



2012/2013

Products and
Applications
for the
Laboratory

eppendorf



In touch with life

Welcome to Eppendorf!

As a leading company in the area of life sciences, we would like to welcome you to our world of products. This year we have once again extended our comprehensive product portfolio. In addition to our classic range of products, our 2012 catalog features a series of new high-quality products and technologies.

Ever since Eppendorf was founded 66 years ago, the company has been a premium supplier for devices, systems and consumables in all aspects of work and research in the lab. We maintain close contact with research developments in the area of life sciences worldwide. Our knowledge of our customers needs and requirements combined with our technical know how guarantee that our products will always give you the best possible support in your research.

But our support does not end with the delivery of an Eppendorf product. With epServices, we have developed a comprehensive training and service program for you. And our applications hotline is available to customers around the clock. See pages 50, 100, 108, 146, 206, 234, 248 and 309 for more information.

True to our holistic company philosophy, we at Eppendorf also take our social responsibility for the environment very seriously. With epGreen, we identify the environmental impact caused

by our actions and develop strategies to reduce, or completely eliminate it. The focus of our efforts is the sustainability over the entire life cycle of our products: from the product idea to manufacturing, shipment, application, maintenance and the disposal of old equipment.

The premium quality, the comprehensive service and a company philosophy that is based on the principles of sustainability give you and us the security of knowing that you can always rely on your Eppendorf products.

If you have any questions or suggestions please do not hesitate to contact your local Eppendorf representative. See pages 482-491 for complete contact information. Enjoy exploring a wide range of products in the Eppendorf world!

Eppendorf – In touch with life



Dr. Dirk Ehlers
Chairman of the Board

Liquid
HandlingSample
HandlingCell
Handling

- To make navigation easier, Eppendorf's three areas of competence are reflected in the color index of the catalog sections.

In touch with life

Eppendorf quality products

How to optimize your research

Accuracy, reliability, experience, innovation — characteristics that customers all over the world associate with Eppendorf. This excellent reputation is the result of 66 years of commitment to provide the best solutions for handling valuable samples in Life Science research. Whether it is a new technology or developing an existing product further — every detail is considered, taking users' requirements into account. We are in close contact with our customers and therefore know their daily problems. With the combination of knowing customers' requirements, technical expertise and high-tech manufacturing methods Eppendorf can supply quality products which provide optimum support to scientists for achieving their goals. The wide range of Eppendorf products covers three areas of expertise: Liquid Handling, Sample Handling and Cell Handling.

Eppendorf Sample Handling

Since 1950, when the first photometer was introduced, Eppendorf has been leading in the field of Sample Handling. High-quality devices for centrifugation, heating, cooling, freezing and mixing are complemented by a wide range of consumables such as the Eppendorf micro test tube ("Eppi"). We have been using our experience in plastics technology to develop a number of laboratory consumables in different biological purity grades. With our high-grade quality assurance and optimum material selection we can guarantee reliable results with maximum accuracy.

Eppendorf Liquid Handling

Accurate, reliable, ergonomic and with an award-winning design: perfection is in the detail. This applies to our manual pipettes and dispensers just as much as to our automatic *epMotion* pipetting system and the matching pipette tips. With more than 50 years of experience in Liquid Handling and by using the latest manufacturing methods we will guarantee the quality you require with our premium products.

Eppendorf Cell Handling

For more than 30 years Eppendorf have been developing devices for the micro manipulation and electroporation of cells. New Brunswick Scientific, the latest member of the Eppendorf group has 60 years of experience in Cell Handling and complements our product portfolio perfectly with its shakers, CO₂ incubators, fermenters and bioreactors for the cultivation and multiplication of cells. Our development engineers work closely with researchers in laboratories worldwide. This is how we can guarantee optimum solutions for your requirements.

And if there are any questions?

Eppendorf offers more than premium products. Comprehensive customer support around the clock and an excellent service also form part of the Eppendorf concept. Eppendorf's competent and experienced personnel will accompany you every step of the way - from the selection of the product to support for the application and maintenance for your device. We will also support you with the integration of your Eppendorf products to ensure maximum accuracy and reliability of your results.

The three competence areas of Eppendorf

- Manual pipettes
- Electronic pipettes
- Pipette tips
- Combitips
- Dispenser
- Burettes
- Automated pipetting systems
- Calibration software

Liquid
Handling

eppendorf

Cell
Handling

Sample
Handling

- Electroporators
- Electroporation cuvettes
- Cell fusion chambers
- Micromanipulators
- Microinjectors
- Capillaries
- Biological shakers
- CO₂ Incubators
- Fermentors/bioreactors

- Plates and reaction tubes
- Mixers
- Temperature control systems
- Centrifuges
- PCR Thermocyclers
- PCR plates and tubes
- Photometers
- Cuvettes
- ULT Freezers

Eppendorf
PiezoXpert



NEW!
Page 288

NEW!

Page 236
and 244



Eppendorf BioSpectrometer
and Reference filter set

In touch with life

NEW! Page 214



Eppendorf
Mastercycler nexus

Eppendorf innovations 2012

Eppendorf PiezoXpert

The new star of our Cell Technology product portfolio is the ideal complement for a wide variety of micromanipulation or microinjection techniques in which additional force is needed to perforate cell membranes. The Eppendorf PiezoXpert is used for piezo-assisted micromanipulation and facilitates easy perforation of cells for subsequent microinjection or manipulation.

The penetration into cells is supported by piezo impulses that are directly and without loss transmitted onto the attached microcapillary. Intuitive operation and a wide adjustment range ensure best performance and reproducible work.

Additional information available on page 288

Eppendorf Mastercycler Nexus

The Mastercycler nexus is exactly that. It brings the reliability and ease of use of an Eppendorf cyclers at an affordable price. Low energy consumption, easy expansion to 3 units and a small footprint make it not only fit to your budget, but also to your precious lab space.

Due to the flexlid™ concept, the cyclers can deal with all types of PCR consumables, from low volume all the way up to 0.5 mL PCR tubes. Of course, all common PCR plates fit – and if your throughput becomes even higher, you can just connect one or two Mastercycler nexus eco to your Mastercycler nexus.

Additional information available on page 214

Eppendorf BioSpectrometer

Eppendorf's new BioSpectrometer redefines the bench-mark for spectrometry in modern laboratories. Never before has Eppendorf had such a small device with such a wide range of applications along with simple operation and high capability and accuracy.

Measure and record UV/Vis spectral ranges or just measure individual wavelengths from 200 nm to 830 nm. The freely selectable wavelengths provide maximum flexibility for all current and future applications. The BioSpectrometer software is based on an operation concept which has been awarded for its innovative technology and user-friendly design.

Additional information available on page 236

BioSpectrometer Reference filter set

The secondary UV/Vis reference filter set is for checking photometric and wavelength systematic errors in accordance with NIST (National Institute of Standards and Technology, Gaithersburg MD, USA).

It can be used both with the BioSpectrometer basic and the BioSpectrometer kinetic.

Additional information available on page 244

...and further novelties by Eppendorf

Eppendorf Concentrator plus

With its excellent functions and simple operation, the new Eppendorf Concentrator stands out from the competition. It features an LCD display, increased capacity, new design and a user-friendly control panel with clearly arranged function keys. The complete "connection" system offers new functions and more flexibility than ever before. This means that the integrated vacuum pump can also be used separately, without being dismantled from the system. Simply connect the port to the external device (e.g., gel dryer).

Additional information available on page 202

epMotion GxP system solution

The epMotion GxP system solution has been specially developed for automated pipetting, for regulated areas such as pharmaceutical processes and CLIA certified laboratories and in accordance with GLP, GAMP 5 and 21 CFR Part 11 regulations. The solution is made up of the automated epMotion pipetting system, software and services, which are specially designed to significantly reduce qualification and process validation procedures. Important features include electronic documentation, access control, audit trail and log file, revision management, electronic signatures, exporting and archiving of digitally signed documents, and much more. The GxP solution is also available as an upgrade set for previously installed epMotion PC versions.

Special features:

- Compliant with 21 CFR Part 11, 58, 211 and 820, GLP and GMP
- Validated complete solution with special range of services
- Electronic documentation and signatures
- User access control and secure database system

Additional information available on page 98

epT.I.P.S. Motion Reloads

Thanks to color-coded trays and a flexible packaging system, the epT.I.P.S. Motion now offer an even safer and more intelligent automated pipetting on the epMotion. As an Eco-friendly option, epT.I.P.S. Motion are also now available as a Reload-System.

Special features:

- Color-coded trays for easy volume identification
- Available in various purity levels
- Easy to replace; labware files are automatically detected
- Also available as reload system
- Simple system conversion with TipHolder adapter
- TipHolders can be autoclaved
- Up to 40 % waste prevention possible

Additional information available on page 99

NEW!



**Eppendorf
Concentrator plus**

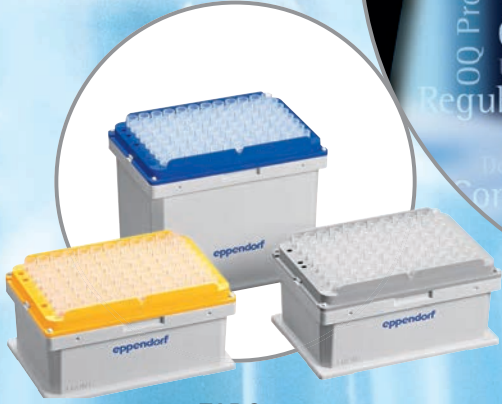


Rotor F-35-6-30

In touch with life

NEW! Page 98

**epT.I.P.S.
Motion Reloads**



**epT.I.P.S.
Motion Reloads**



**epMotion GxP
system solution**



In touch with life

Eppendorf and the environment

Eppendorf recognizes its responsibility as a global citizen. We have a long history as a socially responsible organization, consistently supporting education and research through research awards, product donations and more. Protecting the environment is critical to the conservation of precious natural resources and the continued health of our planet.

The Eppendorf epGreen initiative is another example of our commitment to social responsibility.

Our goal with epGreen is to constantly reduce the environmental impact of our business operations and the products that we produce. Environmental considerations have become more and more important in our business as we look for new ways to support our commitment to the environment – from product/packaging design, manufacturing and marketing, to customer product use and eventually trade-in or disposal.

Further information on page 444.



epServices: You can rely on us

You will never feel unattended after purchasing a product by Eppendorf. With epServices, we provide you with a comprehensive customer service package. We ensure that you can always rely on your Eppendorf device.

Our global certification services ensure the compliance with legal guidelines and standards. Standardized working provides for an uncomplicated validation of your System, from the implementation to the shut down. Be ensured that, thanks to the regular inspection, calibration and service performed by our trained service technicians, your precision instruments will continuously achieve repeatable results. As a matter of course, our customer hotline helps you with applicatory questions at any time.

For further information, please visit:
www.eppendorf.com/epservices

Eppendorf Training Center

Optimally serviced premium products alone do not provide for reliable results. The operator's experience is just as important. With the Eppendorf Training Center, you can extend your knowledge and, thus, assure your professional future. In the easy to understand and active environment of our practice-oriented seminars, you will learn the operation of our devices. Our experienced application specialists will support you in small groups. Learn something new or brush up your knowledge. You will receive a certificate for successful participation.

For further information, please visit:
www.eppendorf.com/etc



epServices
for premium performance

In touch with life



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Our lab team is performing a nucleic acid purification into an Eppendorf deepwell plate with the new electronic multi-channel pipette Eppendorf Xplorer. The intuitive operating concept of the new pipette stands for easy handling while at the same time maintaining the highest efficiency standards. Individually adjustable parameters ensure optimal conditions for dispensing and subsequent automated mixing of the solutions in the individual wells. Fatigue-free work and consistent full control guarantee maximum reproducible results.

A photograph of a laboratory bench with various pieces of equipment. In the foreground, several white manual pipettes are mounted on a stand. To the right, a white computer mouse is visible. In the background, there are more pipettes and dispensers on a shelf. A large blue circle is overlaid on the right side of the image, containing the title '1. Liquid Handling'.

1. Liquid Handling

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Summary of applications

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Pipetting, standard application	epT.I.P.S.®	54
Tips for workstation	epT.I.P.S.® Motion	105
Standard application	epT.I.P.S.® Motion	105
Reference to pipette/tip combination		67
Reference to purity quality		52
<p>The preceding table shows a selection of particular applications from Pipetting/Dispensing and serves as an overview. The complete product portfolio is found on the following pages.</p> <p>A selection of products, shown on the following pages, can be provided as Customized Solutions. Further information on page 411.</p> <p>Sign up now for ep-points, the Eppendorf Bonus Points program, and get your first 50 ep-points for free! Ep-points labels are to be found, for instance, on the inside of the packages of Eppendorf tubes and pipette tips. Collect these points and get attractive bonus products at www.ep-points.com.</p>		

**Eppendorf epGreen Initiative**

- Eppendorf pipettes and dispensers are made of inoffensive and harmless materials. Instead of wet varnish, they receive environmentally friendly powder coating.
- Eppendorf tips are produced with optimized molds using closed water circulation. Basically no external water is needed or consumed. Excess plastic that accompanies every molding process has been significantly reduced. No lubricants are used during the manufacturing of epT.I.P.S. pipette tips.
- The environmentally friendly epT.I.P.S. refill system significantly reduces packaging waste.
- The lubricant consumption during the pipette production has been reduced over 50 % in the last few years and all swarf (metal and plastic) is collected and recycled.
- Our electronic pipettes and dispensers are provided with modern energy-saving technologies, e.g. lithium-ion

batteries and a highly efficient standby mode.

- We introduced highly efficient Automated Pipetting Systems with a power consumption between 70 W and 270 W, which is significantly lower than the power consumption of most competitor units.

For an overview on Eppendorf epGreen, see page 10 or Appendix page 444.



Product selection guide for Pipetting/Dispensing

		Volumes 0.1-1,250 µL			
		Instruments	Page	Consumables	Page
Aqueous solutions	one-time dispensing	Eppendorf Research® plus	33	epT.I.P.S.®	56
		Eppendorf Xplorer®	45	epT.I.P.S.®	56
		Eppendorf Reference®	40	epT.I.P.S.®	56
		Biomaster®	68	Mastertip®	68
		Multipette stream®	71	Combitips plus®	70
		Multipette Xstream®	71	Combitips plus®	70
		epMotion®	80	epT.I.P.S.® Motion	105
		Easypet®	77		
	multiple dispensing	Eppendorf Xplorer®	45	epT.I.P.S.®	56
		Multipette® plus	72	Combitips plus®	70
		Multipette stream®	71	Combitips plus®	70
		Multipette Xstream®	71	Combitips plus®	70
		epMotion®	80	epT.I.P.S.® Motion	105
Liquids with high vapor pressure and/or high viscosity	one-time dispensing	Biomaster®	68	Mastertip®	68
		Multipette stream®	71	Combitips plus®	70
		Multipette Xstream®	71	Combitips plus®	70
	multiple dispensing	Multipette® plus	72	Combitips plus®	70
		Multipette stream®	71	Combitips plus®	70
		Multipette Xstream®	71	Combitips plus®	70

		Volumes up to 25 mL			
		Instruments	Page	Consumables	Page
Aqueous solutions	one-time dispensing	Multipette stream®	71	Combitips plus®	70
		Multipette Xstream®	71	Combitips plus®	70
		Easypet®	77		
	multiple dispensing	Multipette stream®	71	Combitips plus®	70
Multipette Xstream®		71	Combitips plus®	70	
Liquids with high vapor pressure and/or high viscosity	one-time dispensing	Multipette stream®	71	Combitips plus®	70
		Multipette Xstream®	71	Combitips plus®	70
	multiple dispensing	Multipette stream®	71	Combitips plus®	70
		Multipette Xstream®	71	Combitips plus®	70

Product selection guide for Pipetting/Dispensing

Volumes 1,250-2,500 µL				Volumes 2.5-10 mL			
Instruments	Page	Consumables	Page	Instruments	Page	Consumables	Page
Multipette stream®	71	Combitips plus®	70	Eppendorf Research® plus	33	epT.I.P.S.®	56
Multipette Xstream®	71	Combitips plus®	70	Eppendorf Xplorer®	45	epT.I.P.S.®	56
Varipette®	69	Varitip P und S	69	Multipette stream®	71	Combitips plus®	70
Easypet®	77			Multipette Xstream®	71	Combitips plus®	70
				Varipette®	69	Varitip P, Varitip S	69
				Easypet®	77		
Multipette® plus	72	Combitips plus®	70	Eppendorf Xplorer®	45	epT.I.P.S.®	56
Multipette stream®		Combitips plus®	70	Multipette® plus	72	Combitips plus®	70
Multipette Xstream®	71	Combitips plus®	70	Multipette stream®	71	Combitips plus®	70
	71			Multipette Xstream®	71	Combitips plus®	70
Multipette stream®	71	Combitips plus®	70	Multipette stream®	71	Combitips plus®	70
Multipette Xstream®	71	Combitips plus®	70	Multipette Xstream®	71	Combitips plus®	70
Varipette®	69	Varitip P und S	69	Varipette®	69	Varitip P, Varitip S	69
Multipette® plus	72	Combitips plus®	70	Multipette® plus	72	Combitips plus®	70
Multipette stream®	71	Combitips plus®	70	Multipette stream®	71	Combitips plus®	70
Multipette Xstream®	71	Combitips plus®	70	Multipette Xstream®	71	Combitips plus®	70

Volumes up to 50 mL				Volumes up to 100 mL			
Instruments	Page	Consumables	Page	Instruments	Page	Consumables	Page
Multipette stream®	71	Combitips plus®	70				
Multipette Xstream®	71	Combitips plus®	70				
Easypet®	77			Easypet®	77		
Multipette stream®	71	Combitips plus®	70	Varispenser® + Varisp.® plus	78		
Multipette Xstream®	71	Combitips plus®	70	Top Buret™	79		
Multipette stream®	71	Combitips plus®	70				
Multipette Xstream®	71	Combitips plus®	70				
Multipette stream®	71	Combitips plus®	70				
Multipette Xstream®	71	Combitips plus®	70				

The Invention Was Not Enough! Over 50 years of pipetting – Still making history

1958

- Patent of the first piston stroke pipette handed in

1961

1964

- 3110 Marburg

1970

- First industrial manufactured piston stroke pipette "Marburg"

1976

- Eppendorf Comforpette 4700 (with combined control button and ejector)

1979

- Eppendorf 3130
- First handheld repetitive dispenser Eppendorf Multipette / Repeater
- Varipette 4780

1990

- Varipette 4720 (first completely autoclavable pipette)

1991

- Eppendorf Unipette 3190

1994

- Biomaster 4830
- Eppendorf Reference 4910

The Invention Was Not Enough! Over 50 years of pipetting – Still making history

The timeline features a dark blue background with a white wave-like shape. Various pipette models are shown in circular callouts, with their respective years and descriptions. The models include the Titerman 4908 (1995), Multipette plus 4981 (1998), Multipette plus (1996), Eppendorf Research pro (1999), PhysioCare Concept (2003), Multipette stream/Xstream (2006), Eppendorf Research plus (2009), and Eppendorf Xplorer (2010).

- Multipette plus with automatic Combitip recognition
- Research 3110
- Electronic pipette Eppendorf Research pro
- New electronic dispensers Multipette stream/Xstream
- Newest generation of electronic pipette Eppendorf Xplorer
- Eppendorf Titerman 4908, first multichannel pipette
- First electronic dispenser Eppendorf Multipette pro
- Multipette plus 4981
- Eppendorf PhysioCare Concept® – a new standard for integrated liquid handling systems and work processes
- Newest generation of manual pipette Eppendorf Research plus

Make your lab a better place.

The Eppendorf PhysioCare Concept (PCC):



The more strain you experience, the less energy you have. And because energy is a very precious and exhaustible resource, we try to use it as efficiently as possible. Thus, we have reduced the operating forces and the weight considerably.

This is the Eppendorf PhysioCare Concept: rather than focusing on one specific product feature, it always offers a holistic solution. This is just possible because the development of each product is always based on the requirements of three spheres.

These spheres are directly involved in the users work processes;

Sphere 1 | The User

Sphere 2 | The Lab

Sphere 3 | The Working Environment

A holistic solution for improved work processes

Sphere 1 | The User


- The PhysioCare concept guarantees ergonomic design and optimized product alignment to the needs of the individual

Sphere 2 | The lab

- The PhysioCare concept allows the uncomplicated integration of instrument in the lab and its specific requirements

Sphere 3 | The Working Environment

- The PhysioCare concept ensures general support to enhance processes around the lab and improve the results of the whole company

 For more information go to www.physiocare-concept.info



Sphere 1 | The User

The direct impact of the product on the user is Eppendorf's foremost concern. Thus, Eppendorf's products are optimized to show

- outstanding ergonomics
- superior ease of use
- very precise handling

Especially with hand held devices like pipettes, the user should benefit from low weight, low operation forces and optimal control button positioning.

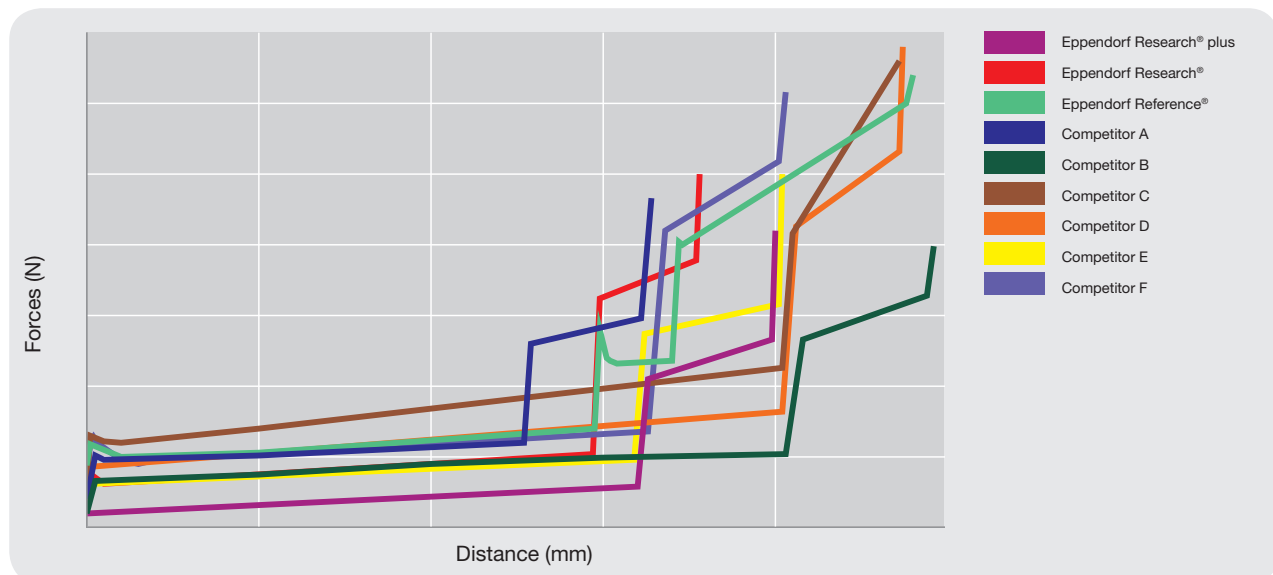
A user should never be forced to make unnatural movements or to stress certain muscles or parts of the body excessively. Thus, sphere 1 aims at the most important thing — your everyday health and well-being.

Reduce your stress

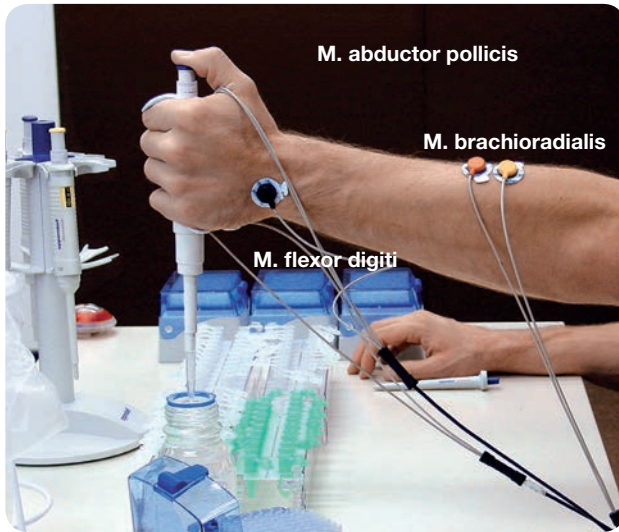
Unlike other pipettes and hand dispensers that force an unnatural hand position during the pipetting process, Eppendorf PCC pipettes are designed to sit effortlessly in your hand. The easy-to-grip handle and well-placed operating buttons, combined with a perfectly positioned hand rest, ensure a comfortable fit. In our comparison tests with similar commercially available pipettes, the Eppendorf PCC manual models required up to 50 % less force to operate. We attribute this to our innovative mechanisms and specially developed precision components, such as special springs, guides and seals, which contribute to the overall ergonomic design.

Comparison of pipetting forces without tip ejection

Manual single-channel pipettes 100–1,000 µL



* Eppendorf AG, Quality Assurance; data determined using Zwick force transducer Zwick/Roell model Z005.



Ergonomic studies during pipette development

Sphere 2 | The Lab

PhysioCare does not end at your fingertips. The right storage and easy accessibility of your pipette helps to make your workflow easy and effective — as does the color coding of the different volumes. Eppendorf also offers various fully autoclavable pipettes — to keep your lab and your hands free from contamination! Sometimes small differences like an easily identifiable color coding make a big change if you have to work with your pipette every day.

Sphere 3 | The Working Environment

Is the reproducibility to your results important for you? Would you like to use a calibrated and reliable pipette? Do you think documentation is necessary? Do you want to optimize your workflow? Would you like to learn more about pipetting? If so, please contact us and learn more about the extensive Eppendorf support:

E-mail: support@eppendorf.com

Phone: +49 (0)1803 666789

Weight comparison (in g)

of adjustable, single-channel, manual pipettes

Competitor	Model	Serial-no.	Weight (g)
0,5 – 10 µl			
Eppendorf	Research plus	3117838	77
Eppendorf	Research	1981304	87
Eppendorf	Reference	4768963	87
Competitor 5			104
Competitor 6			94
Competitor 2			96
Competitor 3			97
Competitor 4			87
10 – 100 µl			
Eppendorf	Research plus	3116728	76
Eppendorf	Research	1016224	85
Eppendorf	Reference	4776783	87
Competitor 5			102
Competitor 6			99
Competitor 2			102
Competitor 3			99
Competitor 4			84
100 – 1000 µl			
Eppendorf	Research plus	4131358	80
Eppendorf	Research	1040374	96
Eppendorf	Reference	2440984	99
Competitor 5			125
Competitor 6			122
Competitor 2			119
Competitor 3			128
Competitor 4			91

Data: Eppendorf AG, Quality assurance; determined with Sartorius® scale BL-1.00S. Errors and technical changes may occur.

➔ For pipette service and maintenance information, see page 50; Pipette tips information begins on page 53.

Research® plus fixed-volume, adjustable-volume and multichannel pipettes



reddot design award

CE
IVD*



Description

An Eppendorf Research plus pipette is of extremely low weight! This can only be achieved by using the most advanced materials and production processes, including the new Eppendorf PerfectPiston® system, made of Fortron®. Fortron is an organic polymer with impressive characteristics. It is highly resistant to heat, acids and alkalis, mildew, bleaches, aging, sunlight and abrasion. It absorbs only small amounts of solvents and resists dyeing. This means your pipette is safe, robust and ultra light.

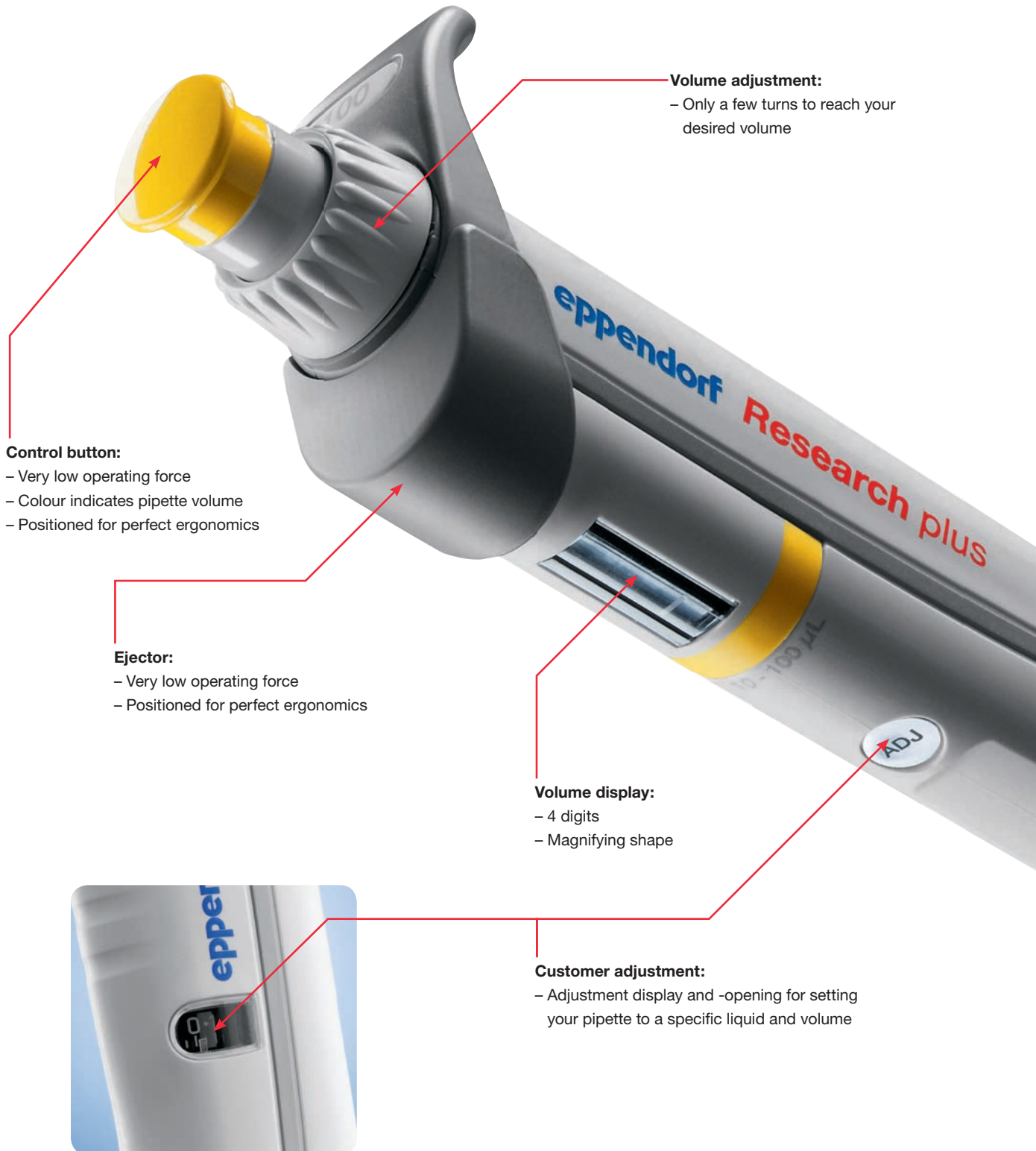
Product features

- Volume adjustment:
 - Only a few turns to reach your desired volume
- Control button:
 - Very low operating force
 - Colour indicates pipette volume
 - Positioned for perfect ergonomics
- Ejector:
 - Very low operating force
 - Positioned for perfect ergonomics
- Volume display:
 - 4 digits
 - Magnifying shape
- Eppendorf PerfectPiston® system:
 - Ultra light system made of Fortron®
- Quick connection clip:
 - Remove lower part easily

Fortron is a registered trademark of Fortron Industries

➔ For pipette service and maintenance information, see page 50; Pipette tips information begins on page 53.

Research® plus fixed-volume, adjustable-volume and multichannel pipettes

**Control button:**

- Very low operating force
- Colour indicates pipette volume
- Positioned for perfect ergonomics

Ejector:

- Very low operating force
- Positioned for perfect ergonomics

Volume adjustment:

- Only a few turns to reach your desired volume

Volume display:

- 4 digits
- Magnifying shape

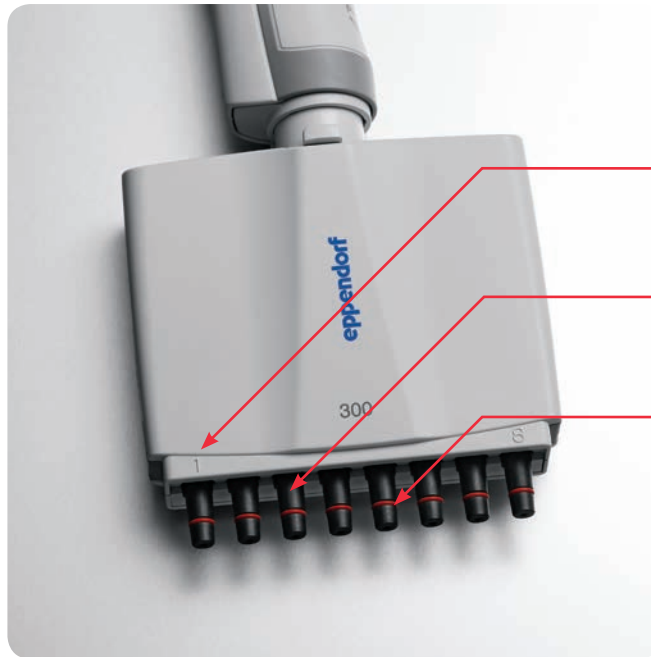
Customer adjustment:

- Adjustment display and -opening for setting your pipette to a specific liquid and volume

Research® plus fixed-volume, adjustable-volume and multichannel pipettes



CE
IVD*

**Channel indicator:**

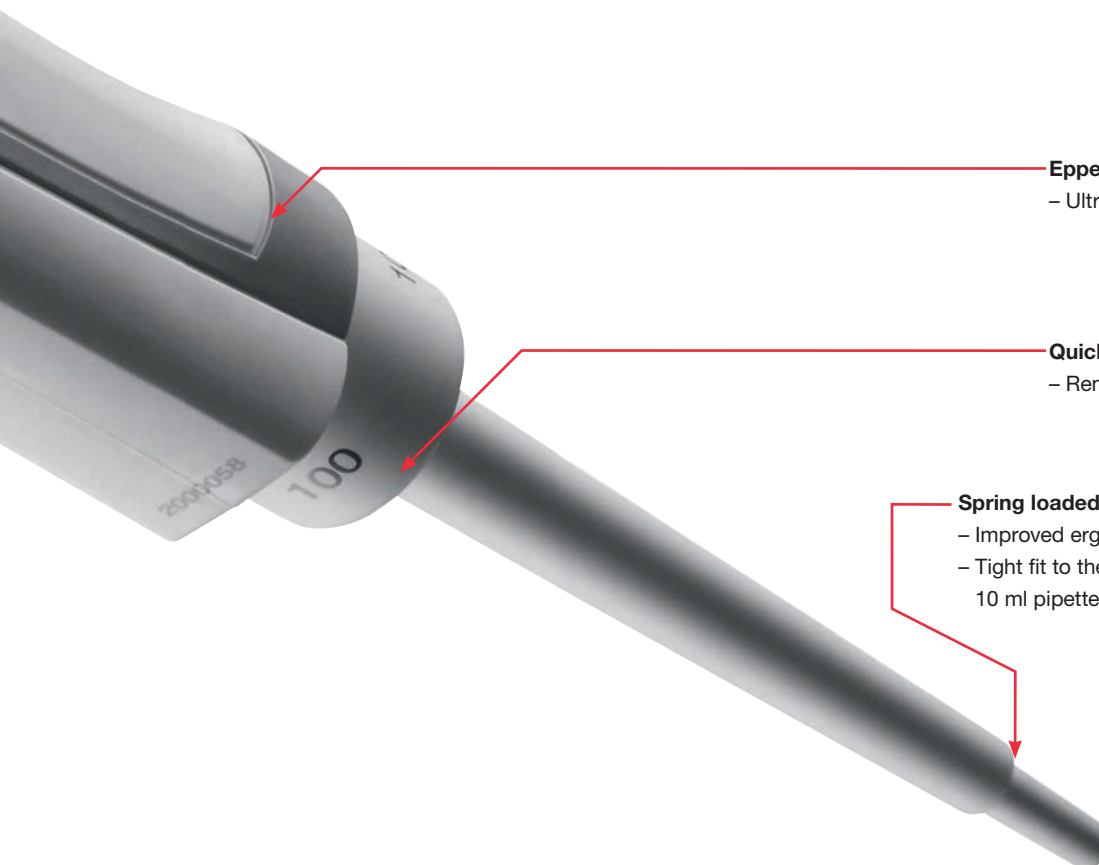
- Use the pipette the same way round
- all the time

Remove any of the independent channels:

- Gain flexibility for individual needs

Spring loaded tip cone:

- Improved ergonomics
- Tight fit to the tip

**Eppendorf PerfectPiston® system:**

- Ultra light system made of Fortron®

Quick connection clip:

- Remove lower part easily

Spring loaded tip cone:

- Improved ergonomics
- Tight fit to the tip (not in 5 ml and 10 ml pipettes)

Fortron is a registered trademark of Fortron Industries

Research® plus fixed-volume, adjustable-volume and multichannel pipettes



Ordering information: Eppendorf Research® plus

Model	Volume range	Volume	Systematic error* ¹	Random error* ¹	Order no.			
Single-channel pipette, adjustable-volume								
Dark gray dispensing button, for use with 10 µL pipette tips								
	0.1–2.5 µL	0.1 µL 0.25 µL 1.25 µL 2.5 µL	±48.0 % ±12.0 % ±2.5 % ±1.4 %	±0.048 µL ±0.03 µL ±0.031 µL ±0.035 µL	±12.0 % ±6.0 % ±1.5 % ±0.7 %	±0.012 µL ±0.015 µL ±0.019 µL ±0.018 µL	3120 000.011	
Gray dispensing button, for use with 20 µL pipette tips								
	0.5–10 µL	0.5 µL 1 µL 5 µL 10 µL	±8.0 % ±2.5 % ±1.5 % ±1.0 %	±0.04 µL ±0.025 µL ±0.075 µL ±0.1 µL	±5.0 % ±1.8 % ±0.8 % ±0.4 %	±0.025 µL ±0.018 µL ±0.04 µL ±0.04 µL	3120 000.020	
Gray dispensing button, for use with 20 µL L pipette tips								
	2–20 µL	2 µL 10 µL 20 µL	±5.0 % ±1.2 % ±1.0 %	±0.1 µL ±0.12 µL ±0.2 µL	±1.5 % ±0.6 % ±0.3 %	±0.03 µL ±0.06 µL ±0.06 µL	3120 000.097	
Yellow dispensing button, for use with 200 µL pipette tips								
	2–20 µL	2 µL 10 µL 20 µL	±5.0 % ±1.2 % ±1.0 %	±0.1 µL ±0.12 µL ±0.2 µL	±1.5 % ±0.6 % ±0.3 %	±0.03 µL ±0.06 µL ±0.06 µL	3120 000.038	
	10–100 µL	10 µL 50 µL 100 µL	±3.0 % ±1.0 % ±0.8 %	±0.3 µL ±0.5 µL ±0.8 µL	±1.0 % ±0.3 % ±0.2 %	±0.1 µL ±0.15 µL ±0.2 µL	3120 000.046	
	20–200 µL	20 µL 100 µL 200 µL	±2.5 % ±1.0 % ±0.6 %	±0.5 µL ±1.0 µL ±1.2 µL	±0.7 % ±0.3 % ±0.2 %	±0.14 µL ±0.3 µL ±0.4 µL	3120 000.054	
Orange dispensing button, for use with 300 µL pipette tips								
	30–300 µL	30 µL 150 µL 300 µL	±2.5 % ±1.0 % ±0.6 %	±0.75 µL ±1.5 µL ±1.8 µL	±0.7 % ±0.3 % ±0.2 %	±0.21 µL ±0.45 µL ±0.6 µL	3120 000.100	
Blue dispensing button, for use with 1,000 µL pipette tips								
	100–1,000 µL	100 µL 500 µL 1,000 µL	±3.0 % ±1.0 % ±0.6 %	±3.0 µL ±5.0 µL ±6.0 µL	±0.6 % ±0.2 % ±0.2 %	±0.6 µL ±1.0 µL ±2.0 µL	3120 000.062	
Violet dispensing button, for use with 5 mL pipette tips								
	0.5–5 mL	0.5 mL 2.5 mL 5 mL	±2.4 % ±1.2 % ±0.6 %	±0.012 mL ±0.03 mL ±0.03 mL	±0.6 % ±0.25 % ±0.15 %	±0.003 mL ±0.006 mL ±0.008 mL	3120 000.070	
Turquoise dispensing button, for use with 10 mL pipette tips								
	1–10 mL	1 mL 5 mL 10 mL	±3.0 % ±0.8 % ±0.6 %	±0.03 mL ±0.04 mL ±0.06 mL	±0.6 % ±0.2 % ±0.15 %	±0.006 mL ±0.01 mL ±0.015 mL	3120 000.089	

*¹ The data for random error and systematic error according to EN ISO 8655 is valid only when original Eppendorf® pipette tips are used.

Research® plus fixed-volume, adjustable-volume and multi-channel pipettes



Ordering information: Eppendorf Research® plus

Model	Volume range	Volume	Systematic error*1	Random error*1	Order no.		
Multi-channel pipette, adjustable-volume							
Gray dispensing button, for use with 20 µL pipette tips							
8-channel	0.5–10 µL	0.5 µL	±12.0 %	±0.06 µL	±8.0 %	±0.04 µL	3122 000.019
		1 µL	±8.0 %	±0.08 µL	±5.0 %	±0.05 µL	
12-channel		5 µL	±4.0 %	±0.2 µL	±2.0 %	±0.1 µL	3122 000.027
		10 µL	±2.0 %	±0.2 µL	±1.0 %	±0.1 µL	
Yellow dispensing button, for use with 200 µL pipette tips							
8-channel	10–100 µL	10 µL	±3.0 %	±0.3 µL	±2.0 %	±0.2 µL	3122 000.035
		50 µL	±1.0 %	±0.5 µL	±0.8 %	±0.4 µL	
12-channel		100 µL	±0.8 %	±0.8 µL	±0.3 %	±0.3 µL	3122 000.043
Orange dispensing button, for use with 300 µL pipette tips							
8-channel	30–300 µL	30 µL	±3.0 %	±0.9 µL	±1.0 %	±0.3 µL	3122 000.051
		150 µL	±1.0 %	±1.5 µL	±0.5 %	±0.75 µL	
12-channel		300 µL	±0.8 %	±1.8 µL	±0.3 %	±0.9 µL	3122 000.060
Accessories							
Reagent Reservoir , autoclavable reservoir for reagent takup with multichannel pipette, filling volume 50-60 mL, 1 set = 10 pcs.						0030 058.607	

*1 The data for random error and systematic error according to EN ISO 8655 is valid only when original Eppendorf® pipette tips are used.

Ordering information: Eppendorf Research® plus

Model	Volume range	Systematic error*1	Random error*1	Order no.		
Single-channel pipette, fixed volume						
Gray dispensing button, for use with 20 µL pipette tips						
	10 µL	±1.2 %	±0.12 µL	±0.6 %	±0.06 µL	3121 000.015
Gray dispensing button, for use with 20 µL L pipette tips						
	20 µL	±0.8 %	±0.16 µL	±0.3 %	±0.06 µL	3121 000.031
Yellow dispensing button, for use with 200 µL pipette tips						
	10 µL	±1.2 %	±0.12 µL	±0.6 %	±0.06 µL	3121 000.023
	20 µL	±1.0 %	±0.2 µL	±0.3 %	±0.06 µL	3121 000.040
	25 µL	±1.0 %	±0.25 µL	±0.3 %	±0.08 µL	3121 000.058
	50 µL	±0.7 %	±0.35 µL	±0.3 %	±0.15 µL	3121 000.066
	100 µL	±0.6 %	±0.6 µL	±0.2 %	±0.2 µL	3121 000.074
	200 µL	±0.6 %	±1.2 µL	±0.2 %	±0.4 µL	3121 000.082
Blue dispensing button, for use with 1,000 µL pipette tips						
	200 µL	±0.6 %	±1.2 µL	±0.2 %	±0.4 µL	3121 000.090
	250 µL	±0.6 %	±1.5 µL	±0.2 %	±0.5 µL	3121 000.104
	500 µL	±0.6 %	±3.0 µL	±0.2 %	±1.0 µL	3121 000.112
	1,000 µL	±0.6 %	±6.0 µL	±0.2 %	±2.0 µL	3121 000.120

*1 The data for random error and systematic error according to EN ISO 8655 is valid only when original Eppendorf® pipette tips are used.

Eppendorf Research® plus 3-Pack



Description

Look forward to triple pipetting fun with one of the world's most advanced pipettes – in the economical triple pack in three variations. Ready for immediate use with matching Eppendorf pipette tips – for optimal user comfort and highest precision.

Eppendorf Research plus 3-Pack includes:

- **Option 1:**
3 pipettes Eppendorf Research plus (0.5-10 μ L, 10-100 μ L, 100-1,000 μ L), 3 x 96 epT.I.P.S. pipette tips in refill boxes! 1 pipette pen!
- **Option 2:**
3 pipettes Eppendorf Research plus (2-20 μ L yellow, 20-200 μ L, 100-1,000 μ L), 3 x 96 epT.I.P.S. pipette tips in refill boxes, 1 pipette pen!
- **Option 3:**
3 pipettes Eppendorf Research plus (1,000 μ L, 5 mL, 10 mL), 1 x 96 epT.I.P.S. pipette tips, refill box 1,000 μ L, 1 sample bag 5 mL, 1 sample bag 10 mL! 1 pipette pen!



Ordering information

Description	Order no.	
Eppendorf Research plus 3-Pack, Option 1	3120 000.909	
Eppendorf Research plus 3-Pack, Option 2	3120 000.917	
Eppendorf Research plus 3-Pack, Option 3	3120 000.925	

➔ For pipette service and maintenance information, see page 50; Pipette tips information begins on page 53.

ep Reference³™ Pack**Description**

Comfortable, high precision pipetting is the result of perfect teamwork between the pipette and tip. Why not rely upon the unbeatable team of Eppendorf Reference pipettes and epT.I.P.S. pipette tips? Now conveniently available as ep Reference³ Pack at a special price that's too good to miss!

