3	1	2
Formamide	1	1	1	1	1	1	1	1	3	3
Formic acid 50 %	3	3	1	2	1	1	1	2	3	3
Glucose	1	1	1	1	1	1	1	1	1	1
Glycerine	1	1	1	1	1	1	1	1	3	3
Heptane	4	4	3	3	2	3	3	4	1	2
Hexanol	-	-	1	-	1	-	1	-	2	2
Hydrochloric acid 20 %	1	1	1	1	1	1	1	1	2	3
Hydrochloric acid conc.	3	3	1	1	1	1	1	1	4	4
Hydrogen peroxide 3 %	1	1	1	1	1	1	1	1	3	3
Hydroquinone	4	4	1	-	-	-	1	3	3	3
Isoamyl alcohol	1	1	-	-	-	-	-	-	3	0
Isobutanol	2	2	1	1	1	1	1	1	1	2
Isopropanol	2	2	1	1	1	1	1	1	1	2
Isopropyl acetate	4	4	2	3	1	2	2	3	4	4
Isopropyl benzene	4	4	3	4	2	3	3	4	4	4
Isopropyl ether	4	4	4	4	4	4	4	4	4	4
Lactic acid 3 %	2	2	1	2	1	1	1	2	1	2
Lactic acid 85 %	2	2	1	2	1	1	1	1	1	2
Liquid paraffin	1	1	1	3	1	1	1	3	1	-
Methanol	3	4	1	1	1	1	1	1	4	4
Methyl acetate	4	4	2	3	3	3	3	4	4	4
Methyl phenyl ether 100 %	4	4	3	-	-	-	3	-	4	4
Methyl propyl ketone	4	4	2	3	1	2	2	3	4	4

1 = resistant 2 = limited resistant 3 = moderate resistant 4 = no resistance
This table is a general guide only. As many factors can affect the chemical resistance of a given product, its suitability for a specific application should be tested.

Chemical Resistance of Various Materials

	PS 20 °C	PS 50 °C	PP 20 °C	PP 50 °C	HDPE 20 °C	HDPE 50 °C	LDPE 20 °C	LDPE 50 °C	PC 20°	PC 50°
Methylamine 32 %	-	-	1	-	1	-	1	-	4	4
Methylene chloride	4	4	3	4	4	4	4	4	4	4
Naphthalene	-	-	1	-	1	3	-	-	3	3
Nitrobenzene	4	4	4	4	3	4	4	4	4	4
Oxalic acid	1	1	1	1	1	1	1	1	3	4
Ozone	3	3	1	2	1	1	1	2	1	2
Palmitic acid	1	1	3	4	3	-	2	-	2	2
Phenol 10 %	4	4	1	1	1	1	1	1	4	4
Phenol 100 %	4	4	1	1	2	3	3	3	4	4
Phosphoric acid 1 – 5 %	2	2	1	1	1	1	1	1	1	1
Phosphoric acid 85 %	1	1	1	2	1	1	1	1	1	2
Phthalic acid	1	1	1	1	1	1	1	1	3	3
Potassium carbonate	1	1	1	1	1	1	1	1	3	3
Potassium chromate	1	1	1	1	1	1	1	-	2	2
Potassium permanganate	2	3	1	1	1	1	1	1	1	-
Propanol	3	3	1	1	1	1	1	1	1	-
Sodium acetate	2	2	1	1	1	1	1	1	1	2
Sodium chloride	1	1	1	1	1	1	1	1	1	1
Sodium hydroxide 30 %	1	1	1	1	1	1	1	1	4	4
Sodium hydroxide 45 %	1	1	1	1	1	1	1	1	4	4
Sodium hydroxide 60 %	1	1	1	1	-	-	-	-	4	4
Sodium hypochloride	1	1	2	3	2	3	2	3	2	3
Sodium permanganate	2	3	1	1	1	1	1	1	-	-
Sodium thiosulfate	1	1	1	1	1	1	1	1	2	2
Stearic acid	1	2	1	1	1	1	1	1	1	2
Sulphuric acid 1 – 6 %	1	2	1	1	1	1	1	1	1	1
Sulphuric acid 60 %	2	4	1	3	1	3	1	3	3	3
Sulphuric acid conc.	4	4	4	4	4	4	4	4	4	4
Tannin acid	1	1	1	1	-	-	-	-	3	3
Terpentine oil	-	-	-	-	3	4	3	4	4	4
Tetrahydrofuran	4	4	3	4	3	4	4	4	4	4
Toluene	4	4	3	4	3	4	3	4	4	4
Trichloroacetic acid	4	4	3	4	3	3	3	4	4	4
Urea	1	2	1	1	1	1	1	1	1	1
Uric acid	-	-	1	-	1	-	1	-	1	-
Urine	3	3	1	1	1	1	1	1	1	-
Xylene	4	4	4	4	2	3	2	4	4	4

1 = resistant 2 = limited resistant 3 = moderate resistant 4 = no resistance
This table is a general guide only. As many factors can affect the chemical resistance of a given product, its suitability for a specific application should be tested.

Chemical Resistance of Cycloolefins (COC/COP)

	Cycloolefin		Cycloolefin		Cycloolefin
Acetic acid 99 %	1	Dibutyl ether	4	Isopropanol	1
Acetone	1	Dichloroethane	4	Methanol	1
Acrylonitrile	1	Dichloromethane	4	Methylene chloride	4
Ammonia 33 %	1	Diethyl ether	4	Nitric acid (HNO_3)	1
Benzaldehyde	3	Dimethyl sulfoxide	1	Octane	4
Benzene	4	DMSO	1	Pentane	4
Benzine	4	Ethanol 50 %	1	Sodium hydroxide (NaOH) 50 %	1
Butanon	1	Ethanol 96 %	1	Sulphuric acid (H_2SO_4) 40 %	1
Carbon tetrachloride	4	Fatty acid	4	Sulphuric acid (H_2SO_4) 95 %	1
Chloroform	4	Heptane (n-Heptane)	4	Toluene	4
Cyclohexane	4	Hexane	4	Xylene	4
Cyclohexanone	4	Hydrochloric acid (HCl) 36 %	1		
Detergents	1	Hydrogen peroxide water 30 %	1		

1 = resistant 2 = limited resistant 3 = moderate resistant 4 = no resistance
This table is a general guide only. As many factors can affect the chemical resistance of a given product, its suitability for a specific application should be tested.

Chemical Resistance of Polyethylene Terephthalate (PET) Capillary Pore Membranes (ThinCert™ Cell Culture Inserts)

Acetaldehyde	1	Ethanol	1	Monochlorbenzene	1
Acetic acid (10 %)	1	Ethyl acetate	1	Nitric acid (30 %)	1
Acetic acid (100 %)	3	Ethyl ether	1	Nitrobenzene	1
Acetone	1	Ethylendichloride	1	Nitropropane	1
Ammonium hydroxide (5 %)	1	Ethylene glycol	1	n-Propanol	1
Amyl acetate	1	Fluoric acid (35 %)	1	Pentane	1
Amyl alcohol	1	Formaldehyde	1	Perchlorethylene	1
Aniline	1	Formic acid (50 %)	1	Petroleum ether	1
Benzene	3	Freon	1	Phosphoric acid (85 %)	3
Benzyl alcohol	1	Glutaraldehyde	1	Potassium hydroxide	4
Benzyl benzoate	1	Glycerol	1	Propyl acetate	1
Boric acid (5 %)	1	H_2O_2 (30 %)	1	Pyridine	1
Butanol	1	Halogenated phenoles	4	Silicon oil	1
Butyl acetate	1	Hexane	1	Sodium hydroxide	4
Butyl cellusolve	1	Hydrochloric acid (20 %)	1	Sulphuric acid (25 %)	1
Carbon tetrachloride	1	i-Propanol	1	Terpentine oil	1
Chloroform	1	Isopropyl myristate	1	Tetrahydrofurane	1
Concentrated strong acids	4	Methanol	1	Tetraline	1
Cyclohexane	1	Methyl acetate	1	Toluene	3
Cyclohexanone	3	Methyl cellusolve	1	Trichlorbenzene	1
Dekaline	1	Methylenchloride	3	Trichlorethylene	1
Dimethylacetamide	1	Methylethylketone	1	Triethanolamin	1
Dimethylformamide	1	Methylglycol acetate	1	Trikresyl phosphate	1
Dimethylsulfoxide	1	Methylisobutylketone	1	Xylene	3
Dioxane	1	Mineral oils	1		

For the solvents effecting slight changes the user should test the compatibility under the specific application conditions. All tests have been performed at RT. Please be aware that ThinCert™ cell culture inserts are made of PET membranes sealed on polystyrene housings. Therefore, solvents shown compatible with PET membranes in the above table might be incompatible with the polystyrene housing. Please check solvent compatibility with polystyrene on page 248–249.

Resistance scale from 1 to 4

1 = resistant i.e. the plastics may be treated with the chemical compound at mentioned temperature over several years without any significant alterations in its physical, optical and chemical properties

2 = limited resistant i.e. the plastics may be treated with the chemical compound at mentioned temperature over several weeks without any significant alterations in its physical, optical and chemical properties

3 = moderate resistant i.e. the plastics may be treated with the chemical compound at mentioned temperature for short time only (several minutes to one hour) without any alterations in physical, optical and chemical properties (mixing and measuring is possible)

4 = no resistance i.e. treating the plastics with the substance named may cause alterations in physical, optical and chemical properties within seconds

Chemical Resistance of Sealers

	EASYseal™ (Cat.-No. 676001)	VIEWseal™ (Cat.-No. 676070)	AMPLIseal™ (Cat.-No. 676040)	SILVERseal™ (Cat.-No. 676090)
Acetone	4	4	4	3
Acetonitrile	3	3	4	1
Acetic acid 1 %	3	1	4	3
Glacial acetic acid	1	3	4	3
Chloroform	4	4	4	4
DMSO	3	3	3	1
Ethanol	3	1	1	1
Hydrochloric acid 32 %	3	1	3	4
Isopropanol	3	1	1	1
Methanol	3	1	4	1
Phenol	3	3	4	3
Sulphuric acid 0.5 M	1	1	1	1

1 = Stable no visible change in the sealer after one week's incubation
3 = Moderately stable after one week, optical and physical changes in the sealer (clouding tears on removal)
4 = Unstable adhesive and foil are dissolved, wells not leak-tight
This table can only be used as an orientation aid for the suitability of the respective sealers, since their behaviour against chemicals depends on the respective application. Tests under practical conditions are absolutely essential in many cases.

Temperature Stability of Sealers

	Temperature Stability
EASYseal™	-40 °C to + 120 °C
VIEWseal™	-70 °C to + 100 °C
AMPLIseal™	-80 °C to + 110 °C
SILVERseal™	-80 °C to + 110 °C
BREATHseal™	n.a. Evaporation rate 4200 g H_2O/m^2 in 24 h

This table can basically be used as an orientation aid for the temperature stability of the respective sealers, since the behaviour of the product depends on the respective application. Tests under practical conditions are absolutely essential in many cases.

Physical Properties of Various Materials

Material	Sterilisation by				Autoclavability	Thermal Stability [°C]	Transparency	Gas Permeability [cc x mm/m² x 24 h x Bar]			WVTR (at 37 °C, 90 % humidity) [g x mm/m² x 24 h x Bar]
	gamma irradiation	chemicals (formalin, ethanol)	dry heat	gas*				O_2	N_2	CO_2	
Polystyrene	yes	yes	no	yes	no	-20 to +60	clear	4.7	853	17.8	108 – 155
Poly-propylene	yes	yes	no	yes	yes	-196 to +121	translucent	3.7	744	12.4	3.9
HDPE	yes	yes	no	yes	no	-50 to +100	translucent	2.9	651	9	4.6 – 6.2
LDPE	yes	yes	no	yes	no	-50 to +80	translucent	7.8	2.8	41.9	15.5 – 23.3
UV-Star®	yes	-	no	yes	no	-20 to +40	clear	-	-	-	-
PETG	yes	yes	no	yes	no	-40 to +60	clear	388	155	1.2	62
PET	yes	some	no	yes	no	-40 to +60	clear	46.5	10.9	236	15 – 20
Cycloolefin	yes	-	no	yes	no	-80 to +100	clear	-	-	-	-

Exemptions are mentioned in the respective product data sheets.
* Ethylene oxide, formaldehyde

Material	Refractive Index
Polystyrene	1.59
UV-Star®	1.53
Cycloolefin	1.53
Glass	1.53

These tables are a general guide only. As many factors can affect the resistance of a given product, its suitability for a specific application should be tested.

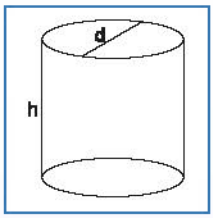
Manual Calculation
– Coefficient of Variation (CV)

The coefficient of variation compares the variability of several random samples with different means, taking into account the different dimensions of means:

$$CV\,\% = \frac{S}{I\,\overline{X}\,I} \cdot 100\,\%$$

where S is the standard deviation and
$I\,\overline{X}\,I$ is the absolute value of the arithmetic mean.

– Volume of Diverse Bodies

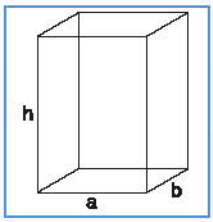


Volume of a cylinder:

$$= \frac{\pi \cdot d^2 \cdot h}{4}$$

$$= \frac{4 \cdot V}{\pi}$$

This formula can be used for calculating the filling level in relation to the filling volume in a 96 well microplate with cylindrical wells.



Volume of a cuboid:

$$V = a \cdot b \cdot h$$

$$= \frac{V}{a \cdot b}$$

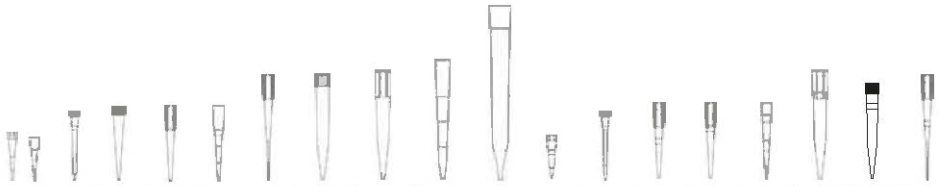
This formula can be used for calculating the filling level in relation to the filling volume in 384 and 1536 well microplates with rectangular wells.

Overview
– Metric prefixes

G	=	giga	= 10^{9}
M	=	mega	= 10^{6}
k	=	kilo	= 10^{3}
c	=	centi	= 10^{-2}
m	=	milli	= 10^{-3}
µ	=	micro	= 10^{-6}
n	=	nano	= 10^{-9}
p	=	pico	= 10^{-12}
f	=	femto	= 10^{-15}
a	=	atto	= 10^{-18}
z	=	zepto	= 10^{-21}

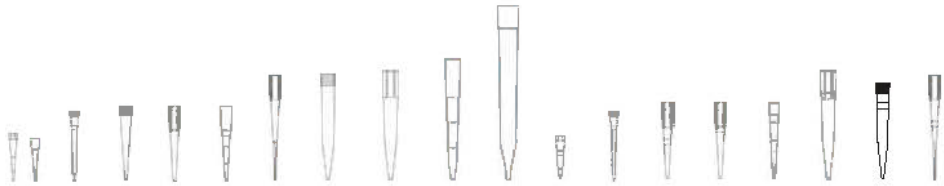
Laboratory Information for Liquid Handling

Table of Compatibility for Pipette Tips and Pipettors



Volume [µl]	0.5 – 10	0.5 – 10	10 – 100	10 – 200	10 – 200	10 – 200	100 – 1000	200 – 1000	200 – 1000	1 – 5 ml	10	10	20	100	200	1000	1000	Gel 20
Description	**771290** natural **771291** natural	**765290** natural	**685290** yellow	**739290** yellow	**739291** natural	**770290** natural Gel	**686290** blue **686295** natural	**740290** blue	**740291** natural **740296** blue	**745290** natural	**771288** natural	**765288** natural	**774288** natural	**772288** natural	**739288** natural	**740288** natural	**750288** natural	**775288** natural
Single-channel Pipettors	**Standard Pipette Tips**										**Filter Pipette Tips (sterile)**							
Biohit® Proline (0.5 – 10 µl)	•	•									•	•						
Biohit® eLine (5 – 120 µl)				•	•	•							•	•				•
Biohit® eLine (50 – 1000 µl)							•	•	•								•	
Brand® Transferpette (2 – 20 µl)		•										•						
Brand® Transferpette (20 – 200 µl)			•	•	•	•							•	•	•			•
Brand® Transferpette (100 – 1000 µl)							•	•	•									
Eppendorf® Reference (0.5 – 10 µl)	•	•									•	•						
Eppendorf® Reference (2 – 20 µl)			•	•	•	•							•	•				•
Eppendorf® Reference (50 µl)			•	•	•	•								•				
Eppendorf® Reference (10 – 100 µl)			•	•	•	•							•	•				•
Eppendorf® Reference (100 µl)			•	•	•	•								•				
Eppendorf® Reference (50 – 200 µl)			•	•	•	•							•	•	•			•
Eppendorf® Reference (500 µl)							•	•	•								•	
Eppendorf® Reference (100 – 1000 µl)							•	•	•								•	
Eppendorf® Reference (1000 µl)							•	•	•								•	
Eppendorf® Research (20 – 200 µl)			•	•	•	•							•	•	•			•
Eppendorf® Research (100 – 1000 µl)							•	•	•								•	
Eppendorf® Research pro (0.5 – 10 µl)	•	•									•	•						
Eppendorf® Research pro (5 – 100 µl)			•	•	•	•							•	•				•
Eppendorf® Research pro (20 – 300 µl)			•	•	•	•							•	•	•			•
Eppendorf® Research pro (50 – 1000 µl)							•	•	•								•	
Finnpipette® Digital 4500 (200 – 1000 µl)							•	•	•							•	•	
Gilson® Pipetman P2 (0.5 – 2 µl)	•	•									•	•						
Gilson® Pipetman P10 (1 – 10 µl)	•	•									•	•						
Gilson® Pipetman P20 (2 – 20 µl)			•	•	•	•							•					•
Gilson® Pipetman P100 (20 – 100 µl)			•	•	•	•							•	•				•
Gilson® Pipetman P200 (50 – 200 µl)			•	•	•	•								•	•			
Gilson® Pipetman P1000 (200 – 1000 µl)							•	•	•							•	•	
Gilson® Pipetman P5000 (1 – 5 ml)										•								
Gilson® F5/F10/F20 (5/10/20 µl)			•	•	•	•							•					•
Gilson® F25/F50 (25/50 µl)			•	•	•	•								•				
Gilson® F100 (100 µl)			•		•													
Gilson® F200 (200 µl)			•	•	•	•									•			
Gilson® F250/F300 (250/300 µl)							•	•	•							•	•	
Gilson® F500/F1000 (500/1000 µl)							•	•	•							•	•	
Gilson® Pipetman U10 (1 – 10 µl)	•	•									•	•						
Gilson® Pipetman U200 (20 – 200 µl)			•	•	•	•							•	•	•			•
Gilson® Pipetman U1000 (200 – 1000 µl)							•	•	•							•	•	