**ep Reference³ Pack includes:**

- **Option 1:**
3 Eppendorf Reference[®] PhysioCare Concept[®] pipettes (0.5-10 µL, 10-100 µL, 100-1,000 µL); 3 refillable epT.I.P.S. pipette tips boxes with 96 tips each
- **Option 2:**
3 Eppendorf Reference[®] PhysioCare Concept pipettes (2-20 µL yellow, 50-200 µL, 100-1,000 µL); 3 refillable epT.I.P.S. pipette tips boxes with 96 tips each

Ordering information

Description	Order no.	
ep Reference ³ Pack, Option 1	4910 000.506	
ep Reference ³ Pack, Option 2	4910 000.514	

i Further information under www.eppendorf.com/reference

Eppendorf Reference® fixed-volume and adjustable-volume pipettes



- User-friendly
- User-tested
- Ergonomic



Ordering information: Eppendorf Reference, fixed-volume

Model	Volume range	Systematic error*1	Random error*1	Order no.			
Gray operating button, for use with 20 µL pipette tips or GELoader Tip							
	1 µL	±2.5 %	±0.025 µL	±1.8 %	±0.018 µL	4900 000.010	
	2 µL	±2.0 %	±0.04 µL	±1.2 %	±0.024 µL	4900 000.028	
	5 µL	±1.5 %	±0.075 µL	±0.8 %	±0.04 µL	4900 000.036	
	10 µL	±1.0 %	±0.1 µL	±0.5 %	±0.05 µL	4900 000.044	
Yellow operating button, for use with 200 µL pipette tips							
	10 µL	±1.0 %	±0.1 µL	±0.5 %	±0.05 µL	4900 000.109	
	20 µL	±0.8 %	±0.16 µL	±0.3 %	±0.06 µL	4900 000.117	
	25 µL	±0.8 %	±0.2 µL	±0.3 %	±0.075 µL	4900 000.150	
	50 µL	±0.7 %	±0.35 µL	±0.3 %	±0.15 µL	4900 000.125	
	100 µL	±0.6 %	±0.6 µL	±0.2 %	±0.2 µL	4900 000.133	
Blue operating button, for use with 1,000 µL pipette tips							
	200 µL	±0.6 %	±1.2 µL	±0.2 %	±0.4 µL	4900 000.508	
	250 µL	±0.6 %	±1.5 µL	±0.2 %	±0.5 µL	4900 000.540	
	500 µL	±0.6 %	±3 µL	±0.2 %	±1 µL	4900 000.516	
	1,000 µL	±0.6 %	±6 µL	±0.2 %	±2 µL	4900 000.524	
Red operating button, for use with 2,500 µL pipette tips							
	1,500 µL	±0.6 %	±9 µL	±0.2 %	±3 µL	4900 000.923	
	2,000 µL	±0.6 %	±12 µL	±0.2 %	±4 µL	4900 000.907	
	2,500 µL	±0.6 %	±15 µL	±0.2 %	±5 µL	4900 000.915	

*1 The data for systematic error and random error according to EN ISO 8655 is valid only when original Eppendorf pipette tips are used.

Liquid: Bidistilled water, degassed, Temperature: 20-25 °C, constant to ±0.5 °C, No. of measurements: 10, in accordance with EN ISO 8655 using original Eppendorf® pipette tips

➔ For pipette service and maintenance information, see page 50; Pipette tips information begins on page 53.

* Technical specifications subject to change.

Eppendorf Reference® fixed-volume and adjustable-volume pipettes

**Description**

People who work in regulated areas or areas with high security requirements need an instrument with accordingly high reproducibility and dependability.

With its control button and ejector combination, the Eppendorf Reference is designed to actively reduce contamination from aerosols. The one-button operation prevents gloves from becoming jammed in the device. The volume is set using the

control button and always remains visible on the display – no matter where the hand is positioned. A locking mechanism ensures that the settings cannot be changed accidentally. Of course, the Eppendorf Reference is fully autoclavable and the adjustment status is clearly indicated by the various calibration seals, thereby fulfilling all current laboratory guidelines.

Ordering information: Reference adjustable-volume pipettes

Model	Volume range	Volume	Systematic error*1	Random error*1	Order no.	
Single-channel pipette, adjustable-volume						
Dark gray operating button, for use with 10 µL pipette tips						
	0.1–2.5 µL	0.25 µL	±12.0 %	0.030 µL	±6.0 %	4910 000.085
		1.25 µL	±2.5 %	0.031 µL	±1.5 %	
		2.5 µL	±1.4 %	0.035 µL	±0.7 %	
Gray operating button, for use with 20 µL pipette tips						
	0.5–10 µL	1 µL	±2.5 %	±0.025 µL	±1.8 %	4910 000.018
		5 µL	±1.5 %	±0.075 µL	±0.8 %	
		10 µL	±1.0 %	±0.1 µL	±0.4 %	
	2–20 µL	2 µL	±3.0 %	±0.08 µL	±2.0 %	4910 000.026
		10 µL	±1.0 %	±0.1 µL	±0.5 %	
		20 µL	±0.8 %	±0.18 µL	±0.3 %	
Yellow operating button, for use with 200 µL and 300 µL pipette tips						
	2–20 µL	2 µL	±5.0 %	±0.1 µL	±1.5 %	4910 000.034
		10 µL	±1.2 %	±0.12 µL	±0.6 %	
		20 µL	±1.0 %	±0.2 µL	±0.3 %	
	10–100 µL	10 µL	±3.0 %	±0.3 µL	±0.7 %	4910 000.042
		50 µL	±1.0 %	±0.5 µL	±0.3 %	
		100 µL	±0.8 %	±0.8 µL	±0.15 %	
	50–200 µL	50 µL	±1.0 %	±0.5 µL	±0.3 %	4910 000.093
		100 µL	±0.9 %	±0.9 µL	±0.3 %	
		200 µL	±0.6 %	±1.2 µL	±0.2 %	
Blue operating button, for use with 1,000 µL pipette tips						
	50–250 µL	50 µL	±1.4 %	±0.7 µL	±0.3 %	4910 000.050
		100 µL	±1.1 %	±1.1 µL	±0.3 %	
		250 µL	±0.6 %	±1.5 µL	±0.2 %	
	100–1,000 µL	100 µL	±3.0 %	±3.0 µL	±0.3 %	4910 000.069
		500 µL	±1.0 %	±5.0 µL	±0.2 %	
		1,000 µL	±0.6 %	±6.0 µL	±0.2 %	
Red operating button, for use with 2,500 µL pipette tips						
	500–2,500 µL	500 µL	±1.5 %	±7.5 µL	±0.3 %	4910 000.077
		1,250 µL	±0.8 %	±8.0 µL	±0.2 %	
		2,500 µL	±0.6 %	±15.0 µL	±0.2 %	

*1 The data for random error and systematic error according to EN ISO 8655 is valid only when original Eppendorf® pipette tips are used.

Ordering information: Accessories

Description	Order no.	
Pipette carousel, for 6 pipettes	3115 000.003	
Pipette holder, for wall mounting	3115 000.020	

i Each adjustable-volume Reference pipette contains a service kit and an epT.I.P.S.® Box with the appropriate tips.

An overview of the Eppendorf Reference®

**Catch:**

- Prevent unintentional volume adjustments

4-position volume display:

- Precise volume setting
- Easy to read, regardless of pipetting style

Labeling area:

- Optional individual labeling

Combined dispensing button and tip ejection:

- Active reduction of aerosol contamination
- No jamming of gloves

Calibration seal:

- Clear identification of the adjustment status

**Color coding:**

- Makes tip size easy to recognize

Ergonomic tip ejection:

- Low stress with frequent tip changes

Volume labeling:

- Fast identification

An overview of the Eppendorf Reference®



TÜV-tested user friendliness:

- Simple and ergonomic handling

Perfect combination:

- With epT.I.P.S. high reliability of results

Made in Germany:

- High quality standards

Fully autoclavable:

- Fast and secure disinfection

Unique handle:

- All individual hand positions possible

Stopper:

- No accidental rolling away



Eppendorf pipettes accessories

**Description**

Enjoy an organized workplace with our rotating pipette stand. Pipettes attach to the stand by the handle, not the nose cone, which rules out potential cross-contamination from the stand to the pipettes.

In addition to the Eppendorf Research and Reference pipettes, the stand can also hold all older models of Eppendorf pipettes. Also available: a pipette holder that attaches to the wall, which keeps the pipette within reach, even when you have limited bench space.

Description

The charging rack for the Eppendorf Xplorer® enables you to charge your electronic pipette in an uncomplicated fashion while at the same time avoiding contamination by improper storage. In addition, the quadruple charging rack allows you to charge your Multipette Stream®/Multipette Xstream® on the same rack using an adapter.

Product features

- Pipette carousel for 6 pcs, Eppendorf Reference® and Eppendorf Research® plus
- With an adapter, also suitable for use with Multipette®, Multipette plus™ and Varipette® 4720

Ordering information

Description	Order no.	
Pipette carousel , for 6 pipettes	3115 000.003	
Pipette holder , for wall mounting	3115 000.020	
Multipette plus/Varipette adapter , for pipette carousel stand	4981 201.006	
Multipette plus/Varipette adapter , for wall mounting	4981 203.009	
Charging rack , for 1 Eppendorf Xplorer	4880 000.000	
Charging rack , for 4 Eppendorf Xplorer	4880 000.026	
Charger shell , for Multipette	4880 601.003	

➔ For pipette service and maintenance information, see page 50;
Pipette tips information begins on page 53.

* Further information about IVD products see on page 442.
Technical specifications subject to change.

Eppendorf Xplorer® electronic pipettes



reddot design award
best of the best 2010



Description

The new Eppendorf Xplorer electronic pipette was specially designed for high professional standards to provide optimal support for you in your work, with a new intuitive operating concept and design based on the proven Eppendorf Physio-Care Concept®. These features set new standards for simplicity, precision and reproducibility, which means no more delays due to complicated programming or inflexible processes. Instead, you get precisely adjustable parameters, maximum reproducible results, fatigue-free work and consistent, full control over the pipetting processes.

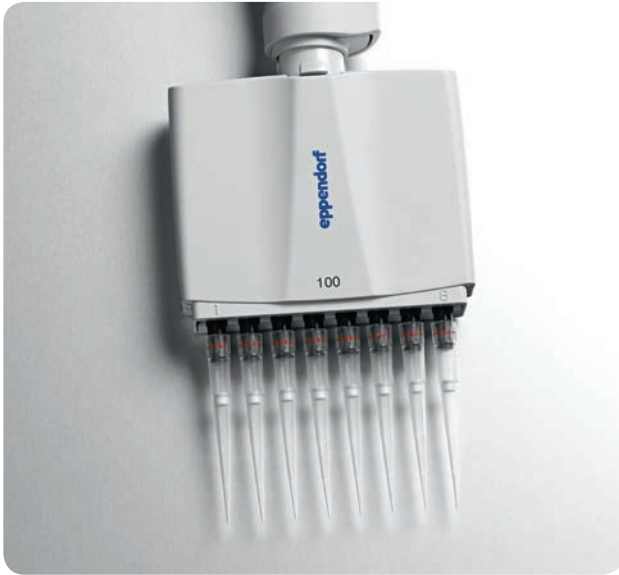
Product features

- Multi-function rocker
- Function control softkeys
- Selection dial
- Innovative ejector
- Separate power socket
- Practical charging contacts
- Modern color display
- Multilingual menu navigation
- Powerful battery
- Ergonomic display angle
- Convenient handle

i Further information on www.eppendorf.com/xplorer

➔ For pipette service and maintenance information, see page 50.

Eppendorf Xplorer® electronic pipettes

**Function control softkeys**

- Edit and Help at the push of a button

Multi-function rocker

- Simple logic: the “Up is up and down is down”™ principle

Innovative ejector

- After tip ejection, the piston automatically returns to zero position

Convenient handle

- Ergonomic design according to the PhysioCare Concept®



**Benefit from the high quality of
Eppendorf epT.I.P.S.® pipette tips**

(More information www.eppendorf.com/consumables)

Eppendorf Xplorer® electronic pipettes



➔ For pipette service and maintenance information, see page 50.

⚡ Ordering information for other voltage options begins on page 472.

Eppendorf Xplorer® electronic pipettes

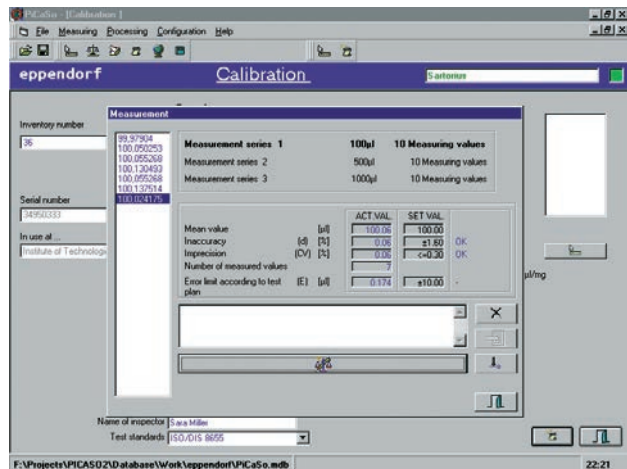


Ordering information: Eppendorf Xplorer® electronic pipettes

Model	Volume range	Volume	Systematic error*1		Random error*1		Order no.
Single-channel pipette							
Medium gray multi-function rocker for 20 µL pipette tips							
with charging adapter	0.5-10 µL	1 µL	±2.5 %	±0.025 µL	±1.8 %	±0.018 µL	4861 000.015
		5 µL	±1.5 %	±0.075 µL	±0.8 %	±0.04 µL	
		10 µL	±1.0 %	±0.1 µL	±0.4 %	±0.04 µL	
Yellow multi-function rocker for 200 µL pipette tips							
with charging adapter	5-100 µL	10 µL	±2.0 %	±0.2 µL	±1.0 %	±0.1 µL	4861 000.023
		50 µL	±1.0 %	±0.5 µL	±0.3 %	±0.15 µL	
		100 µL	±0.8 %	±0.8 µL	±0.2 %	±0.2 µL	
Orange multi-function rocker for 300 µL pipette tips							
with charging adapter	15-300 µL	30 µL	±2.5 %	±0.75 µL	±0.7 %	±0.21 µL	4861 000.031
		150 µL	±1.0 %	±1.5 µL	±0.3 %	±0.45 µL	
		300 µL	±0.6 %	±1.8 µL	±0.2 %	±0.6 µL	
Blue multi-function rocker for 1,000 µL pipette tips							
with charging adapter	50-1,000 µL	100 µL	±3.0 %	±3 µL	±0.6 %	±0.6 µL	4861 000.040
		500 µL	±1.0 %	±5 µL	±0.2 %	±1 µL	
		1,000 µL	±0.6 %	±6 µL	±0.2 %	±2 µL	
Violet multi-function rocker for 5 mL pipette tips							
with charging adapter	0.25-5 mL	500 µL	±3.0 %	±15 µL	±0.6 %	±3 µL	4861 000.058
		2,500 µL	±1.2 %	±30 µL	±0.3 %	±6.25 µL	
		5,000 µL	±0.6 %	±30 µL	±0.15 %	±7.5 µL	
Turquoise multi-function rocker for 10 mL pipette tips							
with charging adapter	0.5-10 mL	1,000 µL	±3.0 %	±30 µL	±0.6 %	±6 µL	4861 000.066
		5,000 µL	±0.8 %	±40 µL	±0.2 %	±10 µL	
		10,000 µL	±0.6 %	±60 µL	±0.15 %	±15 µL	
Multichannel pipette incl. charging adapter							
Medium gray multi-function rocker for 20 µL pipette tips							
8-channel	0.5-10 µL	1 µL	±5.0 %	±0.05 µL	±3.0 %	±0.03 µL	4861 000.104
		5 µL	±3.0 %	±0.15 µL	±1.5 %	±0.075 µL	
		10 µL	±2.0 %	±0.2 µL	±0.8 %	±0.08 µL	
12-channel							4861 000.112
Yellow multi-function rocker for 200 µL pipette tips							
8-channel	5-100 µL	10 µL	±2.0 %	±0.2 µL	±2.0 %	±0.2 µL	4861 000.120
		50 µL	±1.0 %	±0.5 µL	±0.8 %	±0.4 µL	
		100 µL	±0.8 %	±0.8 µL	±0.25 %	±0.25 µL	
12-channel							4861 000.139
Orange multi-function rocker for 300 µL pipette tips							
8-channel	15-300 µL	30 µL	±2.5 %	±0.75 µL	±1.0 %	±0.3 µL	4861 000.147
		150 µL	±1.0 %	±1.5 µL	±0.5 %	±0.75 µL	
		300 µL	±0.6 %	±1.8 µL	±0.25 %	±0.75 µL	
12-channel							4861 000.155
Green multi-function rocker for 1,200 pipette tips							
8-channel	50-1,200 µL	120 µL	±6.0 %	±7.2 µL	±0.9 %	±1.08 µL	4861 000.163
		600 µL	±2.7 %	±16.2 µL	±0.4 %	±2.4 µL	
		1,200 µL	±1.2 %	±14.4 µL	±0.3 %	±3.6 µL	

*1 The data for systematic error and random error according to EN ISO 8655 is valid only when original Eppendorf® pipette tips are used.

PICASO®



Minimum system requirements Computer

- Intel-Pentium®/100 Hz – 32 MB RAM – Windows® 95/98/NT/2000/XP
- CD ROM drive
- Two- or three-key mouse
- RS-232 interface
- Interface for printer

Photometric test

- Eppendorf ECOM® 6.22
- Artel® PCS2

Application

- Software for calibrating pipettes and dispensing systems

Calibration display – for calibrating pipettes

- Choice of pipette type and volumes (via quick-sort function for filters)
- Choice of guidelines for measurement (test standard)
- Ambient conditions can be entered
- Pre-measurement possible
- User guided through measurements
- Software in German, English and French
- Additional Test protocol printout in Spanish, Italian and Portuguese

Analysis balances

- Sartorius® ME, CP, MC, BP
- Mettler® AT, AE, AX, AG, SAG
- Ohaus® AP
- AnD HM
- Note: balances not listed here can be adapted by adjusting data transmission accordingly

Sartorius® is a registered trademark of Sartorius AG.
 Ohaus® is a registered trademark of Ohaus Cooperation
 Mettler® is a registered trademark of Mettler-Toledo GmbH

Ordering information

Description	Order no.	
PICASO Software, incl. installation instructions and detailed online assistance	3113 004.001	

Pipette Performance Plans

Value of maintenance and calibration

For over 65 years Eppendorf has been an innovator and leading provider of liquid handling systems, which include pipetting devices and consumables. This total approach philosophy extends beyond products to our quality pipette calibration, certification, maintenance and repair services – for all major brands of pipettes – not just our own. We offer a range of service options from basic calibration at an economical price to GLP/GMP custom-designed calibration services.

Precision and accuracy of the pipettes are important for the quality of all your work results. Regular maintenance and calibration by Eppendorf assures a consistent result quality.

Our Service Levels:

- 1. BASIC:** Affordable quality control according to EN ISO 8655
- 2. STANDARD:** Repairs with purpose of maintaining conformity with EN ISO 8655
- 3. PREMIUM:** Total care program for your pipettes
- 4. CUSTOMIZED:** Flexible testing program according to your specifications

**Long-term benefits:**

- Consistent, reliable pipettes
- Highest confidence in results
- GLP compliant audited systems

Performance Plans**BASIC**

Affordable calibration/adjustment according to EN ISO 8655

Initial inspection to determine pipette condition		
Replace all defective parts*		
Preventive maintenance and cleaning: Cleaning and lubrication of seals, O-rings and piston, replacement of small parts like seals and O-rings, checking seals for damage/integrity		
Calibration according to EN ISO 8655 specifications with 10 measurements per test volume (min, mid, max)		
Quick check according to EN ISO 8655 specifications with 4 measurements per test volume (min, mid, max)	●	
Issue calibration report	●	
Service turnaround (from time of receipt, in business days)* ³	3-5	
Service ordering information	Order no.	
Fixed-volume pipette	0050 600.015	
Adjustable-volume pipette	0050 600.071	
8-channel pipette	0050 600.116	
12-channel pipette	0050 600.128	
Hand dispenser	0050 600.071	

*1 Handgrip, motor and PCB are priced separately.

*2 Is included in the 10 measurements

*3 Standard value, deviations possible, excl. shipping duration

Other services may be available upon request

Pipette Performance Plans

epServices
for premium performance

Additional services:

- Trade-in program
- Reminder of service intervals
- Service voucher incl. shipping packaging and ep-points (please inquire)
- Customized maintenance contracts
- Inspection of pipettes from all manufacturers not just Eppendorf
- Emergency service
- On site service
- Pipette training, with emphasis in ergonomics (PhysioCare)

Service features:

- Eppendorf service quality and integrity
- Certified reports
- Quick turnaround time



① For more information go to www.eppendorf.com/epservices. In selected countries only.

	STANDARD	PREMIUM	CUSTOMIZED
	Preventive maintenance, calibration, adjustment according to EN ISO 8655	Total Care program for your pipettes (Certification services)	Flexible testing program according to your specifications
			e.g.
		●	Testing according to special GLP and GMP specifications
		●	
	●	●	
	●	●	
	●*2	●*2	
	●	●	
	3-5	3-5	
	Order no.	Order no.	Order no.
	0050 600.017	0050 600.025	on request
	0050 600.076	0050 600.084	on request
	0050 600.122	0050 600.092	on request
	0050 600.130	0050 600.033	on request
	0050 600.076	0050 600.084	on request

Eppendorf purity levels for tips, tubes, plates and Combitips®

Purity Levels

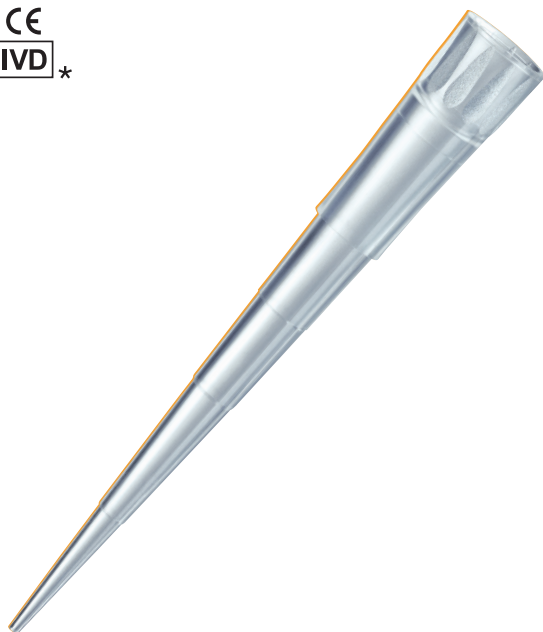
1.

<p>i For more information go to www.eppendorf.com/purity and on pages 145 and 435</p>					
Continuous quality control for the following relevant criteria:					
Function, tightness, precision	●	●	●	●	●
Low wetting	●	●	●	●	●
High chemical resistance	●	●	●	●	●
High thermal resistance	●	●	●	●	●
High resistance to centrifugation forces*1	●	●	●	●	●
High transparency	●	●	●	●	●
Precisely shaped	●	●	●	●	●
Lot testing² (certified) for the following purity criteria:					
Human DNA-free			●	●	●
DNA-free (Human- + bacteria DNA)					●
DNase-free			●	●	● NEW!
RNase-free			●	●	●
PCR-inhibitor-free			●	●	● NEW!
ATP-free					●
Pyrogen-free (endotoxin-free)		● NEW!		●	●
Sterile (Ph.Eur./USP)		●		●	●
Eppendorf products					
Tips					
epT.I.P.S.® Standard + Box + Set	●				
epT.I.P.S.® Reloads	●		●		
epT.I.P.S.® Racks					●
epT.I.P.S.® Singles					●*3
ep Dualfilter T.I.P.S.®				●	
Combitips plus®	●				●*3
epT.I.P.S.® LoRetention	●		●	●	
epT.I.P.S.® Motion	●	●			
epT.I.P.S.® Motion filtertips	●	●	●		
Tubes					
Safe-Lock Tubes	●		●		●*3
3810X	●		●		
DNA + Protein LoBind Tubes			●		
PCR Tubes (PCR + <i>real-time</i> PCR)			●		
Cap Strips (PCR + <i>real-time</i> PCR)			●		
Plates and accessories					
Deepwell Plates® + Microplates®		●	●		
Protein LoBind Deepwell Plates®			●		
DNA LoBind Deepwell Plates			●		
twin.tec® PCR Plates (PCR and <i>real-time</i> PCR)			●		
twin.tec® <i>microbiology</i> PCR Plates					●
Heat Sealing Film and Foil			●		
PCR, Storage Films + Foils			●		
Plate Lid		●	●		
UVette®	●		●*4		

*1 For accurate details regarding resistance to centrifugation, please refer to the respective product pages.
 *2 Batch-specific certificate can be downloaded from www.eppendorf.com. *3 Individually packaged. *4 Additionally sterile. *5 Additionally free of protein.



CE
IVD*



Product features of epT.I.P.S. tip system

- Drop-contour design gives all Eppendorf tips a uniform look
- Soft, flexible tip cone ensures better pipette tip sealing
- Ergonomically optimized cone geometry ensures perfect fit on Eppendorf pipettes
- Universal fit — can be used with pipettes from other manufacturers
- Fine graduations make it easy to visually check the volume pipetted
- Available in 5 purity levels: Eppendorf Quality; PCR clean; Eppendorf Biopur®; PCR clean, sterile and pyrogen-free
- New tip design for better access to a wider variety of tubes and wells
- Finely tapered and extended for working with small volumes

Description

A pipette is only as good as its tip.

Only a perfectly manufactured pipette tip can ensure that the precision of a modern pipette is maximized. Our epT.I.P.S.® — Eppendorf *Totally Integrated Pipetting System* — have been developed to work in perfect combination with our pipettes. The results are reduced-force tip attachment and ejection with complete sealing. Additionally, the universal nose cone design allows the tips to be used with pipettes from other manufacturers. As we have our own production facilities, we can maintain the highest standards in the selection and processing of plastic materials. Ideal wetting properties, high transparency and special certified purity levels are the visible expression of this production philosophy. Having our own production facility means that each one of our epT.I.P.S. is manufactured to the highest quality standards. Through our selection of the best plastic materials and ISO 9001-certified production processes, our tips maintain ideal wetting properties and boast high transparency and certified purity levels. Every tip is manufactured to match specifically to its respective Eppendorf pipette(s), thus ensuring the maximum precision and reliability you have come to expect and rely on.

The Eppendorf pipette and tip system satisfies all of the requirements of EN ISO 8655 standards.

Product features of epT.I.P.S. refill system

- Contamination-free handling of the refill tray — plastic lids protect refill trays from direct contact during transfer to the reusable box (see page 55)
- Stable, sturdy box design is ideal for working with multi-channel pipettes
- Reloads can be autoclaved in their packaging and stored for future use — reducing the need for multiple refill boxes
- Color-coded tray for easy volume identification and matching to respective Eppendorf pipette
- Reloads available in 2 purity levels (see page 55):
 - Eppendorf Quality
 - PCR clean

➔ Further information on www.eppendorf.com/consumables

epT.I.P.S.[®] Standard

- Original, high-quality Eppendorf pipette tips packaged in resealable bags
- Available in sizes from 10 μ L to 10 mL
- 200 μ L, 300 μ L and 1,000 μ L tips are also available color-coded yellow and blue

epT.I.P.S.[®] Box/epT.I.P.S.[®] Set

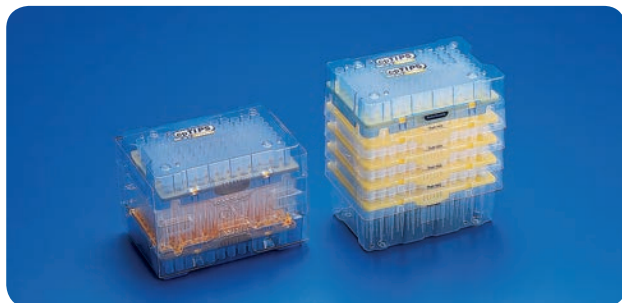
- Contamination-free transfer of trays to the working box
- System optimized for use with multichannel pipettes
- Color-coded trays for simple identification of tips and matching Eppendorf pipette
- Tips can be attached to the pipette from the refill trays
- Refill trays and epT.I.P.S. boxes are entirely autoclavable for future use

epT.I.P.S.[®] Racks

- Eppendorf Biopur[®] pipette tips provide maximum biological purity. Guaranteed PCR clean, sterile, pyrogen-free, ATP-free, bacterial DNA-free, they meet the most stringent requirements of the medical, pharmaceutical and foodstuffs industry as well as those of molecular biology and cell technology
- Continuous control of each batch by an independent laboratory – Batch-related certificates available on request, or go to www.eppendorf.com
- Packaged in racks of 96, 48 or 24 tips

epT.I.P.S.[®] Singles

- Individually wrapped pipette tips in Eppendorf Biopur: guaranteed sterile, RNase-, DNA-, ATP- and pyrogen-free
- Batch number and expiration date printed on each blister pack
- Continuous quality control of each batch by an independent laboratory – Batch-specific purity certificates available upon request, or go to www.eppendorf.com

epT.I.P.S.[®] Reloads

- All components are 100 % recyclable
- Reduced waste as compared with disposable racks
- The refill system, depending on tip size, is packaged as either dual-sided or in stack form
- Reloads are available in two purity levels: Eppendorf Quality and PCR clean

Handling of the refill system



The epT.I.P.S. refill system consists of the reusable, fully autoclavable epT.I.P.S. box and the epT.I.P.S. Reloads refill trays. This system offers the easiest possible handling in a space-saving

and environmentally friendly package. All components are 100 % recyclable, which greatly reduces overall waste as compared with conventional tips packages.



Lift



Lift



Transfer



Engage

The transparent blue protective lid for epT.I.P.S. Reloads allows individual trays to be lifted off the respective stack (left) or dual tray (right) without contamination.

An audible “click” indicates that the tray is fully engaged. The blue lid can be used to reseal the epT.I.P.S. Reloads to protect the tips from contamination.

epT.I.P.S.[®] Long**Extra long epT.I.P.S. and ep Dualfilter T.I.P.S. pipette tips[®]**

With the long, slender design of extra long epT.I.P.S. and ep Dualfilter T.I.P.S. pipette tips best pipetting results are always guaranteed when pipetting into high tubes or the deep wells of Eppendorf Deepwell Plates. At the same time, the risk to contact the walls of these deep tubes is kept to a minimum rendering cross-contamination virtually impossible.

The extra long epT.I.P.S. and ep Dualfilter T.I.P.S. pipette tips are available in the following volumes:

- 0.5-20 μ L, L, 46 mm
- 50-1,250 μ L, L, 103 mm
- 1-10 mL, L, 243 mm








Purity levels Eppendorf Quality; PCR clean; PCR clean, sterile and pyrogen-free; Eppendorf Biopur[®].



➔ Further information on www.eppendorf.com/consumables

Pipette tips



Volume range/pipette tip (all tips shown are actual size and are colourless unless otherwise stated)	Standard	Reloads	Reloads
	Eppendorf Quality	Eppendorf Quality	PCR clean
0.1-10 μL , 34 mm 	2 bags of 500 tips = 1,000 tips 0030 000.811	10 trays of 96 tips = 960 tips* ¹ 0030 073.363	10 trays of 96 tips = 960 tips* ¹ 0030 073.746
0.1-20 μL , 40 mm 	2 bags of 500 tips = 1,000 tips 0030 000.838	10 trays of 96 tips = 960 tips 0030 073.380	10 trays of 96 tips = 960 tips 0030 073.762
0.5-20 μL , 46 mm 	2 bags of 500 tips = 1,000 tips 0030 000.854	10 trays of 96 tips = 960 tips 0030 073.401	10 trays of 96 tips = 960 tips 0030 073.789
2-200 μL , 53 mm 	2 bags of 500 tips = 1,000 tips 0030 000.889 0030 000.870 yellow	10 trays of 96 tips = 960 tips* ¹ 0030 073.428	10 trays of 96 tips = 960 tips* ¹ 0030 073.800
20-300 μL , 55 mm 	2 bags of 500 tips = 1,000 tips 0030 000.900 0030 000.897 yellow	10 trays of 96 tips = 960 tips 0030 073.444	10 trays of 96 tips = 960 tips 0030 073.827
50-1,000 μL , 71 mm 	2 bags of 500 tips = 1,000 tips 0030 000.927 0030 000.919 blue	10 trays of 96 tips = 960 tips 0030 073.460	10 trays of 96 tips = 960 tips 0030 073.843
50-1,250 μL , 76 mm 	2 bags of 500 tips = 1,000 tips 0030 000.935	10 trays of 96 tips = 960 tips 0030 073.487	10 trays of 96 tips = 960 tips 0030 073.860

Note: All pipette tips meet the Eppendorf Quality purity standard; where applicable, higher purity levels are noted.
*1 Packed in the form of a stack that includes five reloads. All nonmarked ePT.I.P.S. Reloads are packed dual-sided.

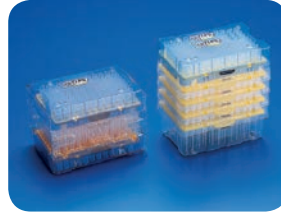
Pipette tips




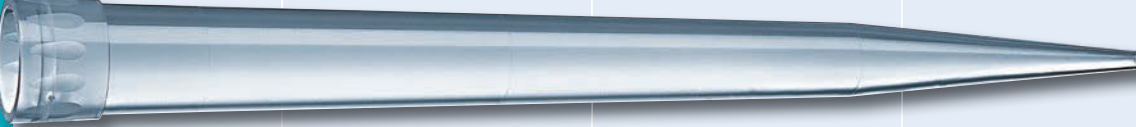



Box	Set	Singles	Racks
Eppendorf Quality	Eppendorf Quality	Eppendorf Biopur (sterile)	Eppendorf Biopur (sterile)
1 reusable box incl. 96 tips 0030 073.002	1 reusable box incl. 5 trays of 96 tips 0030 073.207		
1 reusable box incl. 96 tips 0030 073.029	1 reusable box incl. 5 trays of 96 tips 0030 073.223	100 tips, individually wrapped 0030 010.019	5 racks of 96 tips = 480 tips 0030 075.005
1 reusable box incl. 96 tips 0030 073.045	1 reusable box incl. 5 trays of 96 tips 0030 073.240		
1 reusable box incl. 96 tips 0030 073.061	1 reusable box incl. 5 trays of 96 tips 0030 073.266	100 tips, individually wrapped 0030 010.035	5 racks of 96 tips = 480 tips 0030 075.021
1 reusable box incl. 96 tips 0030 073.088	1 reusable box incl. 5 trays of 96 tips 0030 073.282		5 racks of 96 tips = 480 tips 0030 075.048
1 reusable box incl. 96 tips 0030 073.100	1 reusable box incl. 5 trays of 96 tips 0030 073.304	100 tips, individually wrapped 0030 010.051	5 racks of 96 tips = 480 tips 0030 075.064
1 reusable box incl. 96 tips 0030 073.126	1 reusable box incl. 5 trays of 96 tips 0030 073.320		5 racks of 96 tips = 480 tips 0030 075.080

i For more information go to www.eppendorf.com/consumables

Pipette tips 



Volume range/pipette tip (most tips shown are actual size)	Standard	Reloads	Reloads
	Eppendorf Quality	Eppendorf Quality	PCR clean
50–1,250 µL L, 103 mm 	2 bags of 500 tips = 1,000 tips 0030 000.730	10 trays of 96 tips = 960 tips 0030 073.606	10 trays of 96 tips = 960 tips 0030 073.614
500–2,500 µL, 115 mm 	5 bags of 100 tips = 500 tips 0030 000.951	10 trays of 48 tips = 480 tips 0030 073.509	10 trays of 48 tips = 480 tips 0030 073.886
100–5,000 µL, 120 mm 	5 bags of 100 tips = 500 tips 0030 000.978		
1–10 mL, 165 mm 	2 bags of 100 tips = 200 tips 0030 000.765		
1–10 mL L, 243 mm (Image reduced in size) 	2 bags of 100 tips = 200 tips 0030 000.781	Fits in deep and narrow test tubes, cell culture bottles and measuring cylinders	

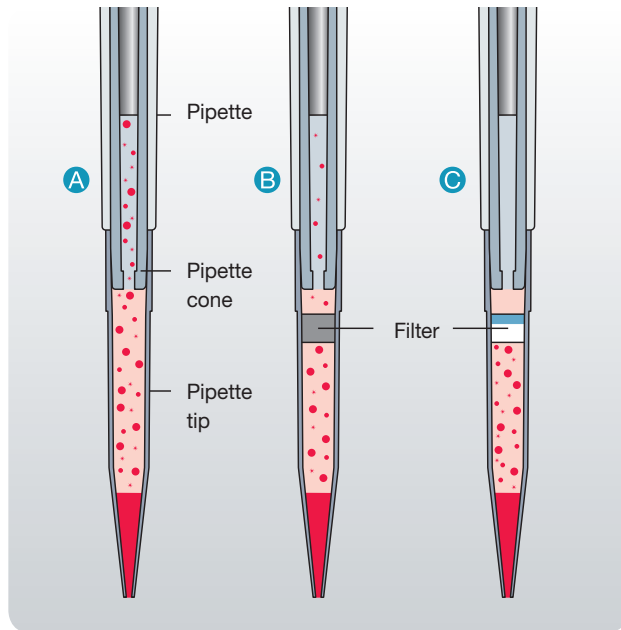
i For more information go to www.eppendorf.com/consumables

Pipette tips



Box	Set	Singles	Racks
Eppendorf Quality	Eppendorf Quality	Eppendorf Biopur (sterile)	Eppendorf Biopur (sterile)
1 reusable box incl. 96 tips 0030 073.622			5 racks of 96 tips = 480 tips 0030 075.129
1 reusable box incl. 48 tips 0030 073.142	1 reusable box incl. 5 trays of 48 tips 0030 073.347		5 racks of 48 tips = 240 tips 0030 075.102
1 reusable box incl. 24 tips 0030 073.169			
			5 racks of 24 tips = 120 tips 0030 075.145

Pipette tips ep Dualfilter T.I.P.S.® – Aerosols don't stand a chance!*



Without a filter **A**, the pipette is exposed to contamination by samples and aerosols. Conventional single-layer filters **B** do not fully block particles and molecules. Only ep Dualfilter T.I.P.S. **C** provide reliable protection even against the finest impurities.

Dual protection against contamination right from the start.

ep Dualfilter T.I.P.S. are manufactured to the highest possible quality from pure, non-recycled materials under cleanroom conditions. They are characterized by defined flow dynamics, low wettability and high thermal stability. ep Dualfilter T.I.P.S. are sterilized by electron beams and certified pyrogen-free and PCR clean (free from human DNA, DNase, RNase and PCR-inhibiting substances). Individual batch certification can be downloaded from www.eppendorf.com

Two filter layers are better than one.

Eppendorf ep Dualfilter T.I.P.S. are the first filter tips with a two-phase filter for contamination protection.

The unmistakable blue and white filter layers are made of flexible, hydrophobic material to fit perfectly in the tip cone and retain practically 100 % of all aerosols* and biomolecules. This unique filtering effect is achieved using various, well-defined pore sizes in the two filter layers.

The white layer that faces the sample retains drops, splashes and aerosols. The blue layer above it forms a highly-effective double barrier that reliably binds biomolecules. The air flow rate through the filter is the same as with single-layer filters – it simply makes your rapid pipetting tasks much safer.

The ep Dualfilter T.I.P.S. hydrophobic filter surface also enables easier and complete recovery of samples.

* Aerosol: Aerosol particle and the air or dispersion of solid or liquid particles surrounding it in a gas, usually air.

Product features

- Two filter layers provide dual protection
- Dual protection for pipette and sample
- Dual protection from aerosols and biomolecules
- Free of PCR inhibitor additives
- Patent-pending technology
- Sterile, Eppendorf PCR clean and pyrogen-free
- Batch certified



Pipette tips ep Dualfilter T.I.P.S.® – Scientifically proven



No filter protects better than ep Dualfilter T.I.P.S.

Filter tips from different manufacturers were tested in a blind trial at the “Fraunhofer-Institut für Toxikologie und Experimentelle Medizin” (Fraunhofer Institute for Toxicology and Experimental Medicine – ITEM) in Hanover. Testing focused on the prevention of pipette cone contamination by aerosols. Filter effect with regard to salt aerosols and biomolecules (DNA fragments) was examined. Quantitative determination of DNA fragments was performed using real-time PCR.

The results indicate that ep Dualfilter T.I.P.S. filter tips are much better at protecting against aerosols than other commercially available filter tips. With regard to particle permeability, ep Dualfilter T.I.P.S. filter tips are 55 to 677 times more effective than the filter tips tested from other manufacturers. ep Dualfilter T.I.P.S. filter tips were 21 to 600 times more effective when protection against DNA fragments was examined for the first time.

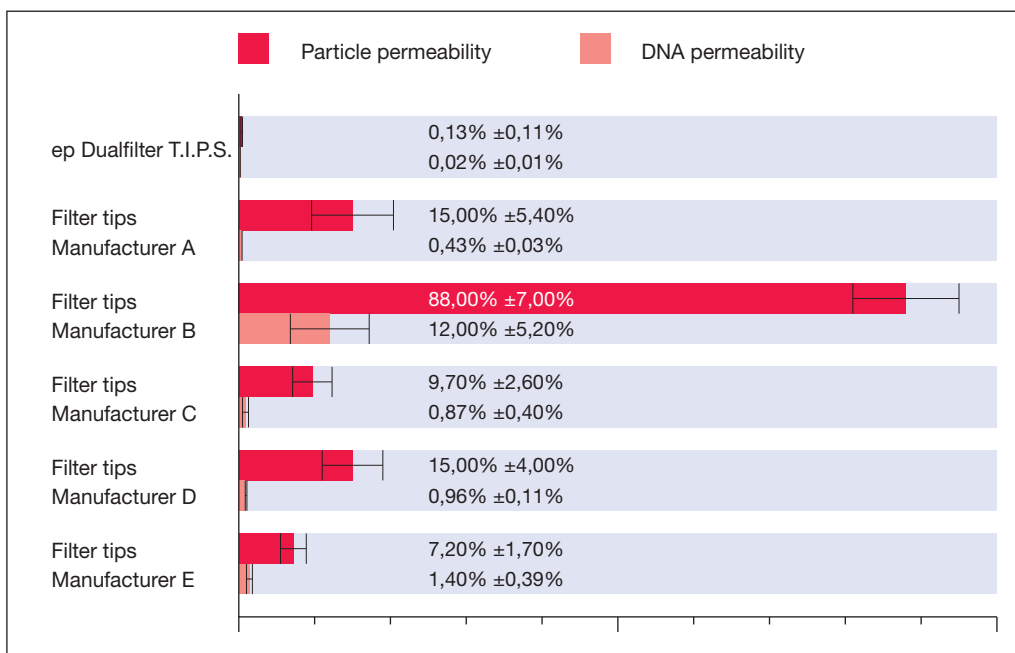


Fraunhofer Institut
Toxikologie und
Experimentelle Medizin

Pipette Tips

1.

Aerosol/particle penetration of various filter tips



Pipette tips ep Dualfilter T.I.P.S.®



Volume range/pipette tip
(all tips shown are actual size)

Dualfilter

PCR clean, sterile and pyrogen free

0.1-10 µL S, 34 mm

10 racks of 96 tips = 960 tips



0030 077.504

0.1-10 µL M, 40 mm

10 racks of 96 tips = 960 tips



0030 077.512

0.5-20 µL L, 46 mm

10 racks of 96 tips = 960 tips



0030 077.520

2-20 µL, 53 mm

10 racks of 96 tips = 960 tips



0030 077.539

2-100 µL, 53 mm

10 racks of 96 tips = 960 tips



0030 077.547

2-200 µL, 55 mm

10 racks of 96 tips = 960 tips



0030 077.555

20-300 µL, 55 mm

10 racks of 96 tips = 960 tips



0030 077.563

50-1,000 µL, 76 mm




10 racks of 96 tips = 960 tips



0030 077.571

i For more information go to www.eppendorf.com/consumables

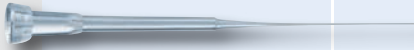

Pipette tips ep Dualfilter T.I.P.S.[®]

Volume range/pipette tip (most tips shown are actual size)	Dualfilter
	PCR clean, sterile and pyrogen free
50–1,250 μL L, 103 mm	5 Racks of 96 Tips = 480 Tips
	0030 077.750
100–5,000 μL L, 120 mm	5 racks of 24 tips = 120 tips
	0030 077.580
1–10 mL L, 243 mm (Image reduced in size)	100 tips, individually wrapped
	0030 077.598

Note: All pipette tips meet the Eppendorf Quality purity standard; where applicable, higher purity levels are noted.

Special tips



Volume range/pipette tip	GEloader
0.5–20 μL L, 62 mm	2 racks of 96 tips = 192 tips
	0030 001.222
	Microloader
0.5–20 μL L, 100 mm	2 racks of 96 tips = 192 tips
	5242 956.003

epT.I.P.S.[®] LoRetention – The “Pearl Effect”

Maximum results

The ultra hydrophobic, extremely homogeneous surface of the epT.I.P.S. LoRetention pipette tips is achieved via innovative treatment on the molecular level – the pearl effect technology. They are not coated, free of additives and do not leach into the sample. Liquids slide off leaving almost no detergent containing liquid inside the tip. By comparison, the clinging liquid film found in standard tips holds back considerably more material. These unique material properties guarantee maximum sample recovery, improved reproducibility and higher sensitivity.

Reduce costs, increase reproducibility

Particularly with sensitive PCR and real-time PCR applications, low-retention surfaces can increase reproducibility and notably reduce the loss of expensive reagents—depending on the reagent solution by up to 5 %!

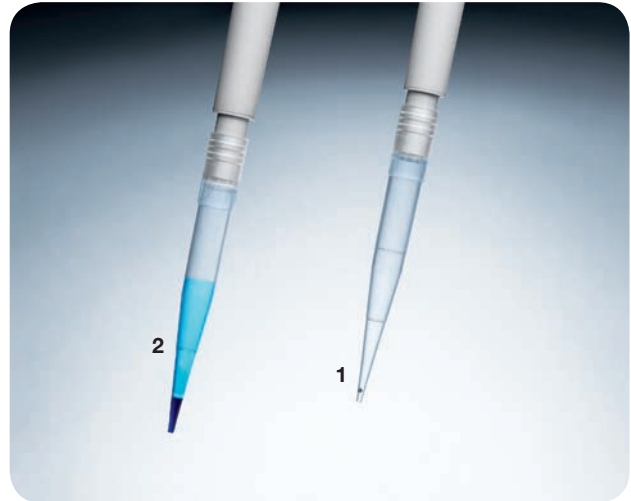
Various applications

epT.I.P.S. LoRetention pipette tips are ideally suited for all applications with samples that contain detergents:

- PCR and real-time PCR preparation of enzyme solutions and master mix isolations
- Purification and denaturation of proteins, restriction digestions and ligations
- Pipetting DNA ladders during gel electrophoresis.

epT.I.P.S. LoRetention pipette tips perform considerably better in terms of precision and sample recovery than low-retention tips from other manufacturers.

Simple differentiation of racks and reloads through a new, clear lid with a white seal. When open, the writing “LoRetention” can be seen from the inside. The reusable seal also makes it possible to label existing epT.I.P.S. boxes.



The “Pearl Effect” — a comparison of the amount of residual liquid when pipetting solutions that contain detergents:

1. Maximum recovery with epT.I.P.S. LoRetention
2. Significant loss of sample using standard tips

Product features

- Ultrahomogenous surface for maximum reproducibility
- Ultrahydrophobic surface for minimum loss of sample
- Air bubbles and foaming are significantly reduced during pipetting
- Autoclavable, high chemical resistance
- 5 year shelf life
- Available as ep Dualfilter T.I.P.S., as well as in PCR clean and Eppendorf Quality



➔ More information of Eppendorf Purity Levels see page 436 or visit www.eppendorf.com

➔ Further information on www.eppendorf.com/loretention

epT.I.P.S.[®] LoRetention – The facts speak for themselves



Quality and purity Eppendorf style

It goes without saying that the new epT.I.P.S. LoRetention have all the valued properties of the proven Eppendorf epT.I.P.S. They are produced in high-precision manufacturing processes, can be autoclaved, are extremely resistant to chemicals, and are

available in the PCR clean (free of human DNA, DNase, RNase, and PCR inhibitors) purity grade, as well as in Eppendorf Quality. For maximum contamination protection, epT.I.P.S. LoRetention are also available as ep Dualfilter T.I.P.S.

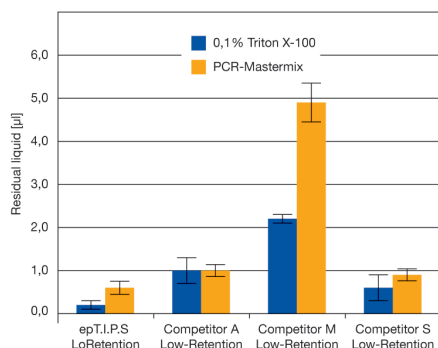


Fig. 1. Comparison of residual liquid from epT.I.P.S.