Table of Compatibility for Pipette Tips and Pipettors



Volume [µl]	0.5 – 10	0.5 – 10	10 – 100	10 – 200	10 – 200	10 – 200	100 – 1000	200 – 1000	200 – 1000	1 – 5 ml	10	10	20	100	200	1000	1000	Gel 20
Description	771290 natural 771291 natural	765290 natural	685290 yellow	739290 yellow	739291 natural	770290 natural Gel	686290 blue 686295 natural	740290 blue	740291 natural 740296 blue	745290 natural	771288 natural	765288 natural	774288 natural	772288 natural	739288 natural	740288 natural	750288 natural	775288 natural
Single-channel Pipettors	**Standard Pipette Tips**												**Filter Pipette Tips (sterile)**					
Socorex® Calibra 822 (1 – 10 µl)		•																
Socorex® Calibra 822 (2 – 20 µl)			•	•	•	•							•					•
Socorex® Calibra 822 (10 – 100 µl)			•	•	•	•							•					•
Socorex® Calibra 822 (20 – 200 µl)			•	•	•	•							•	•				•
Socorex® Calibra 822 (100 – 1000 µl)								•	•								•	
Socorex® Acura 825 (0.5 – 10 µl)	•	•									•	•						
Socorex® Acura 825 (2 – 20 µl)			•	•	•	•												
Socorex® Acura 825 (5 – 50 µl)			•	•	•	•							•	•				•
Socorex® Acura 825 (10 – 100 µl)			•	•	•	•							•	•				•
Socorex® Acura 825 (20 – 200 µl)			•	•	•	•							•	•	•			•
Socorex® Acura 825 (100 – 1000 µl)							•	•	•								•	
Multi-channel Pipettors	**Standard Pipette Tips**												**Filter Pipette Tips (sterile)**					
8F Biohit® Proline (50 – 300 µl)			•	•	•									•	•			
8F Biohit® Proline (25 – 250 µl)			•	•	•									•	•			
8F Brand® Transferpette (20 – 200 µl)			•	•	•								•	•	•			
8F Eppendorf® Research (10 – 200 µl)			•	•	•								•	•				
8F Finnpipette® Digital 4510 (50 – 300 µl)			•	•	•									•	•			
8F Gilson® Pipetman (20 – 200 µl)			•	•	•								•	•	•			
8F Socorex® Calibra 852 (1 – 10 µl)	•	•									•	•						
8F Socorex® Acura (5 – 50 µl)			•	•	•								•	•				
8F Socorex® Calibra 852 (20 – 200 µl)			•	•	•								•	•				
12F Eppendorf® Research (0.5 – 10 µl)		•										•						
12F Socorex® Calibra 852 (10 – 100 µl)			•	•	•								•					

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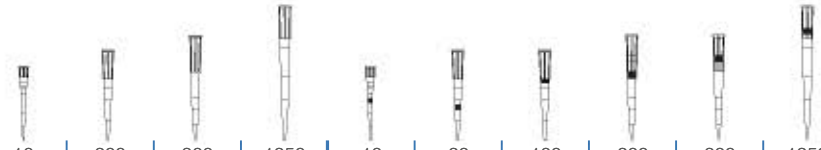
Table of Compatibility for Sapphire Pipette Tips and Pipettors



Volume [µl]	10	200	300	1250	10	20	100	200	300	1250
Cat.-No.	77125X	73725X	73825X	75025X	77126X	77326X	737261	73726X	73826X	75026X
Pipettors	**Standard Pipette Tips**				**Filter Pipette Tips (sterile)**					
Biohit® M20 (2–200 µl)		•	•			•	•	•	•	
Biohit® M200 (20–200 µl)		•	•			•	•	•	•	
Biohit® Proline (0.5–100 µl)	•				•					
Biohit® Proline (200–1000 µl)				•						•
Biohit® Proline M3 (0.1–3 µl)	•				•					
Biohit® Proline Plus (20–200 µl)		•	•			•	•	•	•	
Biohit® Proline Plus (200 µl)		•	•			•	•	•	•	
Brand® Transferpette S (0.5–100 µl)	•				•					
Brand® Transferpette S (2–200 µl)		•				•	•			
Brand® Transferpette S (10–1000 µl)		•				•	•			
Brand® Transferpette S (20–200 µl)		•	•			•	•	•	•	
Brand® Transferpette S (100–1000 µl)				•						•
Capp® (0.5–100 µl)	•				•					
Capp® (5–50 µl)		•	•			•	•	•	•	
Capp® (10–1000 µl)		•	•			•	•	•	•	
Capp® (10–1000 µl) handle ejector			•					•	•	
CLP Beta-Pette (0.1–2 µl)	•				•					
CLP Beta-Pette (0.5–100 µl)	•				•					
CLP Beta-Pette (2–200 µl)		•				•	•			
CLP Beta-Pette (10–1000 µl)		•				•	•			
CLP Beta-Pette (20–200 µl)		•	•			•	•	•	•	
CLP Beta-Pette (100–1000 µl)				•						•
CLP Poseidon (0.2–2 µl)	•				•					
CLP Poseidon (0.5–100 µl)	•				•					
CLP Poseidon (5–50 µl)		•	•			•	•	•	•	
CLP Poseidon (10–1000 µl)		•	•			•	•	•	•	
CLP Poseidon (20–200 µl)		•	•			•	•	•	•	
CLP Poseidon (20–200 µl) handle ejector			•					•	•	
CLP Poseidon (100–1000 µl)				•						•
CLP Poseidon Electronic (2–200 µl)	•				•					
CLP Poseidon Electronic (10–200 µl)		•	•			•	•	•	•	
CLP Poseidon Electronic (100–1000 µl)				•						•
Eppendorf® Reference (0.1–2.5 µl)	•				•					
Eppendorf® Reference (0.5–10 µl)	•				•					
Eppendorf® Reference (2–200 µl)		•				•	•			
Eppendorf® Reference (10–1000 µl)		•				•	•			
Eppendorf® Reference (50–200 µl)		•	•			•	•	•	•	
Eppendorf® Reference (100–1000 µl)				•						•
Eppendorf® Reference plus (0.1–2.5 µl)										
Eppendorf® Research (0.1–2.5 µl)	•				•					
Eppendorf® Research (0.5–100 µl)	•				•					
Eppendorf® Research (2–200 µl)		•				•	•			
Eppendorf® Research (10–1000 µl)		•				•	•			
Eppendorf® Research (20–200 µl)		•	•			•	•	•	•	
Eppendorf® Research (100 µl)		•				•	•			
Eppendorf® Research (100–1000 µl)				•						•
Eppendorf® Research plus (0.1–2.5 µl)	•				•					
Eppendorf® Research plus (0.5–100 µl)	•				•					
Eppendorf® Research plus (2–200 µl)	•	•			•	•	•			
Eppendorf® Research plus (10–1000 µl)		•				•	•			
Eppendorf® Research plus (100–1000 µl)				•						•

Table of Compatibility for Sapphire Pipette Tips and Pipettors

Volume [µl]	10	200	300	1250	10	20	100	200	300	1250
Cat.-No.	77125X	73725X	73825X	75025X	77126X	77326X	737261	73726X	73826X	75026X
Pipettors	**Standard Pipette Tips**				**Filter Pipette Tips (sterile)**					
Finnpipette (0.5 – 10 µl)	•				•					
Finnpipette (2 – 20 µl)		•				•	•			
Finnpipette (5 – 50 µl)	•	•	•		•	•	•	•	•	
Finnpipette (20 – 200 µl)		•	•			•	•	•	•	
Finnpipette (30 – 300 µl)		•	•			•	•	•	•	
Finnpipette (100 – 1000 µl)				•						•
Finnpipette (200 – 1000 µl)				•						•
Finnpipette F1 (1 – 10 µl)	•				•					
Finnpipette F1 (10 – 100 µl)		•	•			•	•	•	•	
Finnpipette F2 (10 – 100 µl)		•	•			•	•	•	•	
Gilson Pipetman P2	•				•					
Gilson Pipetman P10	•				•					
Gilson Pipetman P20		•				•				
Gilson Pipetman P100		•				•	•			
Gilson Pipetman P200		•	•			•	•	•	•	
Gilson Pipetman P1000				•						•
Gilson Pipetman Ultra U20 (2 – 20 µl)		•				•	•			
Gilson Pipetman Ultra U200 (20 – 200 µl)		•	•			•	•	•	•	
Hamilton (0.2 – 2 µl)	•				•					
Hamilton (1 – 10 µl)	•				•					
Hamilton (2.5 – 25 µl)		•	•			•	•	•	•	
Hamilton (10 – 100 µl)		•	•			•	•	•	•	
Hamilton (30 – 300 µl)		•	•			•	•	•	•	
Hamilton (100 – 1000 µl)				•						•
Nichiryo Nichipet EX (0.5 – 10 µl)	•				•					
Nichiryo Nichipet EX (2 – 20 µl)		•				•	•			
Nichiryo Nichipet EX (10 – 100 µl)		•				•	•			
Nichiryo Nichipet EX (20 – 200 µl)		•	•			•	•	•	•	
Nichiryo Nichipet EX (100 – 1000 µl)				•						•
Nichiryo Oxford Benchmate II (0.1 – 2 µl)	•				•					
Nichiryo Oxford Benchmate II (2 – 20 µl)		•				•	•			
Socorex® Calibra 822 (1 – 10 µl)	•				•					
Socorex® Calibra 822 (10 – 100 µl)		•				•	•			
Socorex® Calibra 822 (20 – 200 µl)		•	•			•	•	•	•	
Socorex® Calibra 822 (100 – 1000 µl)				•						•
VWR® Ergonomic High-Performance (2 – 20 µl)		•	•			•	•	•	•	
VWR® Ergonomic High-Performance (20 – 200 µl)		•	•			•	•	•	•	
VWR® Ergonomic High-Performance (50 – 250 µl)		•	•			•	•	•	•	
VWR® Ergonomic High-Performance (100 – 1000 µl)				•						•
VWR® Ultra High-Performance (0.1 – 2 µl)	•				•					
VWR® Ultra High-Performance (0.5 – 10 µl)	•				•					
VWR® Ultra High-Performance (2 – 20 µl)		•	•			•	•	•	•	
VWR® Ultra High-Performance (10 – 100 µl)		•	•			•	•	•	•	
VWR® Ultra High-Performance (20 – 200 µl)		•	•			•	•	•	•	
VWR® Ultra High-Performance (100 – 1000 µl)				•						•

Table of Compatibility for PCR Microplates

✶ Optimal Fit		Model	**652201** unskirted, chimney top	**652250** unskirted, universal	**652210** unskirted, low-profile	**652260** semi-skirted, ABI-Design	**652270** skirted	**652290** semi-skirted, suitable for ABI	**669285** semi-skirted, RT-PCR	**785201** skirted	**785285** skirted, RT-PCR	**785290** skirted, suitable for ABI
			96 well							384 well		
Applied Biosystems	Thermal Cyclers	2700	•	•		•		•				•
		2720				✶						•
		6100				✶						
		9600	•	•		•		•				
		9700	•	•		✶		•				✶
		Veriti 0.2 ml				✶		✶				•
	Real Time Thermal Cyclers	5700		•		•		•				
		PRISM 7000		•		✶		✶				
		7300		•		✶		✶				
		7500		•		✶		✶				
		7700		•		•		✶				
		7900HT		•		✶						•
		ViiA 7				✶						•
		Quant Studio 12K Flex				•						•
	Sequencers	PRISM 310	•	•		•		✶				
		PRISM 3100	•	•		✶		•				✶
		3130 (XL)	•	•		✶		✶				✶
		3700	•	•		✶		✶				✶
		PRISM 3730 (XL)	•	•		✶		✶				✶
		3500 (XL)				•						•
Bio-Rad/MJ Research	Thermal Cyclers	Gene Cycler	•	•		•						
		PTC-100	•	•	•		✶	•				•
		PTC-200	•	•	•		✶	•				•
		PTC-225 Tetrad	•	•	•		✶	•				•
		Dyad/Dyad Disciple	•	•	•		✶	•				•
		iCycler	•	•			•	✶				
		MyCycler	•	•								
		Mini Gradient		•	•							
		Personal		•				•				
		T100		✶			✶					
		DNA Engine family		•	•		•	•		•		•
		C1000/S1000		•	✶		•	•		•		•
	Real Time Thermal Cyclers	Opticon/Opticon2		•	•		✶					
		Chromo-4			•		•					
		iCycler	•	•			•	✶				
		MyiQ	•	•			•	✶				
		iQ5	•	•			•	✶				
		CFX Connect			•		•	•				
		CFX96					✶					
		CFX384								•		•
	Sequencers	BaseStation					•					
Eppendorf	Thermal Cyclers	Mastercycler	•	•	•		•	•				
		Mastercycler ep Gradient	•	•		•	✶	•				
		Mastercycler M384								•		•
		Mastercycler Nexus		•	•		•	•				
		Mastercycler Nexus Gradient		•	•		✶	•				
		Mastercycler Nexus Eco		•	•		•	•				
		Mastercycler Pro		•			•	•		•		•
	Real Time Thermal Cyclers	Mastercycler ep Realplex	•	•			✶	•				

The registered trademarks of the mentioned manufacturers belong to the above mentioned companies.
This compatibility chart is a general guide only and subject to error and modifications. We cannot accept any liability or responsibility for the above information.

		Model	652201 unskirted, chimney top	652250 unskirted, universal	652210 unskirted, low-profile	652260 semi-skirted, ABI-Design	652270 skirted	652290 semi-skirted, suitable for ABI	669285 semi-skirted, RT-PCR	785201 skirted	785285 skirted, RT-PCR	785290 skirted, suitable for ABI
			96 well							384 well		
Amersham	Sequencers	MegaBACE 500					•					
		MegaBACE 1000					•					
		MegaBACE 4000										•
Beckman	Sequencers	CEQ		•								
Biometra	Thermal Cyclers	Uno	•	•	•		•	•				
		Uno II	•	•	•			•				•
		T1 Thermal Cycler	•	•	•		•	•				•
		Tgradient	•	•	•		•	•				•
		Trobot	•	•	•		•	•				•
		T3000		•	•		•					•
		T Professional		•	•		•					•
	Real Time Thermal Cyclers	Toptical		•	•		•					•
Corbett	Thermal Cyclers	PalmCycler 96					•	•				
		PalmCycler 384										•
Ericom	Thermal Cyclers	Power Block I	•	•	•	•						
		Deltacycler I	•	•	•			•				
		Deltacycler II	•	•	•	•						
		Single Block	•	•	•			•				
		Twin Block	•	•	•			•				
Esco	Thermal Cyclers	Swift	•	•				•				•
		Gene	•	•			•	•				•
		Genius	•	•			•	•				
G-Storm	Thermal Cyclers	GS1	•	•	•	•		•				
		GS2	•	•	•	•		•				
		GS4	•	•	•	•		•				
		GSX	•	•	•	•		•				
		GSXs	•	•	•	•		•				
MWG	Thermal Cyclers	Primus 96	•	•	•	•	•	•				
		Primus 384										•
Stratagene	Thermal Cyclers	Robocycler 96		•				•				
		Robocycler Gradient	•	•	•	•	•	•				
	Real Time Thermal Cyclers	Mx4000 and Mx3005P	•	•	•	•						
TaKaRa	Thermal Cyclers	TP240					•					
		TP3000	•	•	•	•	•	•				
Techne	Thermal Cyclers	Touchgene	•	•	•	•		•				
		Cyclogene	•	•	•	•		•				
		Genius	•	•	•	•		•				
		Genius Quad	•	•	•	•		•				
		Genius (TC412)	•	•	•	•	•	•				
		Flexigene	•	•	•	•	•	•				•
		Touchgene X		•	•	•	•	•				•
		Touchgene Gradient (TC512)	•	•	•	•	•	•				•
	Real Time Thermal Cyclers	Quantica			•		•					
Thermo Hybaid	Thermal Cyclers	PCR Sprint	•	•	•	•	•	•				
		MBS Satelite (Multiblock)	•	•	•	•	•	•				•
		Px2 and PxE	•	•	•	•	•	•				•
		PCR Express and Omni-E	•	•	•	•	•	•				•
		Touchdown	•	•	•	•	•	•				•
		Omnigene	•	•	•	•	•	•				•
Transgenomic	Sequencers	WAVE System					•					
Roche	Real Time Thermal Cyclers	LightCycler 96							•	•		
		Light Cycler 480							•	•	•	•

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Technical appendix is subject to error and technical modifications.