LoRetention and low-retention tips of other manufacturers. 200 µL tips were used to pipette a commercial PCR master mix and the detergent 0.1 % Triton X-100. Once the liquid had been dispensed, the residual liquid in the tips was determined. The measurements were repeated several times and the standard deviation determined. epT.I.P.S. LoRetention resulted in the lowest residual liquid, as well as the smallest standard deviation.

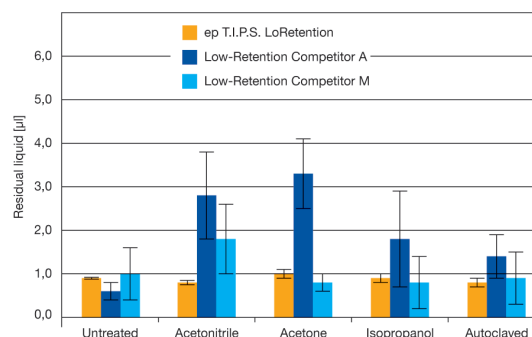


Fig. 2. Comparison of resistance of the low-retention property when subjected to solvents or autoclaving. 200 µL epT.I.P.S.

LoRetention and low-retention tips of other manufacturers were autoclaved or treated with the solvent specified. An enzymatic buffer containing detergents was then pipetted and the residual moisture was determined. epT.I.P.S. LoRetention resulted in reproducible low levels of residual liquid with minimum standard deviation. Low-retention tips from other manufacturers are less resistant to chemicals or autoclaving: this resulted in an increase in residual liquid and standard deviation.

Ordering information

Description	Order no.	
ep Dualfilter T.I.P.S. LoRetention, Racks, PCR clean/sterile/pyrogen-free, 10 x 96 tips		
0.1-10 µL S, 34 mm, medium grey	0030 077.610	
0.5-20 µL L, 46 mm, light grey	0030 077.628	
2-100 µL, yellow	0030 077.644	
20-300 µL, orange	0030 077.636	
50-1,000 µL, blue	0030 077.652	
epT.I.P.S. LoRetention, Sets, Eppendorf Quality, 5 x 96 Tips + 1 Box		
0.1-10 µL	0030 072.251	
0.5-20 µL L	0030 072.260	
2-200 µL	0030 072.278	
50-1,000 µL	0030 072.286	
epT.I.P.S. LoRetention, Reloads, PCR clean, 10 x 96 tips		
0.1-10 µL, 34 mm	0030 072.006	
0.5-20 µL L, 46 mm	0030 072.014	
2-200 µL	0030 072.022	
50-1,000 µL	0030 072.030	
epT.I.P.S. LoRetention, Reloads, Eppendorf Quality, 10 x 96 tips		
0.1-10 µL, 34 mm	0030 072.049	
0.5-20 µL L, 46 mm	0030 072.057	
2-200 µL	0030 072.065	
50-1,000 µL	0030 072.073	

Eppendorf pipettes/epT.I.P.S.® pipette tips combinations



Pipette/epT.I.P.S. (µL)	0.1-10	0.1-20	0.5-20 L	2-200	20-300	50-1.000	50-1.250	50-1.250 L	0.1-5 mL	1-10 mL	1-10 mL/L	GEloader	Microloader
Research® plus													
Fixed volume													
10 µL	●*1	●*2	●*1									●*1	●*1
20 µL	●*1	●*1	●*2									●*1	●*1
10 µL				●*2									
20 µL				●*2									
25 µL				●*2	●*1								
50 µL				●*2	●*1								
100 µL				●*2	●*1								
200 µL				●*2	●*1								
200 µL						●*2	●*1	●*1					
250 µL						●*2	●*1	●*1					
500 µL						●*2	●*1	●*4					
1,000 µL						●*2	●*1	●*4					
Adjustable volume													
0.1-2.5 µL	●*2	●*1											
0.5-10 µL	●*1	●*2	●*1									●*1	●*1
2-20 µL	●*1	●*1	●*2									●*1	●*1
2-20 µL gelb				●*2									
10-100 µL				●*2	●*1								
20-200 µL				●*2	●*1								
30-300 µL				●*3	●*2								
100-1,000 µL						●*2	●*1	●*4					
0.5-5 mL									●*2				
1-10 mL										●*2	●*4		
Multi-channel													
0.5-10 µL	●*1	●*2	●*1										
10-100 µL				●*2	●*1								
30-300 µL				●*3	●								
Reference®													
Fixed volume													
1-10 µL	●	●	●										●
10-100 µL				●									
200-1,000 µL						●	●	●					
1,500-2,500 µL									●				
Adjustable volume													
0.1-2.5 µL	●	●											
0.5-10 µL	●	●	●										●
2-20 µL		●	●	●									
10-100 µL				●	●								
50-200 µL				●	●								
100-1,000 µL						●	●	●					
500-2,500 µL									●				
Xplorer®													
Single-channel													
0.5-10 µL	●*1	●*2	●*4									●*1	●*1
5-100 µL				●*2	●*4								
15-300 µL				●*3	●*2								
50-1,000 µL						●*2	●*1	●*4					
0.25-5 mL									●*2				
0.5-10 mL										●*2	●*4		
Multi-channel													
0.5-10 µL	●*1	●*2	●*4										
5-100 µL				●*2	●*4								
15-300 µL				●*3	●*2								
50-1,200 µL								●*2	●*4				

*1 Pipette can be used with this tip.

*2 Pipette can be used with this tip. This tip was used to calculate the random and systematic error.

*3 Pipette can be used with this tip. Notice! Do not select a volume which exceeds the nominal volume of the tip, otherwise liquid may enter the pipette.

*4 Pipette can be used with this tip. When using the Xplorer with the Adjustment option, select epT.I.P.S. long in order to optimize the dispensing accuracy of this tip. If the Research plus is not adjusted accordingly by the user, the systematic error is increased by approximately a factor of 2 in comparison to standard tips.



Eppendorf pipettes/ep Dualfilter T.I.P.S.[®] combinations

Pipette/ep Dualfilter T.I.P.S. (µL)	0.1-10	0.1-20	0.5-20 L	2-200	20-300	50-1.000	50-1.250	50-1.250 L	0.1-5 mL	1-10 mL	1-10 mL/L	GEloader	Microloader
Research[®] plus													
Fixed volume													
10 µL	•*1	•*1	•*1										
20 µL			•*1										
10 µL				•*1	•*1	•*1							
20 µL				•*1	•*1	•*1							
25 µL					•*1	•*1	•*1						
50 µL					•*1	•*1	•*1						
100 µL						•*1	•*1						
200 µL						•*1	•*1						
200 µL							•*1	•*1					
250 µL							•*1	•*1					
500 µL							•*1	•*4					
1,000 µL							•*1	•*4					
Adjustable volume													
0.1-2.5 µL	•*1	•*1											
0.5-10 µL	•*1	•*1	•*1										
2-20 µL	•*3	•*3	•*1										
2-20 µL gelb				•*1	•*1	•*1							
10-100 µL				•*3		•*1	•*1						
20-200 µL					•*3	•*1	•*1						
30-300 µL					•*3	•*3	•*1						
100-1,000 µL								•*1	•*4				
0.5-5 mL										•*1			
1-10 mL											•*4		
Multi-channel													
0.5-10 µL	•*1	•*1	•*1										
10-100 µL				•*3		•*1	•*1						
30-300 µL					•*3	•*3	•*1						
Reference[®]													
Fixed volume													
1-10 µL	•	•	•										
10-100 µL					•	•							
200-1,000 µL							•	•					
1,500-2,500 µL													
Adjustable volume													
0.1-2.5 µL	•	•											
0.5-10 µL	•	•	•										
2-20 µL		•	•	•	•	•							
10-100 µL					•	•	•						
50-200 µL					•	•	•						
100-1,000 µL							•	•					
500-2,500 µL													
Xplorer[®]													
Single-channel													
0.5-10 µL	•*1	•*1	•*4										
5-100 µL				•*3	•*1	•*1	•*4						
15-300 µL					•*3	•*3	•*1						
50-1,000 µL								•*1	•*4				
0.25-5 mL										•*1			
0.5-10 mL											•*4		
Multi-channel													
0.5-10 µL	•*1	•*1	•*4										
5-100 µL				•*3	•*1	•*1	•*4						
15-300 µL					•*3	•*3	•*1						
50-1,200 µL								•*3	•*4				

*1 Pipette can be used with this tip.

*2 Pipette can be used with this tip. This tip was used to calculate the random and systematic error.

*3 Pipette can be used with this tip. Notice! Do not select a volume which exceeds the nominal volume of the tip, otherwise liquid may enter the pipette.

*4 Pipette can be used with this tip. When using the Xplorer with the Adjustment option, select ep.T.I.P.S. long in order to optimize the dispensing accuracy of this tip. If the Research plus is not adjusted accordingly by the user, the systematic error is increased by approximately a factor of 2 in comparison to standard tips.

Biomaster® 4830 and Mastertip®



Product features of Biomaster® 4830

- Single-handed tip attachment and ejection
- Lateral volume locking
- Ergonomic design
- UV-resistant and fully autoclavable
- Maintenance-free
- Three-year warranty

Application

- Contamination-free pipetting in positive displacement mode
- Ideal for liquids that are viscous (e.g., glycerol) or have high vapor pressure (e.g., ethanol, acetone)

Ordering information

Description	Order no.
Biomaster pipette kit , includes 1 Biomaster 4830 pipette with 1–20 µL continuous volume selection and 1 box of 96 Mastertips	4830 000.017

Description

Enjoy contamination-free pipetting with the Biomaster 4830 pipette, an adjustable pipette for the volume range from 1 µL to 20 µL.

With the Mastertip pipette tips, the pipette functions according to the positive displacement principle; thus, the formation of aerosols — a common cause of contamination — is eliminated.

Technical specifications

Volume:	Volume increment	Inaccuracy*2	Imprecision*1
2 µL	0.02 µL	±6.0 %	≤4.0 %
3 µL		±5.0 %	≤3.0 %
5 µL		±4.0 %	≤2.0 %
10 µL		±3.0 %	≤1.5 %
20 µL		±2.0 %	≤0.8 %
Liquid:	Bidistilled water		
Temperature:	20–25 °C, constant to ±0.2 °C		
Number of determinations:	10, in accordance with EN ISO 8655 using original Eppendorf® pipette tips		

*1 The data for random measurement error and *2 systematic measurement error according to EN ISO 8655 is valid only when original Eppendorf pipette tips are used.



Product features of Mastertips

- Ready-for-use piston integrated in tip
- 96 positive displacement tips per rack

Ordering information

Description	Order no.
Mastertips , includes ready-for-use piston, 5 racks of 96 tips	0030 001.320

Varipette® with Varitip P and Varitip S



Product features of Varipette

- Adjustable pipette for 1 mL to 10 mL
- Control button for volume selection
- Digital volume display
- Maintenance-free
- Exchangeable Varitips

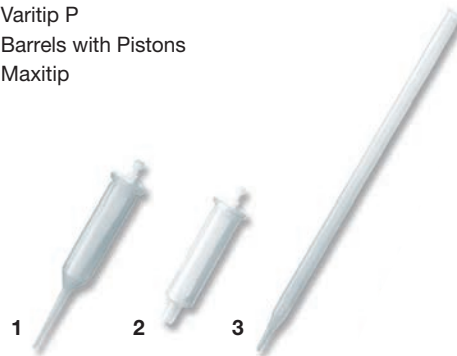
Description

The Varipette is an incrementally adjustable pipette for precise pipetting of volumes up to 10 mL (in 10 µL increments). Even liquids with a high vapor pressure or viscosity can be easily pipetted.

Ordering information

Description	Order no.	
Varipette , with continuous volume adjustment in the range from 1–10 mL	4720 000.011	
Adapter , for storing Varipette 4720 in carousel pipette stand 3115	4981 201.006	
Starter Kit (100 Maxitips, 10 dispensing parts, 10 valves)	0030 050.525	
Varitips P (fig. 1) , for aspirating from smaller vessels, set of 100	0030 048.130	
Varitip S for aspirating from narrow-neck vessels and volumetric flasks, consisting of:		
Barrels with Pistons (fig. 2) , for Varitip S, set of 30	0030 050.533	
Maxitip (fig. 3) , for Varitip S, set of 200	0030 050.568	
Valves , for Varitip S, set of 100	0030 050.541	

- 1 - Varitip P
- 2 - Barrels with Pistons
- 3 - Maxitip



Product features of Varitips

- Varitip P (fig. 1) for aspirating 1 mL to 10 mL from beakers using a positive displacement technique
- Varitip S (fig. 2): The dosing part, in combination with the Maxitip (fig. 3) forms a system for aspiration of between 2.5 mL and 10 mL liquid from high, narrow-mouth vessels – air displacement principle
- No carryover as Varitips are exchanged
- Valve for Maxitip ensures drip-free dispensing of liquids with a high vapor pressure
- Maxitip is graduated for dispensing accurate volumes of nonaqueous liquids

Description

The pipette tips for the Varipette are tailored to different vessels. For example, the Varitip P is designed for aspirating 1 mL to 10 mL from beakers, and it pipettes according to the positive displacement principle. The Varitip S for 2.5 mL to 10 mL forms a system with the Varipette, and it is used for aspirating liquids from tall, narrow-neck vessels.

Technical specifications

Nominal volume	Inaccuracy* ²	Imprecision* ¹
Varipette 4720 and Varitip S		
2.5 mL	±1.0 %	≤0.2 %
5 mL	±0.4 %	≤0.2 %
10 mL	±0.3 %	≤0.2 %
Varipette 4720 and Varitip P		
1.0 mL	±0.6 %	≤0.2 %
5 mL	±0.5 %	≤0.1 %
10 mL	±0.3 %	≤0.1 %
Measuring conditions in accordance with EN ISO 8655	bidest. water, 20 °C, n = 10	

*¹ The data for random measurement error and *² systematic measurement error according to EN ISO 8655 is valid only when original Eppendorf pipette tips are used.

Serial dispensing: Multipette® and Combitips plus®



reddot design award



Multipette Xstream



Multipette plus

**The instruments**

The electronic and manual Eppendorf Multipettes facilitate the performance of lengthy pipetting and dispensing series. Nine different Combitip sizes allow extraordinary flexibility when selecting the correct volume (1 μ L-50 mL). The integrated tip recognition automatically displays the dispensing volume you selected. You may dispense liquid up to 100 times without the need to refill the tip. The simple handling, unique flexibility and considerable time savings render the Multipette an important liquid handling tool in research as well as in routine laboratories. Symptoms of fatigue, which are commonly experienced when performing repetitive tasks, are noticeably reduced by the user-friendly design.

The consumables

The easy-to-apply Combitips plus are recognized by an integrated sensor, and the volume is automatically displayed. Thus, time-consuming volume calculations and faulty dispensing volumes are a thing of the past. Available in nine sizes, Combitips plus offer a dispensing range between 1 μ L and 10 mL (Multipette plus), and between 1 μ L and 50 mL (Multipette stream/Xstream),

respectively. This way, as an example, 100 x 250 μ L may be dispensed in succession without the need to refill the tip – always contamination-free!

The liquids

Combitips plus function by the direct displacement principle. They ensure dispensing of the correct volume, independent of relative density and viscosity of the liquids used. The direct displacement principle allows safe dispensing of radioactive and toxic substances, as well as of solutions with high vapor pressure. No aerosols are formed. Following use, the Combitips are detached by the simple push of a button and may be disposed of without fear of contamination.

The conclusion

The Eppendorf Multipette/Combitips system is a thoroughly developed system solution for repeat pipetting/dispensing, which is also recommended for the handling of dangerous, volatile and viscous liquids.

i For more information go to www.eppendorf.com/multipette

Electronic dispensing: Multipette stream® and Multipette Xstream®



Description

The Multipette stream and Xstream are the first electronic dispensers to combine easy handling with a broad range of features. The Multipette stream is suitable for all standard applications; for added versatility, such as titration and aspirating of supernatants, the Multipette Xstream is your first choice. When combined with the Combitips plus tip system, both dispenser/tip teams make an unbeatable and essential lab tool for all applications. More than 2,500 different volumes from 1 µL to 50 mL can be dispensed.

Application

- Electronic dispensing with programmable storage functions
- Ergonomic design for fatigue-free work
- Easy-to-read blue display
- Contamination-free dispensing according to the positive displacement principle
- Highly precise dispensing of viscous solutions (e.g. glycerol, oil), as well as liquids with high vapor pressure (e.g. acetone, ethanol: no dripping or running of the liquid)
- Dispensing in long series
- Simplest performance of serial dilutions

Multipette stream and Multipette Xstream at a glance		
Feature	Multipette [®] stream	Multipette [®] Xstream
Positive displacement principle	•	•
Rapid, ergonomic dispensing with motorized piston	•	•
Automatic Combitips plus [®] tip recognition	•	•
One button tip ejector	•	•
Volume range from 1 µL to 50 mL	•	•
Li-ion battery	•	•
Automatic dispensing	•	•
Pipetting	•	•
Dispensing	•	•
Aspiration (for example, supernatant removal)		•
Titration (e.g. Determination of buffer capacities)		•
Sequential dispensing (ideal for the performance of serial dilutions)		•



i For more information go to www.eppendorf.com/multipette

Manual dispensing: Multipipette® plus



Application

- Dispensing volumes in long series
- Contamination-free dispensing using the positive displacement principle
- Highly precise dispensing of viscous solutions (e.g. glycerol, oil), as well as liquids with high vapor pressure (e.g. acetone, ethanol; no dripping or running of the liquid)



The rounded, grooved grip of the Multipipette plus means easier dispensing with less stress on hand and thumb muscles.

Description

The Multipipette plus manual hand dispenser is the ideal precision instrument for faster dispensing of long pipetting series. Thanks to the large selection of volumes, the instrument is readily available for a large variety of flexible research and routine applications. The automatic volume display allows error-free dispensing, combined with ergonomic handling.

Product features

- Simplest handling
- Easy to read: automatic Combitip recognition with electronic volume display
- Easy volume setting
- More flexibility with 112 different volumes from 1 µL to 10 mL
- Up to 100 dispensings per filling for easy processing of long series
- Versatile, even for “uneven” volumes (e.g., 1 µL, 3 µL or 17 µL)
- Contaminant free working thanks to contact-free Combitip attachment and ejection

i For more information go to www.eppendorf.com/mpplus

Dispenser accessories: Eppendorf Combitips plus®



Product features

- Perfect system component for all Multipettes
- 1,000 selectable dosing volumes for every size of Combitips (Multipette stream/Xstream)
- 20 selectable dispensing volumes for every size of Combitips (Multipette plus)
- Higher throughput with up to 100 dispensings per filling
- Reliable results ensured by positive displacement system
- Available in Eppendorf Quality and Eppendorf Biopur purity levels
- 9 different sizes, 0.1 mL–50 mL
- Certified trace metal release
- Contamination-free dispensing



Description

In addition to standard purity, Combitips are also available as Eppendorf Biopur — signifying outstanding biological purity. Eppendorf Biopur® Combitips are guaranteed to be sterile and free of pyrogens, DNA, DNase, RNase, PCR inhibitors and ATP. They meet the most stringent demands of the medical, pharmaceutical and food industries, as well as PCR applications, molecular biology and cell technology labs. This purity is ensured through an automated manufacturing process, which safeguards the product against any contamination with biological substances. Individual lot certificates are available at www.eppendorf.com/certificates.

The rotating pipette stand design means that the Multipette plus is no longer held at the bottom, ruling out potential contamination from being put on a stand. Multipette, Multipette plus and Varipette pipettes can likewise be stored in the new pipette carousel (see page 75). For the electronic Multipette stream/Xstream a charging stand is available. In addition to the pipette carousel, there is the practical wall-mounted pipette bracket. This allows the Multipette pipette to always be within reach without wasting any valuable bench space.

Combitips plus® mounting rack



Product features

- Box with tray for storing up to 10 Combitips plus from 0.1 mL to 10 mL sizes
- Autoclavable
- Particularly suitable for storing sterile products
- Can also be used as a stand for Multipette plus
- Allows tips to be attached single-handedly
- Detachable sliding lid
- Nonslip stand
- Durable construction
- Labeling surface

Description

To save time and fully enjoy the improved convenience of the Multipette plus and Multipette stream/Xstream, we have developed the Combitips Rack — a box for 10 Combitips plus tips that helps you to easily and single-handedly attach the tips.

i For more information go to www.eppendorf.com/combitipsplus

Eppendorf Combitips plus® for Multipette® plus and Multipette stream®/Xstream®

Technical specifications

Combitips plus	Volume min./max.	Increment/step size	Max. dispensing volume	Volume	Systematic error*1	Random error*1
for Multipette® plus						
0.1 mL	1 µL 20 µL	1 µL	20 µL	2 µL 20 µL	±1.6 % ±1.0 %	≤3.0 % ≤2.0 %
0.2 mL	2 µL 40 µL	2 µL	40 µL	4 µL 40 µL	±1.3 % ±0.8 %	≤2.0 % ≤1.5 %
0.5 mL	5 µL 100 µL	5 µL	100 µL	10 µL 100 µL	±0.9 % ±0.8 %	≤1.5 % ≤0.6 %
1 mL	10 µL 200 µL	10 µL	200 µL	20 µL 200 µL	±0.9 % ±0.6 %	≤0.9 % ≤0.4 %
2.5 mL	25 µL 500 µL	25 µL	500 µL	50 µL 500 µL	±0.8 % ±0.5 %	≤0.8 % ≤0.3 %
5 mL	50 µL 1,000 µL	50 µL	1,000 µL	100 µL 1,000 µL	±0.6 % ±0.5 %	≤0.6 % ≤0.25 %
10 mL	100 µL 2,000 µL	100 µL	2,000 µL	200 µL 2,000 µL	±0.5 % ±0.5 %	≤0.6 % ≤0.25 %
25 mL	250 µL 5,000 µL	250 µL	5,000 µL	500 µL 5,000 µL	±0.4 % ±0.3 %	≤0.6 % ≤0.25 %
50 mL	500 µL 10,000 µL	500 µL	10,000 µL	1,000 µL 10,000 µL	±0.3 % ±0.3 %	≤0.5 % ≤0.3 %
for Multipette® stream/Xstream						
0.1 mL	1 µL 100 µL	0.1 µL	0.1 mL	10 µL 100 µL	±1.6 % ±1.0 %	≤2.5 % ≤0.5 %
0.2 mL	2 µL 200 µL	0.2 µL	0.2 mL	20 µL 200 µL	±1.3 % ±1.0 %	≤1.5 % ≤0.5 %
0.5 mL	5 µL 500 µL	0.5 µL	0.5 mL	50 µL 500 µL	±0.9 % ±0.9 %	≤0.8 % ≤0.3 %
1 mL	10 µL 1 mL	1 µL	1 mL	100 µL 1,000 µL	±0.9 % ±0.6 %	≤0.55 % ≤0.2 %
2.5 mL	25 µL 2.5 mL	2.5 µL	2.5 mL	250 µL 2,500 µL	±0.8 % ±0.5 %	≤0.45 % ≤0.15 %
5 mL	50 µL 5 mL	5 µL	5 mL	500 µL 5,000 µL	±0.8 % ±0.5 %	≤0.35 % ≤0.15 %
10 mL	100 µL 10 mL	10 µL	10 mL	1,000 µL 10,000 µL	±0.5 % ±0.4 %	≤0.25 % ≤0.15 %
25 mL	250 µL 25 mL	25 µL	25 mL	2,500 µL 25,000 µL	±0.3 % ±0.3 %	≤0.35 % ≤0.15 %
50 mL	500 µL 50 mL	50 µL	50 mL	5,000 µL 50,000 µL	±0.3 % ±0.3 %	≤0.5 % ≤0.15 %

*1 The data for systematic error and random error according to EN ISO 8655 is valid only when original Eppendorf Combitips plus are used.

Multipette®, Combitips plus® and accessories



Ordering information

Description	Order no.		Order no.	
Multipette plus	4981 000.019			
Multipette stream , includes charging adapter, 100–240 V/50–60 Hz	4986 000.017			
Multipette Xstream , includes charging adapter, 100–240 V/50–60 Hz	4986 000.025			
Charging stand , for Multipette stream/Xstream, holds one unit	4880 000.018			
Multipette charging tray for pipette charging rack	4880 601.003			
Multipette plus adapter, for pipette carousel stand	4981 201.006			
Multipette plus Wall Mount	4981 203.009			
Combitip Rack , for mounting Combitips plus tips	0030 069.897			
Combitips plus	Standard (set of 100)		Eppendorf Biopur®* (individually wrapped, set of 100)	
0.1 mL	0030 069.200		0030 069.404	
0.2 mL	0030 069.218		0030 069.412	
0.5 mL	0030 069.226		0030 069.420	
1.0 mL	0030 069.234		0030 069.439	
2.5 mL	0030 069.242		0030 069.447	
5.0 mL	0030 069.250		0030 069.455	
10 mL	0030 069.269		0030 069.463	
25 mL	0030 069.293		0030 069.390	
50 mL	0030 069.277		0030 069.471	
25 mL adapter , (1 piece), blue	0030 069.528			
50 mL adapter , (1 piece), dark gray	0030 069.161			
25 mL adapter , (set of 7)			0030 069.498	
50 mL adapter , (set of 7)			0030 069.480	
Combitips plus tips assortment pack , includes five of each size plus one 50 mL and one 25 mL adapter	0030 069.285			
Combilong (set of two) , aspirating aid for removing liquids from volumetric flasks and tall bottles; Combitips plus tips sizes 5 mL, 25 mL and 50 mL	0030 059.506			

*1 Eppendorf Biopur Combitips (individually packed) are guaranteed to be sterile and free of pyrogens, DNA, DNase, RNase, PCR inhibitors and ATP.

➔ For pipette service and maintenance information, see page 50.

Volume table: Combitips plus®/Multipette® plus

Volume table for using Combitips plus with the Multipette® plus:

(The positions and dispensing steps which are marked in **bold** are based on Combitips plus used with the Multipette 4780)

Position of the volume selection dial:																				
	0.5	1/1	1.5	2/2	2.5	3/3	3.5	4/4	4.5	5/5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	10
Maximum number of dispensing volumes:																				
	100	50/48	33	25/23	20	16/15	14	12/11	11	10/8	9	8	7	7	6	6	5	5	5	5
Combitip® plus with the following volumes:																				
0.1 mL	1 µL	2 µL	3 µL	4 µL	5 µL	6 µL	7 µL	8 µL	9 µL	10 µL	11 µL	12 µL	13 µL	14 µL	15 µL	16 µL	17 µL	18 µL	19 µL	20 µL
0.2 mL	2 µL	4 µL	6 µL	8 µL	10 µL	12 µL	14 µL	16 µL	18 µL	20 µL	22 µL	24 µL	26 µL	28 µL	30 µL	32 µL	34 µL	36 µL	38 µL	40 µL
0.5 mL	5 µL	10 µL	15 µL	20 µL	25 µL	30 µL	35 µL	40 µL	45 µL	50 µL	55 µL	60 µL	65 µL	70 µL	75 µL	80 µL	85 µL	90 µL	95 µL	100 µL
1.0 mL	10 µL	20 µL	30 µL	40 µL	50 µL	60 µL	70 µL	80 µL	90 µL	100 µL	110 µL	120 µL	130 µL	140 µL	150 µL	160 µL	170 µL	180 µL	190 µL	200 µL
2.5 mL	25 µL	50 µL	75 µL	100 µL	125 µL	150 µL	175 µL	200 µL	225 µL	250 µL	275 µL	300 µL	325 µL	350 µL	375 µL	400 µL	425 µL	450 µL	475 µL	500 µL
5 mL	50 µL	100 µL	150 µL	200 µL	250 µL	300 µL	350 µL	400 µL	450 µL	500 µL	550 µL	600 µL	650 µL	700 µL	750 µL	800 µL	850 µL	900 µL	950 µL	1.0 mL
10 mL	100 µL	200 µL	300 µL	400 µL	500 µL	600 µL	700 µL	800 µL	900 µL	1.0 mL	1.1 mL	1.2 mL	1.3 mL	1.4 mL	1.5 mL	1.6 mL	1.7 mL	1.8 mL	1.9 mL	2.0 mL
25 mL*	250 µL	500 µL	750 µL	1.0 mL	1.25 mL	1.5 mL	1.75 mL	2.0 mL	2.25 mL	2.5 mL	2.75 mL	3.0 mL	3.25 mL	3.5 mL	3.75 mL	4.0 mL	4.25 mL	4.5 mL	4.75 mL	5 mL
50 mL*	500 µL	1.0 mL	1.5 mL	2.0 mL	2.5 mL	3.0 mL	3.5 mL	4.0 mL	4.5 mL	5 mL	5.5 mL	6.0 mL	6.5 mL	7.0 mL	7.5 mL	8.0 mL	8.5 mL	9.0 mL	9.5 mL	10 mL

* 25 mL and 50 mL Combitips plus must be used with the supplied adapter.

Combitips® for use with original Multipette® and Multipette® plus/8 accessories

All Combitips and Combitips plus form a reliable and precise system for positive displacement dispensing in combination with the original Multipette. Combitips are also available in Eppendorf Biopur quality, for the utmost purity and reliability.

Ordering information

Description	Order no.	Order no.
Combitips	Standard set of 100	Biopur®*1 (individually wrapped, 100 pieces)
1.25 mL	0030 048.083	0030 048.407
12.5 mL	0030 048.024	0030 048.431
Plus/8 accessories		
Plus/8-Cartridge, sterile		
for 100 µL pipette tips, set of 18/180 pieces, per 10 pieces	0030 058.500	
for 1.25 mL pipette tips, set of 18/180 pieces, per 10 pieces	0030 058.542	
Plus/8-Cartridge, non-sterile		
for 100 µL pipette tips, set of 18/360 pieces, per 20 pieces	0030 058.534	
for 1.25 mL pipette tips, set of 18/360 pieces, per 20 pieces	0030 058.518	

*1 Eppendorf Biopur Combitips (individually packed) are guaranteed to be sterile and free of pyrogens, DNA, DNase, RNase, PCR inhibitors and ATP.

Easypet®



Product features

- Suitable for pipettes from 0.1 mL to 100 mL
- Lightweight, balanced design provides comfortable, fatigue-free operation
- Touch-control adjustable speed for rapid or slow pipetting needs
- Fine control of the meniscus movement
- High aspirating speed: 25 mL in 5 seconds
- One-finger control for the dispensing and blow-out functions
- Cordless, works for up to seven hours after recharging
- Autoclavable pipette adapters and filter holders
- Space-saving wall holder
- Membrane filter exchangeable

Description

Accurate, safe and fatigue-free series pipetting using graduated pipettes is possible with the Easypet. The device responds exactly to finger pressure for slow or rapid aspiration, setting the meniscus or emptying the pipette.

Application

- For graduated and one-mark pipettes from 0.1 mL to 100 mL



Ordering information

Description	Order no.	
Easypet , with transformer, wall holder and two membrane filters/0.45 µm	4421 000.013	⚡
Membrane filter , 0.45 µm for Easypet 4420 000.010, sterile, set of 5	4420 803.007	
Membrane filter , 0.45 µm for Easypet 4421 000.030, sterile, PTFE, set of 5	4421 601.009	
NiMH batteries KR 15/30 (set of 3)	4420 810.003	
Wall-mountable holder	4420 815.005	

ⓘ For more information go to www.eppendorf.com/easypet

⚡ Ordering informations for other voltage options begins on page 471.

Varispenser plus™/Varispenser®



Product features

- Extensive volume range (6 sizes)
- PFA-sealing of the slide piston prevents jamming
- Wiping piston design prevents crystallization of liquid
- Highly resistant to chemicals
- Rapid volume setting using precise graduation scale
- Easy disassembling and cleaning
- Telescopic filling tube for use with most bottles

Description

Our Varispenser and Varispenser plus are ideal for dispensing aliquots of liquid from large supply bottles. Their smart design make them capable of extracting reproducible dispensing volumes with no reagent waste. Their tight seal provides the best possible protection against contact with caustic media, such as solvents, and they are chemically resistant and fully autoclavable for the utmost in safety for you and your lab.

Application

- For dispensing aliquots of liquids

Technical specifications

Size	Volume range	Dispensing steps	Inaccuracy* ¹	Imprecision* ¹
1	0.50-2.50 mL	0.05 mL	±0.6 %	≤0.1 %
2	1.00-5.00 mL	0.10 mL	±0.5 %	≤0.1 %
3	2.00-10.0 mL	0.20 mL	±0.5 %	≤0.1 %
4	5.00-25.0 mL	0.50 mL	±0.5 %	≤0.1 %
5	10.0-50.0 mL	1.00 mL	±0.5 %	≤0.1 %
6	20.0-100.0 mL	2.00 mL	±0.5 %	≤0.1 %
Liquids		Bidistilled water		
Temperature		20 °C constant to ±0.5 °C		
Number of determinations		10 in accordance with EN ISO 8655		

*¹ The data for imprecision (random measurement error) and inaccuracy (systematic measurement error) are given according to EN ISO 8655.

Ordering information

Varispenser: Bottletop dispenser, for external bottle threads of 32 mm (sizes 1, 2 and 3) or 45 mm (sizes 4, 5 and 6), complete with telescopic tube, tool and 3 adapters (see below). Quality certificate.

Varispenser plus: same as Varispenser, plus recirculation valve, valve toggle and media-specific fine adjustment.

Size	Volume range	With 3 adapters for outer diameters (mm)	Order no. Varispenser plus	Order no. Varispenser
1	0.5–2.5 mL	28, 40, 45	4961 000.012	4960 000.019
2	1.0–5.0 mL	28, 40, 45	4961 000.020	4960 000.027
3	2.0–10.0 mL	28, 40, 45	4961 000.039	4960 000.035
4	5.0–25.0 mL	32, 38, 40	4961 000.047	4960 000.043
5	10.0–50.0 mL	32, 38, 40	4961 000.055	4960 000.051
6	20.0–100.0 mL	32, 38, 40	4961 000.063	4960 000.060
Discharge tube, spiral				4960 824.003
80 cm for Varispenser/Varispenser plus, up to 10 mL				
Discharge tube, spiral				4960 825.000
80 cm for Varispenser/Varispenser plus, for 25–100 mL				

Bottle top dispensers do not replace a bottle cap! The system is open; therefore volatile solutions may escape over time.

➔ For more information go to www.eppendorf.com/varispenser

Top Buret



Product features

- Patented recirculation valve for priming without loss of reagent
- Voltage supply with long-life primary cells and charging-display
- Dispensing range from 0.01 mL to 999.9 mL
- Removable electronics unit
- Modular, service-friendly construction
- Simple calibration program
- Discharge tube can be rotated a full 360°
- Adjustable filling tube horizontal: 142-220 mm; vertical: 10-200 mm
- Telescopic filling tube for automatically setting the length from 210 mm to 370 mm
- For 45 mm bottle threads

Description

Our innovative Top Buret sets new standards for manual titration. Its pulse-free dispensing technique allows the desired volumes to be dispensed continuously, thus making titration simpler and safer, with precision values well within required limits. The volume is dispensed by simply rotating the wheels: Model M features a dispensing rate of 2,500 μL per rotation; Model H features a rate of 5,000 μL per rotation. The display readings on both models range from 0.01 mL to 999.9 mL. This bottle-top buret is extremely sturdy, and its user-friendly display and control features provide simple, fatigue-free operation.

Application

- Continuous, pulse-free dispensing technique for rapid titration

Ordering information

Description	Order no.	
Top buret with safety valve, telescopic aspiration tube, adjustable discharge tube, for 45 mm bottle threads, incl. three adapters for 40/38/32 mm threads, two 1.5 V microbatteries, certificate of conformity		
Top Buret M	4965 000.017	
Top Buret H	4965 000.025	
Dry tube	4960 851.000	

Bottle top dispensers do not replace a bottle cap! The system is open; therefore volatile solutions may escape over time.

epMotion® automated pipetting system



General product features

- Pipetting range from 1 μ L to 1,000 μ L
- Best pipetting accuracy, CV values typically 1.6 % at <5 μ l
- Compatible with tubes and plates up to 384 wells
- Calibrated single-channel and multi-channel pipetting tools calibrated to EN ISO 8655
- Completely contained housing including door safety mechanism
- Optical sensor* for identification of labware, tips and reagent volumes
- Compact control panel for easy programming
- PC software optional

*Patent US 6,819,437 B2

5075 models options

- Plate gripper
- Up to 3 temperature control positions


epMotion selection guide

Model	Capacity	Applications examples
5070	4-position deck and 3 virtual positions	All routine pipetting, sample and reagent transfer, real-time PCR set-up, cell-based and immunoassay set-up
5070 CB	4-position deck and 3 virtual positions	Cell handling inside a laminar flow hood
5075 LH	12-position deck	All routine pipetting, sample and reagent transfer, real-time PCR set-up, cell-based and immunoassay set-up
5075 VAC	11-position deck and 1 vacuum station	Walk away nucleic acid extraction with ready to go protocols. Filtration and SPE, <i>In-vitro</i> plasmid amplification.
5075 MC	9 positions deck and 1 position for Mastercycler® ep	Fully automated PCR; Set-up and cycling
5075 TMX	11-position deck and 1 Thermomixer® position	All routine pipetting, sample and reagent transfer, real-time PCR set-up, cell-based and immunoassay set-up, magnetic bead based nucleic acid purification

① For more information go to www.eppendorf.com/epmotion

epMotion® Applications

General Liquid Handling Applications		Product	Literature
Dilution series		epMotion 5070/5075	Application Note 119
Reformatting of plates from 96 wells to 384 wells		epMotion 5070/5075	
Plate replication in 24 well, 96 well, or 384 well formats		epMotion 5070/5075	
Normalization of samples, e.g. DNA/RNA		epMotion 5070/5075	User Guide 15
Hit-picking		epMotion 5070/5075	Application Note 015
Loading of 96-well agarose E-gels		epMotion 5070/5075	User Guide 6
Pipetting of chemicals, e.g. DMSO		epMotion 5070/5075	Application Note 104
Pooling of samples from plates to tubes		epMotion 5070/5075	
Genomics Applications	Sample Type	Product	Literature
Nucleic acid purification	Plasmid DNA	epMotion 5075 VAC	Application Note 95
	BAC DNA	epMotion 5075 VAC	Application Note 94
	PCR products	epMotion 5075 VAC	Application Note 175
	Genomic DNA – blood	epMotion 5075 VAC	Application Note 172, 167, 169, 161
	Total RNA – cultured cells	epMotion 5075 VAC	Application Note 111, 171, 163
Genomic DNA – plant	Genomic DNA – plant	epMotion 5075 LH/5075 TMX	Application Note 124, 126, 210, 230
	Genomic Tissue	epMotion 5075 VAC	Application Note 173
	Genomic Bacterial	epMotion 5075 VAC	Application Note 169
<i>In-vitro</i> plasmid amplification	Bacterial colonies	epMotion 5075 MC	Application Note 133
Aliquoting oligonucleotide targets for array spotting	DNA samples	epMotion 5070	Human-58K-Oligonukleotid-Chip. NCBI, GEO-Profiles, Platform GPL2761
PCR setup Applications	Sample Type	Product	Literature
Real-time PCR diagnostics of HBV and Salmonella	Plasma and stool samples	epMotion 5070/5075 LH	Application Note 81
	mRNA	epMotion 5070	Biospektrum, 2005, 5, 678-679
	Human genomic DNA	epMotion 5070/5075 LH	Application Note 119
PCR setup in 384 well PCR plates	Human genomic DNA	epMotion 5070/5075 LH	Bionews 20
Forensic Applications	Sample Type	Product	Literature
PCR von FTA-Karten	Buccal-swabs	epMotion 5075 MC	Application Note 136
Nukleinsäureaufreinigung	Blood stains, swabs, cigarette butts	epMotion 5075 LH	Application Note 141, 193, 224
Proteomics Applications	Sample Type	Product	Literature
Protein purification of 6xHis tagged proteins	<i>E. coli</i> cell lysates	epMotion 5075 VAC	Product manual Ni-NTA Superflow 96 BioRobot Kit (Qiagen)
Cell based assay Applications	Sample Type	Product	Literature
Cytotoxicity assays	Cell cultures	epMotion 5070/5075	Application Note 195
Apoptosis assay	Cell cultures	epMotion 5075 TMX	Application Note 209
Routine cell culture work	Sample Type	Product	Literature
Automated cell seeding	Cell cultures	epMotion 5070 CB	Application Note 194, 205
Transformation and transfer to 24-well agar plates	Bacteria	epMotion 5075 LH/TMX	Application Note 217
ELISA Applications	Sample Type	Product	Literature
Pancreatic elastase 1 detection	Stool samples	epMotion 5070	Application Note 138

 For more information go to www.ependorf.com/epmotion

epMotion® 5070



Product features

- 4 microplate format positions
- Pipetting range from 1 to 1,000 μL
- Compatible with micro- and PCR-plates
- Compatible with plates up to 384 wells
- Compatible with tubes from 0.2 to 50 mL
- Liquid level detection without conductive tips
- Optical sensor* checks the loaded deck
- Safety hood with monitored front door
- Easy exchangeable pipetting tool
- Innovative control panel
- Optional PC control version

* US patent 6,819,437 B2

i For more information go to www.eppendorf.com/epmotion

epMotion® 5070

Applications

- Serial dilutions
- Reagent distribution
- Reformatting into plates
- Sample transfer from tubes to plates
- Sample normalization
- Media change for cell culture
- Real-time PCR set-up
- Cell based assay set-up
- Immunoassay set-up



30 mL and 100 mL reagent reservoirs

The reagent reservoirs are “PCR clean” as well as autoclavable, and they can be easily placed in the reagent rack; their special geometry minimizes residual volume and makes them ideal vessels for reagents.

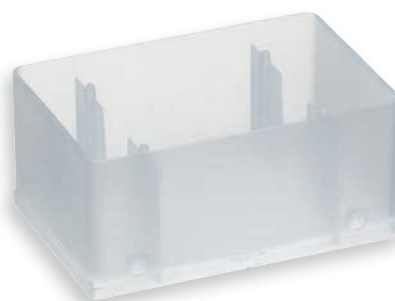


Thermorack for 24 x Safe-Lock tubes

Rack for the automated handling of up to 24 Safe-Lock® tubes in 0.5 or 1.5/2.0 mL format. Rack can be precooled.

Description

The *epMotion 5070* is the most compact solution for accurate and reproducible automated pipetting. It is a perfect match for all routine applications as serial dilutions, reagent distribution, sample transfer from tubes to plates and sample normalization. Due to the excellent pipetting accuracy the *epMotion* is the recommended solution for real-time PCR set-up. Enabling set-ups with less reagent volume and excellent reproducibility. Pipetting technology is based on the classic Eppendorf piston stroke pipettes and allows protocols previously carried out manually to be easily transferred to the *epMotion 5070*. Established procedures can be maintained due to the compatibility to a wide range of predefined consumables. The *epMotion 5070* is equipped with the optical sensor* which checks before every run if the required labware is correctly positioned on the deck and also for tip type and quantity available. Operating software: MotionManager v4.0 or higher; Firmware: MotionInstrument v4.0 or higher



400 mL Reservoir

For large volume pipetting tasks a 400 mL reservoir made of highly crystalline PP is available. It can also be transported with the gripper within the *epMotion*.

epMotion® 5075 LH



Product features

- 12 microplate format positions
- Automatic exchange of all tools
- Pipetting range from 1 to 1,000 μ L
- Thermal module option
- Plate gripper option
- Compatible with tubes from 0.2 to 50 mL
- Compatible with plates up to 384 wells
- Plate stacking
- Optical sensor* checks the loaded deck
- Detection of tip size and tip quantity
- Safety hood with monitored front door
- Innovative control panel
- Optional PC control version
- Modular system:
 - Upgrade to 5075 VAC, TMX or MC is possible
- Liquid level detection without carbonized tips

* US patent 6,819,437 B2

i For more information go to www.eppendorf.com/epmotion

epMotion® 5075 LH

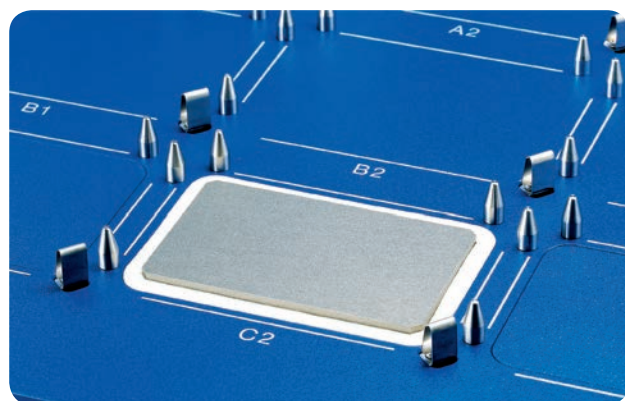
Applications

- Serial dilutions
- Reagent distribution
- Reformatting into plates
- Sample transfer from tubes to plates
- Sample normalization
- Pooling of samples
- Media change for cell culture
- Real-time PCR set-up
- Immuno- and cell-based-assay set-up
- Compound testing
- Magnetic bead applications



Reservoir rack with tube modules

Individually configured and temperature controlled.



Thermoblock for PCR plates

Thermal block holds 96- or 384-well PCR plates.

Description

The epMotion 5075 LH is the solution for advanced liquid handling procedures. It offers the same outstanding accuracy and precision as the epMotion 5070 making it an ideal tool for demanding small volume applications as real time PCR set-up, magnetic bead purification and all routine pipetting tasks. The 12 position decks and the automatic tool exchange expand the application range to complex patterns and higher sample numbers. With the heating, cooling and the gripper option the epMotion 5075 LH is the most flexible and adaptable automated pipetting system. Operating software: MotionManager v4.0 or higher; Firmware: MotionInstrument v4.0 or higher

Technical specification

Cycler unit	5075 LH
Heat-cooling unit	-
Tempering unit (optional)	
Setting range	0-110 °C
Heating time of the heating/ cooling plate	from 25-95 °C in 8 min
Cooling time of the heating/ cooling plate	from 25-4 °C in 5 min

epMotion® 5075 VAC

**Product features**

All the features and benefits of the 5075 LH plus many more:

- 11 microplate format positions
- 1 vacuum position
- Integrated vacuum pump
- Vacuum is fully software controlled
- Universal spring-loaded vacuum frame

i For more information go to www.eppendorf.com/epmotion

epMotion® 5075 VAC

Applications

All the features and benefits of the 5075 LH plus many more:

- Vacuum purification applications
- Solid phase extraction
- Filtration
- Predefined and tested methods for:
 - Plasmid and BAC purification
 - gDNA from blood and tissue
 - gDNA from plants
 - Sequencing and PCR clean-up
 - Total RNA

Description

Tedious and complex applications such as nucleic acid purification should not tie lab personnel to the workbench. The epMotion 5075 VAC allows true walk away automation of purification protocols based on the robust and reliable vacuum technology. Tested protocols are available for most standard applications such as plasmid DNA, genomic DNA and RNA purification. The protocols are predefined and the system set-up takes only a few minutes. Additional customized applications can be developed easily using the control panel or the optional epMotion PC software. The unique Eppendorf silicon mat saves time and money. It allows you to use portions of a 96 well plate when working with smaller sample numbers. The VAC Thermo lid reduces the extraction time substantially by accelerating the ethanol evaporation step. Operating software: MotionManager v4.0 or higher; Firmware: MotionInstrument v4.0 or higher



Integrated vacuum station

Compact system with a completely integrated vacuum chamber and pump.