Table of Compatibility for Mini Block Heater Inserts

Cat.-No.	848916	848923	848902	848913	848921	848915	848950
No. of Tubes per Insert	**15x**	**15x**	**40x**	**15x**	**15x**	**4x**	**2x**
1 ml Cryo.s™					•		
2 ml Cryo.s™					•		
4 ml Cryo.s™				•			
5 ml Cryo.s™				•			
1.5 ml Reaction Tube	•	•					
2 ml Reaction Tube		•					
0.5 ml PCR Tube	•	•					
0.2 ml PCR Tube			•				
1 x 8 PCR Tube Strip			•				
15 ml Conical Tube						•	
50 ml Conical Tube							•
4 ml, 12 x 55 mm Tube					•		
5 ml, 12 x 75 mm Tube				•			
4.5 ml, 12 x 75 mm Tube				•			
7 ml, 13 x 100 mm Tube				•			
12 ml, 16 x 100 mm Tube						•	
12 ml, 17 x 100 mm Tube						•	
20 ml, 16 x 152 mm Tube						•	
14 ml, 17 x 95 mm Tube						•	
14 ml, 18 x 95 mm Tube						•	

Laboratory Information for Centrifugation

Centrifugation – Principle and Calculation of the RCF (Relative Centrifugal Force)

Sedimentation of particles in a gravitational field

If a mixture of sand and water is shaken thoroughly and then left to stand, the sedimentation of the solid particles takes place according to their size. As a result of gravitational acceleration (g = 9.81 m/s²), all of the particles are located in a gravitational field under the influence of which the coarse grains of sand collect at the bottom first and the smaller grains of sand are deposited later. After around 10 – 20 minutes, the following layering is produced (from bottom to top):
coarse grains of sand – fine grains of sand – water.

However, other particles (proteins, nucleic acids, viruses, pro- or eucaryotic cells) do not necessarily precipitate or only sediment out after they have been exposed to higher forces than the force of gravity resulting from the gravitational acceleration. If these forces exceed the counter-forces resulting from convection (heat circulation) and Brownian molecular motion, both of which cause constant mixing of solutions and suspensions, sedimentation takes place.

The sedimentation rate can be calculated on the basis of Stoke's law as follows:

$$\nu = \frac{d^2\,(\rho_P - \rho_L)\,g}{18\mu}$$

where ν = sedimentation rate, ρ_P = density of the particle, ρ_L = density of the liquid, g = 9.81 m/s², μ = viscosity of the liquid

However, a particle will only sediment out if $\rho_P > \rho_L$. If $\rho_P < \rho_L$, ν becomes negative, consequently the particle floats rather than sedimenting out.

Influence of the Centrifugation and Calculation of the RCF respectively RPM

A centrifuge can be used to create a transient gravitational field under the influence of which the sedimentation of cells, cellular components and macromolecules takes place. In a centrifuge, a suspension located in a centrifuge tube rotates around a rotational axis. Each particle of the suspension is subject to centrifugal force, which moves it radially away from the rotational axis. The centrifugal force F_C is calculated as follows:

$$F_C = m_P \omega^2 r$$

where m_P = mass of the particle, ω = angular velocity (s^{-1}) and r = distance of the particle from the rotational axis

The force acting on a particle in a centrifugal field is stated relative to gravitational acceleration, usually as so-called *relative centrifugal force* (RCF) or *g-force* (x g). It is calculated as follows:

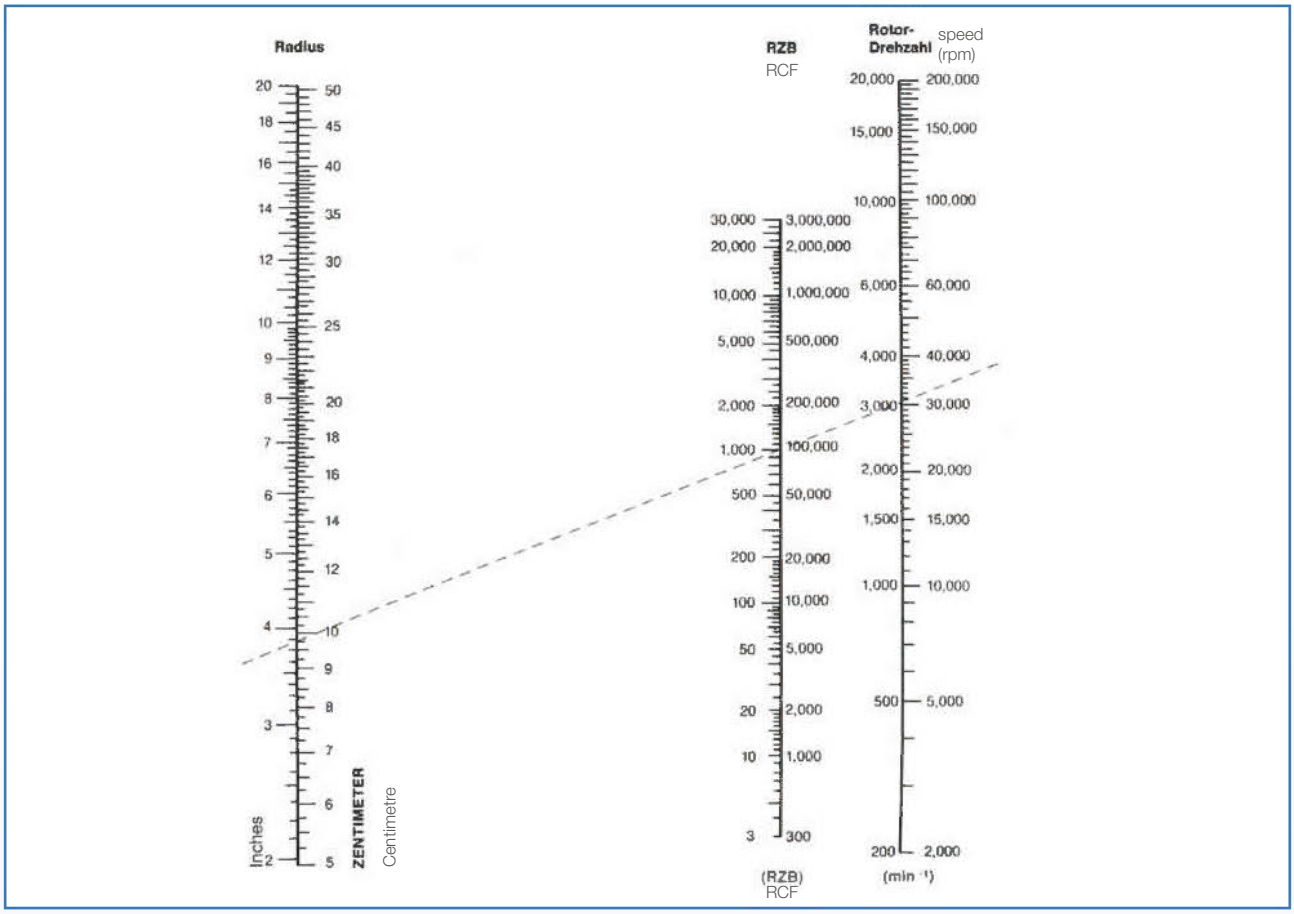
$$RCF = 11.18r \left(\frac{R}{1000}\right)^2$$

where R = rotor revolutions per min and r = distance of the particle from the rotational axis (cm)

For easier conversion of the RCF or *g-force* into revolutions per min, the equation can be transformed as follows:

$$R = 299 \sqrt{\frac{RCF}{r}}$$

Alignment Chart



By use of a ruler, the third value relating to two known scale values can be read from the alignment chart.

Maximal Centrifuge Capacity of Tubes, Reaction Tubes and Microplates

The maximum centrifuge capacity for Greiner Bio-One tubes, reaction tubes and microplates is listed in the form of the RCF in the tables below.

Measuring method:
For centrifugation, all products were filled with water up to their maximum filling volume.

Determination of the maximum RCF in a swinging-bucket rotor was conducted in a Thermo Scientific Centrifuge (Heraeus Multifuge BSR Plus). Determination of the maximum RCF in a fixed-angle rotor was conducted in a Sorvall Centrifuge (Evolution RC). Therefore special rotor inserts for different vessel shapes and sizes were used for a stable fit.

Reaction Tubes

Cat.-No.	Volume [ml]	max. RCF [g] fixed-angle rotor
6162XX	1.5	18000
6232XX	2.0	16000
6672XX	0.5	51400
6932XX	0.5	18000
7162XX	1.5	20000
7172XX	1.5	20000
7222XX	2.0	22000
7422XX	0.7	28000

The stated maximum RCF values are guidelines only, depending on a variety of factors such as rotor, temperature, density, pH and type of liquid. The suitability of tubes for a specific application using high centrifugation forces has to be tested.

Technical appendix is subject to error and technical modifications.

Polystyrene Tubes

Cat.-No.	Dimensions ø [mm] x height [mm]	max. RCF [g] swinging-bucket rotor	max. RCF [g] fixed-angle rotor
1031XX	10.5x40	5800	-[1]
1061XX	11x63	5800	6200
1091XX	11x70	5200	-[1]
1121XX	12x55	5800	6200
1151XX	12x75	5800	5800
1161XX	12x75	5800	-[1]
1201XX	12.4x75	4800	5000
1251XX	13x100	4000	7500
1361XX	14x100	4000	5200
1601XX	16x100	5800	6200
1631XX	17x100	3000	5000
1641XX	16.8x100	5000	5000
1661XX	16x110	2500	3200
1721XX	16.5x103	4800	4800
1861XX	17x120	2500	2800
1881XX	17x100	5200	6600
1881XX	17x120	2500	4500
1911XX	18x95	4000	5500
2011XX	24x90	1000	3500

[1] No fitting rotor inserts available.

The stated maximum RCF values are guidelines only, depending on a variety of factors such as rotor, temperature, density, pH and type of liquid.
The suitability of tubes for a specific application using high centrifugation forces has to be tested.

Polypropylene Tubes

Cat.-No.	Dimensions ø [mm] x height [mm]	max. RCF [g] swinging-bucket rotor	max. RCF [g] fixed-angle rotor
1022XX	8.5x44	5800	20000
1122XX	12x55	5800	30000
1152XX	12x75	5800	34000
1212XX	12.5x48	5800	34000
1222XX	12.5x48	5800	34000
1232XX	12.5x42	5800	26000
1242XX	12.5x86	5800	34000
1262XX	12.4x47	5800	26000
1272XX	12.4x83	5800	34000
1602XX	16x100	5800	34000
160297	16x100	3500	34000
1632XX	16x100	5000	26000
184261	17x77	4800	34000
188201	17x100	4800	34000
188261	18x95	4800	34000
1882XX	17x120	4000	15000
1912XX	18x95	4800	34000
2102XX	30x115	2800	11500
2272XX	30x115	3200	9500
227261	30x115	3200	17000
227270	30x115	3200	17000
227281 / 227285	30x115	3200	9500
227280 / 227283	30x115	3200	9000

The stated maximum RCF values are guidelines only, depending on a variety of factors such as rotor, temperature, density, pH and type of liquid.
The suitability of tubes for a specific application using high centrifugation forces has to be tested.

Polyethylene Tubes

Cat.-No.	Dimensions ø [mm] x height [mm]	max. RCF [g] swinging-bucket rotor	max. RCF [g] fixed-angle rotor
1123XX	12x55	4200	22000
1153XX	12x75	4200	20000
1603XX	16x100	3500	30000
1883XX	17x100	5800	20000

The stated maximum RCF values are guidelines only, depending on a variety of factors such as rotor, temperature, density, pH and type of liquid.
The suitability of tubes for a specific application using high centrifugation forces has to be tested.

Multiwell Plates

Cat.-No.	Multiwell Plate	max. RCF [g] swinging-bucket rotor
657160	6 well, PS, clear	4800
665102	12 well, PS, clear	4800
662160	24 well, PS, clear	4800
677180	48 well, PS, clear	4800

The stated maximum RCF values are guidelines only, depending on a variety of factors such as rotor, temperature, density, pH and type of liquid.
The suitability of tubes for a specific application using high centrifugation forces has to be tested.

Microplates

Cat.-No.	Microplate	max. RCF [g] swinging-bucket rotor
650101	96 well, PS, U-bottom, clear	1000
651101	96 well, PS, V-bottom, clear	4800
655101	96 well, PS, F-bottom, clear	4800
650201	96 well, PP, U-bottom, natural	4800
651201	96 well, PP, V-bottom, natural	4800
655201	96 well, PP, F-bottom, natural	4800
655209	96 well, PP, U-bottom, black	4800
655074	96 well, PS, F-bottom, white	4800
655076	96 well, PS, F-bottom, black	4800
655094	96 well, PS, µClear®, white	4800
655096	96 well, PS, µClear®, black	4800
655801	96 well, PS, UV-Star®	4800
780201	96 well, PP, MASTERBLOCK® 1 ml	4800
780270	96 well, PP, MASTERBLOCK® 2 ml	4800
786201	96 well, PP, MASTERBLOCK® 0.5 ml	4800
781101	384 well, PS, clear	4800
781073	384 well, PS, white	4800
781077	384 well, PS, black	4800
781094	384 well, PS, µClear®, white	4000
781096	384 well, PS, µClear®, black	3000
781201	384 well, PP, F-bottom, natural	4800
781280	384 well, PP, V-bottom, natural	4800
781270	384 well, PP, V-bottom, Deep Well, natural	4800
781801	384 well, PS, UV-Star®	4800
784101	384 well, PS, Small Volume™, clear	800
784075	384 well, PS, Small Volume™, white	800
784076	384 well, PS, Small Volume™, black	800
784201	384 well, PP, Small Volume™, natural	4800

The stated maximum RCF values are guidelines only, depending on a variety of factors such as rotor, temperature, density, pH and type of liquid.
The suitability of tubes for a specific application using high centrifugation forces has to be tested.

Microplates

Cat.-No.	Microplate	max. RCF [g] swinging-bucket rotor
782101	1536 well, PS, HiBase, clear	1800
782074	1536 well, PS, HiBase, white	1500
782077	1536 well, PS, HiBase, black	1500
782094	1536 well, PS, µClear®, HiBase, white	1000
782096	1536 well, PS, µClear®, HiBase, black	1500
782270	1536 well, PP, V-bottom, Deep Well, natural	4800
783101	1536 well, PS, LoBase, clear	4800
783075	1536 well, PS, LoBase, white	4800
783076	1536 well, PS, LoBase, black	4800
783094	1536 well, PS, µClear®, LoBase, white	4800
783096	1536 well, PS, µClear®, LoBase, black	4800

The stated maximum RCF values are guidelines only, depending on a variety of factors such as rotor, temperature, density, pH and type of liquid.
The suitability of tubes for a specific application using high centrifugation forces has to be tested.

PCR Plates

Cat.-No.	PCR Plate	max. RCF [g] swinging-bucket rotor
652270	96 well, PP, natural, full-skirt	4800
652290	96 well, PP, natural, half-skirt, suitable for ABI	4800
785201	384 well, PP, natural, full-skirt	4800
785290	384 well, PP, natural, full-skirt, suitable for ABI	4800

For centrifugation the plates were filled with water as follows:

96 well	300 µl
384 well	50 µl
1536 well	5 µl

The stated maximum RCF values are guidelines only, depending on a variety of factors such as rotor, temperature, density, pH and type of liquid.
The suitability of tubes for a specific application using high centrifugation forces has to be tested.

Laboratory Information for Cryo.s™ Sample Storage

Freezing protocol

1. Wash the cells with warm PBS solution, aspirate the solution and cover the cells with a solution containing trypsin and EDTA (a thin liquid film is enough; the concentration should be evaluated for each cell line).
2. Incubate the cells for max. 3–5 min at 37 °C.
3. Once the cells detach from the bottom, stop incubation by adding cell culture medium supplemented with serum and slightly suspend cells using a pipette.
4. Spin down the suspension (500 x g, 5 min) and resuspend the pellet with medium containing serum.
5. Determine the cell number (using a Neubauer chamber).
6. Spin down the cells for 5 min at 500 x g and discard the supernatant. Resuspend the pellet with an adequate volume of cell culture medium containing serum.
7. Mix the cell suspension 1:1 with freezing medium (60 % medium, 20 % FCS, 20 % DMSO) and transfer it in Cryo.s™. For freezing in Cryo.s™ the concentration of cells should be 1–5 x 10^6 cells/ml.
8. Cryo.s™ containing cells should be frozen at a cooling rate of -1 K/min. This can be achieved by placing them into an isopropanol-filled chamber at -70 °C. If other types of samples are contained, Cryo.s™ may be frozen directly at -20 °C, -70 °C or in the gas phase of liquid nitrogen. In order to assure even freezing of the sample, 4 and 5 ml Cryo.s™ should be frozen at -20 °C overnight before transferring them to -70 °C or to the gas phase of liquid nitrogen.
9. Then transfer the Cryo.s™ into the nitrogen tank. To avoid contamination (e. g. mycoplasma) and due to safety precautions it is recommended to store the Cryo.s™ in the **gas phase** above and not in the liquid nitrogen.