Technical specification

Cycler unit	5075 VAC
Heat-cooling unit	-
Tempering unit (optional)	
Setting range	0-110 °C
Heating time of the heating/ cooling plate	from 25-95 °C in 8 min
Cooling time of the heating/ cooling plate	from 25-4 °C in 5 min



Labware handling

Use of a gripper for automated reconfiguration of the vacuum chamber and transport of plates.

epMotion® 5075 TMX

**Product features**

All the features and benefits of the 5075 LH plus many more:

- 11 microplate format positions
- In addition, one temperature controlled mixing position
- Temperature range RT -15 °C below to 95 °C
- Automatic fixation of the labware
- Pipetting on other worktable positions is possible while the mixer is in operation
- Modular system: The 5075 TMX can be upgraded with a vacuum unit

i For more information go to www.eppendorf.com/tmx

epMotion® 5075 TMX

Applications

- Bead based nucleic acid purification technologies
- Immunoassays
- Cell assays
- PCR, real-time PCR and sequencing set-up
- Serial dilutions
- Hit picking
- Concentration normalisation

Description

The epMotion 5075 TMX is equipped with a fully integrated mixer unit which can be brought to a specified temperature. This allows a fully automated sample preparation without the necessity of user intervention. The mixer is designed to dissolve pellets, e.g. cultivated *E.coli* or magnetic bead applications. The thermo unit of the shaker ensures the right temperature in the individual tubes and microplates from 4 ° to 95 °C. By using Peltier elements, an additional water bath becomes unnecessary. The epMotion 5075 TMX is the ideal tool for a magnetic bead based nucleic acid extraction from blood or tissue or for cell separation purposes. Operating software: MotionManager v4.0 or higher; Firmware: MotionInstrument v4.0 or higher



Integrated temperature controlled mixing (TMX) module

Shakes and heats/cools sample tubes and plates.

Technical specification

Cycler unit	5075 TMX
Heat-cooling unit	-
Tempering unit (optional)	
Setting range	0-110 °C
Heating time of the heating/ cooling plate	from 25-95 °C in 8 min
Cooling time of the heating/ cooling plate	from 25-4 °C in 5 min



Gripper tool option

The gripper moves plates around the deck, loads and unloads the TMX module. Microplates and Deepwell Plates can be stacked using the gripper option.

epMotion® 5075 MC



Product features

- Like 5075 LH, but with 9 ANSI/SBS microplate positions
- option to integrate a Mastercycler ep with motorized lid:
- 96 or 384 well block option
- Premium aluminum or high-speed silver block
- Integrated Mastercycler ep software
- Unique „CycleLock“ silicone locking system
- PCR reaction and pipetting possible in parallel

Purchase of this instrument conveys a limited non-transferable immunity from suit for the purchaser's own use under certain non real-time thermal cycler patents licensed from Applied Biosystems, LLC.

i For more information go to www.eppendorf.com/epmotion

epMotion® 5075 MC

Applications

All the features and benefits of the 5075 LH plus many more:

- Fully automated sample preparation and subsequent amplification in the Mastercycler ep
- Automated PCR and RT-PCR in 96-/384-well plate format
- Automated sequencing reactions in 96-/384-well plate format
- In-vitro plasmid amplification
- Automated DNA extraction and profiling of forensic FTA® samples

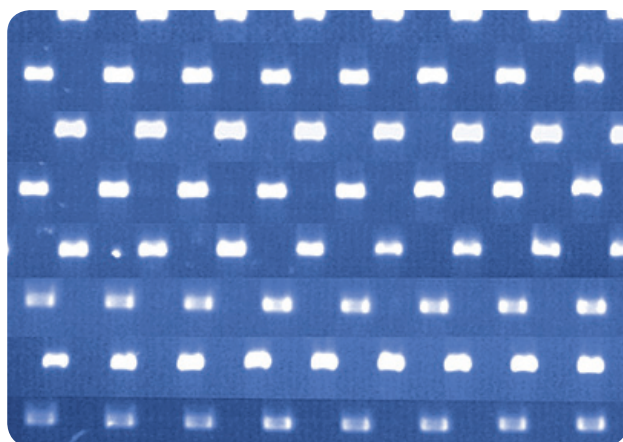
Description

The *epMotion* 5075 MC allows sample preparation and DNA amplification within an integrated system and, thus, fully automated DNA analytics. The *epMotion* 5075 MC may be equipped with any Eppendorf Mastercycler ep model with motorized lid. The Mastercycler software is fully integrated into *epMotion* 5075 MC as well, consequently, both systems can be programmed and operated with an identical control panel. Operating software: MotionManager v4.0 or higher; Firmware: MotionInstrument v4.0 or higher



Ready to go

The Mastercycler ep and *epMotion* 5075 are perfectly compatible, e.g., for direct filling of 384-well plates in the thermal block.



Dispensing without cross-contamination

Amplification of the 535 bp fragment of the human b-globin gene in 384-well format. Every other well contains a negative control in a checkerboard pattern.

Technical specification

Cycler unit	5075 MC
Heat-cooling unit	96 AI, 96 Ag, 384 AI
Tempering unit (optional)	
Setting range	0-110 °C
Heating time of the heating/ cooling plate	from 25-95 °C in 8 min
Cooling time of the heating/ cooling plate	from 25-4 °C in 5 min

epMotion® 5070 CB

**Product features**

- Can be integrated in common laminar flow hoods
- Innovative light barrier technology
- Pre-programmed cell culture labware
- Sterile pipette tips
- Autoclavable pipetting tools

i For more information go to www.eppendorf.com/epmotion

epMotion® 5070 CB

Applications

- Seeding cells
- Aliquoting cells
- Medium changes
- Apoptosis tests
- Cytotoxicity test
- Cell viability test
- Soft agar test

Description

epMotion 5070 CB is the automated pipetting system for cell culture applications. The epMotion 5070 CB enables automated pipetting inside a laminar flow or fume hood. Key processes such as seeding cells, media change, cytotoxicity tests or handling hazardous materials can be automated. The epMotion 5070 CB is compatible with 6-, 24- or 48-well plates or even denser formats such as 96- or 384-well plates. Almost all single tube sizes e.g. Safe-Lock, cryo- or large tubes up to 50 mL are supported. Operating software: MotionManager v4.0 or higher; Firmware: MotionInstrument v4.0 or higher



epMotion 5070 CB

Used inside a laminar flow hood.



Thermorack for Cryotubes

Rack with pre-cooling capability for up to 24 cryotubes.

epMotion® automated pipetting system accessories

**Dispensing tools**

6 dispensing tools from 1 μL to 1,000 μL are available: 3 single-channel and 3 multichannel (see accessories, page 105).

**Reservoir rack**

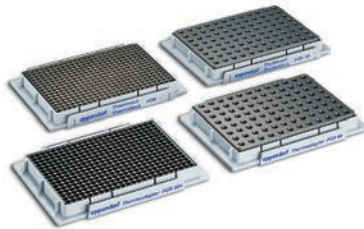
For holding up to 7 reservoir rack modules or reagent reservoirs. Temperature controlled when used with a thermal module.

**Reservoir rack modules TC**

Modules for the reservoir rack. 7 module sizes are available to use tubes from 0.2 mL PCR to 50mL tubes. Temperature controlled when used with a thermal module.

**Height adapter**

Various height adapters allow exact height level adjustment and accelerated processing of PCR and deepwell plates.

**Thermoracks and adapter**

For use with 96-well or 384-well plates and single 0.2 mL tubes. Temperature controlled when used with a thermal module.

**Thermoadapter DWP 96**

For heating or cooling of deepwell plates. Plates can be exchanged by the gripper.

NEW!

**Thermoadapter LC Sample**

This adapter has been specially designed for the filling and temperature control of MagNA Pure LC sample cartridge.

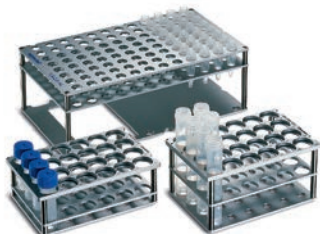
NEW!

**Adapters for work desk adjustment**

The adapters can be screwed under the workstation in order to increase the working height from 5.5 cm up to a maximum of 16.5 cm.

**Thermoracks for 24 x Safe-Lock 0.5 mL/1.5 mL/2.0 mL tubes**

Temperature controlled when used with a thermal module.

**Racks for single test tubes**

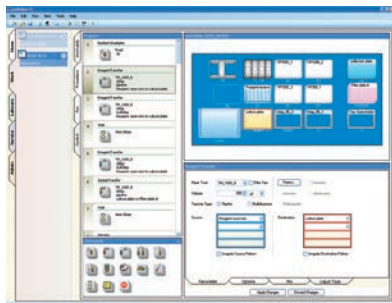
For glass or plastic micro test tubes.

**Gripper for epMotion 5075**

For the transport of plates on the deck, sealing of plates with CycleLock and for automatic operation of the vacuum manifold.

i For more information go to www.eppendorf.com/epmotion

epBlue™ – epMotion® PC software



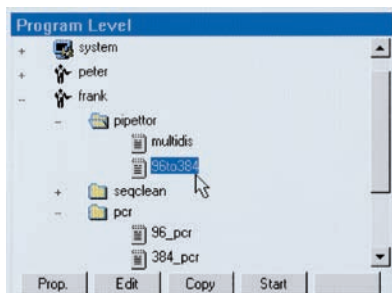
Product features

- Graphical user interface
- Main menu with direct access to the main functions
- 3D view of the workstation and run simulation
- E-mail notification
- Password protected user administration
- CSV file import ability for normalization and cherry picking
- Printing and archiving log files
- ActiveX interface
- Preinstalled on epMotion PC models

Description

Simple and clear. epBlue takes you through your everyday pipetting tasks. Choose your objective in the home section and follow the epBlue commands from left to right with innovative guiding menus. Pipetting pattern recognition, labware database and liquid classes make time-consuming procedures a breeze to program. Simply set-up your worktable, select the pipetting commands, simulate and launch. Operating and programming epBlue is easy and fast.

epMotion® Control Panel software



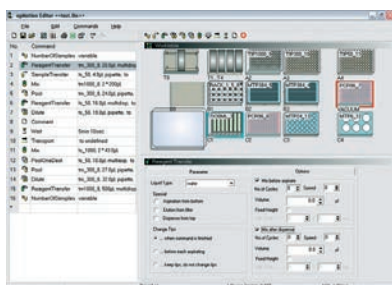
Product features

- LC color display
- Interfaces for keyboard and mouse
- Graphical user interface
- Drag and drop programming
- Windows Explorer style organization
- User management
- Run reports
- MMC card for backups
- Software preinstalled on the control panel

Description

The control panel enables programming and control of the epMotion in an ultra-compact design without the need for an additional PC or monitor. All typical epMotion functions that make programming easy, such as pipetting pattern recognition, labware database and liquid classes, are included in the control panel software.

epMotion® Editor



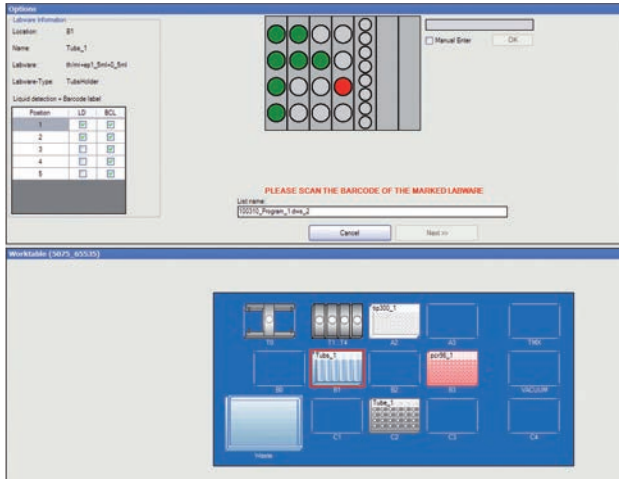
Product features

- Graphical user interface
- Programming functions analogous to the control panel software
- Print function
- Archiving function
- CSV file import ability for normalization and cherry picking

Description

Offline PC software for epMotion. With the PC Editor methods can be generated and edited on a PC. Data is transferred to the epMotion control panel via the MMC card.

epBlue ID™ – epMotion® PC software



Graphical guidance of the labware to be scanned.
Sample and labware documentation status.
Visualisation of the samples, plates or reagents on the worktable

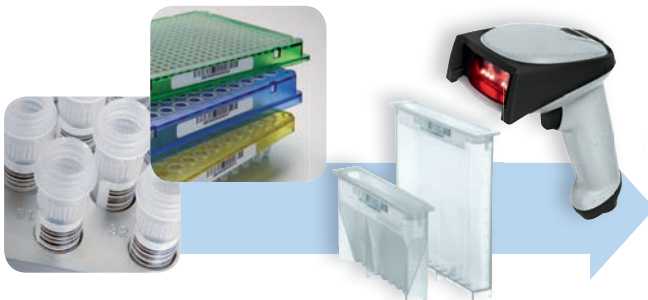
Description

epBlue ID is a software module for epBlue™, the epMotion PC software. With epBlue ID the epMotion can now be employed in application areas requiring process documentation. epBlue ID allows simple and safe data exchange with your laboratory information management system: Barcoded samples, plates and reagents will be scanned manually, their origin and destination will be recorded and documented.

After processing the samples epBlue ID will create a result file and a comprehensive GLP standard run report for documentation purposes. The universal barcode scanner is compliant with all common barcode types including 2D barcodes.

Product features

- Intuitive
 - Simple operation
 - Visual guidance of the scanning process
 - Automated worktable check
- Universal
 - Scanning of single tubes and microplates
 - Documentation of reagent type and batch
 - CSV- or XML-based result file
- Intelligent
 - Compatible with LIMS generated worklists
 - Selective pipetting of samples
 - Data exchange with 2D barcode scanners

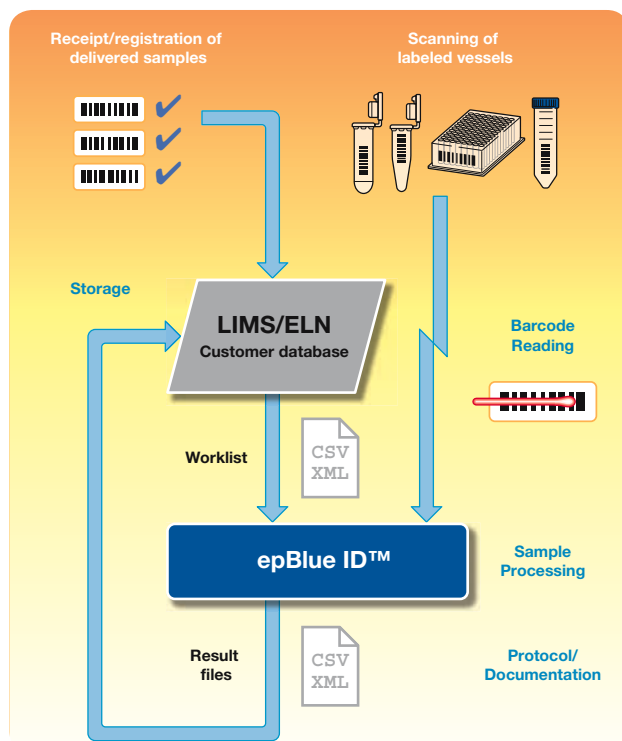


Sample ID scanning of single tubes, plates and reagents



i Further informations at www.eppendorf.com/epBlueID

epBlue ID™ – epMotion® PC software



Applications

- epBlue ID™ simplifies communication with LIMS or ELN:
The manual barcode scanner enables the user to record barcodes on every container type, including a wide range of tube types and microplates. Reagents can be documented with type and lot number. After scanning the barcodes epBlueID will store the scanning data in its database from where data can be rechecked any time. A result file containing sample IDs and their final location is generated by epBlue ID when the liquid handling process is completed. The result file can then be exported to a network drive and uploaded from a LIMS or ELN.
- Worklists enable automated sample specific pipetting
For sample selective work an epBlue ID worklist can be uploaded. The worklists allow the user to define sample specific volumes and pipetting destinations in CSV and XML format.
- epBlue ID composes complete log files
epBlue ID generates comprehensive run reports that include user data and all pipetting steps and times. The run reports can be used for GLP compliant documentation of the performed methods.

epBlue ID log files include users, methods and pipetting and error information

Ordering information

Description	Order no.	
epMotion Software		
epBlue™, epMotion PC software Preinstalled operating software for epMotion versions with integrated PC. Must be ordered with each epMotion PC version.	5075 016.001	
epBlue ID™, barcode software module Modular extension for epBlue to support barcode based documentation and work listing. Includes manual barcode reader and barcode reader stand. To be ordered with basic epBlue software (5075 016.001/960000309) The epBlue ID module is compatible with all epMotion PC versions except the epMotion 5075 MC PC version. It is not compatible with epMotion control panel versions.	5075 002.000	
epMotion PC versions Basic devices incl. waste box, integrated industrial PC, keyboard, and mouse. 50/60 Hz, 100–240 V. Software and monitor not included.		
Monitor , 22" TFT widescreen monitor to be used with epMotion versions with integrated PC.	5075 001.250	
Upgrades		
Upgrade Set 1 , PC version upgrade kit for epMotion 5075 with serial numbers < 1,000, preparing for upgrade kit 2	5075 851.440	
Upgrade Set 2 , PC version upgrade kit for epMotion 5070 and 5075 with serial numbers > 1,000 (Integrated PC)	5075 851.520	
Software and Hardware Upgrade Set epBlue ID™ Upgrade set for 5070 and 5075 PC versions support barcode based documentation and work listing. Software, barcode scanner and stand included. The Software and Hardware Upgrade Set epBlue ID is compatible with all epMotion PC versions except the epMotion 5075 MC PC version. It is not compatible with epMotion control panel versions.	5075 000.830	

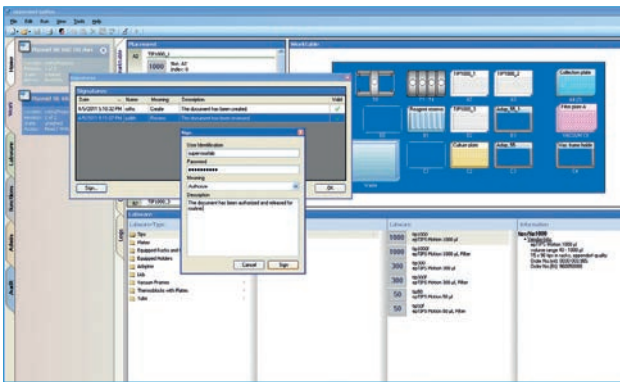
epMotion® GxP solution



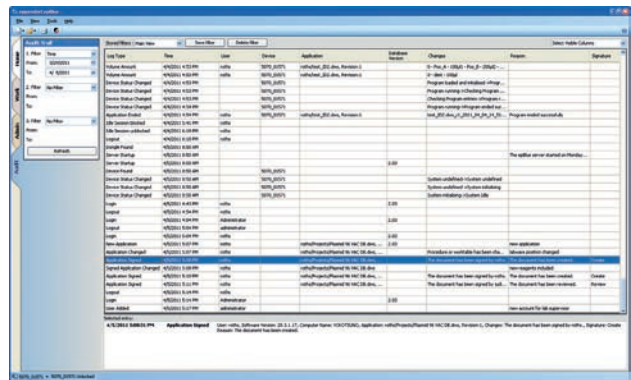
NEW!

Description

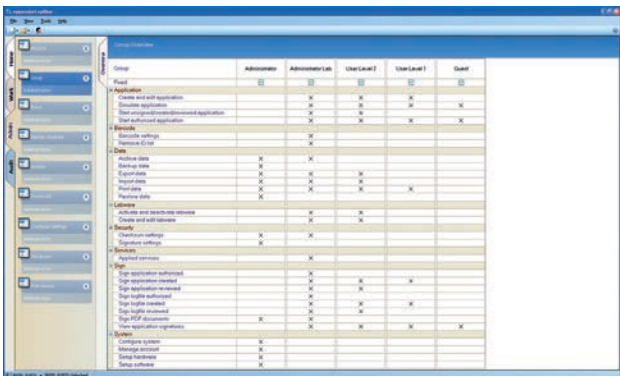
The epMotion GxP solution includes an automated pipetting system, epBlue GxP software and certificates, as well as dedicated certification and validation services (e.g., IQ/OQ and user training). The automated epMotion GxP liquid handling systems have been developed according to GAMP 5 and are certified in accordance with the legal requirements of EU GMP Annex 11, USA 21 CFR Part 11, 58, 211 and 820, GLP and GMP. The GxP solution thus significantly helps strictly regulated laboratories minimize the timeline of their validation and qualification processes. Eppendorf as a supplier has already taken care of a major part of the regulatory, required system validation and qualification with this new software package.



All important actions are documented and have to be digitally signed by the user. To enable the final release of a method, all predefined users need to digitally sign the different steps (e.g., create/review/authorize)



The epBlue GxP software can be used to create a digitally signed PDF format of each electronic document (e.g., applications, log files and audit trail). Digital certificates comply with industry standards and can be exported so that the authenticity of the PDF documents can be verified with external computers (e.g., by authorities)



Access control by user ID and password ensures that the epMotion GxP system is used in compliance with regulated legal requirements in 5 different user groups (Admin, Admin Lab, User Level 1, User Level 2, Guest)

epMotion® GxP solution

Product features

- Complete electronic documentation
- Access control & user level management
- Audit trail & log file
- Revision management
- Electronic signatures
- Electronic certificates compliant with industry standard algorithms
- Export and archiving of digitally signed documents
- Database system
- Supplied certificates & ISO 8655 compliance
- Extension with epBlue ID (optional)

Ordering information

See page 104 for epMotion GxP Systems.

See page 100 for service products - epMotion GxP Certification Plans.

epT.I.P.S. Motion Reloads



NEW!

Description

The new epT.I.P.S. Motion Rack is made up of two components for flexible use in the automated epMotion Liquid Handling Workstation: a color tray and a disposable box for storing the tray. The color-coded tray indicates the volume range of the used tip type quickly and safely. After separating the packing components, epT.I.P.S. Motion can also be integrated into the workstation as a reload system. The reload tips are delivered in a PET thermoformed tray with a sealed lid in the high quality customers have

come to expect. Replacing the disposable box with an autoclavable aluminum tip holder can mean waste savings of up to 40 percent.

epMotion® GxP Certification Plans


 epServices
for premium performance
Value of Certification Services

National and international authorities call for the compliance of currently effective laws, guidelines and norms in regulated areas concerning the validation of computer-assisted systems. Eppendorf offers global certification services conforming to FDA 21 CFR Part 11, EU GMP Annex 11, GLP and GAMP® 5 to assure a uniform and standardized operation. We facilitate an uncomplicated validation, from implementation to the point of shut down, by supporting in the Installation and Operational Qualification (IQ/OQ) process of the instrument and software. The entire qualification will be documented in detail and the user personnel will be extensively trained and certified.



Certification Plans:	BASIC	
	Order no. 5075 005.182	
Installation and Operational Qualification (IQ/OQ):		
according to Eppendorf SOPs incl. 1 single and 1 x 8-channel dispensing tool calibration (EN ISO 8655), complete documentation and certificates	●	
epMotion/epBlue User Starter Training:		
incl. training documents and certificates	●	
epMotion GxP User and Administrator Lab and Administrator IT Training:		
incl. training documents and certificates	●	
“Lab Automation Seminar/Workshop”:		
at Eppendorf Training Center - one person. epMotion basics incl. training documents and certificates		
ETC “epMotion GxP Seminar/Workshop”:		
one person. Electronic signatures, audit trail, Barcode ID, archiving, administrator functions (21 CFR Part 11, GAMP 5) incl. training documents and certificates		
epMotion Application Support:		
customized (e.g. support with customer method programming)		
Consultancy for Validation Process, GxP and Regulatory Details:		
incl. Validation Plan, Performance Qualification and Validation Report templates		
Additional Services:	Order no.	
epMotion GxP Upgrade Installation and User/Administrator Training, epMotion/epBlue Version	5075 005.220	
epMotion GxP Operational Qualification (OQ) , according to Eppendorf SOP's, incl. 1 single channel and 1 x 8 channel dispensing tool calibration (EN ISO 8655)	5075 005.212	
epMotion GxP – single channel dispensing tool calibration* (EN ISO 8655)	5075 005.239	
epMotion GxP - 8-channel dispensing tool calibration* (EN ISO 8655)	5075 005.247	
Calibration/Temperature Adjustment TMX Module* (epMotion 5075 TMX)	5075 005.174	
Calibration/Adjustment for each Thermal Module* (epMotion 5075)	5075 005.018	

*recommended services on a regular basis (according to customer specification at least 1 x or 2 x per year)

epMotion® GxP Certification Plans



Certification Plans Features:

- Qualification, training and consultancy by manufacturer-certified personnel
- Cost transparency and calculability
- Availability of standardized validation documents

Value of Certification Services:

- System performance verifiably complies with the specifications
- Good preparation for audits by fulfilling the currently effective standards
- Reduced validation costs through standardized qualification and documentation

i For more information go to www.eppendorf.com/epservices.
In selected countries only.

	STANDARD	PREMIUM
	Order no. 5075 005.190	Order no. 5075 005.204
	●	●
	●	●
	●	●
	●	●
		●
		●
		●

Additional Services:	Order no.
Maintenance*, Cleaning, exchange of wear and tear parts	on request
Re-qualification (customer-specific), after changes of system/process or environment	5070 005.052
Shut Down Services	5075 005.255
epMotion GxP User Training	5075 005.263
ETC "Lab Automation Seminar/Workshop" – one person	on request
ETC "epMotion GxP Seminar/Workshop" – one person	on request
epMotion Application Support	5075 005.271

*recommended services on a regular basis (according to customer specification at least 1 x or 2 x per year)

epMotion® automated pipetting system

Technical specifications		5070	5075 LH	5075 VAC	5075 TMX
Surface					
System:	Width	98 cm	140 cm	140 cm	140 cm
	Depth	75 cm	75 cm	75 cm	75 cm
Dimensions (W x D x H)					
Device:	Width	65 cm	107 cm	107 cm	107 cm
	Depth	48 cm	61 cm	61 cm	61 cm
	Height	63 cm	67 cm	67 cm	67 cm
Control panel:	Width	25 cm	25 cm	25 cm	25 cm
	Depth	15 cm	15 cm	15 cm	15 cm
	Height	11 cm	11 cm	11 cm	11 cm
Weight					
Device:		45 kg	85 kg	90 kg	116 kg
Control panel:		1.2 kg	1.2 kg	1.2 kg	1.2 kg
Power supply					
Voltage:		200-240 V ±10 %	200-240 V ±10 %	200-240 V ±10 %	200-240 V ±10 %
Frequency		50-60 Hz ±5 %	50-60 Hz ±5 %	50-60 Hz ±5 %	50-60 Hz ±5 %
Max. output:		80 W	80 W	140 W	105 W
Dispensing tools					
Volume 1 µL					
Systematic measurement error		±20 %	±20 %	±20 %	±20 %
Random measurement error		≤5 %	≤5 %	≤5 %	≤5 %
Volume 50 µL					
Systematic measurement error		±1.0 %	±1.0 %	±1.0 %	±1.0 %
Random measurement error		≤0.4 %	≤0.4 %	≤0.4 %	≤0.4 %
Volume 1,000 µL					
Systematic measurement error		±0.7 %	±0.7 %	±0.7 %	±0.7 %
Random measurement error		≤0.15 %	≤0.15 %	≤0.15 %	≤0.15 %
in pipetting mode, free jet, without pre-wetting, with distilled water, at 20 °C					
Conductor					
X, Y, Z Positioning:					
Systematic measurement error		±0.3 mm	±0.3 mm	±0.3 mm	±0.3 mm
Random measurement error		±0.1 mm	±0.1 mm	±0.1 mm	±0.1 mm
Positions in MTP-Format:		4	12	12	12
Detector					
Optical confocal infrared detector:		contact-free detection of liquid levels, tools used, labware worktables, tip types and quantities			
Optical sensor:		liquid surface must be 90 ±3° to the vertical plane of the optical sensor			
Gripper					
Carrying capacity:			≤1,200 g	≤1,200 g	≤1,200 g
Vacuum unit					
Max. output:		-	-	35 l/min	-
Suction range:		-	-	0.1-0.85 ±0.05 hPa	-
Suction time:		-	-	1.99 min	-


epMotion® automated pipetting system

Technical specifications		5075 MC	5070 CB
Surface			
System	Width	140 cm	98 cm
	Depth	75 cm	62 cm
Dimensions (W x D x H)			
Device:	Width	107 cm	65 cm
	Depth	61 cm	48 cm
	Height	67 cm	63 cm
Control panel:	Width	25 cm	25 cm
	Depth	15 cm	15 cm
	Height	11 cm	11 cm
Weight			
Device:		102 kg	45 kg
Control panel:		1.2 kg	1.2 kg
Power supply			
Voltage:		100-240 V \pm 10 %	100-240 V \pm 10 %
Frequency		50-60 Hz \pm 5 %	50-60 Hz \pm 5 %
Max. output:		880 W	70 W
Dispensing tools			
Volume 1 μ L			
Systematic measurement error		\pm 20 %	\pm 20 %
Random measurement error		\leq 5 %	\leq 5 %
Volume 50 μ L			
Systematic measurement error		\pm 1.0 %	\pm 1.0 %
Random measurement error		\leq 0.4 %	\leq 0.4 %
Volume 1,000 μ L			
Systematic measurement error		\pm 0.7 %	\pm 0.7 %
Random measurement error		\leq 0.15 %	\leq 0.15 %
in pipetting mode, free jet, without pre-wetting, with distilled water, at 20 °C			
Conductor			
X, Y, Z Positioning:			
Systematic measurement error		\pm 0.3 mm	\pm 0.3 mm
Random measurement error		\pm 0.1 mm	\pm 0.1 mm
Positions in MTP-Format:		10	4
Detector			
Optical confocal infrared detector:		contact-free detection of liquid levels, tools used, labware worktables, tip types and quantities	
Optical sensor:		liquid surface must be 90 \pm 3 degrees to the vertical plane of the optical sensor	
Gripper			
Carrying capacity:		\leq 1,200 g	
Vacuum unit			
Max. output:		-	-
Suction range:		-	-
Suction time:		-	-

epMotion® automated pipetting system

Ordering information

Description	Order no.	
epMotion – automated pipetting systems		
epMotion 5070 , basic device includes control panel, software, waste container, MMC and reader, operating instructions, 100–240 V, 50–60 Hz	5070 000.000	
epMotion 5070 CB , basic device includes control panel, software, optical sensor, waste container, MMC and reader, operating instructions, 100–240 V (in selected countries only)	5070 000.700	
epMotion 5075 TMX , basic device includes control panel, software, optical sensor, waste container, MMC and reader, operating instructions, 100–240 V (Thermomixer in selected countries only)	5075 000.733	
epMotion 5075 LH , 100–240 V, (liquid handling)	5075 000.008	
epMotion 5075 VAC , 100–240 V, (includes vacuum station)	5075 000.016	
epMotion 5075 MC , 100–240 V (Mastercycler® ep not included)	5075 000.032	
epMotion with integrated PC		
epMotion 5070 , like 5070 000.000 but with integrated industrial PC, keyboard and mouse instead of control panel. Software and monitor not included	5070 000.140	
epMotion 5070 CB with integrated PC, as 5070 000.700 plus integrated industrial PC, keyboard and mouse software and display not included.	5070 000.719	
epMotion 5075 LH , like 5075 000.008 but with integrated industrial PC, keyboard and mouse instead of control panel. Software and monitor not included	5075 000.750	
epMotion 5075 VAC , like 5075 000.016 but with integrated industrial PC, keyboard and mouse instead of control panel. Software and monitor not included	5075 000.768	
epMotion 5075 MC , like 5075 000.032 but with integrated industrial PC, keyboard and mouse instead of control panel. Software and monitor not included	5075 000.776	
epMotion 5075 TMX , like 5075 000.733 but with integrated industrial PC, keyboard and mouse instead of control panel. Software and monitor not included	5075 000.784	
epMotion with integrated PC as a GxP version		
epMotion 5070 GxP , like 5070 000.140, but with epBlue GxP software and certificates	5070 000.240	
epMotion 5070 CB GxP , like 5070 000.719, but with epBlue GxP software and certificates	5070 000.819	
epMotion 5075 LH GxP , like 5075 000.750, but with epBlue GxP software and certificates	5075 000.850	
epMotion 5075 VAC GxP , like 5075 000.768, but with epBlue GxP software and certificates	5075 000.868	
epMotion 5075 TMX GxP , like 5075 000.784, but with epBlue GxP software and certificates	5075 000.884	
epMotion 5075 VAC/TMX GxP , like 5075 000.784, but with epBlue GxP software, certificates and an integrated vacuum station	5075 000.890	
Upgrade and Retrofit Sets		
MC for retrofitting an LH version into an MC version	5075 000.601	
VAC for retrofitting an LH version into a VAC version	5075 000.610	
TMX for retrofitting an LH version into a TMX version	5075 000.628	
Hardware Upgrade Set 1 , for epMotion 5075 with serial numbers < 1,000	5075 851.440	
Soft- and Hardware Upgrade Set 2 , for epMotion 5070 and 5075 PC-Version	5075 851.520	
Thermomixer extension plate, for 5075 VAC upgrade. To be ordered with 5075 000.628	5075 000.636	
epBlue GxP software extension set for already installed epMotion PC versions , with epBlue GxP software, appropriate firmware, USB hardware key, certificates. The integrated PC must have version 627B	5075 000.849	

 OEM components of the epMotion can be placed at the disposal of developers and manufacturers of similar devices as a basic module on request. Please contact our Customized Solutions department.

epMotion® automated pipetting system

Ordering information

Description	Order no.	
Dispensing tools		
Highly precise pipetting heads, for use in the tool holder of the epMotion workstation. Each dispensing tool is completely autoclavable at 121 °C, 1 bar for 20 min. A quality certificate for the measurement results accompanies each tool.		
TS 50 , single-channel dispensing tool for the volume range from 1–50 µL	5280 000.010	
TS 300 , single-channel dispensing tool for the volume range from 20–300 µL	5280 000.037	
TS 1000 , single-channel dispensing tool for the volume range from 40–1,000 µL	5280 000.053	
TM 50-8 , 8-channel dispensing tool for the volume range from 1–50 µL	5280 000.215	
TM 300-8 , 8-channel dispensing tool for the volume range from 20–300 µL	5280 000.231	
TM 1000-8 , 8-channel dispensing tool for the volume range from 40 –1,000 µL	5280 000.258	
Holder , for 6 dispensing tools	5075 774.003	
epT.I.P.S. Motion pipette tips		
Automatic pipette tips in individual racks for use on the epMotion. The tip type and size is automatically recognized on the device. 96 epT.I.P.S./rack, 10 racks per set. The refill racks from the reload products can be placed in an autoclavable tip holder adapter. Three purity levels: Eppendorf Quality, PCR clean and sterile. Pipette tips available with or without a filter. Testing of production batches (certified).		
Without filter		
50 µL, sterile, free of pyrogens, volume range 1–50 µL, 10 × 96 tips in racks	0030 015.207	
300 µL, sterile, free of pyrogens, volume range 20–300 µL, 10 × 96 tips in racks	0030 015.223	
1,000 µL, sterile, free of pyrogens, volume range 40–1,000 µL, 10 × 96 tips in racks	0030 015.240	
50 µL, Eppendorf Quality, volume range 1–50 µL, 10 × 96 tips in racks	0030 014.405	
300 µL, Eppendorf Quality, volume range 20–300 µL, 10 × 96 tips in racks	0030 014.448	
1,000 µL, Eppendorf Quality, volume range 40–1,000 µL, 10 × 96 tips in racks	0030 014.480	
50 µL, Eppendorf Quality, Reloads, volume range 1-50 µL, 24 × 96 tips	0030 014.421	
300 µL, Eppendorf Quality, Reloads, volume range 20-300 µL, 24 × 96 tips	0030 014.464	
1,000 µL, Eppendorf Quality, Reloads, volume range 40-1,000 µL, 24 × 96 tips	0030 014.502	
With filter		
50 µL, PCR clean, sterile, free of pyrogens, volume range 1–50 µL, 10 × 96 tips in racks	0030 015.215	
300 µL, PCR clean, sterile, free of pyrogens, volume range 20–300 µL, 10 × 96 tips in racks	0030 015.231	
1,000 µL, PCR clean, sterile, free of pyrogens, volume range 40–1,000 µL, 10 × 96 tips in racks	0030 015.258	
50 µL, PCR clean, volume range 1-50 µL, 10 × 96 tips in Racks	0030 014.413	
300 µL, PCR clean, volume range 20-300 µL, 10 × 96 tips in Racks	0030 014.456	
1.000 µL, PCR clean, volume range 40-1,000 µL, 10 × 96 tips in Racks	0030 014.499	
50 µL, PCR clean, Reloads, volume range 1–50 µL, 24 × 96 tips	0030 014.430	
300 µL, PCR clean, Reloads, volume range 20–300 µL, 24 × 96 tips	0030 014.472	
1,000 µL, PCR clean, Reloads, volume range 40–1,000 µL, 24 × 96 tips	0030 014.510	
Reservoir rack modules		
Are inserted in a Reservoir rack. They can be temperature controlled with a thermal module for heating and cooling.		
PCR 0.2 mL , for 8 × 0.2 mL PCR tubes	5075 799.049	
PCR 0.5 mL , for 8 × 0.5 mL PCR tubes	5075 799.065	
Safe-Lock , for 4 × 0.5/1.5/2 mL tubes	5075 799.081	
Tubes Ø12 mm , for 4 × Ø 12 mm tubes	5075 799.103	
Tubes Ø16 mm , for 4 × Ø 16 mm tubes	5075 799.120	
15 mL Falcon® tubes , for 4 × Ø 17 mm tubes	5075 799.162	
50 mL Falcon® tubes , for 2 × Ø 29 mm tubes	5075 799.189	
Reservoir adapter 30 mL , for 1 × epMotion reservoir 30 mL	5075 799.146	
Reservoir adapter 100 mL , for 1 × epMotion reservoir 100 mL	5075 799.260	
400 mL reservoir , also for use in the epMotion VAC, 10 pcs./set, made of PP	5075 751.364	

Falcon® is a registered trademark of Becton Dickinson.

epMotion® automated pipetting system

Ordering information

Description	Order no.	
Racks, for 24 glass or plastic tubes, no temperature control		
Ø 17 mm x 100 mm max. length	5075 761.009	
Ø 17 mm x 60 mm max. length	5075 775.000	
Ø 16 mm x 100 mm max. length	5075 760.002	
Ø 16 mm x 60 mm max. length	5075 776.006	
Ø 15 mm x 100 mm max. length	5075 792.028	
Ø 15 mm x 60 mm max. length	5075 792.044	
Ø 14 mm x 100 mm max. length	5075 792.001	
Ø 14 mm x 60 mm max. length	5075 792.060	
Ø 13 mm x 100 mm max. length	5075 762.005	
Ø 13 mm x 60 mm max. length	5075 792.087	
Ø 12 mm x 100 mm max. length	5075 763.001	
Ø 12 mm x 60 mm max. length	5075 792.109	
Rack for 24 x HPLC tubes, Ø 12 mm x 40 mm max. length	5075 792.125	
Rack for 96 x 1.5/2.0 mL screw-cap Requires two positions on the deck	5075 791.005	
Height adapter, for uniform levels of labware; enables faster processing of the plate		
85 mm	5075 751.003	
55 mm	5075 752.000	
40 mm (for epT.I.P.S. Motion pipette tips)	5075 755.009	
Accessories for epMotion 5070/5075		
epMotion Editor , includes editor key, software package for creating and editing methods and for printing out and archiving program sequences on a PC	5075 014.009	
epMotion Editor , additional license	5075 015.200	
MultiMediaCard , for archiving parameters and transporting data between control panel and PC	5075 780.003	
Waste container, receptacle for used pipette tips, with lid	5075 753.006	
Thermorack for 24 x 0.5 mL Safe-Lock tubes , for a supply of 24 test tubes, temperature control	5075 769.000	
Thermorack for 24 x 1.5 mL/2.0 mL Safe-Lock tubes , for a supply of 24 test tubes, temperature control	5075 771.004	
Thermorack for CryoTubes , to the collecting main of 24 reaction containers	5075 777.055	
Thermorack TMX , 24 x 1.5/2.0 mL Safe Lock Tubes	5075 751.186	
Thermoadapter for Deep Well Plates 96	5075 751.054	
Adapter sleeves , 1 set = 25 pieces for reconfiguration of the thermo rack (1.5 mL/2.0 mL) for use with 0.5 mL tubes	5075 772.000	
Assembly plate to be used with epMotion 5070 CB, supports laminar flow worktable.	5070 751.005	
Temperature controlled shaker. Upgrade option for the 5075 LH and 5075 VAC	5075 000.628	
Panel plate , for control panel	5075 798.000	
Monitor , 22" TFT monitor to be used with epMotion versions with integrated PC	5075 001.250	
epBlue™ – epMotion PC software , operating software for epMotion versions with integrated PC, preinstalled	5075 016.001	
epBlue ID™ – barcode software module, modular extension for epBlue to support barcode based documentation and work listing. Includes manual barcode reader and barcode reader stand.	5075 002.000	
epBlue GxP – epMotion PC systems and upgrade kit , for use in a regulated process environment (in accordance with GLP, GMP, 21 CFR)	5075 000.849	

epMotion® automated pipetting system

Ordering information

Description	Order no.	
Accessories for PCR/real-time PCR		
Rack Smart , for holding one tube rack of SmartCycler® reaction tubes	5075 790.009	
Rack LC 20 µL/100 µL , for holding up to 96 x 20 µL or 100 µL LightCycler® capillaries, for use with, e.g., Centrifuge 5804/5804 R or 5810/5810 R, set of 2	5075 795.000	
Thermorack CB 100 µL , for holding up to 384 x 0.1 mL strip tubes in the Corbett Research Rotor-Gene™ 3000	5075 767.031	
Thermorack for CryoTubes , to the collecting main of 24 reaction containers	5075 777.055	
Thermoadapter for PCR plates, 96-well, skirted , for heating or cooling of PCR plates; plates are exchangeable using the gripper	5075 787.008	
Thermoadapter for PCR plates, 384-well, skirted , for heating or cooling of PCR plates; plates are exchangeable using the gripper	5075 788.004	
Thermoadapter Frosty , combination of height adapter and PCR-Cooler for cooling of skirted PCR plates	5075 789.000	
Thermoblock for PCR plates, 96-well , for use with 96 x 0.2 mL tubes or a PCR plate 96	5075 766.000	
Thermoblock for PCR plates, 384-well , for use with a PCR plate 384	5075 767.007	
CycleLock starter set , 1 frame and 8 mats for automated sealing of Eppendorf® PCR plates, PCR clean; can only be used with Mastercycler® ep	0030 126.530	
CycleLock mats , 5 sealing mats, PCR clean, frame not included	0030 126.548	
Accessories		
Reservoir rack , for use with 30 mL and 100 mL reagent reservoirs, holds max. seven reservoirs of 30 mL or 100 mL filling volumes	5075 754.002	
epMotion Reservoir		
Large volume reservoir , must be used with a reservoir rack. Two sizes: 30 mL or 100 mL maximum volume. Five reservoirs packed in separate bags, 10 bags per set. All reservoirs are PCR clean (free of human DNA, DNase, RNase and PCR inhibitors) and made of polypropylene. Production batch-tested, certified.		
30 mL , set of 50	0030 126.505	
100 mL , set of 50	0030 126.513	
Accessories for nucleic acid purification		
Vac frame holder	5075 778.009	
Vac lid	5075 779.005	
Mat , for vacuum lid	5075 793.008	
Vac frame 1	5075 784.009	
Vac frame 2	5075 785.005	
Collection Plate Adapter , for handling collection microtubes in microtube racks	5075 785.030	
Channeling Plate Adapter , for vacuum-processing foaming solutions through multiwell plates, set of 10	5075 794.004	
Vac Thermo Lid , for effective drying of filter plates in epMotion 5075 VAC vacuum chamber Note: additional thermal module required	5075 796.007	
Accessories for epMotion 5075 only		
Thermal module , for heating and cooling microplates and thermal racks	5075 757.001	
Gripper incl. holder , for transporting plates on the deck and for automatic operation of the vacuum chamber	5282 000.018	
Gripper holder	5075 759.004	

epMotion® Performance Plans

epServices
for premium performance

Value of Preventive Maintenance

Preventive maintenance is a schedule of planned service, designed to check your system and preserve its maximum-performance quality.

Preventive maintenance service for epMotion 5070 and epMotion 5075, performed by our dedicated, Eppendorf professionally trained service technicians, includes inspection, cleaning, lubricating, partial overhauls, calibration and any necessary adjustments according to system specifications. Our Performance Plans consist of one or two audits per year.

Dispensing tools are precision devices. For this reason they should be regularly maintained and calibrated, which will help ensure their continuing high performance in precision and accuracy.

Calibration of the dispensing tools can be performed according to ISO 8655 with NIST-traceable standards supporting GLP documentation.



Calibration of dispensing tool (gravimetric), Thermal Module and vacuum chamber

Performance Plans	epMotion 5070/CB BASIC	epMotion 5070/CB STANDARD	epMotion 5070/CB PREMIUM	
Order no. for 1 service per year	5070 005.095	5070 005.109	-	
Order no. for 2 services per year	5070 005.001	5070 005.010	5070 005.028	
Cleaning and lubricating the device and components	•	•	•	
Inspection of sensors, and the adjustment if necessary (e.g., ejector)	•	•	•	
Software update (upon customer request)	•	•	•	
Replacement of all dispensing tool seals	•	•	•	
Calibration/adjustment of level sensor and carrier, first thermomodule, vacuum chamber of epMotion 5075 VAC and thermo unit of epMotion TMX	•	•	•	
Function test according to service test methods	•	•	•	
Full documentation	•	•	•	
Function test according to Operation Qualification (OQ)		•	•	
OQ Certificate		•	•	
Cost for all replaced parts included			•	
Warranty extension			12 months	

Additional service:	Order no.	
Calibration of single-channel dispensing tool, according to EN ISO 8655	5070 005.036	
Calibration of 8-channel dispensing tool, according to EN ISO 8655	5070 005.044	
Calibration/adjustment of each Thermal Module (epMotion 5075 only)	5075 005.018	
Calibration/temperature adjustment of TMX module (epMotion 5075 TMX)	5075 005.174	

epMotion® Performance Plans



Long-term benefits of preventive maintenance include:

- Consistent, reliable system operation
- Confidence in results
- Audited system for GLP compliance

Features of Eppendorf Performance Plans:

- Eppendorf quality and integrity maintained
- Original Eppendorf spare parts used
- Certified calibration reports provided
- PREMIUM Plans include 1-year warranty extension
- Programs are clearly outlined with no hidden fees – makes choosing and budgeting for them easy



i For more information go to www.eppendorf.com/epservices.
In selected countries only.

1. Performance Plans

	epMotion 5075 LH/VAC/MC/TMX BASIC	epMotion 5075 LH/VAC/MC/TMX STANDARD	epMotion 5075 LH/VAC/MC/TMX PREMIUM
	5075 005.050	5075 005.069	-
	5075 005.026	5075 005.034	5075 005.042
	●	●	●
	●	●	●
	●	●	●
	●	●	●
	●	●	●
	●	●	●
	●	●	●
	●	●	●
			12 months

Customized service	Order no.
Flexible testing program according to your specifications	5070 005.052



Our team is working on programming the new Mastercycler nexus with its particularly user-friendly operating panel that can control 3 devices at the same time. It will amplify the DNA sequences you are interested in. This amplification is the starting point for many modern molecular biology methods, such as electrophoresis, transfection or sequencing. And here's the best part: if you want, the Mastercycler will send you an email to inform you when a PCR run is complete.



2. Sample Handling

- **Plates and reaction tubes** 114
- **Mixers** 130
- **Temperature control systems** 135
- **Centrifuges** 148
- **PCR Thermocyclers** 208
- **PCR Plates and tubes** 222
- **Photometers and cuvettes** 236
- **Freezers** 250

Summary of applications

Application	Product	Page
Instruments		
Heating, cooling and mixing of samples in various vessels (13 °C below RT to 99 °C)	Eppendorf Thermomixer® comfort	136
Heating and mixing of samples in 1.5 mL tubes (4 °C above RT to 99 °C)	Eppendorf Thermomixer® compact	135
Heating and cooling of samples in various vessels (-5 °C to 99 °C)	Eppendorf ThermoStat plus™	138
Efficient mixing of samples in plates (up to 384-well formats) and tubes (0.2 mL to 2.0 mL). Additional vortex function.	MixMate®	133
Device for hermetic heat-sealing of 96/384-well plates	Heat Sealer	230
Consumables		
Eppendorf Tubes		
Standard application, various colors, 1.5 mL	Eppendorf Tubes® 3810X	117
Highest level of safety and stability	Eppendorf Safe-Lock Tubes	118
Light-sensitive samples	Eppendorf Safe-Lock Tubes, amber	118
High recovery rate for DNA and RNA	DNA LoBind Tubes	126
High recovery rate for proteins, Peptides, antibodies and viruses	Protein LoBind Tubes	124
Sterile sample preparation	Eppendorf Safe-Lock Tubes, Eppendorf Biopur®	118
Eppendorf Plates		
Sample preparation and storage, transport	Eppendorf Deepwell Plate™	122
Sample preparation, storage, assays, detection	Eppendorf Microplate™	120
High recovery rate for DNA and RNA	DNA LoBind Plates	126
High recovery rate for proteins, Peptides, antibodies and viruses	Protein LoBind Plates	124
Accessories		
Resuspension of pellets or sediments	Micropestle	131
Processing and storage of max. 20 samples (1.5/2 mL tubes)	Holders for Eppendorf Tubes®	131
Processing and storage of max. 24 sample(0.5/2 mL tubes)	Tube-Rack	131
Cooling (0 °C and -21 °C) and storage of max. 24 tubes (0.5/2 mL tubes)	IsoTherm-System®	143
Cooling (0 °C) and storage of max. 96 samples (0.2/0.5 mL tubes and plates), color change for temperature control	PCR-Cooler	144

Summary of applications

Application	Product	Page
Sealing options for Eppendorf Plates		
Heat-sealing, transparent, not removable, cannot be pierced	Heat Sealing Film	129
Heat-sealing, non-transparent, removable, can be pierced	Heat Sealing Foil	129
Not transparent, removable	Sealing Mats	129
Adhesive seal, transparent, removable, cannot be pierced	Storage Film (self-adhesive) PCR Film	129
Adhesive seal, non-transparent, removable, can be pierced	Storage Foil (self-adhesive) PCR Foil	129
Transparent lid	Plate Lid	129
Descriptions for Eppendorf purity levels		145
<p>This table shows a selection of particular applications from the Consumables and Heating/Mixing area and serves as an overview. The complete product portfolio of the Eppendorf Sample Preparation System is found on the following pages.</p> <p>A selection of Heating and Mixing products, shown on the following pages, can be provided as Customized Solutions. Further information on page 411.</p> <p>Sign up now for ep-points, the Eppendorf Bonus Points program, and get your first 50 ep-points for free! Ep-points labels are to be found, for instance, on the inside of the packages of Eppendorf tubes and pipette tips. Collect these points and get attractive bonus products at www.ep-points.com.</p>		

**Eppendorf epGreen Initiative**





- Eppendorf tubes and plates are produced with optimized molds using a closed water circulation. No additional external water is needed or consumed during production. Excess plastic that accompanies every molding process has been reduced to a minimum. No slip agents are used during production.
- Within the last 4 years, the electrical power consumption per produced consumable unit has been reduced by 30 %.
- Eppendorf tubes and plates are made of virgin Polypropylene that is fully recyclable.
- The thermal energy produced during production is recovered to heat our production facilities.

- Thermomixers contain interval mix motors to significantly reduce power consumption.
- Temperature Control and Mixing instruments and the consumables in this section are packaged in 100 % recyclable material.

For an overview on Eppendorf epGreen, see page 10 and appendix page 444.









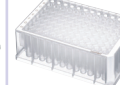
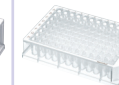
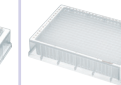
Eppendorf sample handling consumables guide

		Eppendorf Tubes				
		<ul style="list-style-type: none"> ● 3810X Tube for ergonomic lid opening; Safe-Lock lid prevents accidental lid opening during incubation ● Precise lid sealing for minimal evaporation rates during long-term storage ● g-Safe™: Exceptional centrifugation stability of up to 30,000 x g prevents tube breakage 				
		3810X 1.5 mL	Safe-Lock 0.5 mL	Safe-Lock 1.5 mL	Safe-Lock 2.0 mL	
						
		Max. Volume	1,500	500	1,500	2,000
		Bottom shape	conical	conical	conical	round
Eppendorf Quality - Manufactured under clean room conditions - For basic applications such as enzymatic digestion, plasmid DNA isolation, sample and reagent storage	Order no.	0030 125.150	0030 121.023	0030 120.086	0030 120.094	
	Quantity	1,000	500	1,000	1,000	
Sterile - Batch-certified sterile and free from endotoxins - For cell culture applications and microbiological experiments, virus work and phage library storage	Order no.					
	Quantity	—	—	—	—	
PCR clean - Batch-certified free from DNA, DNase, RNase, and PCR inhibitors - Ideal for all RNA applications, isolation and analysis of genomic DNA and preparation of samples for PCR or real-time PCR samples	Order no.	0030 125.215	0030 123.301	0030 123.328	0030 123.344	
	Quantity	1,000	500	1,000	1,000	
Biopur - Batch certified free from PCR inhibitors, DNA, DNase, RNase, ATP, endotoxins. Individually wrapped and sterile - The highest purity grade. Ideal for pharmaceutical, medical and forensic applications as well as for work with endotoxin-sensitive cell cultures	Order no.		0030 121.570	0030 121.589	0030 121.597	
	Quantity		50	100	100	
		—				
DNA LoBind (PCR clean) - LoBind material minimizes adsorption of DNA/RNA to the vessel surface for maximum sample recovery - Ideal for low concentrated DNA and RNA samples used for microarray and next-generation sequencing	Order no.		0030 108.035	0030 108.051	0030 108.078	
	Quantity		250	250	250	
		—				
Protein LoBind (PCR clean) - LoBind material minimizes adsorption of proteins and peptides to the vessel surface for maximum sample recovery - Ideal for preparation and storage of low concentrated protein, peptide, antibody or virus samples	Order no.		0030 108.094	0030 108.116	0030 108.132	
	Quantity		100	100	100	
		—				

¹ Clear wells and white OptiTrack labeling (MTP and deepwell plates). Please see product pages for more color options.

² RecoverMax conical for maximum liquid recovery and improved mixing performance.

Eppendorf sample handling consumables guide

Microplates (MTP)*1					Deepwell Plates™ (DWP)*1				
<ul style="list-style-type: none"> Unmatched transparency for better sample visibility OptiTrack®: 30 % faster well identification and less pipetting errors RecoverMax® well-design: Optimized well geometry for maximum sample recovery and excellent mixing performance. The smooth contours also reduce capillary effects in well corners (“wicking”), thus minimizing the risk of cross-contamination. 					<ul style="list-style-type: none"> OptiTrack labeling: 30 % faster well identification and less pipetting errors RecoverMax well-design: Optimized well geometry for maximum sample recovery and excellent mixing performance. The smooth contours also reduce capillary effects in well corners (“wicking”), thus minimizing the risk of cross-contamination. 				
MTP 96/F	MTP 96/U	MTP 96/V	MTP 384/F	MTP 384/V	DWP 96/2000	DWP 96/1000	DWP 96/500	DWP 384/200	
									
400 flat	360 round	350 conical	150 flat	140 conical	2,400 conical*2	1,200 conical*2	700 conical*2	240 conical*2	
—	—	—	—	—	—	—	—	—	
0030 602.102 80	0030 602.200 80	0030 602.307 80	0030 622.103 80	0030 622.308 80	0030 502.302 20	0030 502.205 20	0030 502.108 40	0030 522.109 40	
0030 601.106 80	0030 601.203 80	0030 601.300 80	0030 621.107 80	0030 621.301 80	0030 501.306 20	0030 501.209 20	0030 501.101 40	0030 521.102 40	
—	—	—	—	—	—	—	—	—	
—	—	—	—	0030 623.304 80	—	0030 503.201 20	0030 503.104 40	0030 523.105 40	
—	—	—	—	0030 624.300 80	0030 504.305 20	0030 504.208 20	0030 504.100 40	0030 524.101 40	

The best consumables for your samples



Eppendorf® is a leading manufacturer of high quality consumables for research laboratories. Since inventing the 1.5 mL microcentrifuge tube in 1963 we constantly keep your needs in mind to develop products that benefit you and your work processes. Some characteristic examples are:

- Optimized product design for reliable sealing to minimize sample evaporation
- Outstanding stability to protect your samples during centrifugation
- LoBind consumables to minimize sample loss
- Unique Safe-Lock Tubes minimize accidental lid opening to protect from hazardous materials and prevent sample loss
- Minimized lid locking forces for ergonomic opening and closing of tube lids
- OptiTrack® frame in MTP and deepwell plates for super easy well identification and less pipetting errors

With fully automated production and continuous quality monitoring of molding tools and production areas, we assure minimal production tolerances to guarantee you batch-to-batch and tube-to-tube consistency.

Clean-room manufacturing from selected raw materials and advanced product handling ensures you the highest product purity and no foreign contaminants. As a further commitment

to product purity, each batch of PCR-clean and Biopur® quality products is tested and certified by an independent laboratory to guarantee traceability and purity. This is quality you can rely on!



	Eppendorf Quality	Eppendorf Sterile	Eppendorf PCR clean	Eppendorf Biopur
Continuous quality control for the following quality criteria:				
Function, tightness, precision	●	●	●	●
Defined flow dynamics	●	●	●	●
Minimal water retention	●	●	●	●
High chemical resistance	●	●	●	●
High thermal stability	●	●	●	●
Precisely molded	●	●	●	●
Lot testing*¹ (certified) for the following purity criteria:				
Human DNA-free			●	●
DNA-free (Human- and bacteria DNA-free)				●
DNase-free			●	●
RNase-free			●	●
PCR inhibitors-free			●	●
ATP-free				●
Pyrogen-free (endotoxin-free)		●		●
Sterile (Ph.Eur./USP)		●		●

¹ Batch-specific certificates can be downloaded from www.eppendorfna.com/certificates

➔ For more information on Eppendorf purity levels, see pages 435 or visit www.eppendorf.com/purity.

Eppendorf Tubes® 3810X



The 3810X tube guarantees tried and tested tight lid closure and easy, stress-free opening and closing.

Description

The easy-open, easy-close design of our 3810X tube provides convenient and reliable sample preparation, centrifugation and storage.

Product features

- 3810X tube lid is easy to open and close for ergonomic operation
- Polypropylene provides high resistance to chemicals, mechanical stress and temperature extremes
- Manufactured without the use of slip agents, plasticizers and biocides—substances that have been shown to leach from plastic consumables into the sample and negatively affect bio-assay results
- Precise lid sealing for minimal evaporation rates during long-term storage
- g-Safe™: Exceptional centrifugation stability of up to 30,000 x g prevents tube breakage. This prevents sample loss and provides the extra safety when working with hazardous samples
- Frosted lid and surface on the side for easy labeling
- Graduations provide an easy volume reference
- Guaranteed functionality between –86 °C to 100 °C
- Autoclavable when open (121 °C, 20 min)
- Available in batch-certified Eppendorf® PCR clean quality for guaranteed purity

Ordering information

Description	Order no.	
3810X tube 1.5 mL, 1,000 pcs.		
Colorless	0030 125.150	
Blue	0030 125.177	
Yellow	0030 125.207	
Green	0030 125.185	
Red	0030 125.193	
Eppendorf PCR clean purity*		
Colorless, PCR clean	0030 125.215	

i For more information go to www.eppendorf.com/consumables

Eppendorf Safe-Lock Tubes



Safe-Lock Tubes with hinged lid to prevent accidental lid opening

Product features

- Hinged Safe-Lock lid prevents accidental lid opening and allows contamination-free lid opening
- Polypropylene provides high resistance to chemicals, mechanical stress and temperature extremes
- Manufactured without the use of slip agents, plasticizers and biocides—substances that have been shown to leach from plastic consumables into the sample and negatively affect bio-assay results
- Precise lid sealing for lowest evaporation rates during long-term storage
- g-Safe™: Exceptional centrifugation stability of up to 30,000 x *g* (70,000 x *g* in form-fitting rotor) prevents tube breakage. This prevents sample loss and provides the extra safety when working with hazardous samples.
- Large frosted lid and surface on the side for easy labeling
- Graduations provide an easy volume reference
- Guaranteed functionality between -86 °C to 100 °C
- Autoclavable when open (121 °C, 20 min)
- Available in batch-certified Eppendorf® PCR clean and Biopur® quality for guaranteed purity
- Available in Protein LoBind and DNA/RNA LoBind quality (see page 124 and 126)

Description

Eppendorf Safe-Lock tubes combine all the experience from over 45 years of constant improvement and development. The original Safe-Lock Tube gives your sample outstanding stability during centrifugation, perfect sealing and evaporation protection. Trust in the original Eppendorf Safe-Lock Tube because your samples deserve the best treatment!

Now even safer!

Tests at 30,000 x *g* show that tubes of inferior quality can burst or form bubbles during centrifugation resulting in sample loss. Eppendorf Tubes withstand forces up to 30,000 x *g* for reliable centrifugation. This prevents sample loss and provides the extra safety when working with hazardous samples.

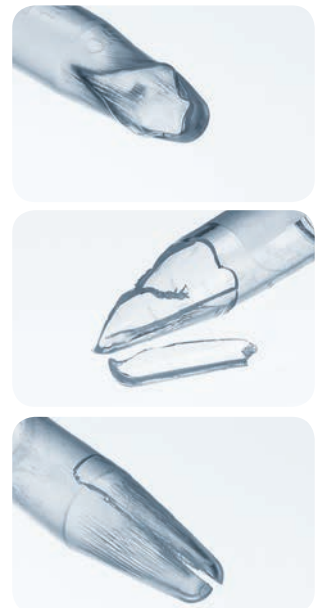
Find the right Eppendorf Tube for your centrifuge applications:

	Eppendorf Quality and PCR clean	Biopur
Safe-Lock 0.5 mL	30,000 x <i>g</i>	22,000 x <i>g</i>
Safe-Lock 1.5 mL	30,000 x <i>g</i>	22,000 x <i>g</i>
Safe-Lock 2.0 mL	25,000 x <i>g</i>	22,000 x <i>g</i>
3810X 1.5 mL	30,000 x <i>g</i>	—

The tubes can be centrifuged in a 45° fixed-angle rotor at 40 °C for 90 min. with aqueous saline solution up to the above-indicated *g*-numbers (rfc). The centrifugation stability depends on the temperature. Liquids that have a higher density or that attack the stability of the plastic (organic solvents, acids), can reduce the mechanical loading capacity of the tubes.



Tubes of inferior quality can burst or form bubbles during centrifugation.



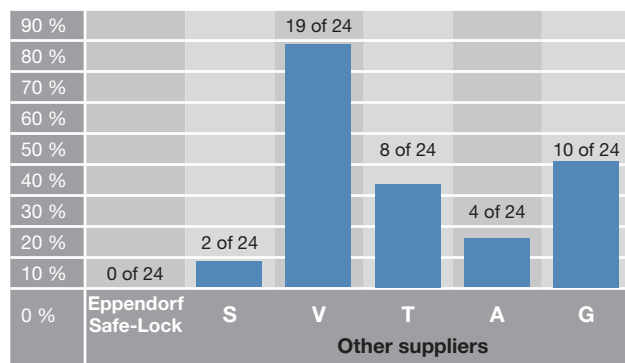
Eppendorf Safe-Lock Tubes

Eppendorf's Safe-Lock lid prevents accidental lid opening.

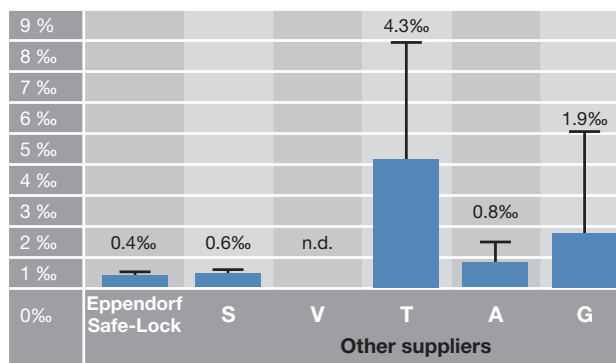
The hinged lid on Eppendorf® Safe-Lock Tubes provides outstanding protection against accidental opening of tube lids ensuring absolute sample protection. This feature is especially important when working with precious samples or hazardous materials (e.g., radioactive probes, virus samples), or buffers containing detergents such as SDS.

Precise lid sealing guarantees lowest evaporation rates.

Intelligent tube design and Eppendorf's vast experience in precision molding guarantee a perfect fit of the tube lids to minimize sample evaporation. Whether you incubate your samples at high temperature or you use an Eppendorf Tube for long-term storage, Eppendorf Safe-Lock Tubes will protect your samples.






Lid sealing: Number of opened lids. Shown is the percentage of tubes that opened during a 30 min incubation at 100 °C in a water bath. Tubes filled with 1 mL aqueous solution. None of the Eppendorf Tube lids opened during the 30 min incubation at 100 °C.



Evaporation in ‰: Evaporation tightness was tested by measuring the weight loss of tubes filled with 1 mL ethanol solution after a 1 h incubation at 70 °C. Shown are the mean values and standard deviation (n=24). Tubes from supplier V could not be measured as several tube lids popped open during the incubation step.

Ordering information

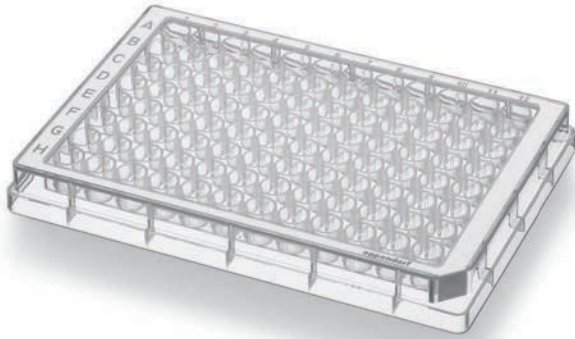
	Order no.	Order no.	Order no.
			
Volume	0.5 mL	1.5 mL	2.0 mL
Safe-Lock Tubes	500	1,000	1,000
Standard Quality colorless	0030 121.023	0030 120.086	0030 120.094
Amber (light protection)	0030 121.155	0030 120.191	0030 120.248
Blue	0030 121.139	0030 120.175	0030 120.221
Green	0030 121.147	0030 120.183	0030 120.230
Red	0030 121.120	0030 120.167	0030 120.213
Yellow	0030 121.112	0030 120.159	0030 120.205
Assorted colors* ¹ (per 100 or 200)	0030 121.708	0030 121.694	0030 121.686
Safe-Lock Tubes, Eppendorf Biopur®*²	50	100	100
Individually packaged	0030 121.570	0030 121.589	0030 121.597
Safe-Lock Tubes, PCR clean*³	500	1,000	1,000
DNA-, DNase-, RNase-, PCR inhibitor-free	0030 123.301	0030 123.328	0030 123.344

*¹ 100 x 0.5 mL tubes and 200 x 1.5 mL/2.0 mL tubes, includes colorless, blue, green, red and yellow. *² PCR clean: Batch-certified free from DNA, DNase, RNase, and PCR inhibitors. *³ Biopur: Batch-certified sterile and free from DNA, DNase, RNase, PCR inhibitors, ATP and pyrogens/endotoxins

i For more information go to www.eppendorf.com/consumables

➔ More information on PCR tubes and plates begins at page 222.

Eppendorf Microplates 96 and 384

**Description**

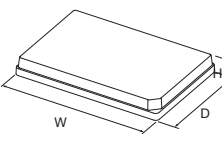
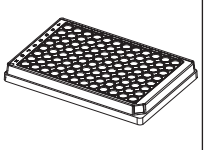
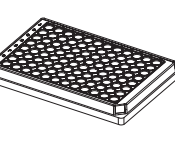
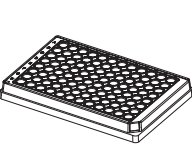
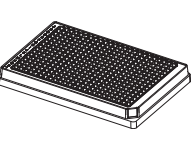
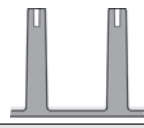
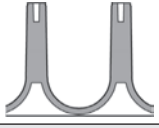
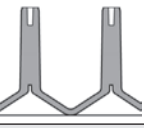
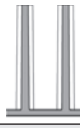

The new Eppendorf® Microplates bring a unique clarity into your laboratory! Never before has it been so easy to pipette, check, and re-extract samples in a polypropylene microplate. The easy to read OptiTrack® alphanumeric labeling on each plate makes identifying individual wells incredibly easy, accelerates the filling and significantly reduces the risk of error. The high level of transparency, unique among polypropylene microplates, ensures that you always find your samples at a glance.

The clear Eppendorf Polypropylene Microplates are ideal for storing substances or for applications requiring high resistance to solvents, such as DMSO. For applications where maximum sample recovery is particularly important, the Microplates 384 are available in Protein and DNA LoBind quality

Product features

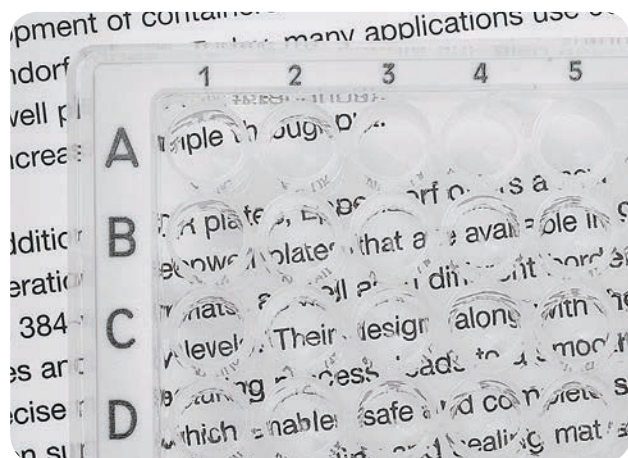
- Unmatched transparency for better sample visibility
- OptiTrack labeling: 30 % faster well identification and less pipetting errors due to colored border with high-contrast alphanumeric labeling
- RecoverMax® well-design: Optimized well geometry for maximum sample recovery and excellent mixing performance.
- Minimal residual volume and high well-to-well homogeneity
- Raised well rims and even surface for reliable sealing
- No well nesting for easy stacking
- Perfect for automation due to rigid design, dimensional accuracy and compliance to SBS specifications
- g-Safe®: Exceptional centrifugation stability of up to 6,000 x g
- Polypropylene provides high resistance to chemicals, mechanical stress and temperature extremes
- Manufactured without the use of slip agents, plasticizers and biocides—substances that have been shown to leach from plastic consumables into the sample and negatively affect bio-assay results
- Guaranteed functionality between –86 °C to 100 °C
- Autoclavable (121 °C, 20 min)
- Available in Protein LoBind and DNA/RNA LoBind quality (see page 124 and 126)
- Black and white MTP plates available for fluorescence and luminescence assays (see page 128)
- Barcode options available. For more details go to www.eppendorf.com/barcode

Technical specifications Microplates

					
Description	Microplate 96/F	Microplate 96/U	Microplate 96/V	Microplate 384/F	Microplate 384/V
Number of wells	96	96	96	384	384
Total well volume	400 µL	360 µL	350 µL	150 µL	140 µL
Work volume	50–350 µL	20–320 µL	20–300 µL	10–120 µL	5–120 µL
Shape of well	round	round	round	rounded edge	rounded edge
Shape of well-bottom	Flat (F) 	Round (U) 	Conical (V) 	Flat (F) 	Conical (V) 
Dimensions (W x D x H)*	5.03 x 3.37 x 0.57 in/127.8 x 85.5 x 14.4 mm				

* All Eppendorf plates fulfill the standards ANSI/SBS 1-2004 up to ANSI/SBS 4-2004.

Eppendorf Microplates 96 and 384


Unique OptiTrack® labeling and exceptional transparency for unmatched ergonomic operation.

High-contrast alphanumeric labeling makes well identification 30 % faster and significantly reduces pipetting errors. Try our plates under the sterile workbench, when wearing goggles or during everyday lab routine—you will enjoy the OptiTrack difference.

Ultra clear wells guarantee easy sample identification. The high optical clarity is ideal for colorimetric assays (VIS light range) of samples and solvents that can usually not be analyzed in polystyrene plates.


RecoverMax design guarantees maximum sample recovery.

Optimized well geometry and rounded corners prevent sample loss and minimize the residual volume. In square-well plates the smooth contours also reduce capillary effects in well corners (“wicking”) thus minimizing the risk of cross-contamination. (Application Note 145)



Eppendorf® plate





Competitor plate

Eppendorf Microplates are available with 3 different bottom shapes:

- **F-bottom (flat)**—excellent for optical measurements and microscopic examination
- **U-bottom (round)**—typically used for applications where efficient mixing or washing is required. Also used for examination of pellets.
- **V-bottom (conical)**—ideal when working with small sample volumes and when maximum liquid recovery is needed. Also recommended for precipitation of low concentrated samples by centrifugation.

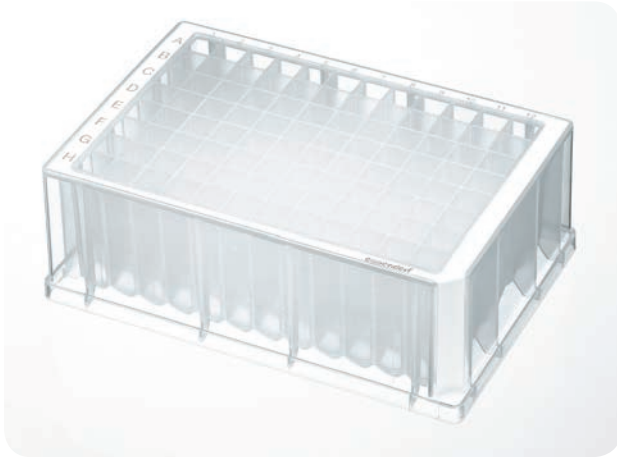
Ordering information

Plate type	Shape of well bottom ¹	Packaging size	OptiTrack frame color	PCR clean		Sterile	
				Order no.		Order no.	
 MTP 96	F	Case of 80 (5 bags of 16)	White	0030 601.106		0030 602.102	
	U			0030 601.203		0030 602.200	
	V			0030 601.300		0030 602.307	
 MTP 384	F	Case of 80 (5 bags of 16)	White	0030 621.107		0030 622.103	
	V			0030 621.301		0030 622.308	

¹F (flat)—for optical measurements and microscopic examination
 U (round)—Ideal if your assays involve mixing or washing steps
 V (conical)—For low sample volumes and maximum sample recovery

PCR clean: Batch-certified free from DNA, DNase, RNase, and PCR inhibitors.

Eppendorf Deepwell Plates 96 and 384

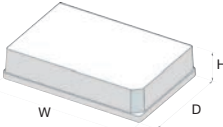
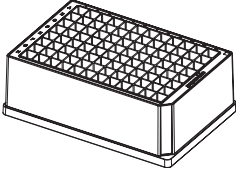
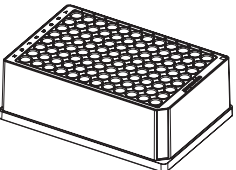
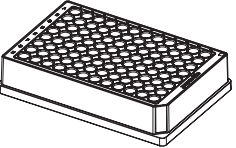
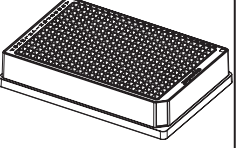






**Description**

The new Eppendorf® Deepwell Plates will change the way you look at plates forever. Eppendorf Deepwell Plates 96 and 384 are top-performance plates designed for all manual and automated applications — from sample storage at -86°C to DNA denaturation at 100°C . Made from virgin polypropylene (PP), these plates offer innovative features that run deep: More reliability. More efficiency. More stability. Our unique OptiTrack® labeling has also brought more enjoyment to work. With its easy to recognize design. Plates are available with white, yellow, green or blue borders with laser-inscribed, high-contrast alphanumeric labeling to easily identify wells. With all their innovative features, they set new standards in the lab.

Product features

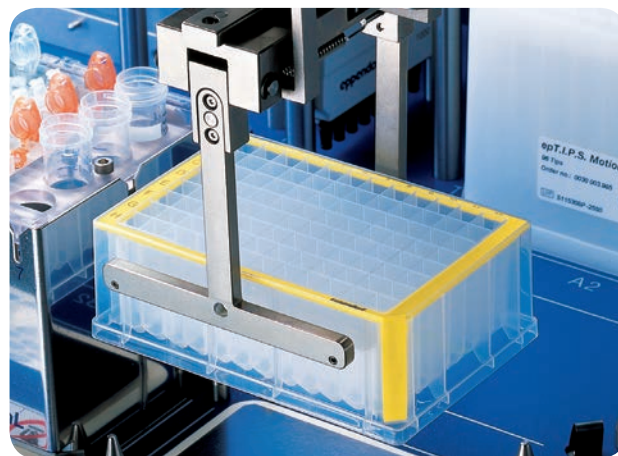
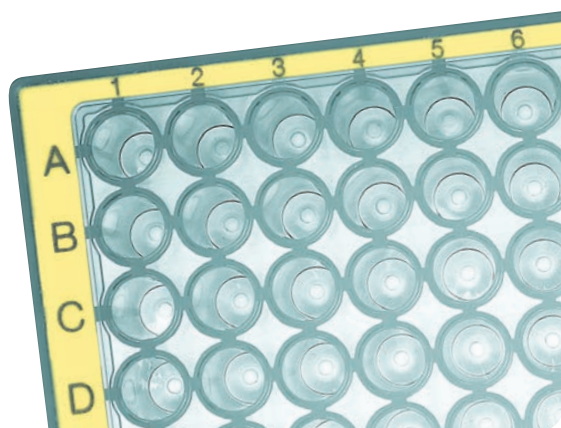
- OptiTrack labeling: 30 % faster well identification and less pipetting errors due to colored border with high-contrast alphanumeric labeling
- RecoverMax® conical well-design: Optimized well geometry for maximum sample recovery and excellent mixing performance. The smooth contours also reduce capillary effects in well corners (“wicking”), minimizing the risk of cross-contamination.
- Minimal residual volume and high well-to-well homogeneity
- Raised well rims and even surface for reliable sealing
- No well nesting for easy stacking
- Perfect for automation due to rigid design, dimensional accuracy and compliance to SBS* specifications
- g-Safe®: Exceptional centrifugation stability of up to $6,000 \times g$ ($5,000 \times g$ for sterile plates) for high-speed plate centrifugation and faster protocols—reducing sample processing time for better sample quality
- Polypropylene provides high resistance to chemicals, mechanical stress and temperature extremes
- Manufactured without the use of slip agents, plasticizers and biocides—substances that have been shown to leach from plastic consumables into the sample and negatively affect bio-assay results
- Guaranteed functionality between -86°C to 100°C
- Autoclavable (121°C , 20 min)
- Available in Protein LoBind and DNA/RNA LoBind quality (see page 124 and 126)
- Barcode options available. For more details go to www.eppendorf.com/barcode

Technical specifications

					
Description	Deepwell 96/2,000 μL	Deepwell 96/1,000 μL	Deepwell 96/500 μL	Deepwell 384/200 μL	
Number of wells	96	96	96	384	
Total well volume	2,400 μL	1,200 μL	700 μL	240 μL	
Work volume	50–2,000 μL	30–1,000 μL	30–550 μL	20–225 μL	
Shape of well	Square well with rounded edges 	Round	Round	Square well with rounded edges 	
Shape of well bottom	RecoverMax conical 	RecoverMax conical 	RecoverMax conical 	RecoverMax conical 	
Dimensions (W x D x H)*	5.03 x 3.37 x 1.74 in 127.8 x 85.5 x 44.1 mm	5.03 x 3.37 x 1.74 in 127.8 x 85.5 x 44.1 mm	5.03 x 3.37 x 1.07 in 127.8 x 85.5 x 27.1 mm	5.03 x 3.37 x 0.99 in 127.8 x 85.5 x 25.1 mm	

* All Eppendorf plates fulfill the standards ANSI/SBS 1-2004 up to ANSI/SBS 4-2004.

Eppendorf Deepwell Plates 96 and 384



Unique OptiTrack® labeling makes manual pipetting 30 % faster and less error prone.

Colored frames with laser-inscribed (UV- and chemical-resistant) high-contrast alphanumeric labeling for easy well identification.




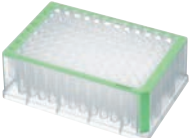


Try our plates under the sterile workbench, when wearing goggles or during everyday lab routine—you will enjoy the OptiTrack difference.

Perfect for automated applications.

Compliance to SBS specifications, high dimensional accuracy and rigidity ensure compatibility with all standard pipetting robots and automated sample processing systems:

- High well-to-well reproducibility
- Minimal residual/dead volumes
- OptiTrack matrix facilitates correct plate positioning
- No well-nesting for easy stacking
- Barcode options available

Ordering information

Plate type	Packaging size	OptiTrack frame color				
			Order no.		Order no.	
 DWP 96/2000* ¹	Case of 20 (5 bags of 4)	White	0030 501.306		0030 502.302	
		Yellow	0030 501.314		0030 502.310	
		Green	0030 501.330		0030 502.337	
		Blue	0030 501.349		0030 502.345	
 DWP 96/1000* ¹	Case of 20 (5 bags of 4)	White	0030 501.209		0030 502.205	
		Yellow	0030 501.217		0030 502.213	
		Green	0030 501.233		0030 502.230	
		Blue	0030 501.241		0030 502.248	
 DWP 96/500* ¹	Case of 40 (5 bags of 8)	White	0030 501.101		0030 502.108	
		Yellow	0030 501.110		0030 502.116	
		Green	0030 501.136		0030 502.132	
		Blue	0030 501.144		0030 502.140	
 DWP 384/200* ¹	Case of 40 (5 bags of 8)	White	0030 521.102		0030 522.109	
	Case of 120 (10 bags of 12)	White	0030 525.108		0030 526.104	

*¹ Larger packs, barcoded and with white color are available upon request. Simple barcode specification and ordering at www.eppendorf.com/barcode

Protein LoBind Tubes and Plates



Description

When biological samples are stored or incubated in standard reaction vessels more than 90 % sample material can be lost within 24 hours due to adsorption to the plastic surface. Eppendorf LoBind Tubes and plates maximize sample recovery by significantly reducing sample-to-surface binding—without the use of any type of coating! A combination of specially developed technology and ultrapure selected polypropylene ensures best recovery rates of your valuable samples.

Eppendorf Protein LoBind Tubes are specifically designed for use in proteomics or other fields of protein research (antibodies, cell biology, peptide drugs etc.), where protein concentration tend to be very small and sample recovery is vital for assay results. Significantly more protein can be recovered for downstream analyses and enzymes remain active as they are not denatured by any tube-surface interactions.

Product features

General features:

- Protein LoBind Tubes are ideal for preparation or storage of protein, peptide, antibody or virus samples
- LoBind material guarantees maximum sample recovery for improved assay results
- Free of surface coating (e.g. siliconization) to eliminate the risk of sample interference
- Certified free of DNA, DNase, RNase and PCR inhibitors (PCR clean)
- Available in tube, microplate and deepwell plate formats for easy up-scaling

Tubes feature:

- Hinged Safe-Lock lid prevents accidental lid opening during incubation
- Precise lid sealing for lowest evaporation rates during long-term storage
- Rated up to 18,000 x g centrifugation speed for molecular biology applications
- Additional features identical to Safe-Lock Tubes (page 118)

Plates feature:

- OptiTrack® labeling: 30 % faster well identification and less pipetting errors due to colored border with high-contrast alphanumeric labeling
- RecoverMax® conical well-design: Optimized well geometry for maximum sample recovery and excellent mixing performance. The smooth contours also reduce capillary effects in well corners (“wicking”), minimizing the risk of cross-contamination.
- Raised well rims and even surface for reliable sealing
- Additional features identical to MTP and DWP features (pages 120–122)

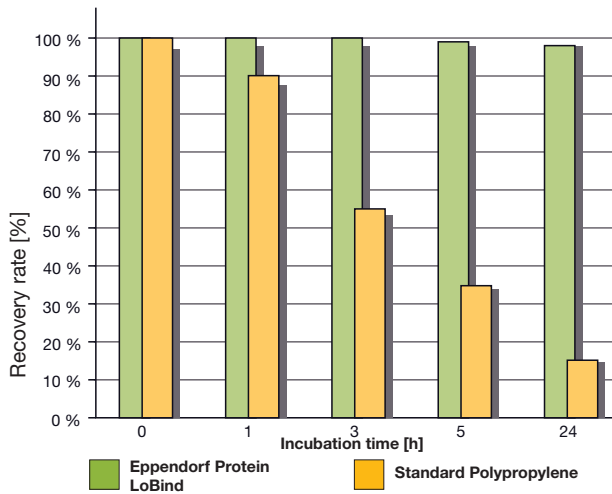


Eppendorf DWP 384/200 Protein LoBind

High-contrast OptiTrack labeling make well identification easier to reduce pipetting errors. LoBind plates are also clearly labeled for easy identification.

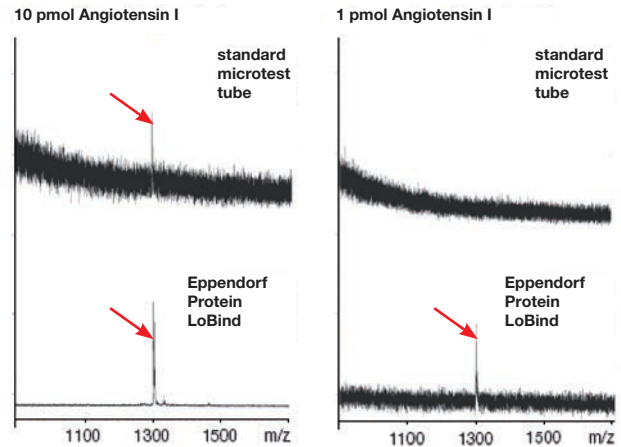
Protein LoBind Tubes and Plates

Typical protein recovery rates in Eppendorf Protein LoBind consumables





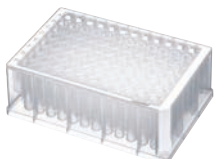
Protein recovery (fluorescein-labeled BSA) in Eppendorf Protein LoBind Deepwell Plates and plates made of standard material. The Eppendorf Protein LoBind material guarantees up to 97% sample recovery independent on incubation time. In contrast, protein sticks to standard material resulting in nearly 50% or 90% sample loss after 3 h or 24 h, respectively.

MALDI-TOF mass spectrometry performed with peptides stored in Protein LoBind and standard tubes



The use of Eppendorf Protein LoBind Tubes yields a significantly higher signal during MALDI-TOF analysis of the peptide angiotensin I when compared to the use of standard tubes. At 1 pmol, analysis becomes impossible with standard microtest tubes. The arrows identify the signals in each experiment. (Source: Dr. S. Seeber and Dr. Humeny, Institute of Biochemistry, University of Erlangen-Nürnberg, Germany)

Ordering information

Material	Tube/plate type	Packaging size	OptiTrack® frame color	Order no.	
				Order no.	
					
Protein LoBind consumables					
	Safe-Lock Tube 0.5 mL	Case of 100 (2 bags of 50)	N/A	0030 108.094	
	Safe-Lock Tube 1.5 mL	Case of 100 (2 bags of 50)	N/A	0030 108.116	
	Safe-Lock Tube 2.0 mL	Case of 100 (2 bags of 50)	N/A	0030 108.132	
	MTP 384 (V-bottom)	Case of 80 (5 bags of 16)	White	0030 624.300	
		Case of 240 (12 bags of 20)	White	0030 628.306	
	DWP 96/2000	Case of 20 (5 bags of 4)	White	0030 504.305	
	DWP 96/1000	Case of 20 (5 bags of 4)	White	0030 504.208	
		Case of 20 (5 bags of 4)	Yellow	0030 504.216	
		Case of 80 (10 bags of 8)	White	0030 508.203	
	DWP 96/500	Case of 40 (5 bags of 8)	White	0030 504.100	
		Case of 40 (5 bags of 8)	Yellow	0030 504.119	
		Case of 120 (10 bags of 12)	White	0030 508.106	
DWP 384/200	Case of 40 (5 bags of 8)	White	0030 524.101		
	Case of 120 (10 bags of 12)	White	0030 528.107		

PCR clean: Batch-certified free from DNA, DNase, RNase, and PCR inhibitors.

DNA LoBind Tubes and Plates

**Description**

DNA LoBind Tubes improve recovery of nucleic acids by reducing their adsorption to the tube wall. A combination of special manufacturing technologies and selected polypropylene batches ensures nearly 100 % recovery of DNA/RNA molecules—without surface coating to eliminate the risk of sample contamination. DNA LoBind Tubes are batch-tested and certified by an independent laboratory to be free from DNA, DNase, RNase and PCR Inhibitors. Small packaging in bags of 50 tubes further reduces the risk of contamination. Eppendorf® DNA LoBind Tubes are ideal for sample preparation or long-term storage of nucleic acids in forensic, microarrays, next generation sequencing applications.

Product features**General features:**

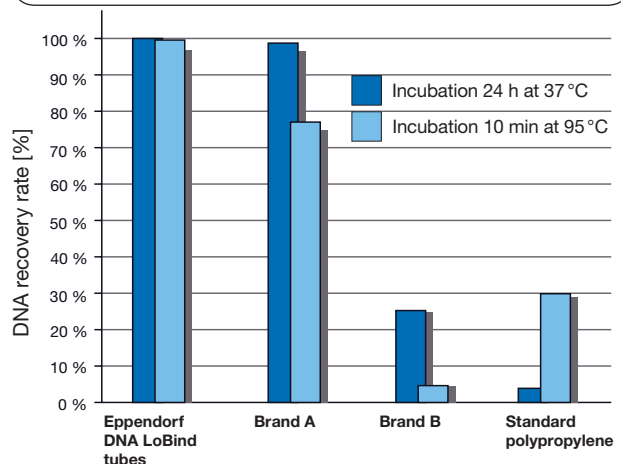
- DNA LoBind for DNA or RNA applications in forensic analysis, microarrays, next generation sequencing
- LoBind material guarantees maximum sample recovery for improved assay results
- Certified free of DNA, DNase, RNase and PCR inhibitors (PCR clean)
- Available in tube, microplate and deepwell plate formats for easy up-scaling

Tubes feature:

- Hinged Safe-Lock lid prevents accidental lid opening during incubation
- Precise lid sealing for lowest evaporation rates during long-term storage
- Rated up to 30,000 x g (25,000 x g for 2.0 mL tube) centrifugation speed for molecular biology applications
- Additional features identical to Safe-Lock Tubes (page 118)

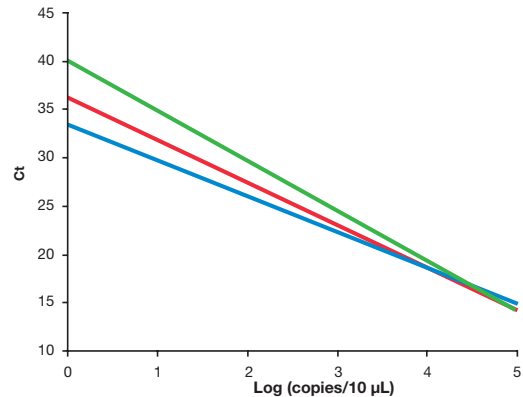
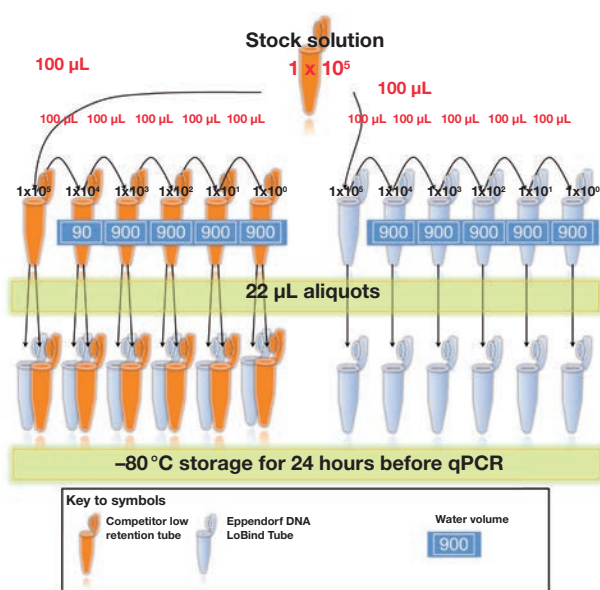
Plates feature:

- OptiTrack® labeling: 30 % faster well identification and less pipetting errors due to colored border with high-contrast alphanumeric labeling
- RecoverMax® conical well-design: Optimized well geometry for maximum sample recovery and excellent mixing performance. The smooth contours also reduce capillary effects in well corners (“wicking”), minimizing the risk of cross-contamination.
- Raised well rims and even surface for reliable sealing
- Additional features identical to MTP and DWP features (pages 120–122)

**DNA recovery rate after different incubation conditions**

DNA recovery rate (0.2 ng/μL DNA fragment (130 bp, 32P labeled) in 2.5 M NaCl/TE buffer) in Eppendorf DNA LoBind Tubes compared to tubes from different suppliers. The Eppendorf DNA LoBind material guarantees up to 99 % sample recovery independent of incubation temperature or time.

DNA LoBind Tubes and Plates



Low bind tubes used for	Panel 1	Panel 2	Panel 3
Serial dilution performed in	Competitor	Competitor	Eppendorf DNA LoBind
–80 °C sample storage in	Competitor	Eppendorf DNA LoBind	Eppendorf DNA LoBind
Slope	–5.20	–4.40	–3.70
Efficiency	56 %	69 %	86 %
r ²	–0.9939	–0.9931	–0.9993

Adsorption of DNA to tube surfaces effects accuracy of real-time PCR results. DNA templates (DNA standard panels) prepared in Eppendorf DNA LoBind tubes show an amplification efficiency of 86 % compared to 56 % for samples prepared and stored in competitor low retention tubes. The much higher DNA recovery from Eppendorf® DNA LoBind tubes leads to improved standard curves and subsequently more an accurate interpretation of DNA quantity in samples assayed.

Left image: Flowchart of DNA standard panels preparation. Genomic DNA stock solution was serial 10-fold diluted in either

competitor's low retention or Eppendorf DNA LoBind tubes. 22 µL aliquots of each dilution were stored for 24 hours at –80 °C in either competitor's low retention or Eppendorf DNA LoBind tubes before real-time PCR assay.