Thawing protocol

1. Immediately after removing them out of the nitrogen tank the frozen cells are thawed in about 1–2 min brandishing the Cryo.s™ in a water bath at 37 °C. The thawing process should be performed as fast as possible.
2. Transfer the thawed cell suspension into a 15 ml tube and mix it immediately with copious amounts of cell culture medium containing serum.
3. After spinning down the cells (500 x g, 5 min) discard the supernatant and resuspend the pellet in an appropriate cell culture medium supplemented with serum and transfer it into one or more cell culture flasks.
4. Follow the recommended cell concentration for seeding.
5. During the next 12 hours cells should rest.
6. A change of medium is recommended after 24 resp. 48 hours.

Safety advisory for working with Cryo.s™

Cryo.s™ tubes are intended for sample storage exclusively in the gas phase over liquid nitrogen or in freezers! If Cryo.s™ are stored in the liquid phase, nitrogen can seep into the tubes. Then upon thawing the vaporising nitrogen can generate high pressure, ultimately resulting in an explosion, as well as the release of any infectious material.
Always take appropriate personal safety measures when working with Cryo.s™, including wearing safety clothing, using goggles and working at a safety laboratory bench.
When undertaking cryogenic preservation, Cryo.s™ must be evenly exposed to freezing temperatures. Uneven temperature exposures can cause formation of ice plugs (i. e. at tube top) that inhibit the expansion of freezing liquid (i. e. at tube bottom), resulting in dangerous high pressure and subsequent harm or damage of tubes.

Never exceed maximum working volumes as specified in → chapter 11.

Laboratory Information for Immunology

Volume-Dependent Wetting of Immunological Products

Liquid volume [µl]	Covered area [mm²]	Liquid height [mm]	Area / volume ratio [cm²/cm³]
96 Well ELISA Microplate, U-Bottom			
25	34	1.7	13.6
50	52	2.6	10.4
75	68	3.4	9.1
100	84.6	4.2	8.5
125	99	4.9	7.9
150	115.5	5.7	7.7
175	130	6.4	7.4
200	145	7.1	7.3
225	160	7.8	7.1
250	174.7	8.5	7.0
275	190	9.2	6.9
300	205	9.9	6.8
96 Well ELISA Microplate, V-Bottom			
25	35	2.3	14.0
50	54.6	3.4	10.9
75	72.4	4.4	9.7
100	88.6	5.3	8.9
125	105	6.2	8.4
150	123.8	7.2	8.3
175	140.8	8.1	8.0
200	156	8.9	7.8
96 Well ELISA Microplate, F-Bottom/Standard			
25	47	0.8	18.8
50	62	1.55	12.4
75	77.5	2.3	10.3
100	92	3.0	9.2
125	108	3.8	8.6
150	123	4.5	8.2
175	137.6	5.2	7.9
200	152.3	5.9	7.6
225	168	6.65	7.5
250	183	7.35	7.3
275	197	8.0	7.2
300	212	8.7	7.1
96 Well ELISA Microplate, F-Bottom/Chimney Well			
25	47	0.7	18.8
50	64	1.5	12.8
75	78.5	2.2	10.5
100	93	2.9	9.3
125	108	3.6	8.6
150	122.6	4.3	8.2
175	137.5	5.0	7.9
200	152	5.7	7.6
225	167	6.4	7.4
250	182	7.1	7.3
275	197	7.8	7.2
300	212	8.4	7.1

Liquid volume [µl]	Covered area [mm²]	Liquid height [mm]	Area / volume ratio [cm²/cm³]
96 Well ELISA Microplate, F-Bottom, Half Area			
25	38	1.65	15.2
50	60	3.2	12.0
75	81.5	4.7	10.9
100	103.6	6.2	10.4
125	124.5	7.6	10.0
150	144	8.9	9.6
175	165.8	10.3	9.5
200	181.7	11.5	9.1
C8 Strip Plate			
25	39	1.0	15.6
50	56	1.9	11.2
75	73	2.8	9.7
100	88.6	3.6	8.9
125	104.3	4.4	8.3
150	120	5.2	8.0
175	136.5	6.0	7.8
200	150.8	6.7	7.5
225	165.4	7.4	7.4
250	181	8.15	7.2
275	196	8.85	7.1
300	211	9.55	7.0
F8 Strip Plate			
25	50.4	0.8	20.2
50	64	1.45	12.8
75	79.7	2.2	10.6
100	93.5	2.85	9.4
125	108.3	3.55	8.7
150	123	4.25	8.2
175	138	4.95	7.9
200	153	5.65	7.7
225	167	6.3	7.4
250	182	7.0	7.3
275	196	7.65	7.1
300	211.5	8.35	7.1
U8 Strip Plate			
25	34	1.7	13.6
50	52	2.6	10.4
75	68	3.4	9.1
100	84	4.2	8.4
125	99.6	4.95	8.0
150	115	5.75	7.7
175	129.6	6.45	7.4
200	144	7.15	7.2
225	159	7.85	7.1
250	174	8.55	7.0
275	189	9.25	6.9
300	204	9.95	6.8

Liquid volume [µl]	Covered area [mm²]	Liquid height [mm]	Area / volume ratio [cm²/cm³]
U16 Strip Plate			
25	35	1.75	14.0
50	52	2.6	10.4
75	68	3.4	9.1
100	84	4.2	8.4
125	98.6	4.9	7.9
150	115	5.7	7.7
175	129.6	6.4	7.4
200	144	7.1	7.2
225	159	7.8	7.1
250	174	8.5	7.0
275	189	9.2	6.9
300	204	9.9	6.8

Liquid volume [µl]	Covered area [mm²]	Liquid height [mm]	Area / volume ratio [cm²/cm³]
F16 Strip Plate			
25	49	0.8	19.6
50	63	1.5	12.6
75	79.8	2.3	10.6
100	94.3	3.0	9.4
125	108	3.7	8.6
150	123.5	4.4	8.2
175	138	5.1	7.9
200	153	5.8	7.7
225	168	6.5	7.5
250	183	7.2	7.3
275	198	7.9	7.2
300	213	8.6	7.1
384 Well Microplate, F-Bottom			
25	39.07	2.50	15.6
50	66.60	4.8	13.3
75	94.03	7.00	12.5
100	119.63	9.05	12.0
125	145.6	11.05	11.6
132	152.6	11.50	11.6

Abbreviations

ANSI	American National Standards Institute
COC	Cycloolefin co-polymer
COP	Cycloolefin polymer
CV	Coefficient of Variation
DMSO	Dimethyl Sulphoxide
DNA	Deoxyribonucleic Acid
DNase	Deoxyribonuclease
ECM	Extracellular Matrix
EL-Rack	EasyLoad® Rack
ELISA	Enzyme Linked Immuno Sorbent Assay
EVA	Ethyl Vinyl Acetate
FDA	Food and Drug Administration
FIA	Fluorescence Immuno Assay
F-Rack	Filter Tip Rack
HDPE	High Density Polyethylene
HLA	Human Leucocyte Antigen
HTS	High-Throughput Screening
IgG	Immunoglobulin G
ID-Card	Identity Card
LAL	Limulus Amoebocyte Lysate
LIA	Luminescence Immuno Assay
med.	Medium
NMWCO	Nominal Molecular Weight Cut-Offs
PC	Polycarbonate
PCR	Polymerase Chain Reaction
PDL	Poly-D-Lysine
PET	Polyethylene Terephthalate
PETG	Polyethylene Terephthalate Copolymer
pH	pH Value
PLA	Polylactate
PLL	Poly-L-Lysine
PP	Polypropylene
PS	Polystyrene
PTFE	Polytetrafluoroethylene
RNA	Ribonucleic Acid
RNase	Ribonuclease
rRNA	Ribosomal RNA
RT	Room Temperature
SBS	Society for Biomolecular Sciences
SPA	Scintillation Proximity Assays
ST-Rack	Standard Rack
TC	Tissue Culture
USP	United States Pharmacopoeia
UV Spectrum	Ultraviolet Spectrum
VIS Spectrum	Visible Spectrum

Units	
°C	Degree Centigrade
Da	Dalton, the unit of molecular mass
g	Gram or Gravitational Acceleration (about 9.81 m/s²)
Gy	Gray, Radiation Unit
h	Hour
l	Liter
M	Molarity, moles of solute per litre of solution
m	Meter
min	Minute
Mol	Absolute Amount of Substance
s	Second

Glossary

Advanced TC™ is a polymer modification increasing the cellular primary and long-term adhesion of Greiner Bio-One cell culture vessels. Based on the innovative technique the surface of the cell culture vessels is modified to positively influence cellular features and functions. Enhanced cellular adhesion and higher proliferation rates improve cell expansion and cultivation of sensitive cells or cells under restricted growth conditions.