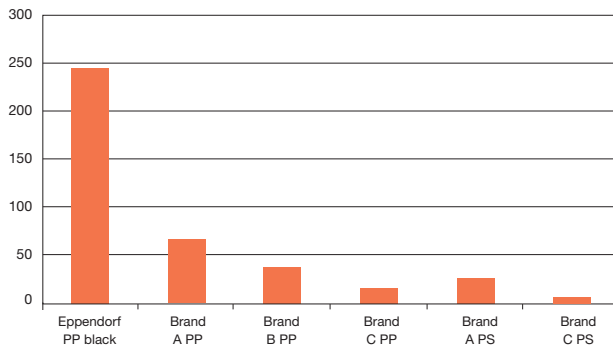
Right image: Standard curves obtained for each panel. C_t versus log¹⁰ of expected DNA concentration was plotted and slopes were obtained after linear regression. PCR efficiencies are derived from slope values. (See Application Note 226 for more details).

Ordering information

Material	Tube/plate type	Packaging size	OptiTrack® frame color	Order no.	
				Order no.	
DNA LoBind consumables					
	Safe-Lock Tube 0.5 mL	Case of 250 (5 bags of 50)	N/A	0030 108.035	
	Safe-Lock Tube 1.5 mL	Case of 250 (5 bags of 50)	N/A	0030 108.051	
	Safe-Lock Tube 2.0 mL	Case of 250 (5 bags of 50)	N/A	0030 108.078	
	MTP 384 (V-bottom)	Case of 80 (5 bags of 16)	White	0030 623.304	
		Case of 240 (12 bags of 20)	White	0030 627.300	
	DWP 96/1000	Case of 20 (5 bags of 4)	White	0030 507.207	
		Case of 20 (5 bags of 4)	Blue	0030 503.244	
		Case of 80 (10 bags of 8)	White	0030 503.201	
	DWP 96/500	Case of 40 (5 bags of 8)	White	0030 503.104	
		Case of 40 (5 bags of 8)	Blue	0030 503.147	
		Case of 120 (10 bags of 12)	White	0030 507.100	
DWP 384/200	Case of 40 (5 bags of 8)	White	0030 523.105		
	Case of 120 (10 bags of 12)	White	0030 527.100		

PCR clean: Batch-certified free from DNA, DNase, RNase, and PCR inhibitors.

Assay microplates



Superior signal-to-noise ratio with Eppendorf black assay plates (fluorescence assay)

Comparison of the signal-to-noise ratio in a DNA quantification using the fluorescent dye PicoGreen®. Black Eppendorf® Microplates and black microplates of other manufacturers were used.

PP = polypropylene, PS = polystyrene (Application note 203).



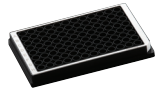
Product features

- Opaque design prevents well-to-well crosstalk
- OptiTrack® labeling: 30% faster well identification and less pipetting errors due to colored border with high-contrast alphanumeric labeling
- RecoverMax® well-design: Optimized well geometry for maximum sample recovery and excellent mixing performance
- Minimal residual volume and high well-to-well homogeneity
- Raised well rims and even surface for reliable sealing
- No well nesting for easy stacking
- Perfect for automation due to rigid design, highest dimensional accuracy and compliance to SBS specifications
- g-Safe™: Centrifugation stability of up to 6,000 x g
- Polypropylene provides high resistance to chemicals, mechanical stress and temperature extremes
- Plates are optimized for minimal auto-fluorescence and auto-luminescence
- Guaranteed functionality between -86 °C to 100 °C
- Autoclavable (121 °C, 20 min)
- Barcode options available

Description

Eppendorf assay plates are designed for use with top-reading luminometers and fluorometers. The black Eppendorf Microplates are ideal for fluorescence detection. They offer an excellent signal-to-noise ratio, resulting in an extremely low detection limit—for clear signals even with low concentration samples! The white Eppendorf Microplates are optimized for highest sensitivity in the detection of luminescence or weak fluorescence signals by maximizing reflectance.

Ordering information

Plate color	Plate type	Shape of well bottom ¹	Packaging size	OptiTrack frame color		
					Order no.	
White plates						
	MTP 96	U	Case of 80 (5 bags of 16)	Gray	0030 601.572	
		V			0030 601.670	
	MTP 384	V			0030 621.670	
Black plates						
	MTP 96	U	Case of 80 (5 bags of 16)	White	0030 601.807	
		V			0030 601.904	
	MTP 384	V			0030 621.905	

¹U (round)—Ideal if your assays involve mixing or washing steps
 V (conical)—For low sample volumes and maximum sample recovery
 PCR clean: Batch-certified free from DNA, DNase, RNase, and PCR inhibitors.

Plate sealing options



Product features

- Eppendorf plates are designed to be heat-sealed up to 5 times
- PCR Film and Foil with heat-activated glue. Lower adhesive strength at room temperature for easy positioning and increased strength at PCR-characteristic temperatures to maximize evaporation protection
- Masterclear™: optically clear film for all optical assays in the UV and VIS light range. Specially selected adhesive does not interfere with assay results

Description

Eppendorf offers high-performance sealing options for almost every application—for incubation and storage, for colorimetric ELISA as well as fluorescence and luminescence assays, for sample processing and cell culture as well as PCR and qPCR amplification.

Heat sealing vs. adhesive seals vs. mats:

- Heat sealing melts the seals onto the plastic of the plate providing a permanent seal and thus better evaporation protection than adhesive seals. Heat sealing is usually used for long-term storage, storage of small sample volumes or when plates have to be shipped.
- Mats and adhesive seals can be manually applied without the need for additional equipment. Since they don't require heating there is less risk for sample damage. In contrast to mats that protrude into the wells, adhesive seals don't reduce the well volume and are suitable for optical assays.
- Mats are considered re-useable since they can be cleaned and autoclaved for sterile applications.

Aluminum foil vs. transparent films:

- Aluminum foil provides slightly better evaporation protection than plastic films—especially during long-term storage. It is also easily pierceable with single or multichannel pipettors and robotic tips for sample recovery. Aluminum provides protection for light sensitive samples
- Transparent films allow you to see the samples based on the type of film and the adhesive is suitable for fluorescence, luminescence and colorimetric assays. Since films are usually non-pierceable they provide a better protection from accidental piercing.

Ordering information

Description	Purity	Order no.	
Heat sealing			
Eppendorf Heat Sealing Film, pack of 100	PCR clean*	0030 127.838	
Eppendorf Heat Sealing Foil, pack of 100	PCR clean*	0030 127.854	
Adhesive seals			
Eppendorf Storage Film, self-adhesive, case of 100 (2 bags of 50)	PCR clean*	0030 127.870	
Eppendorf Storage Foil, self-adhesive, pack of 100	PCR clean*	0030 127.889	
Eppendorf PCR Film, self-adhesive, pack of 100	PCR clean*	0030 127.811	
Eppendorf PCR Foil, self-adhesive, pack of 100	PCR clean*	0030 127.820	
Eppendorf Masterclear Film for optical assays, self-adhesive, pack of 100	PCR clean*	0030 132.904	
Sealing mats			
Eppendorf Sealing Mat, for DWP 96/2000, case of 50 (5 bags of 10)	Standard	0030 127.579	
Eppendorf Sealing Mat, for DWP 96/1000, 96/500 and MTP 96, case of 50 (5 bags of 10)	Standard	0030 127.552	
Lids			
Eppendorf Plate Lid, for MTP and DWP plates, case of 80 (5 bags of 16)	PCR clean*	0030 131.517	
Eppendorf Plate Lid, for MTP and DWP plates, case of 80 (5 bags of 16)	Sterile	0030 131.525	

*PCR clean: Batch-certified free from DNA, DNase, RNase, and PCR inhibitors

Eppendorf Plates and Eppendorf Instruments – a powerful team!

Description

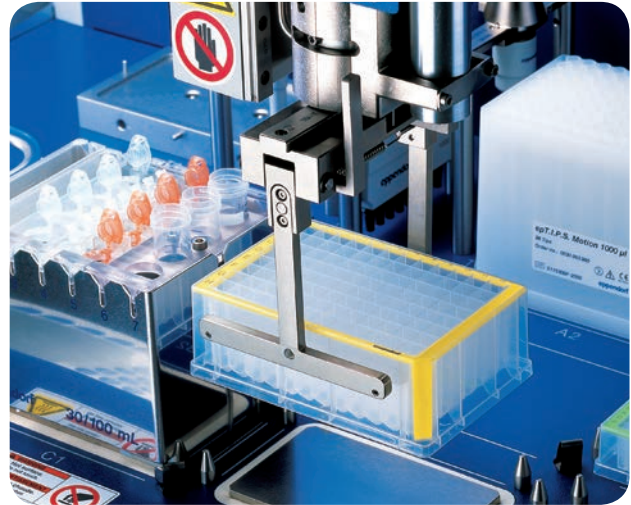
The extra torsion-resistant Eppendorf Plates are made from ultra pure polypropylene and thus fit perfectly into the Eppendorf system. Their high dimensional accuracy, along with temperature- and chemical resistance, facilitate immediate integration into automated applications, such as serial dilutions, sample and reagent transfer or multi step assays. Upon request, all Eppendorf Plates are available with barcode.



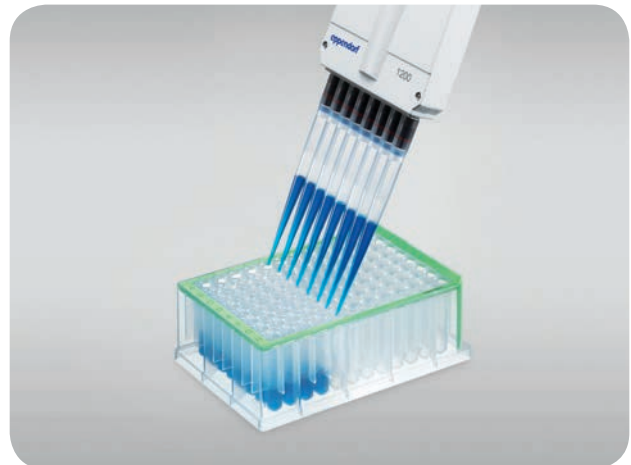
Centrifugation in Rotor A-2-MTP, A-2-DWP or A-4-81 (see page 164, 186, 182)



Efficient mixing with MixMate (see page 133)



Ready for immediate use in epMotion 5075/5070 (see page 88)



Simple manual pipetting in Deepwell Plates with epT.I.P.S. 50-1,250 μ L pipette tips and Research multi-channel pipette (see page 55)

Racks and holders for Eppendorf tubes®



Product features of Tube Racks

- 24-place capacity
- Unique swivel connectors interlock multiple racks in front-to-back and side-to-side configurations
- Numbered positions
- UV-resistant
- Autoclavable (121 °C, 20 min)

Description

Eppendorf Tube Racks, ideal for sample processing and the short- or medium-term storage of samples, can be stored in a freezer and withstand temperatures as low as -80 °C. Each tube is properly spaced and elevated for easy access and convenient handling. Tube Racks are available for 0.5 mL, 1.5 mL and 2.0 mL tubes. They can be stacked, even when fully loaded, interlocked to other racks on both sides and feature labeling surfaces to enable easy identification. The racks are UV-resistant and fully autoclavable.



Product features of Eppendorf Rack 3821

- 20-place capacity for 1.5/2.0 mL tubes
- Numbered positions
- Economically priced
- Note: This product should not be autoclaved.

Ordering information

Description	Order no	
Tube Racks, 24-place capacity		
For 0.5 mL tubes	0030 123.107	
For 1.5/2.0 mL tubes	0030 123.115	
Rack 3821, 20-place capacity		
For 1.5/2.0 mL tubes	3821 000.008	

Micropestle




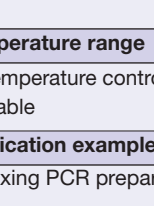
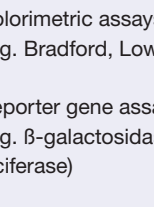
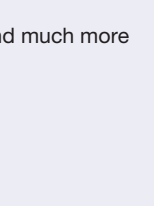
Product features

- Autoclavable micropestle for resuspending pellets from 1.5/2.0 mL test tubes

Ordering information

Description	Order no.	
Micropestle , for resuspending pellets from 1.5/2.0 mL tubes, set of 10	0030 120.973	

MixMate®, Eppendorf Thermomixer® comfort, Thermomixer® compact and ThermoStat plus™

			
MixMate	Thermomixer comfort	Thermomixer compact	ThermoStat plus
Features			
mixes	heats cools mixes	heats mixes	heats cools
Temperature range			
no temperature control available	from 13 °C below RT to 99 °C	from 4 °C above RT to 99 °C	from 30 °C below RT to 99 °C
Application examples			
<ul style="list-style-type: none"> ● Mixing PCR preparations ● Resuspending pellets (e.g. bacteria, DNA, cell culture pellets) ● Incubation (e.g. ELISA assays) ● Colorimetric assays (e.g. Bradford, Lowry, BCA) ● Reporter gene assays (e.g. β-galactosidase, luciferase) ● Mixing restriction digestion preparations ● Vortexing numerous tube formats (e.g. 15 and 50 mL conical tubes) ● And much more 	<ul style="list-style-type: none"> ● Enzyme reactions (e.g. DNA restriction digestion, cDNA production via reverse transcription, Proteinase K digestion) ● Transformation ● Denaturation of DNA, RNA, proteins ● Cultivation of bacteria ● Cultivation of yeasts ● Bead technology (e.g. protein purification) ● Isolation of DNA fragments from agarose gels ● Plasmid isolation ● Immunoprecipitation ● Hybridization experiments on slides, e.g. microarrays or <i>in situ</i> hybridization ● Gentle thawing of deep-frozen solutions such as buffers ● And much more 	<ul style="list-style-type: none"> ● Enzyme reactions at temperatures 4 °C above RT (e.g. DNA restriction digestion, cDNA production via reverse transcription, Proteinase K digestion) ● Transformation ● Denaturation of DNA, RNA, proteins ● Cultivation of bacteria ● Cultivation of yeasts ● Bead technology (e.g. protein purification) ● Isolation of DNA fragments from agarose gels ● Plasmid isolation ● And much more 	<ul style="list-style-type: none"> ● Enzyme reactions (e.g. DNA restriction digestion, cDNA production via reverse transcription, Proteinase K digestion) ● Transformation ● Denaturation of DNA, RNA, proteins ● Storage of enzymes, nucleic acids, etc., at defined temperatures ● Cell lysis ● <i>In vitro</i> translation ● Ligation ● Hybridization experiments on slides, e.g. microarrays or <i>in situ</i> hybridization ● Gentle thawing of deep-frozen solutions such as buffers ● And much more

MixMate® Eppendorf



Description

Compact and amazingly versatile mixer, specially designed for mixing small volumes in numerous plate and tube formats. Fast and precisely controlled mixing movements (^{2D}Mix-Control) enable efficient and homogenous mixing of samples through all vessel formats. MixMate can be used virtually for any application. It accommodates microcentrifuge tubes, PCR plates, deepwell plates and MTPs. Includes the touch vortex function with an innovative 2-second override* for an ergonomic work process and continuous vortexing.


*U.S. Patent 7,575,363 B1

Product features

- ^{2D}Mix-Control: efficient and very fast mixing of volumes from 5 µL to 2 mL
- 3-in-1 format: mixing of plates, tubes and vortexing function (with lowest hand-arm vibration strain; certificate has been issued)
- Anti-spill technology: controlled mixing movement prevents spilling and lid wetting
- Universal holder: allows mixing of all skirted plate formats (up to 96- and 384-wells): MTPs, deepwell plates, PCR plates
- Tube Holders: enable mixing of microcentrifuge tubes up to 2 mL (0.5 mL, 1.5 mL, 2.0 mL), PCR tubes, PCR strips and unskirted as well as semiskirted PCR plates under controlled conditions
- Pre-programmed direct selection keys: optimal time/frequency for each plate or tube format
- Vortexing of numerous tube formats (e.g. microtest tubes, 15 and 50 mL conical tubes)
- Automatic imbalance detection
- High stability and running silence (certificate has been issued), even during maximum mixing frequency
- User-friendly operation



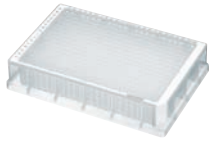
 More information under www.eppendorf.com/mixmate

 Ordering information for other voltage options begins on page 471.

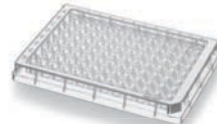
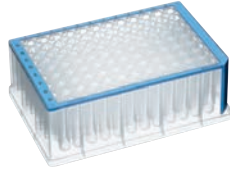
MixMate® Eppendorf



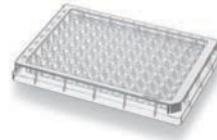
PCR plates



Deepwell plates



Microplates



PCR tubes/rips and test tubes (depicted in the corresponding tube holders)




Technical specifications

Mixing speed	300 to 3,000 rpm (in 50 rpm increments)
Mixing and vortexing radius	1.5 mm (3 mm mixing stroke)
Touch vortexing frequency	3,500 rpm
Adjustable mixing time	15 s to 99.5 h; continuous
Noise level	<50 dB(A) - 3,000 rpm
Power supply	230 V, 50–60 Hz
Power consumption	40 W
Dimensions (W x D x H)	17 x 23 x 13 cm
Weight	4.2 kg

Ordering information

Description	Order no.	
MixMate		
incl. 3 tube holders: PCR 96, 0.5 mL, 1.5/2.0 mL	5353 000.014	
Accessories		
Tube Holder PCR 96 , for 96 x 0.2 mL PCR tubes, PCR strips or 96-well PCR plates, semi-skirted or un-skirted	5353 040.113	
Tube Holder 0.5 mL , for 24 x 0.5 mL micro test tubes	5353 040.121	
Tube Holder 1.5/2.0 mL , for 24 x 1.5 mL or 2.0 mL microcentrifuge tubes	5353 040.130	

 Ordering information for other voltage options begins on page 471.

Eppendorf Thermomixer® compact



IsoTherm Rack in
0 °C IsoPack

Description

Small and perfectly designed: The Thermomixer compact is the perfect compact unit for 24 x 1.5 mL microcentrifuge tubes. Its impressive features include an extremely small footprint, a straightforward design and high stability — even at maximum mixing frequency.

Product features

- Dedicated for 24 x 1.5 mL microtest tubes
- ShortMix function
- Includes an IsoTherm rack and an IsoTherm cooling pack for sample storage at 0 °C
- Small footprint
- Quiet operation due to perfect fit of the test tubes in the thermoblock

Technical specifications

Temperature range	from approx. 4 °C above RT to 99 °C
Temperature settings	from +1 °C to 99 °C
Mixing speed	300–1,400 rpm
Mixing orbit	3 mm
Incubating accuracy	±1 °C between 20 °C and 45 °C ±2 °C below 20 °C and above 45 °C
Heating speed	approx. 5 °C/min
Power requirement	90 W
Dimensions (W x D x H)	16.5 x 24 x 14.5 cm
Weight	2.4 kg

Ordering information

Description	Order no.
Thermomixer compact	
with fixed thermoblock for 1.5 mL tubes, IsoTherm rack and cool pack (0 °C)	5350 000.013

Eppendorf Thermomixer® comfort

**Description**

The Thermomixer comfort conveniently offers simultaneous mixing and temperature control. It meets even the highest demands for user-friendliness and flexibility: its counter-cooling ability provides efficient cooling, thereby greatly expanding both its temperature control functions and range of applications. Ten different thermoblocks are available, all of which can be simply and quickly exchanged, to adapt the unit to daily and/or changing requirements in the laboratory. Two freely selectable program sequences with incubating, mixing and rest phases, as well as subsequent cooling to 13 °C below room temperature, make everyday lab routines much easier. The Eppendorf Thermomixer is your reliable partner for short reaction times and efficient lab routines.

Product features

- Wide temperature control and application ranges thanks to active Peltier element heating and counter-cooling
- Excellent mixing and incubating performance
- Best temperature transfer thanks to a perfectly tight fit and complete enclosure of the vessels.
- Selectable “time” and “temp” controls: timer function starts with program activation or when set temperature is reached
- ShortMix key for brief mixing
- Interval mixing
- Pause function
- RS-232 interface for remote control
- Ten different exchangeable thermoblocks offer a high degree of flexibility
- Automatic thermoblock identification and display of the maximum revolutions
- Quiet operation due to perfect fit of the test tubes in the thermoblock

➔ Exchangeable thermoblocks for Thermomixer comfort ordering information on page 140.
Visit also the micro site: www.eppendorf.com/thermomixer-comfort

⚡ Ordering information for other voltage options begins on page 471.

Eppendorf Thermomixer® comfort

Technical specifications

Temperature range	from 13 °C below RT to 99 °C*1
Temperature settings	from 1 °C to 99 °C
Mixing speed	300–1,500 rpm*1
Incubating accuracy	±0.5 °C between 20 °C and 45 °C ±2 °C below 20 °C and above 45 °C
Heating speed	approx. 5 °C/min
Cooling speed	2–3 °C/min between 99 °C and RT 0.5–1 °C/min between RT and 13 °C below RT
Timer	1 min to 99:59 h, continuous
Mixing orbit	3 mm
Power supply	100–240 V, 50–60 Hz
Power requirement	90 W
Interface	RS-232
Dimensions (W x D x H)	22 x 25 x 12.5 cm
Weight	3.2 kg

*1 Upper limit depends on thermoblock chosen (thermoblock options on page 140)

Ordering information

Description	Order no.	
Thermomixer comfort		
without exchangeable thermoblock	5355 000.011	
Exchangeable thermoblocks and accessories, for tubes, complete* with rack and cool pack for 0 °C (from IsoTherm-System®)		
0.5 mL*	5361 000.015	
1.5 mL*	5360 000.011	
2.0 mL*	5362 000.019	
8 x 15 mL	5366 000.013	
4 x 50 mL	5365 000.010	
Exchangeable thermoblocks for other vessels		
MTPs and deepwell plates, with lid	5363 000.012	
Adapter plate for 96 x 0.2 mL PCR tubes and PCR plates 96 to insert in exchangeable thermoblock for MTPs	5363 007.009	
24 test tubes , diameter 11–11.9 mm, height 30–76 mm	5364 000.016	
24 cryo tubes , 1.5–2.0 mL, external diameter max. 12.5 mm, all base shapes	5367 000.017	
4 slides , for hybridization experiments	5368 000.010	

© IsoTherm-System is a registered trademark of Eppendorf

Eppendorf ThermoStat plus™

**Description**

Convenient and accurate temperature control for all commonly used lab tubes is the concept behind our ThermoStat plus. The result is a compact benchtop thermostat with Peltier technology. Its most notable strength is its ability to maintain different temperature levels: it can heat up samples to 99 °C and also cool them down to as low as -5 °C. Exchangeable thermoblocks ensure effective heat transfer and the flexibility to adapt the ThermoStat plus to your particular application. Operation is incredibly easy: simply select the temperature and press “Start” to initiate the timer. Both the temperature and run time can be programmed for special applications.

Product features

- Precise temperature control with active cooling and heating
- Choice of 11 different exchangeable thermoblocks
- Temperature control range from -5 °C to 99 °C
- Individual programming of up to four separate temperature and time phases and temperature ramps
- The run time for the linear transition between two temperature levels can be individually programmed
- User-friendly operation
- RS-232 interface for remote control and documentation
- Pause function

⊕ Exchangeable thermoblocks for ThermoStat plus ordering information on page 140. Visit also the micro site: www.eppendorf.com/thermostat-plus

⚡ Ordering information for other voltage options begins on page 471.

Eppendorf ThermoStat plus™

Technical specifications

Temperature range	from 30 °C below RT to 99 °C*1
Temperature settings	from -5 °C to 99 °C
Incubating accuracy	±1.0 °C at 0 °C ±0.5 °C at 37 °C ±1.0 °C at 90 °C
Heating speed	5 °C/min
Cooling speed	6 °C/min between 99 °C and 25 °C 1.5 °C/min between 25 °C and -5 °C
Timer	1 min to 99:59 h, continuous
Power supply	100–240 V, 50–60 Hz
Power requirement	75 W
Interface	RS-232
Dimensions (W x D x H)	22 x 25 x 12.5 cm
Weight	5 kg

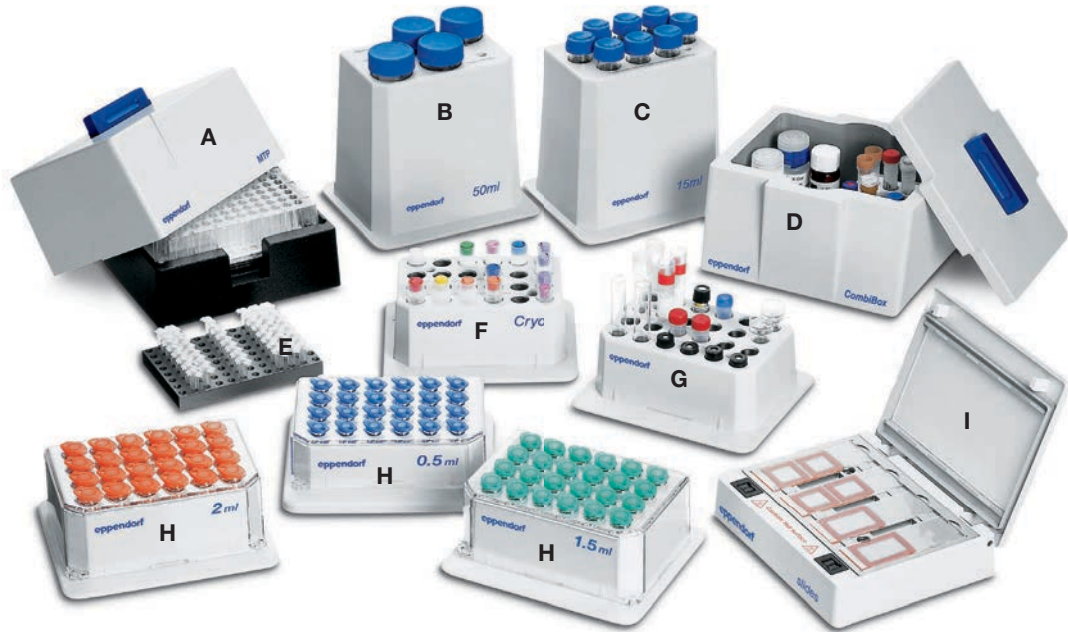
*1 Upper limit depends on thermoblock chosen (thermoblock options on page 140)

Ordering information

Description	Order no.	
ThermoStat plus		
without exchangeable thermoblock	5352 000.010	
Exchangeable thermoblocks and accessories, for tubes, complete* with rack and cool pack for 0 °C (from IsoTherm-System®)		
0,5 mL*	5361 000.015	
1,5 mL*	5360 000.011	
2,0 mL*	5362 000.019	
8 x 15 mL	5366 000.013	
4 x 50 mL	5365 000.010	
Exchangeable thermoblocks for other vessels		
MTPs and deepwell plates, with lid	5363 000.012	
Adapter plate for 96 x 0.2 mL PCR tubes and PCR plates 96 to insert in exchangeable thermoblock for MTPs	5363 007.009	
CombiBox for all tube types, interior 13.5 x 9.0 x 6.0 cm (W x D x H), (ThermoStat plus only)	5352 100.007	
24 test tubes, diameter 11–11.9 mm, height 30–76 mm	5364 000.016	
24 cryo tubes, 1.5/2.0 mL, external diameter max. 12.5 mm, all base shapes	5367 000.017	
4 slides, for hybridization experiments	5368 000.010	

© IsoTherm-System is a registered trademark of Eppendorf

Exchangeable thermoblocks for Thermomixer® comfort and ThermoStat plus™



Exchangeable thermoblocks accommodate:

- A.** MTPs and deepwell plates
- B.** 4 x 50 mL Falcon® tubes
- C.** 8 x 15 mL Falcon® tubes
- D.** Exclusively for ThermoStat plus: CombiBox provides universal temperature control (e.g., for the preparation/cooling of enzymes) for flasks and beakers with a height = 60 mm
- E.** Adapter plate for 96 x 0.2 mL PCR tubes and PCR plates 96 easily inserts into exchangeable thermoblock for MTPs (B)
- F.** 24 x 1.5–2 mL cryo tubes
- G.** Test tubes with a diameter of 11–11.9 mm and a height of 30–76 mm
- H.** 24 x 0.5 mL, 1.5 mL and 2.0 mL microcentrifuge tubes*¹
- I.** 1–4 standard glass slides

©: Falcon is a registered trademark of Becton Dickinson, IsoTherm-System is a registered trademark of Eppendorf

*¹ Includes an IsoTherm rack and IsoTherm cool pack for 0 °C.
For more information see page 143.

Product features

- Contact-safe thanks to optimally shielded thermoblocks
- Better laboratory hygiene — eliminates use of water baths: reduced risk of contamination
- Efficient and simple exchange of all thermoblocks
- Tubes easily accessible
- Personal benchtop devices enable you to always keep an eye on your samples

Description

The exchangeable thermoblock system for the Thermomixer comfort and ThermoStat plus ensures a precise “fit” for all common lab tubes: from simple temperature control of a chemical to complex enzyme reactions and hybridization experiments, and from MTPs to 50 mL conical tubes — the application possibilities are virtually endless!

Exchangeable thermoblocks for Thermomixer® comfort and ThermoStat plus™

Technical specifications

Exchangeable thermoblock for	Max. Temp.	Max. rpm	Thermomixer comfort	ThermoStat plus
24 x 0.5 mL microcentrifuge tubes	99 °C	1,500	●	●
24 x 1.5 mL microcentrifuge tubes	99 °C	1,400	●	●
24 x 2.0 mL microcentrifuge tubes	99 °C	1,400	●	●
24 test tubes dia. = 11.9 mm, height 30–76 mm	99 °C	1,400	●	●
24 x 1.5–2 mL cryo tubes	99 °C	1,400	●	●
8 x 15 mL Falcon® tubes	99 °C	750	●	●
4 x 50 mL Falcon® tubes	99 °C	750	●	●
MTPs and deepwell plates, PCR tubes and plates	99 °C	1,400* ¹	●	●
4 slides	99 °C	1,400	●	●
Slides DC	70 °C	1,400	●	●
CombiBox (ThermoStat plus only)	95 °C	0		●

*¹ With a load of, e.g. 200 g, the max. rpm is 800.

Ordering information

Description	Order no.	
Exchangeable thermoblocks and accessories, for microcentrifuge tubes, complete* with rack and cool pack for 0 °C (from IsoTherm-System®)		
0.5 mL*	5361 000.015	
1.5 mL*	5360 000.011	
2.0 mL*	5362 000.019	
8 x 15 mL	5366 000.013	
4 x 50 mL	5365 000.010	
Exchangeable thermoblocks for other vessels		
CombiBox for all tube types , interior 13.5 x 9.0 x 6.0 cm (W x D x H), (ThermoStat plus only)	5352 100.007	
MTPs and deepwell plates , with lid	5363 000.012	
Adapter plate for 96 x 0.2 mL PCR tubes and PCR plates 96 to insert in exchangeable thermoblock for MTPs	5363 007.009	
24 test tubes , diameter 11–11.9 mm, height 30–76 mm	5364 000.016	
24 cryo tubes , 1.5/2.0 mL, external diameter max. 12.5 mm, all base shapes	5367 000.017	
4 slides , for hybridization experiments	5368 000.010	

© IsoTherm-System is a registered trademark of Eppendorf

Exchangeable thermoblocks for slides™ and microarrays



Description

The exchangeable thermoblock for 4 slides can be used for any application with standard slides. It is ideal for hybridization experiments on slides, e.g., Microarrays, FISH and CISH.

Application

- Hybridization experiments using slides for
 - microarray hybridization
 - *in situ* hybridization (e.g. FISH, CISH)
 - immunohistochemistry

Product features

- Exchangeable thermoblocks for 1 to 4 slides (standard object holder format)
- Uniform heating and atmospheric control improves signal-to-background ratio, increases signal intensity and results in excellent reproducibility
- Increased hybridization efficiency due to rapid and homogeneous mixing of the sample (when using the Thermomixer comfort)
- High level temperature stability during hybridization
- System ensures the highest level of homogeneity of the hybridization parameters between the chambers
- Reservoir pads ensure high air humidity
- Light-proof interior

Technical specifications

Slide Dimensions (W x D x H)	75.0–76.5 mm x 25.0–26.0 mm x 0.9–1.2 mm
Mixing speed	max. 1,400 rpm
Temperature control	max. 99 °C (thermoblock for slides DC: max. 70 °C)
Temperature homogeneity	±2 °C* ¹ (at 70 °C) ±0.5 °C* ¹ (at 45 °C)
Heating speed	>5 °C/min* ¹

*¹ Values were determined using the Thermomixer comfort.

Ordering information

Description	Order no.	
Exchangeable thermoblock for 4 slides, for hybridization experiments	5368 000.010	

IsoTherm-System®



Product features

- Holds 24 reaction tubes (e.g. 0.5 mL or 1.5 mL /2.0 mL)
- IsoPack (cold pack): white maintains 0 °C for up to 6 hours; and blue maintains -21 °C for up to 3 hours
- No more melting ice baths (reduces risk of contamination)
- All system components can be used separately
- Racks are stackable, autoclavable and floatable; can be centrifuged in an MTP rotor

Description

The IsoTherm System, which consists of an IsoRack (work rack), IsoSafe (insulating box) and two IsoPacks (cool packs), specializes in cooling samples effectively and consistently at -21 °C or 0 °C over many hours. The IsoTherm-System can be used to prevent enzymes from becoming inactive as well as for PCR sample preparation, sample transport and slow thawing of frozen samples.

Application

- Cooling, transporting and storing deep-frozen samples

Ordering information

Description	Order no.	
IsoTherm-System® Starter Set , includes IsoSafe, IsoRack, 0 °C IsoPack and -21 °C IsoPack 0.5 mL tubes	3880 000.011	
1.5/2.0 mL tubes	3880 001.018	
IsoPack and IsoRack Set , includes each 1 IsoPack and IsoRack 0.5 mL tubes, 0 °C	3880 000.160	
0.5 mL tubes, -21 °C	3880 000.178	
1.5/2.0 mL tubes, 0 °C	3880 001.166	
1.5/2.0 mL tubes, -21 °C	3880 001.174	
IsoRack , set of 4 racks 0.5 mL tubes	3880 000.038	
1.5 mL/2.0 mL tubes	3880 001.034	
IsoSafe and IsoPack , includes 1 IsoSafe and 3 IsoPacks 0.5 mL tubes, 0 °C	3880 000.020	
0.5 mL tubes, -21 °C	3880 000.046	
1.5/2.0 mL tubes, 0 °C	3880 001.026	
1.5/2.0 mL tubes, -21 °C	3880 001.042	

➔ IsoRacks with proper support adapters can be centrifuged up to 2,700 x g, begins on page 188.

PCR-Cooler



Description

By changing its color from violet to pink or dark blue to light blue, the PCR-Cooler indicates when the temperature ceiling of 7 °C has been exceeded.

Application

- For the protection, transport and storage of sensitive samples, as well as for safely stopping reactions

Product features

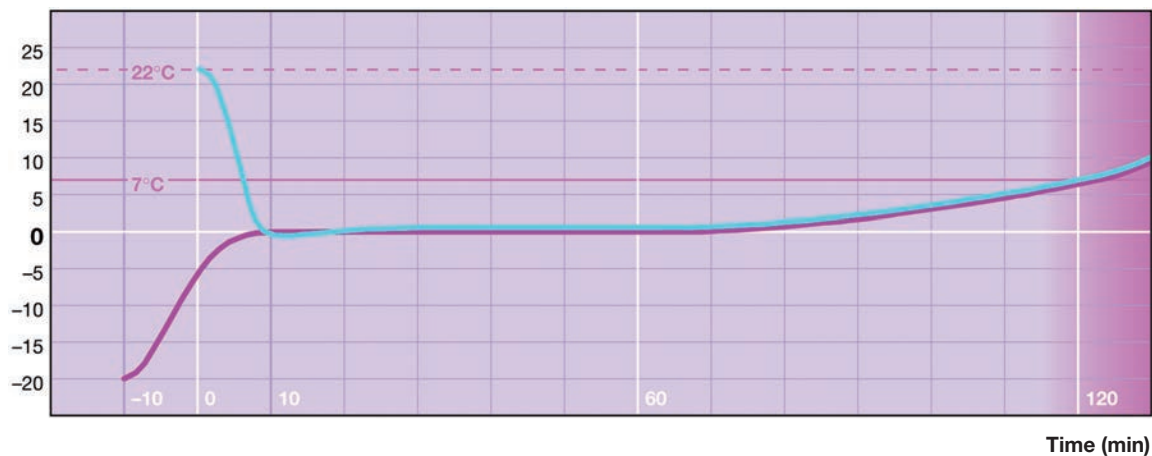
- Reliably cools samples for more than an hour at 0 °C*
- Temperature safety is indicated by color change, when temperature is exceeded: violet or dark blue when ice cold, pink or light blue above 7 °C
- Space saving
- Superior to an ice bath: safe from contamination
- Prohibits freezing of samples due to special cone contour
- The temperature of each individual well is indicated by its color
- For 96-well format
- For 0.2 mL and 0.5 mL reaction tubes/PCR tubes, tube strips and PCR plates 96

*With two-hour precooling at -20 °C.

Ordering information

Description	Order no.	
PCR-Cooler		
Starter Set (1 pink, 1 blue)	3881 000.015	
Pink	3881 000.023	
Blue	3881 000.031	





Temperature (°C)



Cooling curve

Temperature behavior of a pre-cooled PCR-Cooler and a sample inserted at room temperature (the background color indicates the color change)

Eppendorf® purity levels for tips, tubes, plates and Combitips®

 For more information go to www.eppendorf.com/purity and on pages 435				 	
Continuous quality control for the following relevant criteria:					
Function, tightness, precision	●	●	●	●	●
Low wetting	●	●	●	●	●
High chemical resistance	●	●	●	●	●
High thermal resistance	●	●	●	●	●
High resistance to centrifugation forces*1	●	●	●	●	●
High transparency	●	●	●	●	●
Precisely shaped	●	●	●	●	●
Lot testing*2 (certified) for the following purity criteria:					
Human DNA-free			●	●	●
DNA-free (Human- + bacterial DNA)					●
DNase-free			●	●	● NEW!
RNase-free			●	●	●
PCR-inhibitor-free			●	●	● NEW!
ATP-free					●
Pyrogen-free (endotoxin-free)		● NEW!		●	●
Sterile (Ph.Eur./USP)		●		●	●
Eppendorf products					
Tips					
epT.I.P.S.® Standard + Box + Set	●				
epT.I.P.S.® Reloads	●		●		
epT.I.P.S.® Racks					●
epT.I.P.S.® Singles					●*3
ep Dualfilter T.I.P.S.®				●	
Combitips plus®	●				●*3
epT.I.P.S.® LoRetention	●		●	●	
epT.I.P.S.® Motion	●	●			
epT.I.P.S.® Motion filtertips		●	●		
Tubes					
Safe-Lock Tubes	●		●		●*3
3810X	●		●		
DNA + Protein LoBind Tubes			●		
PCR Tubes (PCR + real-time PCR)			●		
Cap Strips (PCR + real-time PCR)			●		
Plates and accessories					
Deepwell Plates® + Microplates®		●	●		
Protein LoBind Deepwell Plates®			●		
DNA LoBind Deepwell Plates			●		
twin.tec® PCR Plates (PCR and real-time PCR)			●		
twin.tec® microbiology PCR Plates					●
Heat Sealing Film and Foil			●		
PCR, Storage Films + Foils			●		
Plate Lid		●	●		
UVette®	●		●*4		

*1 For accurate details regarding resistance to centrifugation, please refer to the respective product pages.

*2 Batch-specific certificate can be downloaded from www.eppendorf.com. *3 Individually packaged. *4 Additionally sterile. *5 Additionally free of protein.

Temperature Control and Mixing Performance Plans

epServices
for premium performance

Value of Preventive Maintenance

System lifetime and operational capability of your instrument can be affected by various conditions. Preventive maintenance provides professional cleaning and visual inspection of the surface, thermoblocks and internal assemblies with special brushes and/or compressed air. Various parts and functions are tested including: block recognition, drive, sensor, vortex, heating, cooling and overload protection.

Operational Qualification

Operational Qualification (OQ) assures that your Eppendorf instrumentation is operating according to manufacturer specifications and continually meets your needs. This service also includes temperature control tests and adjustment, rotational speed frequency and timer verification as well as electrical testing to country specific regulations where applicable. We will issue an OQ certificate for documentation in regulated environments. Temperature control and adjustment as well as electrical testing are also offered as separate services. The exchange of the oscillation frame and adjustment might be necessary in cases of extreme mixing usage over long periods.



Performance Plans	MixMate®	
Recommended service period is once per year	Order no.	
Preventive Maintenance:		
Preventive Maintenance* ¹	5350 997.026	
Certification Service:		
Preventive Maintenance* ¹ plus Operational Qualification (OQ)	5350 997.069	
Electrical testing according to country-specific regulations	5350 997.107	
Additional Service:		
Oscillation frame exchange and adjustment* ²	5350 997.115	
Temperature calibration/adjustment		

*¹ Spare parts, apart from wear and tear parts, that may be required are not included and will be invoiced additionally.

*² Including oscillation frame.

Temperature Control and Mixing Performance Plans

epServices
for premium performance

Long-term benefits of preventive maintenance include:

- Reliable system operation and results over the total system lifetime
- GLP compliant documentation
- Optimized service improves your process yield

Features of Performance Plans:

- Eppendorf customer care and quality commitment
- Genuine and quality inspected Eppendorf parts
- Certified service reports and dated service labels



i For more information go to www.eppendorf.com/epservices.
In selected countries only.

ThermoStat plus™	Thermomixer® compact	Thermomixer® comfort
Order no.	Order no.	Order no.
5350 997.034	5350 997.042	5350 997.050
5350 997.077	5350 997.085	5350 997.093
5350 997.107	5350 997.107	5350 997.107
	5350 997.115	5350 997.115
5350 997.018	5350 997.018	5350 997.018

Eppendorf® centrifuges

Register your Eppendorf products online now to benefit from numerous advantages! You receive bonus ep-points immediately for each Eppendorf device registered. You can also easily manage your devices online and are always kept up-to-date on any news.*



www.eppendorf.com/myeppendorf

*Not available in all countries. Online overview: www.eppendorf.com/centrifuges

Eppendorf epGreen Initiative

Eppendorf centrifuges offer the following epGreen features.

Centrifuges in general:

- All Centrifuges are designed with a brushless induction motor to provide maintenance-free operation, eliminating carbon particle emissions.
- Rotors are made of recyclable aluminium.
- All Centrifuges are designed for low noise emission. Some of the new microcentrifuges can even be operated without the rotor lid, without any significant increase in sound volume.

Refrigerated models feature:

- Patented, dynamic compressor control^{1,2} for optimized cooling performance, extended compressor life and reduced energy consumption.

- CFC-free refrigerant with an ozone depletion potential (ODP) of zero.
- ECO shut-off deactivates the compressor after 8 hours of inactivity to reduce energy consumption and extend compressor life.

Centrifuge packaging:

- The inner- and outer centrifuge packaging are made of 100 % recyclable materials.



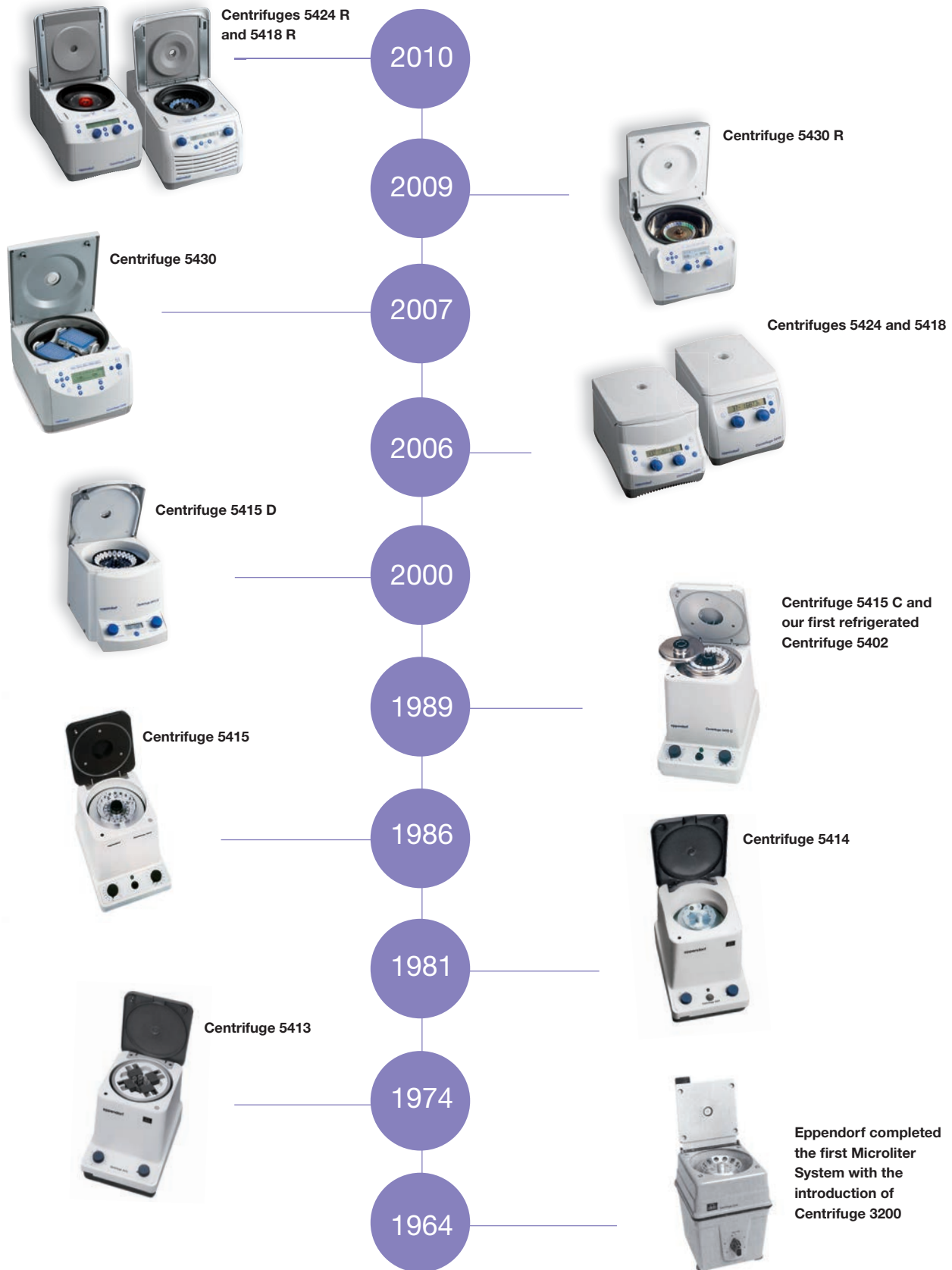
For an overview on Eppendorf epGreen, see page 10 and appendix page 444.

² US Patent 6,866,621






Eppendorf® centrifuges



History of Eppendorf® microcentrifuges



Eppendorf® centrifuges








Microcentrifuges						
Centrifuges						
Model	MiniSpin/ MiniSpin plus	5418/5418 R	5424/5424 R	5417 R	5430/5430 R	
	The "personal" microcentrifuge	Entry-level model	The laboratory standard	High-performance model	Versatile model	
Page	153	154	156	159	162	
Max. capacity	12 x 2 mL	18 x 2 mL	24 x 2 mL	30 x 2 mL	30 x 2 mL	
Max. RCF (x g)	12,100/14,100	16,873	20,238/21,130	25,000	30,130	
Max. RPM	13,400/14,500	14,000	14,680/15,000	16,400	17,500	
Rotor options	2	1	4	5	8	
Refrigerated	no	no/yes	no/yes	yes	no/yes	
Temperature control	–	-/0 to 40 °C	-/-10 to 40 °C	-/-9 to 40 °C	-/-11 to 40 °C	
Tubes/vessels/plates						
0,2–0,6 mL Eppendorf® Tubes	12	18	24	30	30	
1,5 mL Eppendorf® Tubes	12	18	24	30 (F)/8 (A)	30	
2,0 mL Eppendorf® Tubes	12	18	24	30 (F)/8 (A)	30	
8-place PCR strips	2	–	4	6	8	
15 mL Falcon®	–	–	–	–	6	
50 mL Falcon®	–	–	–	–	6	
1,2–5 mL tubes (11 mm Ø)	–	–	–	–	–	
2,6–7 mL tubes (13 mm Ø)	–	–	–	–	12	
3–15 mL tubes (16 mm Ø)	–	–	–	–	12	
7–17 mL tubes (17,5 mm Ø)	–	–	–	–	12 ^{*2}	
7–18 mL tubes (20 mm Ø)	–	–	–	–	–	
18–30 mL tubes (26 mm Ø)	–	–	–	–	–	
30–50 mL tubes (31 mm Ø)	–	–	–	–	–	
50–75 mL tubes (35 mm Ø)	–	–	–	–	–	
80–100 mL tubes (45 mm Ø)	–	–	–	–	–	
180–250 mL tubes bottles (62 mm Ø)	–	–	–	–	–	
20–30 mL Oak Ridge tubes (26 mm Ø)	–	–	–	–	6	
50 mL Oak Ridge tubes (29 mm Ø)	–	–	–	–	6	
85 mL Oak Ridge tubes (38 mm Ø)	–	–	–	–	–	
400/500 mL bottles	–	–	–	–	–	
MTP/PCR-plates	–	–	–	–	2 ^{*1}	
Deepwell plates (DWP)	–	–	–	–	–	
Filter plate systems	–	–	–	–	–	

*1 Max. loading height: 29 mm.

*2 Note: 9–15 mL tubes (16.8 mm Ø)

Falcon® is a registered trademark of Becton Dickinson.

Eppendorf® centrifuges

Small clinical Centrifuges			Multipurpose Centrifuges			
						
5702	5702 R	5702 RH	5804	5804 R	5810	5810 R
Bench-top centrifuge for cell culture and clinical applications	Bench-top centrifuge for cell culture and clinical applications	Bench-top centrifuge for cell culture and clinical applications	Compact bench-top centrifuge for medium throughput	Compact bench-top centrifuge for medium throughput	Versatile bench-top centrifuge for medium to high throughput	Versatile bench-top centrifuge for medium to high throughput
168	168	168	176	176	176	176
4 x 90 mL	4 x 90 mL	4 x 90 mL	4 x 100 mL	4 x 100 mL	4 x 500 mL	4 x 500 mL
3,000	3,000	3,000	20,800	20,800	20,800	20,800
4,400	4,400	4,400	14,000	14,000	14,000	14,000
6	6	6	14	14	14	14
no	yes	yes	no	yes	no	yes
-	-9 to 40 °C	-9 to 42 °C	-	-9 to 40 °C	-	-9 to 40 °C
	24 (F)/16 (A)		30 (F)/120 (T)		30 (F)/120 (T)	
	24 (F)/16 (A)		30 (F)/96 (A)/60 (T)		30 (F)/96 (A)/60 (T)	
	24 (F)/16 (A)		30 (F)/96 (A)/60 (T)		30 (F)/96 (A)/60 (T)	
	-		6		6	
	20 (F)/8 (A)		6 (F)/16 (A)		6 (F)/48 (A)	
	4 (A)		6 (F)/8 (A)		6 (F)/28 (A)	
	-		56 (A)		100 (A)	
	40 (A) (rectangular bucket)/16 (A) (round bucket)		36 (A)		100 (A)	
	16 (A) (round bucket)		28 (A)		48 (A)	
	24 (A) (rectangular bucket)/16 (A) (round bucket)		24 (A)		64 (A)	
	-		16 (A)		32 (A)	
	-		8 (A)		16 (A)	
	-		4 (A)		20 (A)	
	-		4 (A)		8 (A)	
	-		4 (A)		4 (A)	
	-		-		4 (A)	
	-		6 (F)		6 (F)	
	-		6 (F)		6 (F)	
	4		6 (F)		6 (F)	
	-		-		4 (A)	
	-		10 (A)		16 (A)	
	-		4 (A)		4 (A)	
	-		2 (A)		4 (A)	

F = Fixed Angle T = Drum rotor
A = Swing Bucket

Note: the proper adapters are required to obtain maximum capacity; please check the appropriate rotor and/or adapter combination for proper capacity and sizing.

Our new line of microcentrifuges



Description

We introduced our very first centrifuge in 1964 as an integral part of the Eppendorf Microliter System, and revolutionized life science research practices worldwide. To this day, the Eppendorf name remains synonymous with innovative design, technology and performance that stand the test of time.

Our new line of microcentrifuges was designed with you and your applications in mind to deliver a product performance that goes far beyond speed and capacity to benefit you and your applications. In addition to the speed, capacity and versatility you need for all your applications, our new Eppendorf microcen-

trifuges offer unparalleled ergonomic operation (e.g., very low noise levels, soft-touch one-finger lid closures, low profiles) and superior temperature management for maximum sample protection and energy-savings (e.g., dynamic compressor control, ECO shut-off).

All refrigerated models have the compressor at the back for a space-saving small footprint and a low profile for easy operation. With their outstanding quality Eppendorf centrifuges are the cost efficient solution for your lab.

Personal microcentrifuges MiniSpin®/MiniSpin plus™



MiniSpin plus

PCR-strip rotor
(F-55-16-5-PCR)

Product features

- Extremely compact with exceptionally small footprint
- 12 x 1.5/2.0 mL capacity rotor
- Spin up to 14,100 x g (14,500 rpm)
- Deceleration and acceleration of <13 s
- Clear, easy-to-use digital display of time and speed
- Remarkably quiet operation
- Metal rotor housing
- Separate Short Spin button for fast, convenient quick spins
- Excellent air flow minimizes heating — protects temperature-sensitive samples
- Lid automatically opens at the end of the run to prevent sample warming and to reduce handling time
- Maintenance-free drive
- Rotor is autoclavable at 121 °C, 20 min
- Chemical resistant rotor and rotor lid

Technical specifications

Description	MiniSpin	MiniSpin plus
Maximum rcf	12,100 x g	14,100 x g
Speed (in 100 rpm increments)	800-13,400 rpm	800-14,500 rpm
Speed set and displayed in rpm and rcf	No	Yes
Rotor capacity	12 x 1.5/2.0 mL (adapters available for smaller tubes)	
Rotor radius		
F-45-12-11	6,0	6,0
F-55-16-5-PCR	4,9	4,9
Acceleration time to max. speed	13 s	13 s
Braking time from max. speed	12 s	12 s
Timer	15 s to 30 min	15 s to 99 min, with continuous function
Noise level	<49 dB(A)	<52 dB(A)
Power supply	230 V/50-60 Hz	230 V/50-60 Hz
Power requirement	max. 70 W	max. 85 W
Dimensions (W x D x H)	22.6 x 23.9 x 13.0 cm	
Height	25 cm (with open lid)	
Net weight	4.3 kg (incl. rotor)	

Description

Powerful and easy-to-use MiniSpin and MiniSpin plus microcentrifuges are small enough so that each workstation can be equipped with a “personal” centrifuge for a wide range of molecular biology separations and quick spins. Two models are available to meet your performance requirements.

Ordering information

Description	Order no.	
MiniSpin complete with 12-place rotor		
230 V/50-60 Hz	5452 000.018	
MiniSpin plus, complete with 12-place rotor		
230 V/50-60 Hz	5453 000.011	
Rotors and accessories		
Rotor F-45-12-11, incl. rotor lid	5452 720.008	
Rotor lid for F-45-12-11, stainless steel with knurled nut	5452 702.000	
PCR Strip Rotor F-55-16-5-PCR, incl. rotor lid	5452 727.007	
Rotor lid for F-55-16-5-PCR, stainless steel	5452 730.008	
Adapters		
For 0.5 mL tubes and 0.6 mL Microtainer® tubes, set of 6	5425 716.001	
For 0.4 mL tubes, set of 6	5425 717.008	
For 0.2 mL PCR tubes, set of 6	5425 715.005	

Microtainer® is a registered trademark of Becton Dickinson.

Further information at www.ependorf.com/minispin

Centrifuges 5418/5418 R – Silence | Speed | Simplicity®

**Description**

The Centrifuges 5418 and 5418 R, which have been developed for medium sample volumes, are the ideal entry-level models for everyday molecular biology tasks. In particular, the Centrifuge 5418 is notable for its small size. Its footprint is not much bigger than a standard A4 sheet of paper. Both models have a very low access height and are characterized by extremely quiet operation; with or without the rotor lid.

Product features

- Small footprint and low access height of 23 cm
- Max. rotor capacity 18 x 1.5/ 2.0 mL tubes
- max. 16,873 x g (14,000 1/min)
- Unique QuickLock™ rotor lid for fast and reliable lid locking
- Innovative OptiBowl design ensures exceptionally quiet operation - even when used without the rotor lid
- Separate Short-Spin key for short centrifugation operations
- Separate rpm/rcf switch
- Automatic lid opening at the end of the run – prevents sample warming and allows easy access to samples
- Can be operated in a cooling room (only 5418)

Additional product features of the Centrifuge 5418 R:

- Temperature range: 0 °C to +40 °C
- Keeps a constant 4 °C at maximum speed
- FastTemp function for quick pre-cooling of the centrifuge
- Continuous cooling keeps the temperature constant, when no centrifugation takes place and the lid stays closed
- Dynamic compressor control* with ECO shut-off: optimized cooling performance with automatic shutdown of the compressor after 8 hours of non use to reduce energy consumption and extend compressor life
- Condensate drain prevents the accumulation of water in the chamber and thereby reduces the risk of corrosion

* US Patent 6,866,621

Technical specifications

Description	Centrifuge 5418	Centrifuge 5418 R
Maximum rcf	16,873 x g	
Speed	100-14,000 1/min (in 100 rpm increments)	
Maximum capacity	18 x 1.5/2.0 mL	
Number of rotors	1 (rmax = 7.7cm)	
Acceleration time to max. rpm	16 s	13 s
Braking time from max. rpm	18 s	13 s
Timer (with continuous mode)	30 s to 9:59 h	30 s to 99 min.
Noise level* with FA-45-18-11	49 dB(A)	47 dB(A)
Power supply	230 V/50-60 Hz	
Power requirement	max. 170 W	max. 320 W
Dimensions (W x D x H)	21 x 30 x 21 cm	30 x 46 x 25 cm
Height (with open lid)	43 cm	52 cm
Weight without rotor	7.7 kg	22 kg
Temperature range	—	0 °C to +40 °C

* The average noise level has been calculated based on a representative sample.

i Further information at www.eppendorf.com/5418

* Further information about IVD products can be found on page 442
Technical specifications subject to change.

Centrifuges 5418/5418 R – Silence | Speed | Simplicity®



Rotor FA-45-18-11 for 18 x 1.5/2.0 mL tubes comes standard with unique QuickLock™ aerosol-tight lid for fast and reliable locking



Adapter for 0.8 mL BD Microtainer® and 0.5 mL tubes
The adapter can be used with every Eppendorf rotor for 1.5/2.0 mL tubes



Adapter for 0.2 mL PCR Tubes
Ideal to spin down PCR Tubes after reaction setup. Adapter fits in any Eppendorf 1.5/2.0 mL rotor

Ordering information

Description	Order no.	
Centrifuge 5418 , incl. Rotor FA-45-18-11 and lid, 230 V/50-60 Hz	5418 000.017	⚡
Rotor FA-45-18-11 , incl. aerosol-tight rotor lid	5418 707.005	
Rotor lid for FA-45-18-11 , aerosol-tight	5418 708.001	
Spare sealing , for rotor lid FA-45-18-11, set of 5	5418 709.008	
Centrifuge 5418 R , incl. aerosol-tight Rotor (FA-45-18-11) and lid, 230 V/50-60 Hz	5401 000.013	
Rotor FA-45-18-11 , incl. aerosol-tight rotor lid	5418 707.005	
Rotor lid for FA-45-18-11 , aerosol-tight	5418 708.001	
Spare sealing , for rotor lid FA-45-18-11, set of 5	5418 709.008	
Adapters for 0.2/0.4/0.5/0.6 mL tubes see page 158		

⚡ Ordering information for other voltage options begins on page 471.

Centrifuges 5424/5424 R – Silence | Speed | Simplicity®



**Centrifuge 5424
with keypad**

Description

The versatile 24-place centrifuges are incredibly quiet. The operating concept and the design are based on years of experience and extensive ergonomic research with the aim of making routine tasks faster and easier. The Centrifuges 5424 and 5424 R are equipped with a number of innovative features. They therefore set new standards in Eppendorf's product philosophy: Silence | Speed | Simplicity. The Centrifuges 5424/5424 R are available in two versions. Choose between fast operation by rotary knob or the easy-to-clean keypad.



reddot design award
winner 2011



**Centrifuge 5424 R
with knobs**

Description

The advanced compressor technology of the refrigerated 5424 R version enables even more sensitive handling of samples and more precise and efficient cooling. With the help of the FastTemp function, a quick pre-cooling of the centrifuge is possible. From room temperature (~21 °C) to 4 °C in only 8 minutes! The dynamic compressor control system with ECO shut-off function optimizes the cooling performance and extends the compressor life. Among the four available rotor options for the Centrifuge 5424/ 5424 R there is also a special Rotor™ kit that prevents open tube lids from shearing off, e.g., during the centrifugation of spin columns. Both models are fitted with aerosol-tight rotors as standard – for your safety.

Product features

- Max. rotor capacity 24 x 1.5/2.0 mL tubes,
- 4 different rotors available
- Max. 20,238 x g (14,680 1/min)
- Extremely quiet thanks to the innovative OptiBowl design, even when used without the rotor lid
- SOFT brake to protect delicate samples, separate Short-Spin key for quick spins
- Separate rpm/rcf switch
- Automatic lid opening at the end of the run – prevents sample warming and allows easy access to samples
- Can be operated in a cooling room (only 5424)

Additional product features of the Centrifuge 5424 R:

- Max. 21,130 x g (15,000 1/min)
- Temperature range from -10 °C to +40 °C
- Guaranteed temperature of 4 °C at maximum speed
- FastTemp function for quick pre-cooling of the centrifuge, e.g., from 21 °C to 4 °C in only 8 minutes.
- Dynamic compressor control* with ECO shut-off function (optional) for optimized cooling performance and extended compressor life
- Condensate drain prevents the accumulation of water in the chamber and thereby reduces the risk of corrosion
- Continuous cooling keeps the temperature constant when no centrifugation takes place and the lid stays closed

* US Patent 6,866,621

* Further information about IVD products can be found on page 442
Technical specifications subject to change.

Centrifuges 5424/5424 R – Silence | Speed | Simplicity®

Technical specifications

Description	Centrifuge 5424	Centrifuge 5424 R
Maximum rcf	20,238 x g	21,130 x g
Speed	100-14,680 rpm (in 50 rpm increments)	100-15,000 1/min (in 100 rpm increments)
Maximum capacity	24 x 1.5/2.0 mL	
Number of rotors	4	
Acceleration time to max. rpm	15 s	
Braking time from max. rpm	16 s	
Timer	30 s to 9:59 h, with continuous mode	
Noise level with rotor FA-45-24-11	50 dB(A)	48 dB(A)
Power supply	230 V/50-60 Hz	
Power requirement	max. 250 W	max. 350 W
Dimensions (W x D x H)	24 x 32 x 23 cm	29 x 48 x 26 cm
Height (with open lid)	44 cm	51 cm
Weight without rotor	13.4 kg	21 kg
Temperature range	-10 °C to +40 °C	

* The average noise level has been calculated based on a representative sample.

Rotors for Centrifuges 5424/5424 R – Silence | Speed | Simplicity®



Kit rotor with raised rim for safe centrifugation of 18 x spin columns or 1.5/2.0 mL tubes with open tube lids. (F-45-18-11-Kit)

This unique rotor offers a solution for a common problem when working with MiniPrep spin column kits: open tube lids that shear off during the elution step. This problem traditionally occurs because standard rotors do not provide enough support for open tube lids during centrifugation. The Eppendorf® Kit rotor is designed with an extended rim that serves as a rest for tube caps during centrifugation and protects them from shearing off.

Aerosol-tight rotor for 24 x 1.5/2.0 mL tubes. (FA-45-24-11)



Aerosol-tight rotor for 24 x 1.5/2.0 mL tubes with PTFE-coating for increased chemical resistance. (FA-45-24-11-Special)



4 x PCR-strip rotor (F-45-32-5-PCR)



Rotors for Centrifuges 5424/5424 R – Silence | Speed | Simplicity®

Technical specifications of Centrifuges 5424/5424 R rotors


Rotor	Rotor radius	Adapter	Max. rcf (x g) 230 V, 14,680 rpm
FA-45-24-11, FA-45-24-11-Special	8.4 cm	without adapter	20,238 x g
		0.2 mL	15,179 x g
		0.4 mL	20,238 x g
		0.5 mL	17,588 x g
		0.6 mL	20,238 x g
F-45-18-11-Kit	7.2 cm	without adapter	17,347 x g
		0.2 mL	12,288 x g
		0.4 mL	17,347 x g
		0.5 mL	14,697 x g
		0.6 mL	17,347 x g
F-45-32-5-PCR	7.4 cm	without adapter	17,829 x g


Ordering information

Description	Order no.	
Centrifuge 5424 , incl. aerosol-tight 24 x 1.5/2.0 mL rotor with lid		
With rotary knobs , 230 V/50-60 Hz	5424 000.410	
With keypad , 230 V/50-60 Hz	5424 000.010	
Centrifuge 5424 , without rotor		
With rotary knobs , 230 V/50-60 Hz	5424 000.614	
With keypad , 230 V/50-60 Hz	5424 000.215	
Centrifuge 5424 R , incl. aerosol-tight Rotor (FA-45-24-11) with lid		
With rotary knobs , 230 V/50-60 Hz	5404 000.413	
With keypad , 230 V/50-60 Hz	5404 000.014	
Centrifuge 5424 R , without rotor		
With rotary knobs , 230 V/50-60 Hz	5404 000.618	
With keypad , 230 V/50-60 Hz	5404 000.219	
Rotor lid , for FA-45-24-11, aerosol-tight	5424 703.003	
Rotor FA-45-24-11-Special , incl. aerosol-tight rotor lid, PTFE-coated* ¹	5424 700.004	
Rotor lid , for FA-45-24-11-Special, aerosol-tight, PTFE-coated* ¹	5424 701.000	
Rotor F-45-18-11-Kit , incl. rotor lid	5424 706.002	
Rotor lid , for F-45-18-11-Kit	5424 707.009	
Rotor F-45-32-5-PCR , incl. rotor lid	5424 704.000	
Rotor lid , for F-45-32-5-PCR	5424 708.005	
Rotor key , (5 mm)	5416 301.001	
Adapter , for 0.2 mL PCR tubes, set of 6	5425 715.005	
Adapter , for 0.4 mL tubes, set of 6	5425 717.008	
Adapter , for 0.5 mL tubes and 0.6 mL Microtainer®* ² , set of 6	5425 716.001	

*¹ PTFE coated for increased chemical resistance

*² Registered trademark of Becton Dickinson.

 Further information at www.eppendorf.com/5424

 Ordering information for other voltage options begins on page 471.

* Further information about IVD products can be found on page 442
Technical specifications subject to change.

Centrifuge 5417 R

CE
IVD*



Product features

- 30-place refrigerated microcentrifuge for 1.5/2.0 mL tubes
- Spins up to 25,000 x g (16,400 rpm)
- Compact footprint — needs just over a foot of bench space
- Low profile design for easy access to samples and complete lid opening under low-hanging shelves
- Backlit, full-digit display for easy reading
- SOFT brake function to protect delicate samples
- SHORT-spin can be programmed to desired speed
- Keypad control for easy cleaning
- Automatic rotor recognition with speed limitation
- Automatic rotor imbalance detection
- Temperature range from -9 °C to 40 °C
- Maintains constant 4 °C, even at maximum speed
- FastTemp function for fast pre-cooling and maximum temperature accuracy
- Standby cooling maintains temperature when centrifuge is not in use
- ECO shut-off engages after 6 hours of non use to reduce energy consumption and extend compressor life
- Built-in condensation drain to eliminate water accumulation and prevent corrosion

Technical specifications

Description	Centrifuge 5417 R
Maximum rcf	25,000 x g
Speed	500-16,400 rpm (in 100 rpm increments)
Maximum capacity	30 x 1.5/2.0 mL
Number of rotors	5
Acceleration time to max. speed	≤13 s
Braking time from max. speed	≤12 s
SOFT brake function	Yes
Timer	10 s to 99 min, with continuous mode
Noise level with rotor F-45-30-11	<54 dB(A)
Temperature control range	-9 °C to 40 °C
Power supply	230 V/50 Hz
Power requirement	max. 700 W
Dimensions (W x D x H)	31 x 60 x 25 cm
Height with open lid	54 cm
Weight	35 kg

Description

High-performance Microcentrifuge 5417 R spins up to 25,000 x g for quick and efficient pelletization. It is compact, easy-to-use, offers unsurpassed safety and reliability and accommodates a variety of microcentrifuge rotors.

Ordering information

Description	Order no.	
Centrifuge 5417 R, 230 V/50 Hz, refrigerated, without rotor	5407 000.317	⚡

⚡ Ordering information for other voltage options begins on page 471.

ℹ Further information at www.eppendorf.com/5417R

Rotors for Centrifuge 5417 R and discontinued Model 5417 C



Product features of fixed-angle rotors FA-45-30-11, F-45-30-11 and FA-45-24-11

- High capacity rotors for 30 x 1.5/2.0 mL tubes with basic or aerosol-tight lid* for use with hazardous samples. Maximum speed for both rotors is 20,800 x g (14,000 rpm)
- The 24-place high-speed rotor comes with an aerosol-tight lid and has a maximum speed of 25,000 x g (16,400 rpm)
- Rotors, rotor lids and adapters are autoclavable (121 °C, 20 min)
- Aerosol-tight rotors can also be autoclaved for 2 h at 140 °C to eliminate prion contamination
- Adapters available for
 - 0.2 mL PCR tubes
 - 0.4 mL centrifuge tubes
 - 0.5 mL micro test tubes and 0.6 mL Microtainer® tubes

*Aerosol-tightness has been tested and approved in accordance with the procedure of Bennett et al. from the Centre of Emergency Preparedness and Response, Health Protection Agency in Porton Down, Great Britain, and according to annex AA of the IEC 1010-2-020 safety standard. Microtainer® is a registered trademark of Becton Dickinson



Product features of swing-bucket rotor A-8-11

- 8 spaces for 1.5/2.0 mL tubes
 - Maximum rcf: 10,600 x g (max. 10,000 rpm)
 - Rotors, rotor lids and adapters are autoclavable at 121 °C for 20 min.
 - Ideally suited for small sample volumes and transparent, soft or slippery pellets, as well as and gradient formation, as the pellet collects in the tip of the tube during centrifugation.
- Advantage:
- easier and more accurate removal of the supernatant
 - cleaner processing of the pellet and/or supernatants
- Use of the adapters for the fixed angle rotors is possible



Product features of PCR-strip rotor F-45-48-PCR

- Max. rotational speed: rcf: 10,600 x g (max. 10,000 rpm)
- For up to 6 x 8-tube strips, 6 x 5-tube strips or 48 x 0.2 mL single PCR tubes
- Safe and easy handling without additional lid

i These rotors cannot be used in Centrifuge 5430/5430 R.

Rotors for Centrifuge 5417 R and discontinued Model 5417 C

Ordering information

Rotors and accessories	Max. rcf (x g)	Max. rotational speed (rpm)	Rotor radius (cm)	Order no.	
Fixed-angle rotor F-45-30-11					
For 30 x 1.5/2.0 mL tubes, with aluminum lid	20,800	14,000	9.5	5490 015.002	
Replacement aluminum lid, for F-45-30-11, not aerosol-tight				5490 004.302	
Aerosol-tight*1 fixed-angle rotor FA-45-30-11					
For 30 x 1.5/2 mL tubes, with aerosol-tight aluminum lid	20,800	14,000	9.5	5490 025.008	
Replacement aerosol-tight*1 aluminum lid, for FA-45-30-11				5490 025.806	
High-speed, aerosol-tight*1 fixed-angle rotor*2 FA-45-24-11					
For 24 x 1.5/2.0 mL tubes, with aluminum lid	25,000	16,400	8.3	5490 061.004	
Replacement aerosol-tight*1 aluminum lid, for FA-45-24-11				5490 063.007	
Swing-bucket rotor A-8-11					
For 8 x 1.5/2.0 mL tubes, with aluminum lid	10,600	10,000	9.5	5492 008.003	
PCR-strip fixed-angle rotor F-45-48-PCR					
For 6 x 8-tube or 6 x 5-tube strips, or 48 x 0.2 mL PCR tubes	10,600	10,000	9.5	5490 060.008	
Adapters for all fixed-angle rotors (excluding PCR-strip rotor)					
Tube size	Diameter of adapter bore (mm)		Set of 6 adapters		
0.2 mL PCR tubes	6		5425 715.005		
0.4 mL	6		5425 717.008		
0.5 mL and 0.6 mL Microtainer®	8		5425 716.001		

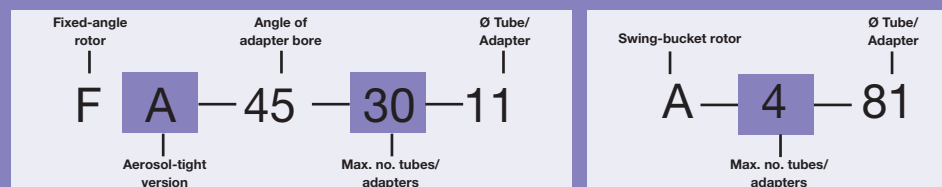
*1 Aerosol-tightness of lid tested by the Centre of Emergency Preparedness and Response, Health Protection Agency, Porton Down, Great Britain.

*2 Can only be used in newer Centrifuges 5417 C; serial no. 13.000 and 5417 R; serial no. 7.000.

Falcon® is a registered trademark of Becton Dickinson.

Rotor code

All Eppendorf rotors are identified using a simple, alphanumeric format that represents the technical specifications in a uniform series of letters and numbers.



Centrifuges 5430/5430 R – Silence | Speed | Simplicity™



Centrifuge 5430, keypad version,
with plate rotor A-2-MTP

CE
IVD*



Refrigerated Centrifuge 5430 R,
rotary knob version,
with 30 x 1.5/2.0 mL rotor

Description

These versatile 30-place centrifuges offer a wide range of applications due to the extensive choice of different rotors.

These Microcentrifuges spin rotors for Eppendorf tubes and PCR strips as you would expect from any microcentrifuge. But that's not all. In a compact size — just over a foot of bench space — Models 5430 and 5430 R also accommodate rotors for microplates, as well as 15 mL and 50 mL Falcon®/conical and all common blood collection tubes. Until now, this has only been possible with large multipurpose centrifuges.

Refrigerated version 5430 R was developed with you and your applications in mind. The compressor at the back of the centrifuge — characteristic to all Eppendorf microcentrifuges — keeps width narrow and the access height low. The 5430 R is equipped with the latest innovations in cooling technology such as programmable pre-cooling time, ECO shut-off function and patented, dynamic compressor control*. The microcentrifuge 5430 R assures accurate temperature control, highest energy efficiency and ease of operation.

U.S. Patent no. 6,866,621

i Further information at www.eppendorf.com/5430

Let the 5430/5430 R be your “personal multipurpose Microcentrifuge.”

With a 5430 or 5430 R personal centrifuge, you will not need to coordinate a time to use your lab's centrifuge or make a visit to the centrifuge room.



6 x 15/50 mL tube rotor comes with adapters for 15 and 50 mL Falcon®/conical tubes. The 50 mL adapter can also handle 50 mL skirted Falcon®/conical tubes. (F-35-6-30)

Falcon® is a registered trademark of Becton Dickinson.

* Further information about IVD products can be found on page 442
Technical specifications subject to change.

Centrifuges 5430/5430 R – Silence | Speed | Simplicity™

Technical specifications

Description	Centrifuge 5430	Centrifuge 5430 R
Maximum rcf	30,130 x g	
Maximum speed	17,500 rpm (in 100 rpm increments)	
Maximum capacity	30 x 1.5/2.0 mL, 6 x 50 mL, 2 x MTP	
Number of rotors	8	
Acceleration time* ¹	14 s	
Braking time* ¹	15 s	
Timer	30 s to 99:59 h, with continuous mode	
Noise level with rotor F-45-30-11	<58 dB(A)	<54 dB(A)
Power supply	230 V/50-60 Hz	
Power requirement	max. 475 W	max. 1.050 W
Dimensions (W x D x H)	33 x 42 x 25 cm	38 x 64 x 29 cm
Height	56 cm	63 cm
Weight without rotor	29 kg	56 kg
Temperature control	—	-11 °C to +40 °C* ²

*¹ Acceleration/braking time to/from max. speed with rotor FA-45-30-11*² Maintains constant 4 °C at max. speed with all rotors

Product features

- Exceptional versatility — 8 different rotors for tubes from 0.2 to 50 mL and microplates allow centrifugation of all common vessel formats
- High centrifugation speed of up to 30,130 x g (17,500 rpm)
- Compact footprint saves valuable bench space
- Menu-driven, multi lingual operation menu (English, German, French, Spanish) with large backlit LC-display for ultra easy operation
- Saves up to 50 programs with program names
- 5 program keys for easy access to routine programs
- Automatic rotor recognition with speed limitation
- Automatic rotor imbalance detection
- Available in 2 versions — rotary knob version that provides

quick parameter settings, or keypad version for easy cleaning

Additional product features of model 5430 R:

- FastTemp^{pro} allows programming of pre-setting via date and time to have the centrifuge refrigerated and ready-for-use at the pre-selected time
- Patented, dynamic compressor control* for optimized cooling performance, extended compressor life and reduced energy consumption
- ECO shut-off engages after 8 hours of non-use to reduce energy consumption and extend compressor life
- Built-in condensation drain to eliminate water accumulation and prevent corrosion

U.S. Patent no. 6,866,621

Ordering information

Description	Order no.	
	Keypad	Knob
Centrifuge 5430		
5430, with 30 x 1.5/2.0 mL aerosol-tight fixed-angle rotor (FA-45-30-11), 230 V/50-60 Hz	5427 000.216	5427 000.410
5430, without rotor, 230 V/50-60 Hz	5427 000.011	5427 000.615
Centrifuge 5430 R (Refrigerated)		
5430 R, with 30 x 1.5/2.0 mL aerosol-tight fixed-angle rotor (FA-45-30-11), 230 V/50-60 Hz	5428 000.015	5428 000.414
5430 R, without rotor, 230 V/50-60 Hz	5428 000.210	5428 000.619

i Further information at www.eppendorf.com/5430R

Rotors for Centrifuges 5430/5430 R



Aerosol-tight rotor for 30 x 1.5/2.0 mL tubes provides speed up to 20,817 x g (14,000 rpm, rmax = 9.5 cm). The rotor is PTFE-coated for increased chemical resistance and easy cleaning. (FA-45-30-11)^{*1*2}



Basic rotor for 30 x 1.5/2.0 mL tubes provides speed up to 20,817 x g (14,000 rpm, rmax = 9.5 cm). The rotor is PTFE-coated for increased chemical resistance and easy cleaning. (F-45-30-11)^{*1}



6 x 15/50 mL tube rotor comes with adapters for 15 and 50 mL Falcon[®]/conical tubes. The 50 mL adapter can also handle 50 mL skirted Falcon[®]/conical tubes. Additional adapters available (see page 165). Maximum speed 7,197 x g (7,830 rpm, rmax = 10.5 cm). (F-35-6-30)



2 x plate swing-bucket rotor for MTP, PCR and deepwell plates up to 29 mm height; speed up to 2,204 x g (4,680 rpm). Wind-shield design for whisper quiet operation. (A-2-MTP)



Aerosol-tight high-speed rotor spins 24 x 1.5/2.0 mL tubes up to 30,130 x g (17,500 rpm, rmax = 8.8 cm). PTFE-coated for increased chemical resistance and easy cleaning. (FA-45-24-11-HS)^{*1*2}



Aerosol-tight Kit rotor for 24 x spin columns or 1.5/2.0 mL tubes. Designed with an extra high rim to support open tube lids during centrifugation. Spins at max. 19,090 x g (13,200 rpm, rmax = 9.8 cm). (FA-45-24-11-Kit)^{*2}



18-place Cryovial rotor with adapters. Speed up to 8,320 x g (8,900 rpm without, rmax = 9.4 cm; 7,970 x g with adapters, rmax = 9.0 cm). (F-45-18-17-Cryo)



Rotor for 8 x 8-tube PCR strips with removal adapters that can be used as a tube rack for pipetting; maximum speed is 13,543 x g outer row. 11,987 x g inner row (11,800 rpm, rmax = 8.7 cm). (F-45-64-5-PCR)


^{*1} PTFE coated for increased chemical resistance

^{*2} Certified aerosol-tight

Falcon[®] and Microtainer[®] are registered trademarks of Becton Dickinson.

Rotors for Centrifuge 5430/5430 R

Adapters for 6 x 15/50 mL tube rotor

 <ul style="list-style-type: none"> ● Rotor with 12 positions (6 small and 6 large holes to accommodate appropriate “small” or “large” adapters) ● Adapters for 15/50 mL Falcon® tubes are included in rotor package*² ● Speed up to 7,830 rpm (7,197 x g) 	Adapter* ¹	Tube Dimensions (mm) Ø x L (min-max)	Bottom shape	Max. RCF	Adapter size	Order no. (set of 2 pc)	
	13 mm round	13 x 68-100	RND	7,129 x g	Small	5427 731.008	
13 mm round	13 x 77-107	RND	7,129 x g	Large	5427 733.000		
16 mm round	16 x 74-103	RND	7,005 x g	Small	5427 732.004		
16 mm round	16 x 85-115	RND	7,005 x g	Large	5427 734.007		
16.8 mm round	16.8 x 84-125	RND	7,745 x g	Small	5427 735.003		
16.8 mm round	16.8 x 84-125	RND	7,403 x g	Large	5427 738.002		
15 mL conical	17.5 x 103-125	CON	7,540 x g	Small	5427 726.004		
30 mL round	26 x 97-110	RND	7,087 x g	Large	5427 736.000		
50 mL round	29 x 100-125	RND	7,581 x g	Large	5427 737.006		
50 mL conical* ³	29.5 x 99-125	CON* ³	7,197 x g	Large	5427 727.000		
Centriprep®* ⁴	29.5 x 100-125	Flat	7,567 x g	Large	5427 723.005		

*1 One tube per adapter, 6 per rotor. Up to 105 mm tube length “small” and “large” adapters for 13, 16, and 16.8 mm tubes can be combined for a maximum rotor capacity of 12 tubes per run. For all other adapter combinations or longer tube lengths the loading capacity is at least 6 tubes per run. Please perform a manual test to determine the actual loading capacity. *2 Three sets of 2 are included within 6 x 15/50 mL rotor package. *3 Adapter accommodates skirted 50 mL Falcon® tubes *4 Only Centriprep® tube without lid

Ordering information

Description	Order no.	
Rotor F-45-30-11 , incl. rotor lid, PTFE-coated	5427 712.003	
Rotor lid , for F-45-30-11	5427 718.001	
Rotor FA-45-30-11 , incl. rotor lid, aerosol-tight, PTFE-coated	5427 713.000	
Rotor lid , for FA-45-30-11, aerosol-tight, PTFE-coated	5427 719.008	
Rotor FA-45-24-11-HS , incl. rotor lid, aerosol-tight, PTFE-coated	5427 710.000	
Rotor lid , for FA-45-24-11-HS, aerosol-tight, PTFE-coated	5427 711.007	
Rotor FA-45-24-11-Kit , incl. rotor lid, aerosol-tight	5427 703.004	
Rotor lid , for FA-45-24-11-Kit, aerosol-tight	5427 704.000	
Rotor F-45-18-17-Cryo , incl. rotor lid and adapters	5427 705.007	
Rotor lid , for F-45-18-17-Cryo	5427 707.000	
Adapter for HPLC tubes (set of 18)	5427 708.006	
Rotor F-45-64-5-PCR , incl. rotor lid and adapters	5427 714.006	
Rotor lid , for F-45-64-5-PCR	5427 720.006	
Adapters , for F-45-64-5-PCR (set of 4)	5427 717.005	
Adapters, for F-45-30-11, FA-45-30-11, FA-45-24-11-HS, FA-45-24-11-Kit		
Adapter , for 0.2 mL PCR tubes, (set of 6)	5425 715.005	
Adapter , for 0.4 mL tubes (set of 6)	5425 717.008	
Adapter , for 0.5 mL tubes and 0.6 mL Microtainer® (set of 6)	5425 716.001	
Rotor F-35-6-30 , incl. rotor lid and adapters for 15/50 mL Falcon® tubes	5427 716.009	
Rotor lid , for F-35-6-30	5427 715.002	
Rotor A-2-MTP , incl. 2 MTP buckets and wind shield	5427 700.005	
Wind shield (upper shell of the wind shield) , for A-2-MTP	5427 725.008	
Spare MTP buckets , for A-2-MTP (set of 2)	5427 722.009	
Adapter , PCR 96-well plate (set of 2)	5825 711.009	
Adapter , PCR 384-well plate (set of 2)	5825 713.001	
CombiSlide adapter , for up to 12 glass slides (set of 2)	5825 706.005	
Adapter plates , with rims in the SBS format (set of 2)	5825 718.003	
Rotor key	5416 301.001	
Rotor key for high-speed rotor (torque)	5427 730.001	

The Eppendorf 5702 family of centrifuges



Description

The 5702 family of low-speed, general-purpose centrifuges was especially designed to meet the requirements of clinical and cell culture labs. They are compact in design to fit on almost every lab bench, quiet in operation to improve your work environment. They can be operated with 6 different swing-bucket and fixed-angle rotors to accommodate almost any kind of tube.

The right model for your application:

- Economical Model 5702 for standard applications
- Refrigerated Model 5702 R for heat sensitive samples
- Heated and refrigerated Model 5702 RH allows centrifugation under biological conditions to improve cell viability for more accurate results in downstream applications (e.g. cell cultivation)

General product features







- Very compact footprint to fit on every lab bench
- Whisper quiet operation
- Low access height for easy access to samples
- Rotary knobs for fast parameter settings
- Digital display for maximum reproducibility
- SOFT brake function for slow acceleration and breaking. Optimized for cell separation by gradient centrifugation
- "At set RPM" function starts time counting when selected speed is reached for reproducible centrifugation runs
- Parameter lock prevents accidental changes
- Stainless steel rotor chamber is rust-proof and easy to clean
- Electronic imbalance detection for maximum safety

Temperature control versions also feature:

- Two programming keys to store routine procedures
- Separate FastTemp function
- Automatic ECO-shut off mode reduces energy consumption

Applications for 5702 centrifuge family

5702 centrifuges are perfectly suited for clinical and cell culture lab applications:

Application		Recommended accessories
<ul style="list-style-type: none"> Serum or blood plasma purification in blood collection tubes with gel barrier (e.g. BD Vacutainer® SST or PST tubes) Mononuclear cell isolation using Ficoll® gradient centrifugation Sperm cell isolation prior to in vitro fertilization (IVF) 		<p>4 x 85 mL swing-bucket rotor (A-4-38) with round buckets and aerosol-tight caps. Depending on application, adapters for tubes with 13 mm or 16 mm diameter, and 15 mL or 50 mL Falcon® tubes.</p> <p>Heated Centrifuge 5702 RH allows centrifugation at biological temperatures to improve cell viability for more accurate results in downstream applications</p>
<ul style="list-style-type: none"> Centrifugation of urine samples in glass tubes 		4 x 90 mL swing-bucket rotor (A-4-38) with rectangular buckets and adapters for glass tubes.
<ul style="list-style-type: none"> Cell culture centrifugation in 15 mL or 50 mL Falcon® tubes to separate cells from medium Bacterial or yeast cell separation from suspensions prior to DNA or protein isolation 		<p>4 x 85 mL swing-bucket rotor (A-4-38) with round buckets and adapters for 15 mL and 50 mL Falcon® tubes.</p> <p>8 x 15 mL swing-bucket rotor with inserts for 15 mL Falcon® tubes.</p>
<ul style="list-style-type: none"> Cell culture centrifugation in 15 mL Falcon® tubes Bacterial or yeast cell separation in 15 mL Falcon® tubes or glass tubes Ultrafiltration for protein purification or sample concentration (e.g. Sartorius Centrisart I® or Millipore Centrifree®) 		30 x 15 mL fixed-angle rotor (F-35-30-17) with inserts for 15 mL Falcon® tubes or rubber mats for glass tubes.
<ul style="list-style-type: none"> Knock down of liquid in cryo tubes prior to cryo conservation 		Cryo tube rotor
<ul style="list-style-type: none"> Knock down of liquid in 1.5 mL or 2.0 mL Eppendorf tubes 		Eppendorf tube rotor

®: Falcon is a registered trademark of Becton Dickinson.

*1 Registered trademark of Greiner Bio-One.

*2 Registered trademark of Sarstedt.

Centrifuges 5702/5702 R (refrigerated)/5702 RH (temperature-controlled)

**Centrifuge 5702:**

The economical centrifuge for the clinical and cell culture lab. With various fixed-angle and swing-bucket rotors and an extensive range of adapters. Virtually all types of tubes can be used.

Centrifuge 5702 R

This model has all the product characteristics that make refrigerated Eppendorf centrifuges so outstanding: The desired temperature can be reached quickly by using the “FastTemp” function. Likewise, standby refrigeration will maintain a particular temperature following use. Precise centrifugation is made possible by the “At Set rpm” function: time is counted down once the set rpm is reached; as a result, different centrifugal runs can be more easily reproduced.

Centrifuge 5702 RH

For active cells, Eppendorf offers a centrifuge with unique temperature control capabilities. It is the first centrifuge from Eppendorf that can consistently maintain special temperatures above room temperature. Temperature-sensitive cells or cell cultures can be centrifuged at defined temperatures, particularly at 37 °C which increases cell viability to benefit your downstream applications.

Product features

General product features of the 5702 family are listed on page 166.

Specific features for Model 5702:

- Optimized rotor chamber ventilation minimizes sample warming
- Lid opens automatically at the end of the run to prevent sample warming and allow easy access to samples

Specific features for Model 5702 R and RH:

- Two programming keys to store routine procedures
- FastTemp function for fast pre-cooling
- Standby temperature control keeps centrifuge at programmed temperature
- ECO shut-off engages after 8 hours of non use to reduce energy consumption and extend compressor life
- Built-in condensation drain to eliminate water accumulation and prevent corrosion

Specific feature for Model 5702 RH:

- Active heating guarantees high temperature accuracy during the entire centrifugation cycle

i Further information at www.eppendorf.com/5702

Centrifuges 5702/5702 R (refrigerated)/5702 RH (temperature-controlled)



Centrifuge 5702 display



Centrifuges 5702 R and 5702 RH display

User-friendly control panel features

- Small number of clearly labeled function keys/knobs
- Large dials and an easy-to-read back-lit display
- Switch between rpm/rcf
- Speed can be set from 100 rpm to a max. of 4,400 rpm, in increments of 100 rpm
- Separate Short Spin button
- Timer can be set for up to 99 minutes
- Continuous mode can be selected

Temperature control versions also feature:

- Two programming keys to store routine procedures
- Separate FastTemp function

Technical specifications

Description	Centrifuge 5702	Centrifuge 5702 R	Centrifuge 5702 RH
Maximum rcf		3,000 x g	
Speed		100-4,400 rpm (in 100 rpm increments)	
Maximum capacity		4 x 90 mL or 30 x 15 mL	
Number of rotors		6	
Acceleration time to max. rpm		<25 s	
Braking time from max. rpm		<25 s	
Timer		0-99 min, with hold mode	
Noise level with rotor A-4-38	<51 dB(A)		<45 dB(A)
Power supply		230 V/50-60 Hz	
Maximum power requirement	max. 200 W		max. 380 W
Dimensions (W x D x H)	32 x 40 x 24 cm		38 x 58 x 26 cm
Height with open lid	53 cm		60 cm
Weight	20 kg		36 kg
Temperature control range		-9 °C to +40 °C	-9 °C to +42 °C

Ordering information

Description	Order no.	
Centrifuge 5702 , non-refrigerated, without rotor, 230 V/50-60 Hz	5702 000.019	⚡
Centrifuge 5702 R , refrigerated, without rotor, 230 V/50-60 Hz	5703 000.012	⚡
Centrifuge 5702 RH , heating/refrigerating, without rotor, 230 V/50-60 Hz	5704 000.016	⚡
Please refer to page 174 for clinical and culture centrifuge bundles		

⚡ Ordering information for other voltage options begins on page 471.

Swing-bucket rotors for Centrifuges 5702/5702 R/5702 RH



Swing-bucket rotor A-8-17

- Maximum speed: 2,800 x g (4,400 rpm)
- Economical rotor for centrifugation of 15 mL Falcon® tubes or 15 mL glass tubes
- Adapters for 15 mL Falcon® tubes and rubber mat inserts for centrifugation of glass tubes optionally available



4 x 85 mL swing-bucket rotor A-4-38

- Maximum speed: 3,000 x g (4,400 rpm)
- Standard rotor for centrifugation of blood collection tubes or 15/50 mL Falcon® tubes
- Rotor can be operated with round or rectangular buckets
 - Round buckets for tubes 1.5 mL to 85 mL (aerosol-tight caps optionally available)
 - Rectangular buckets for glass tubes from 5 mL to 25 mL
- Broad variety of adapters available to fit all types of blood collection tubes and cell culture tubes

Ordering information

Rotors and accessories	Max. rcf (x g)	Max. rotational speed (rpm)	Rotor radius	Order no.	
4 x 85 mL Swing-bucket rotor A-4-38					
With 4 x 85 mL round buckets	3,000	4,400	14.0 cm	5702 720.003	
Without buckets				5702 740.004	
Round buckets , 85 mL, set of 4				5702 722.006	
Rectangular buckets *2, 90 mL, set of 4				5702 709.000	
Aerosol-tight lids , for 85 mL round buckets, set of 2				5702 721.000	
Rubber mats, replacements					
For Adapter 5702 737.003 and 5702 719.005, set of 20				5702 741.000	
For Adapter 5702 735.000, set of 20				5702 742.007	
For Adapter 5702 724.009, set of 16				5702 759.007	
8 x 15 mL Swing-bucket rotor A-8-17					
8 x 15 mL (without adapters or rubber mats)	2,800	4,400	12.8 cm	5702 700.002	
Adapters , for 15 mL Falcon® tubes, set of 8				5702 702.005	
Rubber mats , for 15 mL glass tubes, set of 8				5702 701.009	

*2 Not for use with aerosol-tight lids.

® Falcon is a registered trademark of Becton Dickinson.