Biobanking Tubes are 300 µl, 600 µl and 1000 µl Cryo.s™ tubes for the efficient storage of biological samples in large-scale biorepositories. The design of tubes and racks allows for a very space-efficient storage with up to 30 % better utilisation of storage space in freezers or liquid nitrogen tanks. In addition, they are optimised for sample storage at extremely low temperatures over long periods of time.

Bioburden is used to describe the colonisation of viable microorganisms on a material or product and is the basis for determining the necessary radiation dose for sterilisation.

C-bottom stands for the well profile of a flat well bottom with rounded corners.

CELLCOAT® is the Greiner Bio-One brand name for all protein-coated cell culture vessels for adherent cell culture.

CELLMASTER™ is a quality term that refers to all roller bottles.

CELLreactor™ is a 15 ml/50 ml polypropylene tube with filter screw cap for the cultivation of suspension and spheroid cells, expansion of aerobic bacteria, yeast or other microorganisms as well as storage of components and liquids requiring gas exchange.

Cell-repellent surface reliably prevents cell attachment in suspension cultures of semi-adherent and adherent cell lines where standard hydrophobic surfaces generally used for suspension culture are insufficient.

CELLSTAR® is a Greiner Bio-One brand name and includes culture vessels with physically modified surfaces for adherent or suspension cell cultures.

CELLview™ is a quality term for cell culture products with glass bottom for high-resolution microscopic applications.

Datamatrix Code is a 2D barcode which can also be used for tracking biological and medical reagents and samples. Its small footprint provides nearly infinite scalability and large data capacity. Datamatrix codes can be scanned independent of their orientation and are very accurate due to the Reed-Solomon error correction method.

Deep Well microplates have conical bottom wells and are ideally suited for the storage of non-human samples.

EASYstrainer™ are cell strainers for the fast and safe filtration of cell suspensions such as those from tissue dissociation or for flow cytometry.

F-bottom stands for a flat bottom well profile.

F-bottom/chimney well stands for the well profile of a flat well bottom in a chimney-like arrangement. In other words, each well stands on its own. The risk of contamination from sample material being carried over is minimised.

FLUOTRAC™ is a quality term for immunological products, referring to black microplates (fluorescence measurement).

FourWell Plate™ is a subdivided plate for microscopic applications facilitating the cultivation of cells and the storage of microscopic slides in an HTS-compatible plate complying with ANSI standards.

Hanging Drop is a technique for protein crystallisation based on → vapour diffusion, where droplets literally hang from the top of an upper substrate.

HiBase is a special plate profile of 384 well → Small Volume™ and 1536 well microplates. In contrast to the → LoBase profile, the HiBase profile is particularly well suited for top-reading systems, since the measuring optic has a minimal separation from the upper edge of the well in this plate profile.

High binding microplates (= MICROLON® 600, FLUOTRAC™ 600 and LUMITRAC™ 600) are immunological microplates with a high-binding polystyrene surface. Hydrophilic groups are introduced to the polystyrene surface by physical treatment. The high binding surface contains more hydrophilic groups than the less hydrophilic → medium binding surface.

LoBase is a special plate profile in 384 well → Small Volume™ and 1536 well microplates. In contrast to the → HiBase profile, the LoBase profile is particularly well suited for bottom-reading sytems, since the measuring optic has a minimal separation from the well bottom in this plate profile.

LUMITRAC™ is a quality term for immunological products, referring to white microplates (luminescence measurement).

MASTERBLOCK® is a brand name that stands for polypropylene microplates that are suitable for the storage of non-human sample material. They are also ideally suited for cultivating bacteria or yeast.

Med. binding (medium binding) microplates (= MICROLON® 200, FLUOTRAC™ 200 and LUMITRAC™ 200) are immunological microplates with a less hydrophobic surface than → high binding microplates.

Microbatch under oil is a method for protein crystallisation where the droplet is covered with oil. The oil generally used is paraffin wax and/or silicone oil. Paraffin wax allows little to no diffusion of water out of the droplet. Hence, all the reagents involved in the crystallisation process, as well as the protein, are present at defined concentrations, and no significant increase of concentration occurs within the crystallisation droplet. When paraffin wax is mixed with silicone oil, it is possible for water to diffuse out of the droplet through the oil and both protein and reagent concentrations increase within the droplet.

µClear® (Micro-Clear) microplates, in contrast to standard microplates with a solid bottom, have a very thin foil bottom. µClear® microplates are ideal for cell-based test systems, microscopic analyses, as well as for bottom-reading systems.

MICROLON® is a quality term for immunological products, referring to clear microplates (transmission measurement).

Non-binding microplates are characterised by low protein, DNA, RNA and peptide binding properties.

OneWell Plate™ is a non-divided HTS plate for tissue culture applications complying with the ANSI standards. The plate is also available in a non-TC-treated version for bacteriology.

Sapphire is a quality term for pipette and filter tips. The product family comprises standard pipette tips, standard filter tips as well as a low-retention version of both. All tips are transparent, graduated and allow precise pipetting with maximal recovery. They can be used with all common pipettors.

SCREENSTAR is a quality term for microplates manufactured out of high-quality cycloolefin with an ultra-clear film bottom for high-content and high-throughput screening.

Sitting Drop is a technique for protein crystallisation based on → vapour diffusion, where droplets sit on the bottom of a substrate.

Small Volume™ is a well profile that was developed in 384 well format for reducing the sample volume. The → LoBase and → HiBase variants are distinguished here. In contrast to the 384 well standard microplate, the sample volume can be considerably reduced, while the detection limit remains the same or is even improved.

TC surface treatment stands for a special physical procedure with which the surfaces of CELLSTAR® products for adherent cell culture are treated. This treatment leads to the incorporation of polar groups, such as carboxy and hydroxy groups, into the plastic surface making it hydrophilic. This enables the adhesion of cells to the plastic surface.

U-bottom stands for the well profile of wells with round bottom.

UV-Star® microplates are made of polyolefin and have a film bottom. In contrast to standard microplates with a solid bottom, they are characterised by an extended transparency range to as low as 200 nm.

Vapour diffusion is the most commonly used method for protein crystallisation. In this method a crystallisation droplet, formed by combining a protein solution with a reagent solution, is incubated together with a larger volume of the same reagent solution within a closed system. The reagent solution can contain a wide range of chemicals, e. g. buffers, salts or precipitating agents. Due to mixing the reagent and protein solutions, the concentration of reagents within the crystallisation droplet becomes lower than the concentration of the reagent solution itself. This causes water to evaporate out of the droplet until equilibrium is reached. During this process, the concentration of protein and chemicals in the crystallisation droplet is continuously rising, and, if optimal conditions have been chosen, protein crystals will begin to form. Vapour diffusion experiments are most often set up as → hanging or → sitting drop.

V-bottom stands for the well profile of wells with a conically tapered well bottom.

Glossary of Symbols


Manufacturer


Use-by date

Batch code

Catalogue number

Sterilised by irradiation

In vitro diagnostic medical device


Fragile, handle with care


Keep dry


This way up


Do not use if package is damaged


Temperature limit


Do not re-use


Consult instructions for use


Caution

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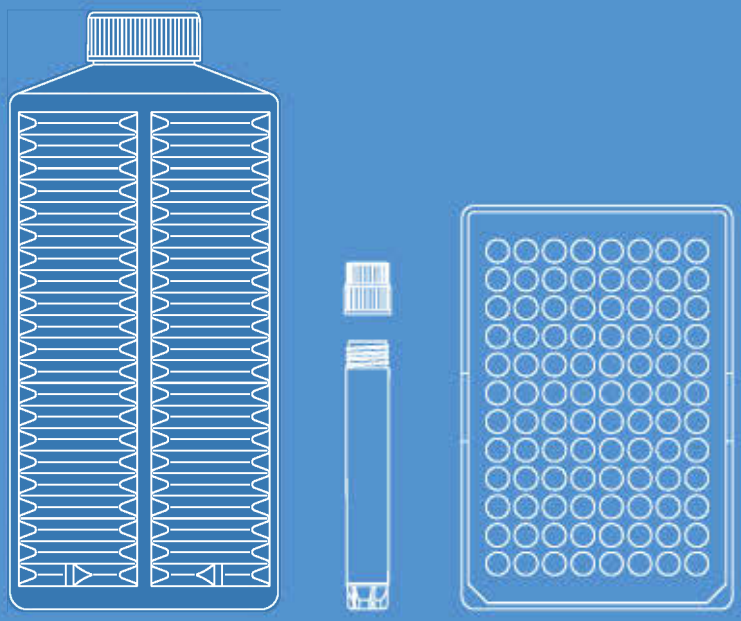
Your Power for Health

greiner bio-one

UK Catalogue BioScience



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