Fixed-angle rotors for Centrifuges 5702/5702 R/5702 RH

**30 x 15 mL fixed-angle rotor F-35-30-17**

- Maximum speed: 2,750 x g (4,400 rpm)
- High-capacity fixed-angle rotor for 20 x 15 mL Falcon® tubes or 30 x 15 mL glass tubes
- Form inserts for 15 mL Falcon® conical tubes and rubber mats for use with glass tubes are included
- Steel sleeves have an inner diameter of 17 mm and a depth of 92 mm

**24-place fixed-angle rotor F-45-24-11**

- Maximum rcf: 1,770 x g (4,400 rpm)
- Low-noise centrifugation, even without rotor lid
- Centrifugation of 1.5 mL and 2.0 mL Eppendorf Tubes®
- Adapter for:
 - 0.2 mL PCR tubes (5425 715.005)
 - 0.4 mL centrifuge tubes (5425 717.008)
 - 0.5 mL micro test tubes and 0.6 mL Microtainer® tubes (5425 716.001)
- Rotor and adapter are autoclavable (121 °C, 20 min)

**18-place fixed-angle rotor F-45-18-17-Cryo**

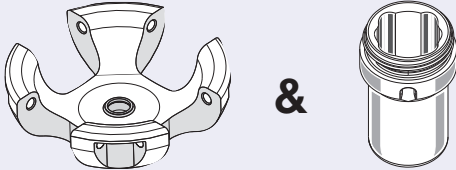
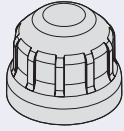
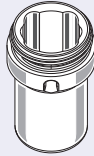
- Maximum rcf: 1,840 x g (4,400 rpm)
- Low-noise centrifugation, even without rotor lid
- Centrifugation of 1–2 mL Cryotubes® (max. 13 mm Ø, use with adapter) and screw-cap centrifugation tubes (max. 17 mm Ø, adapter not needed)
- Rotor and adapter are autoclavable (121 °C, 20 min)

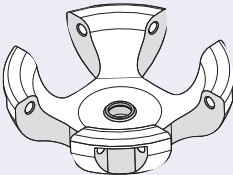
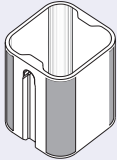
Ordering information

Rotors and accessories	Max. rcf (x g)	Max. rotational speed (rpm)	Rotor radius	Order no.	
Fixed-angle rotor F-35-30-17					
Includes 30 steel sleeves for 15 mL tubes, with 20 Falcon® adapters and 30 rubber mats	2,750	4,400	12.7 cm	5702 704.008	
Includes 10 steel sleeves for 15 mL tubes, with 10 Falcon® adapters and 10 rubber mats	2,750	4,400		5702 705.004	
Steel sleeves for rotor F-35-30-17, set of 10				5702 707.007	
Adapters, for 15 mL Falcon® tubes, set of 10				5702 706.000	
Rubber mats, for 15 mL round bottom tubes, set of 10				5702 708.003	
Fixed-angle rotor F-45-24-11, for 24 x 1.5/2.0 mL tubes, without lid	1,770	4,400	8.2 cm	5702 746.002	
Fixed-angle rotor F-45-18-17-Cryo, without lid and adapters	1,840	4,400	9.1 cm	5702 747.009	
Cryovial adapter, for 1–2 mL Cryotubes Ø 13 mm, set of 6				5702 752.002	
Adapter for HPLC tubes set of 18				5427 708.006	

©: Falcon and Microtainer are registered trademarks of Becton Dickinson.

Rotors and accessories for Centrifuges 5702/5702 R/5702 RH

	
Swing-bucket rotor A-4-38 including 4 round buckets* ¹ 5702 720.003	
	
Aerosol-tight lid Set of 2 5702 721.000	Round bucket**¹ replacement kit 4 buckets with 85 mL capacity 5702 722.006

	
Swing-bucket rotor A-4-38	Rectangular bucket**¹
5702 740.004	4 buckets of 90 mL capacity 5702 709.000

Falcon®: Registered trademark of Becton Dickinson.

*¹ Swing-bucket rotors are delivered with buckets of one weight class. Adapters and tubes, which together do not exceed a maximum weight of 0.19 kg, can be put in one round bucket. Rectangular bucket sets are delivered with buckets of one weight class. Adapters and tubes, which together do not exceed a maximum of 0.24 kg, can be put in one rectangular bucket. The following applies to rotors with round buckets, as well as to rotors with rectangular buckets:




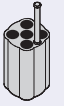
The total weight of a loaded bucket (including adapter and filled tubes) may not exceed 0.38 kg. The weight given on the rotor applies to buckets (including their load).



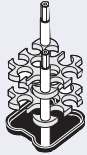
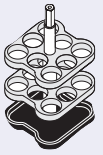
*² If the maximum tube length is exceeded, the loading capacity of the adapter may be reduced. Please perform a manual swing test.

*³ Warning: Aerosol-tight centrifugation not possible.

*⁴ Nominal volume

*⁵ w/o rubber cushion. Rubber cushion available as accessories. See page 170
 Adapter, lids and rotor are autoclavable at 121 °C/20 min.

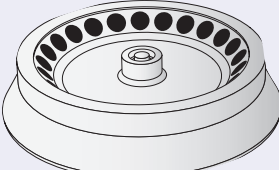
Tube type			
Volume (mL)	1.5–2.0	1.1–1.4	
Adapter			
Max. tube length for all positions below the lid (mm)* ²	43	100	
Max. tube length for all positions without the lid (mm)* ²	43	100	
Number of tubes per adapter/per rotor	4/16	5/20	
Adapter bore (Ø mm)	11	8.5	
Max. rcf (g-force)	2,900	2,850	
Centrifugation radius (mm)	134	132	
Bottom shape of adapter	round	flat	
Order no. (set of 2 adapters)	5702 745.006	5702 736.007	

Tube type			
Volume (mL)	5–7	9	
Adapter			
Max. tube length (mm)* ²	100	100	
Number of tubes per adapter/per rotor	10/40	8/32	
Adapter bore (Ø mm)	13	14.5	
Maximum rcf (g-force)	2,750	2,750	
Centrifugation radius (mm)	127	127	
Bottom shape incl. rubber mat	flat	flat	
Order no. (set of 2 adapters)	5702 710.008	5702 711.004	

Rotors and accessories for Centrifuges 5702/5702 R/5702 RH

2-7	2.6-7	4-10	9-15	15 mL Falcon®	15 mL Falcon®	25	50 mL Falcon®	85*4
100	100	100	100	120	-	100	115	106
100	100	100	100	121	121	100	115	106
5/20	4/16	4/16	4/16	1/4	2/8	1/4	1/4	1/4
12.5	13.5	16	17.5	17.2	17.2	25	30	38
2,850	2,850	2,850	2,800	3,000	3,000	2,900	2,900	2,900
132	132	132	130	137	137	135	135	135
flat	flat	flat	round ⁵	conical	conical	round	conical	round
5702 737.003	5702 719.005	5702 735.000	5702 724.009	5702 732.001	5702 723.002	5702 717.002	5702 734.004	5702 718.009

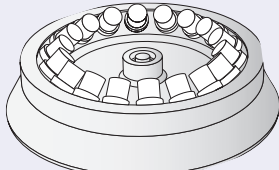
15	20	25
100	100	100
6/24	4/16	2/8
17.5	22	25
2,750	2,750	2,750
127	127	127
flat	flat	flat
5702 712.000	5702 713.007	5702 716.006



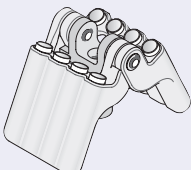
Fixed-angle rotor F-45-24-11
without lid
5702 746.002



Fixed-angle rotor F-35-30-17
with 30 steel sleeves
5702 704.008



Fixed-angle rotor F-45-18-17-Cryo
without lid
5702 747.009



Swing-bucket rotor A-8-17
5702 700.002

Rotors and Accessories
2.



Product features

Cell Culture Centrifuge Bundles include

- Centrifuge 5702, 5804/5804 R or 5810/5810 R
- Swing-bucket rotor incl. buckets
- Four adapters for 15 mL Falcon® tubes (two sets of 2)
- Four adapters for 50 mL Falcon® tubes (two sets of 2)

Clinical Centrifuge Bundles include

- Centrifuge 5702 R
- Swing-bucket rotor A-4-38 incl. round buckets
- Four adapters for 13 mm blood collection tubes or urine tubes (two sets of 2)
- Four adapters for 16 mm blood collection tubes or urine tubes (two sets of 2)

Falcon®: Registered trademark of Becton Dickinson.

Description

Whether you need a refrigerated or non-refrigerated centrifuge for low, medium or high-throughput applications, one of these bundles will definitely suit your requirements.

The Cell Culture Centrifuge Bundles are optimized for swing-bucket rotor applications in standard 15 mL and 50 mL Falcon® tubes.

The Clinical Centrifuge Bundle is optimized for Centrifuge 5702 R with adapters for 13 mm and 16 mm blood collection tubes or urine tubes.

Bundle packages of Multipurpose Benchtop centrifuges

Technical specifications

Cell Culture Centrifuge Bundles	Number of tubes per adapter/rotor	
	15 mL Falcon® tubes	50 mL Falcon® tubes
5702	2/8	1/4
5804/5804 R	4/16	1/4
5810/5810 R with rotor A-4-62	9/36	4/16
5810/5810 R with rotor A-4-81	12/48	5/20
Clinical Centrifuge Bundle	13 mm tubes	16 mm tubes
5702 R	4/16	4/16

Ordering information

Description	Order no.		
Cell Culture Centrifuge Bundles			
Centrifuge 5702 , 230 V/50-60 Hz, with swing-bucket rotor A-4-38 incl. round buckets and 15 mL*/50 mL Falcon® adapters (2 sets of each adapter) (Order no. 5702 723.002 and 5702 734.004)	5702 000.329		
Centrifuge 5804 , 230 V/50-60 Hz, with swing-bucket rotor A-4-44 incl. rectangular buckets and 15 mL*/50 mL** Falcon® adapters (2 sets of each adapter), (Order no. 5804 755.006 and 5804 758.005)	5804 000.323		
Centrifuge 5804 R , refrigerated, 230 V/50-60 Hz, with swing-bucket rotor A-4-44 incl. rectangular buckets and 15 mL*/50 mL** Falcon® adapters (2 sets of each adapter), (Order no. 5804 755.006 and 5804 758.005)	5805 000.327		
Centrifuge 5810 , 230 V/50-60 Hz, with swing-bucket rotor A-4-62 incl. rectangular buckets and 15 mL/50 mL** Falcon® adapters (2 sets of each adapter), (Order no. 5810 755.000 and 5810 763.002)	5810 000.327		
Centrifuge 5810 R , refrigerated, 230 V/50-60 Hz, with swing-bucket rotor A-4-62 incl. rectangular buckets and 15 mL/50 mL** Falcon® adapters (2 sets of each adapter), (Order no. 5810 755.000 and 5810 763.002)	5811 000.320		
Centrifuge 5810 , 230 V/50-60 Hz, with swing-bucket rotor A-4-81 incl. rectangular buckets and 15 mL/50 mL Falcon® adapters (2 sets of each adapter) (Order no. 5810 722.004 and 5810 723.000)	5810 000.424		
Centrifuge 5810 R , refrigerated, 230 V/50-60 Hz, with swing-bucket rotor A-4-81 incl. rectangular buckets and 15 mL/50 mL Falcon® adapters (2 sets of each adapter), (Order no. 5810 722.004 and 5810 723.000)	5811 000.428		
Clinical Centrifuge Bundle			
Centrifuge 5702 R , refrigerated, 230 V/50-60 Hz, with swing-bucket rotor A-4-38 incl. round buckets and adapters for 13 mm and 16 mm blood collection or urine tubes (2 sets of each adapter), (Order no. 5702 719.005 and 5702 735.000)	5703 000.322		

* Aerosol-tight lids can not be used together with 15 mL Falcon® tubes

** Aerosol-tight lids can not be used together with 50 mL Falcon® tubes

Centrifuges 5804/5804 R and 5810/5810 R

CE
IVD*



Unparalleled versatility

Featuring powerful, maintenance-free motors, these models accommodate a variety of rotors to meet your application needs. They are three centrifuges in one: a high-capacity, general-purpose centrifuge for cell harvesting; a high-speed centrifuge for separating cell lysates; and a microcentrifuge for DNA precipitations.

Centrifuge 5810 and refrigerated Centrifuge 5810 R offer maximum application versatility and popular tube capacity, accommodating up to 4 x 500 mL tubes or 16 microplates.

These compact benchtop centrifuges achieve remarkable throughput of up to 48 x 15 mL or 28 x 50 mL Falcon® tubes. For lower capacity needs in one compact unit, Model 5804 and refrigerated Model 5804 R spin volumes from 0.2 mL to 4 x 100 mL at low-to-high speeds for a wide range of applications. These centrifuges can accommodate capacities of up to 16 x 15 mL Falcon® or 30 microcentrifuge tubes per run.

®: Registered trademark of Becton Dickinson.



Simple operation

- Full-digit digital display for easy reading
- Easy programming of time, speed, g-force and temperature
- Timer from 1–99 min with a high accuracy of ± 2 s in 5 min
- Short Spin button can be set to desired speed
- Possibility to adjust radius setting for every adapter for maximum RCF accuracy
- “At set RPM” mode starts timer when set speed is reached for maximum run-to-run reproducibility
- 10 different acceleration and braking ramps to protect sensitive samples

ⓘ Further information at www.eppendorf.com/58XX

⚡ Ordering information for other voltage options begins on page 471.

* Further information about IVD products can be found on page 442
Technical specifications subject to change.

Centrifuges 5804/5804 R and 5810/5810 R

**Product features**

- Multipurpose capabilities — 14 different rotor options for maximum versatility
 - Swing-bucket rotors and adapters accommodate tubes and bottles from 0.2 mL to 500 mL
 - Plate rotors for centrifugation of all types of MTP, PCR, cell culture, or deepwell plates
 - Fixed-angle rotors for high-speed molecular biology applications in tubes from 0.2 mL to 85 mL
- High centrifugation speed of up to 20,800 x g (14,000 rpm)
- Low access height of 29 cm for easy loading and unloading of rotors
- Saves up to 35 user-defined programs
- Automatic rotor recognition with speed limitation for maximum safety
- Automatic imbalance detection
- Quiet operation to improve your work environment

Additional product features of refrigerated Centrifuges 5804 R and 5810 R

- Temperature range from -9 °C to 40 °C
- Rotors can be spun at maximum speed and still maintain 4 °C (Except Rotor F-34-6-38 and Rotor FA-45-6-30 max. speed) (230 V refrigerated versions)
- FastTemp function for fast pre-cooling
- Standby cooling maintains temperature when centrifuge is not in use
- ECO shut-off engages after 8 hours of non use to reduce energy consumption and extend compressor life
- Built-in condensation drain to eliminate water accumulation and prevent corrosion

Centrifuges 5804/5804 R and 5810/5810 R

Technical specifications

Description	Centrifuge 5804	Centrifuge 5804 R	Centrifuge 5810	Centrifuge 5810 R
Maximum rcf				
• Fixed-angle rotor	20,800 x g	20,800 x g	20,800 x g	20,800 x g
• Swing-bucket rotor	4,500 x g	4,500 x g	4,500 x g	4,500 x g
• Plate rotor	2,250 x g	2,250 x g	3,486 x g	3,486 x g
Speed	200-14,000 rpm (in 10 rpm increments)			
Maximum capacity	4 x 100 mL, 6 x 85 mL	4 x 100 mL, 6 x 85 mL	4 x 500 mL	4 x 500 mL
Rotor options	8	8	14	14
Accel./Braking ramps	10/10			
Programs	35 user programs			
Timer	1 min. to 99 min, with continuous mode, short spin			
Temperature control range	N/A	-9 °C to 40 °C	N/A	-9 °C to 40 °C
Noise level				
Rotor A-4-81 (4 x 500 mL)			<65 dB(A)	<56 dB(A)
Rotor A-4-44 (4 x 100 mL)	<67 dB(A)	<56 dB(A)	<65 dB(A)	<56 dB(A)
Rotor F-34-6-38 (6 x 85 mL)	<51 dB(A)	<58 dB(A)	<53 dB(A)	<59 dB(A)
Power supply	230 V/50-60 Hz	230 V/50-60 Hz	230 V/50-60 Hz	230 V/50-60 Hz
Power requirement	Max. 900 W	Max. 1,650 W	Max. 900 W	Max. 1,650 W
Dimensions (W x D x H)	47 x 55 x 34 cm	64 x 55 x 34 cm	54 x 61 x 35 cm	70 x 61 x 35 cm
Height with open lid	74 cm	74 cm	80 cm	80 cm
Weight without rotor	55 kg	80 kg	68 kg	99 kg


Ordering information

Description	Order no.	
Centrifuge 5804 , 230 V/50-60 Hz benchtop centrifuge, without rotor	5804 000.013	
Centrifuge 5810 , 230 V/50-60 Hz benchtop centrifuge, without rotor	5810 000.017	
Centrifuge 5804 R , 230 V/50-60 Hz benchtop centrifuge, without rotor, refrigerated	5805 000.017	
Centrifuge 5810 R , 230 V/50-60 Hz benchtop centrifuge, without rotor, refrigerated	5811 000.010	
Cell Culture Centrifuge Bundles		
Centrifuge 5804 , 230 V/50-60 Hz, with swing-bucket rotor A-4-44 incl. rectangular buckets and 15 mL*/50 mL** Falcon® adapters	5804 000.323	
Centrifuge 5804 R , refrigerated, 230 V/50-60 Hz, with swing-bucket rotor A-4-44 incl. rectangular buckets and 15 mL*/50 mL** Falcon® adapters	5805 000.327	
Centrifuge 5810 , 230 V/50-60 Hz, with swing-bucket rotor A-4-62 incl. rectangular buckets and 15 mL/50 mL** Falcon® adapters	5810 000.327	
Centrifuge 5810 R , refrigerated, 230 V/50-60 Hz with swing-bucket rotor A-4-62 incl. rectangular buckets and 15 mL/50 mL** Falcon® adapters	5811 000.320	
Centrifuge 5810 , 230 V/50-60 Hz, with swing-bucket rotor A-4-81 incl. rectangular buckets and 15 mL/50 mL Falcon® adapters	5810 000.424	
Centrifuge 5810 R , refrigerated, 230 V/50-60 Hz, with swing-bucket rotor A-4-81 incl. rectangular buckets and 15 mL/50 mL Falcon® adapters	5811 000.428	

* Aerosol-tight lids can not be used together with 15 mL Falcon® tubes

*** Aerosol-tight lids can not be used together with 50 mL Falcon® tubes

® Falcon is a registered trademark of Becton Dickinson.

 **Ordering information for other voltage options begins on page 471.**

Interchangeable rotors and adapters



Simple adapters for swing-bucket rotors

- Buckets, lids and adapters are autoclavable (121 °C, 20 min)
- Stackable modular adapters for swing-bucket rotors are easy to disassemble for vessels of different lengths
- Adapters are color-coded for quick and simple identification
- Buckets can be easily sealed with aerosol-tight lids to provide protection against biohazardous samples

Description

Our multipurpose centrifuges accommodate both fixed-angle and swing-bucket rotors for a variety of applications. A large selection of adapters allows maximum application flexibility with a minimum number of rotors.

Their modular construction allows centrifugation of virtually all commercially available tubes. The adapter modules can be stacked until the required tube height is attained and then lowered onto the holders in the rectangular buckets. Additional exchangeable swing buckets for MTPs and 50 mL Falcon® tubes are available.

The stable plastic adapters are solidly constructed and can be easily cleaned — even autoclaved in their entirety in the event of contamination with biologically active sample material.

Advanced fixed-angle rotor design



Cross section of Rotor FA-45-6-30 (6 x 15/50mL Falcon) showing the light-weight design. All metal not needed for safety or performance is hollowed out to reduce weight and improve handling

The ergonomic solution for your lab

Elevate your centrifuge performance to a new level with Eppendorf aluminium rotors. Selected aluminium alloys, advanced rotor design and unique product features will make everyday routines faster and safer.

Low rotor weight

Eppendorf's fixed-angle rotors are among the lightest in the industry to improve handling and operational safety. All metal that is not needed for safety or performance is routed out for weight reduction.

Maximum safety

Manufacturing excellence, selection of aluminium alloys, vigorous testing for material integrity and postproduction treatment ensure maximum rotor safety.

Superior temperature control

Aluminium, with its high heat conductivity, allows fast pre-cooling and accurate temperature control in refrigerated centrifuges.

Additional rotor features

- More ergonomic lifting and carrying due to light-weight design
- Light-weight rotors cause less wear and tear on the motor and allow for faster acceleration and braking times
- Rotors are designed for fast lid locking. Rotor FA-45-6-30 for 6 x 15/50 mL Falcon (see above) features an unique QuickLock™ aerosol-tight lid that allows fast and ergonomic lid locking with only ¼ of a turn
- All rotors are anodized for high chemical resistance and to prevent corrosion
- Optimized design of rotor boreholes and adapters provide optimal support for high-speed centrifugation of tubes
- Aluminium rotors are recyclable

Performance data of rotors

Centrifuges 5804/5804 R and 5810/5810 R together with the high-performance, high-capacity swing-bucket rotors accommodate virtually all commercially available tubes from 0.2 mL to 500 mL.

5804/ 5804 R	5810/ 5810 R	Rotors	Max. capacity	Max, rcf (x g)	Max, rotational speed (rpm)	Max, radius (cm)	Lowest attain- able tempera- ture at max, rpm*1	Max, loading height for plate buckets	Aerosol-tight centrifugation possible*3
Swing-bucket rotors									
–	●	A-4-81*4	4 x 500 mL	3,220	4,000	18.0	<4 °C	–	●
–	●	A-4-81-MTP/Flex*4	4 x 4 MTP	2,900	4,000	16.3	<0 °C	60 mm	–
–	●	A-4-62*5	4 x 250 mL	3,220	4,000	18.0	≤2 °C	–	●
–	●	A-4-62-MTP*5	4 x 3 MTP	2,750	4,000	15.4	<0 °C	53 mm	–
●	●	A-4-44	4 x 100 mL	4,500	5,000	16.1	≤4 °C	–	●
–	●	A-2-DWP-AT	2 x 4 MTP	3,486	4,500	15.4	≤4 °C	67 mm	●
●	●	A-2-DWP	2 x 5 MTP	2,250	3,700	14.7	<0 °C	89 mm	–
Fixed-angle rotors									
●	●	F-34-6-38	6 x 85 mL	18,500 (5810 R)	12,000 (5810 R)	11.5	≤9 °C	–	–
				15,550	11,000		≤4 °C		
●	●	FA-45-6-30	6 x 50 mL	20,130 (5810 R)	12,100 (5810 R)	12.3	≤10 °C	–	●
				16,639	11,000		4 °C		
●	●	FA-45-30-11	30 x 1.5/2.0 mL	20,800	14,000	9.5	≤3 °C	–	●
●	●	F-45-30-11	30 x 1.5/2.0 mL	20,800	14,000	9.5	≤3 °C	–	–
●	●	F-45-48-PCR	6 x 5/8 PCR strips (48 x 0.2 mL)	15,350	12,000	9.5	1 °C	–	–
Drum rotor									
●	●	T-60-11	60 x 1.5/2.0 mL	16,400	14,000	7.5	<2 °C	–	–

*1 Refrigerated centrifuges (230 V or 120 V/20 A) at 23 °C room temperature, after 1 h run.

*3 Aerosol-tightness has been tested and approved in accordance with the procedure of Bennett et al. from the Centre of Emergency Preparedness and Response, Health Protection Agency, Porton Down, Great Britain, and according to annex AA of the IEC 1010-2-020 safety standard. The test procedure simulates the accidental release of biological material (bacteria) inside the closed rotor or closed rectangular bucket. Air and swab samples are taken to ensure that no material is released from the closed rectangular buckets or closed rotor during operation.

*4 The swing-bucket rotor can be delivered without buckets, equipped with rectangular buckets as an A-4-81 or with MTP/Flex buckets as an A-4-81-MTP/Flex, whereby the MTP/Flex buckets can be purchased separately in sets of 2 or 4. A user-friendly change of rectangular buckets or MTP/Flex buckets is guaranteed by the use of a common rotor cross.

*5 The swing-bucket rotor can be delivered as A-4-62 (loaded with buckets) or as A-4-62-MTP (loaded with plate buckets). User-friendly exchange of rectangular buckets or microtest plate buckets is guaranteed by the use of the all-in-one rotor cross.

Approximate braking times for different rotors at levels 0 to 9 (in seconds) for 230 V* centrifuges

5804/ 5804 R	5810/ 5810 R	Max. volume	Rotor	0	1	2	3	4	5	6	7	8	9
–	●	4 x 500 mL	A-4-81	532	189	174	143	131	109	95	85	59	31
–	●	4 x 4 MTP	A-4-81-MTP/Flex	643	191	174	142	131	110	94	83	58	30
–	●	4 x 250 mL	A-4-62	740	190	170	140	130	110	95	85	55	26
–	●	4 x 3 MTP	A-4-62-MTP	620	190	170	140	130	110	95	85	55	26
●	●	4 x 100 mL	A-4-44	470	300	270	220	200	140	100	75	45	23
●	●	2 x 5 MTP	A-2-DWP	304	174	130	118	100	75	51	44	32	14
–	●	2 x 4 MTP	A-2-DWP-AT	587	231	202	176	157	135	112	102	69	39
●	●	6 x 50 mL	FA-45-6-30	759	423	322	231	205	178	148	113	93	58
●	●	6 x 85 mL	F-34-6-38	880	370	280	190	170	150	125	95	75	54
●	●	30 x 1.5/2.0 mL	FA-45-30-11	240	140	70	45	35	30	25	22	19	18
●	●	30 x 1.5/2.0 mL	F-45-30-11	240	140	70	45	35	30	25	22	19	18
●	●	48 x 0.2 mL	F-45-48-PCR	169	119	60	41	31	26	22	19	17	16
●	●	60 x 2.0 mL	T-60-11	800	280	140	95	70	55	45	40	36	36

The given times are to be considered guidelines. While level 9 means "strongest braking," level 0 means "free deceleration," whereby considerable fluctuations can occur with this uncontrolled deceleration, depending upon the condition of the device and the load.

* The deceleration times for the 230 V and 120 V devices are almost identical.

Rotors exclusively for Centrifuges 5810/5810 R

**Swing-bucket rotor A-4-81**

- High-capacity swing-bucket rotor with speed up to $3,220 \times g$ (4,000 rpm)
- Ideal for medical and biotechnology laboratories: Broad range of adapters enable high versatility for tubes and flasks from 0.2 mL to 500 mL
- Rectangular design of the buckets allows for higher tube capacity compared to standard round buckets
- Rotor A-4-81 can handle up to 28 x 50 mL Falcon® or 48 x 15 mL Falcon® tubes
- Buckets, lids and adapters are autoclavable (121 °C, 20 min)

**Rotor A-4-81 with aerosol-tight lids**

- Rotor A-4-81 provides high capacity for up to 72 x 5/7 mL or 64 x 10 mL blood collection tubes
- Lids for aerosol-tight centrifugation optionally available
- Aerosol-tightness is tested and certified by the Centre of Emergency Preparedness and Response, Health Protection Agency, Porton Down, Great Britain

**7 x 50 mL conical buckets for rotor A-4-81**

- Max. rcf: $3,220 \times g$ (4,000 rpm)
- Max. capacity: 28 x 50 mL Falcon® tubes
- Adapters for 15 mL Falcon® tubes available
- Buckets are autoclavable (121 °C, 20 min)

**Rotor A-4-81 with plate buckets (A-4-81-MTP/Flex)**

- Rotor A-4-81 can be upgraded with MTP/Flex buckets to spin plates
- Max. rcf: $2,900 \times g$ (4,000 rpm)
- With a maximum loading height of 60 mm rotor A-4-81-MTP/Flex can handle up to
 - 4 x 4 MTP
 - 4 x 2 Cell culture plates
 - 4 x 1 DWP
- The open design of the MTP/Flex bucket without cross bar allows for easy loading and unloading

*: Falcon is a registered trademark of Becton Dickinson.

Rotors exclusively for Centrifuges 5810/5810 R



500 and 400 mL wide-mouth bottle for rotor A-4-81*1
(80 x 135 mm, polypropylene, centrifugation resistance up to 3,250 x g, autoclavable)



Mixed loading with 2 plate buckets and 2 rectangular tube buckets is possible with rotor A-4-81

Ordering information

Description	Max. rot. speed (rpm)	Max. rcf (x g)	Rotor radius (cm)	Order no.
Rotor A-4-81 with 500 mL rectangular buckets				
Rotor A-4-81, incl. 4 x 500 mL rectangular buckets	4,000	3,220	18.0	5810 718.007
Rotor A-4-81, without buckets				5810 743.001
Special 7 x 50 ml Falcon® buckets, set of 4	4,000	3,220	18.0	5825 730.003
Adapter 15 ml Falcon® for 7 x 50 ml Falcon® buckets, set of 7				5820 718.005
Aerosol-tight lids*2, for 500 mL rectangular buckets, set of 2				5810 724.007
400 mL wide-mouth bottle, incl. stabilizing sleeves, set of 2				5810 729.009
500 mL wide-mouth bottle, set of 2				5820 707.003
Adapters: See up to page 192				
Replacement rubber mat, for 500 mL bucket adapters, set of 4				5810 734.002
Replacement adapter clamp, for 500 mL bucket adapters, set of 2				5810 735.009
Rotor A-4-81 with MTP/Flex plate buckets				
Rotor A-4-81-MTP/Flex, incl. 4 x MTP/Flex plate buckets	4,000	2,900	16.3	5810 725.003
MTP/Flex buckets, set of 4				5810 741.009
MTP/Flex buckets, set of 2				5810 742.005
Replacement rubber base plate for MTP/Flex bucket, set of 2				5810 737.001
Adapter PCR 96-well plate, set of 2	4,000	2,880	16.1	5825 711.009
Adapter PCR 384-well plate, set of 2	4,000	2,820	15.8	5825 713.001
Adapter for IsoRack 24 x 0.5 mL tubes, set of 2	4,000	2,680	15.0	5825 708.008
Adapter for IsoRack 24 x 1.5/2.0 mL tubes, set of 2	4,000	2,600	14.6	5825 709.004
Adapter CombiSlide for up to 12 glass slides, set of 2		100	15.9	5825 706.005

*1 filled with blue liquid for illustration purposes

*2 Aerosol-tightness is tested and certified by the Centre of Emergency Preparedness and Response, Health Protection Agency, Porton Down, Great Britain

Rotors exclusively for Centrifuges 5810/5810 R



Swing-bucket rotor A-4-62

- All-in-one rotor for 4 x 250 mL rectangular buckets and 4 MTP buckets
- Flexible adapters for a wide range of tubes
- Max. rcf: 3,220 x g (4,000 rpm)
- Rotor, buckets, lids and adapters are autoclavable (121 °C, 20 min)
- Lids for aerosol-tight*¹ centrifugation optionally available



Rotor A-4-62 with plate buckets (A-4-62-MTP)

- Rotor A-4-62 can be upgraded with MTP buckets to spin plates
- Max. rcf: 2,750 x g (4,000 rpm)
- With a maximum loading height of 53 mm rotor A-4-62-MTP can handle up to:
 - 4 x 3 MTP
 - 4 x 2 Cell culture plates
 - 4 x 1 DWP

Ordering information

Description	Max. rotational speed (rpm)	Max. rcf (x g)	Rotor radius (cm)	Order no.	
Rotor A-4-62 with 250 mL rectangular buckets					
Rotor A-4-62 , incl. 4 x 250 mL rectangular buckets	4,000	3,220	18.0	5810 709.008	
Aerosol-tight lids*¹ , for 250 mL rectangular buckets, set of 2				5810 710.006	
Replacement 250 mL rectangular buckets , set of 4				5810 716.004	
Adapters: See up to page 192					
Replacement rubber mat , for 250 mL bucket adapters, set of 4				5810 782.007	
Replacement adapter clamp , for 250 mL bucket adapters, set of 2				5810 781.000	
Rotor A-4-62 with MTP buckets					
Rotor A-4-62-MTP , incl. 4 x MTP buckets	4,000	2,750	15.4	5810 711.002	
Replacement MTP buckets , set of 4				5810 702.003	
Replacement rubber base plate for MTP bucket , set of 2				5810 737.001	
Adapter PCR 96-well plate , set of 2	4,000	2,700	15.2	5825 711.009	
Adapter PCR 384-well plate , set of 2	4,000	2,660	14.9	5825 713.001	
Adapter CombiSlide for up to 12 glass slides , set of 2		100	15.0	5825 706.005	

*¹ Aerosol-tightness is tested and certified by the Centre of Emergency Preparedness and Response, Health Protection Agency, Porton Down, Great Britain

Rotors for Centrifuges 5804/5804 R and 5810/5810 R



Swing-bucket rotor A-4-44

- Max. rcf: 4,500 x g (max. 5,000 rpm)
- Broad range of adapters available to handle all common tube formats from 0.2 mL to 100 mL
- Lids for aerosol-tight*1 centrifugation optionally available
- Rotor, buckets, lids and adapters are autoclavable (121 °C, 20 min)



Rotor A-4-44 with 50 mL Falcon® tube buckets

- 50 mL Falcon® tube buckets for medium throughput applications
- Swing-bucket rotor provides high centrifugation speed up to 4,500 x g (5,000 rpm)
- Form inserts to support Falcon® tube bottoms included

Ordering information

Description	Max. rotational speed (rpm)	Max. rcf (x g)	Rotor radius (cm)	Order no.	
4 x 100 mL Swing bucket Rotor A-4-44					
Rotor A-4-44 , incl. 4 x 100 mL rectangular buckets	5,000	4,400	15.7	5804 709.004	
Rotor A-4-44 , incl. 4 x 50 mL Falcon® tube buckets, incl. conical form inserts	5,000	4,500	16.1	5804 719.000	
Aerosol-tight lids*1 , for 100 mL rectangular buckets, set of 2				5804 712.005	
Replacement 100 mL rectangular buckets , set of 4				5804 741.005	
4 Falcon® buckets , each for 2 x 50 mL Falcon® tubes for Rotor A-4-44 incl. form inserts				5804 706.005	
Adapters for rotor A-4-44: see page 192					
Replacement rubber mat , for 100 mL bucket adapters, set of 4				5804 782.003	
Replacement adapter clamp , for 100mL bucket adapters, set of 2				5804 781.007	
Replacement form inserts , for 50 mL Falcon® tube buckets, set of 8				5804 728.009	

*1 Aerosol-tightness is tested and certified by the Centre of Emergency Preparedness and Response, Health Protection Agency, Porton Down, Great Britain
 ®: Falcon is a registered trademark of Becton Dickinson.

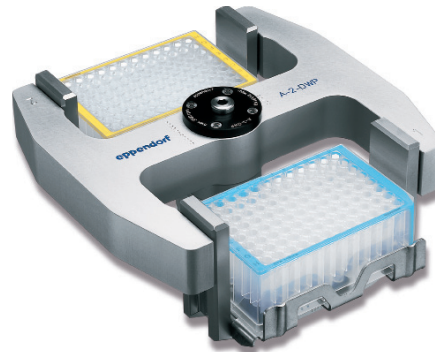
Rotors exclusively for Centrifuges 5804/5804 R and 5810/5810 R



Aerosol-tight deepwell plate Rotor A-2-DWP-AT^{*1} - for use in Centrifuges 5810 and 5810 R only

- Maximum speed: 3,486 x g (4,500 rpm)
- For use in Centrifuges 5810 and 5810 R only
- Rotor can handle up to
 - 2 x 4 MTP
 - 2 x 4 Cell culture plates
 - 2 x 1 DWP
 - 2 x 1 Filtration plate kits
- Maximum loading height of 67 mm
- Aerosol-tight^{*2} lids for all applications involving hazardous samples
- Rotors and buckets are autoclavable (121 °C, 20 min)

^{*1} Please note that a software upgrade will be necessary for older centrifuges when using Rotor A-2-DWP-AT. Please contact your local Eppendorf organization or dealer for further information.



Deepwell plate rotor A-2-DWP - for use in Centrifuges 5804/5804 R and 5810/5810 R

- Max. rcf: 2,250 x g (3,700 rpm)
- Rotor can handle up to
 - 2 x 5 MTP
 - 2 x 4 Cell culture plates
 - 2 x 2 DWP
 - 2 x 1 Filtration plate kits
- Maximum loading height of 89 mm
- Rotors and buckets are autoclavable (121 °C, 20 min)

Ordering information

Description	Max. rotational speed (rpm)	Max. rcf (x g)	Rotor radius (cm)	Order no.	
Aerosol-tight deepwell plate Rotor A-2-DWP-AT					
Rotor A-2-DWP-AT, incl. buckets, aerosol-tight lids and plate removal	4,500	3,486	15.5	5820 710.004	
Aerosol-tight lids for rotor A-2-DWP-AT, set of 2				5820 713.003	
Plate removal tool, set of 2				5820 712.007	
Spare buckets for A-2-DWP-AT, set of 2				5820 711.000	
Spare seals, for aerosol-tight plate rotor lids, set of 2				5820 705.000	
Deepwell plate Rotor A-2-DWP					
Rotor A-2-DWP, incl. 2 deepwell plate buckets	3,700	2,250	14.7	5804 740.009	
Replacement buckets for A-2-DWP, set of 2				5804 743.008	
Replacement rubber base plate for A-2-DWP buckets, set of 2				5427 702.008	
Adapter for Rotor A-2-DWP and A-2-DWP-AT					
Adapter PCR 96-well plate ^{*2} , set of 2	3,700	2,220	14.5	5825 711.009	
Adapter PCR 384-well plate, set of 2	3,700	2,170	14.2	5825 713.001	
Adapter for IsoRack 24 x 0.5 mL tubes, set of 2	3,700	2,050	13.8	5825 708.008	
Adapter for IsoRack 24 x 1.5/2 mL tubes, set of 2	3,700	1,990	13.3	5825 709.004	
CombiSlide adapter, for up to 12 glass slides, set of 2				5825 706.005	
Adapter plates with rims in the SBS format, set of 2	3,700	2,227		5825 718.003	

^{*2} Max. rotational speed of adapter are only valid for rotor A-2-DWP

^{*1} Aerosol-tightness is tested and certified by the Centre of Emergency Preparedness and Response, Health Protection Agency, Porton Down, Great Britain

Eppendorf Plate® – Perfect for centrifugation!



Eppendorf Microplates 96 and 384

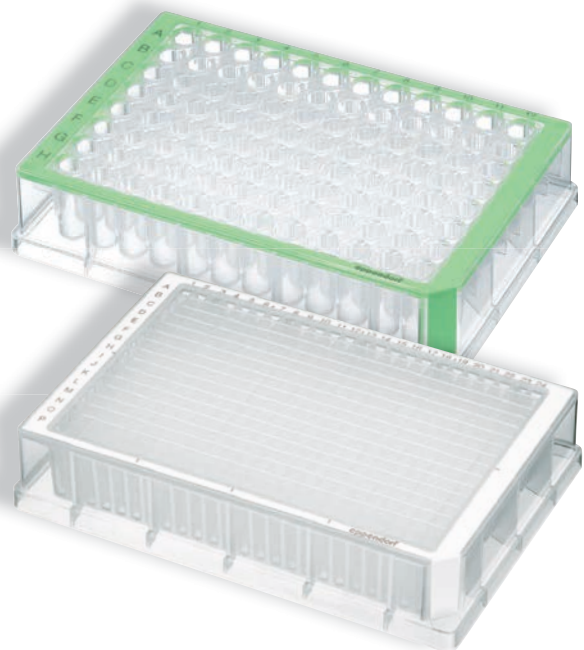
Product features

- **g-Safe®** – stable at high centrifugation forces
- **OptiTrack® matrix** – colored borders feature alphanumeric coding for easy well tracking
- **RecoverMax® design** – rounded-corner, conical bottom well
- High chemical resistance
- Autoclavable (121 °C, 20 min)
- Perfect for automation
- Conform to ANSI/SBS*1
- Optional barcoding available
- Raised well rims for effective sealing

*1 ANSI/SBS 1-2004 - ANSI/SBS 4-2004

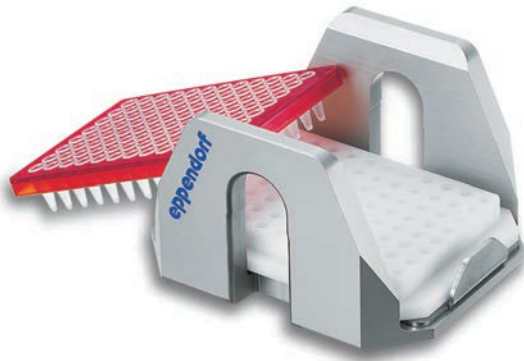


Eppendorf Deepwell Plates 96 and 384



i For more information please refer to page 122

Accessories for plate rotors

**PCR plate adapter**

- PCR plate adapters are designed to support thin-walled PCR plate wells during centrifugation
- Available for 96-well and 384-well PCR plates
- Adapters can be used in all Eppendorf plate rotors (A-2-DWP, A-2-DWP-AT, A-4-62-MTP, A-4-81-MTP/Flex, A-2-MTP for Centrifuge 5430/5430 R)

**IsoRack adapter (for 1.5/2.0 mL tube IsoRacks)**

- IsoRack adapter support IsoRack tube racks during centrifugation
- Available for 24 x 0.5 mL and 24 x 1.5/2.0 mL tube IsoRacks
- Adapters can be used in Eppendorf plate rotors A-2-DWP and A-4-81-MTP/Flex

**Cell culture flask adapter**

- Adapter to spin down cell cultures directly in a cell culture flask
- Suitable for 25 cm² flasks
- Adapters can be used in Eppendorf plate rotor A-4-81-MTP/Flex

**CombiSlide adapter**

- CombiSlide adapter provides safe centrifugation support for glass slides and microarrays
- Designed for drying slides after hybridization experiments
- Adapter can hold up to 12 regular glass slides
- Removable inserts allow centrifugation of glass slides across and parallel to the direction of rotation
- Adapters can be used in all Eppendorf plate rotors (A-2-DWP, A-2-DWP-AT, A-4-62-MTP, A-4-81-MTP/Flex, A-2-MTP for Centrifuge 5430/5430 R)

Ordering information

Description	Order no.	
Adapter PCR 96-well plate, set of 2	5825 711.009	
Adapter PCR 384-well plate, set of 2	5825 713.001	
Adapter, for cell culture flasks, set of 2	5825 719.000	
Adapter, for IsoRack 24 x 0.5 mL tubes, set of 2	5825 708.008	
Adapter, for IsoRack 24 x 1.5/2.0 mL tubes, set of 2	5825 709.004	
CombiSlide adapter, for up to 12 glass slides, set of 2	5825 706.005	

Rotors for Centrifuges 5804/5804 R and 5810/5810 R



Fixed-angle Rotor F-34-6-38

- Six boreholes for different tubes (max. tube size: 85 mL)
- Max. rcf: 15,550 x g (11,000 rpm)
- When used in Centrifuge 5810 R: max. rcf 18,500 x g (12,000 rpm)
- Conical tubes, such as 15 and 50 mL Falcon® tubes, as well as 13 mm blood collection tubes (75 mm and 100 mm height), may be centrifuged using adapters*¹
- Light-weight design (only 3,25 kg incl. lid) for easier handling
- Anodized aluminium for high chemical resistance
- Rotor, lids and adapters are autoclavable (121 °C, 20 min)

¹ Please observe the limits for tube load-bearing capacity as specified by the tube manufacturer.



Aerosol-tight Rotor FA-45-6-30*²

- 6 x 15/50 mL Falcon® tubes
- Adapter for 15 mL as well as 10/16/30/35 mL Oak Ridge tubes
- Aerosol-tight QuickLock™ rotor lid
- Max. rcf: 16,639 x g (11,000 rpm)
- When used in Centrifuge 5810 R: max. rcf 20,130 x g (12,100 rpm)
- 45° borehole angle for compact pellets at the bottom of the tube — minimizes pellet smear along the tube wall
- Light-weight design (only 3,2 kg incl. lid) for easy handling
- Made from anodized aluminum, thus offering high chemical resistance
- Rotor, lid and adapters are autoclavable (121 °C, 20 min)

² Please note that a software upgrade will be necessary for older centrifuges when using Rotor FA-45-6-30. Please contact your local Eppendorf organization or dealer for further information

Ordering information

Description	Max. rotational speed (rpm)	Max. rcf (x g)	Rotor radius (cm)	Order no.	
Fixed-angle Rotor F-34-6-38					
Rotor F-34-6-38 for 6 x 85 mL tubes incl. rotor lid	11,000/12,000*	15,500/18,500*	11.5	5804 727.002	
Replacement rotor lid , for rotor F-34-6-38				5804 727.509	
Adapters: see page 192					
Aerosol-tight Rotor FA-45-6-30					
Rotor FA-45-6-30 , incl. aerosol-tight QuickLock™ rotor lid	11,000/12,100*	16,639/20,130*	12.3	5820 715.006	
Adapter , for 15 mL Falcon® tubes, set of 2		16,233/19,642*	12.0	5820 717.009	
Adapter , for 10 mL Oak Ridge tubes, set of 2				5820 719.001	
Adapter , for 16 mL Oak Ridge tubes, set of 2				5820 720.000	
Adapter , for 30 mL Oak Ridge tubes, set of 2				5820 721.006	
Adapter , for 35 mL Oak Ridge tubes, set of 2				5820 722.002	
Rotor lid , for rotor FA-45-6-30				5820 716.002	

* The lower value refers to use in Centrifuges 5804/5804 R/5810; the higher value refers to use in Centrifuges 5810 R. Falcon® is a registered trademark of Becton Dickinson.

Rotors for Centrifuges 5804/5804 R and 5810/5810 R



Fixed-angle Rotors F-45-30-11 and FA-45-30-11

- 30 places for 1.5/2.0 mL test tubes
- Max. rcf: 20,800 x g (max. 14,000 rpm)
- Rotor, lid and adapters are autoclavable (121 °C, 20 min)
 - the rotor FA-45-30-11 with lid can even be autoclaved for 2 h at 140 °C to destroy prion contamination
- Anodized aluminium for high chemical resistance
- Aerosol-tight*¹ centrifugation possible with rotor FA-45-30-11

*¹ Aerosol-tightness has been tested and approved in accordance with the procedure of Bennett et al. from the Centre of Emergency Preparedness and Response, Health Protection Agency, Porton Down, Great Britain and according to annex AA of the IEC 1010-2-020 safety standard. The test procedure simulates the accidental release of biological material (bacteria) inside the closed rotor or closed rectangular bucket. Air and swab samples are taken to ensure that no material is released from the closed rectangular buckets or closed rotor during operation.



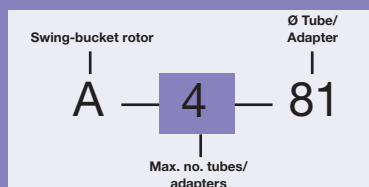
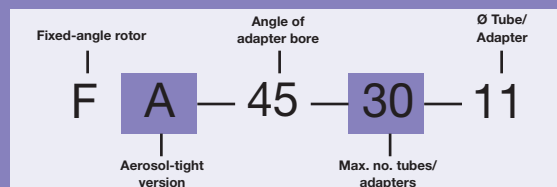
Ordering information

Description	Max. rotational speed (rpm)	Max. rcf (x g)	Rotor radius (cm)	Order no.	
Fixed-angle rotor F-45-30-11, 30 x 1.5/2.0 mL, with aluminum lid	14,000	20,800	9.5	5804 715.004	
Fixed-angle rotor FA-45-30-11, 30 x 1.5/2.0 mL, with aluminum lid, aerosol-tight* ¹	14,000	20,800	9.5	5804 726.006	
Adapter for 0.2 mL PCR tubes, set of 6				5425 715.005	
Adapter for 0.4 mL tubes, set of 6				5425 717.008	
Adapter for 0.5 mL tubes and Microtainer [®] , set of 6				5425 716.001	

*¹ Tested by the Centre of Emergency Preparedness and Response, Health Protection Agency, Porton Down, Great Britain

Rotor code:

All Eppendorf rotors are identified using a simple, alphanumeric format that represents the technical specifications in a uniform series of letters and numbers.



Rotors for Centrifuges 5804/5804 R and 5810/5810 R



Rotor F-45-48-PCR

- Max. rcf: 15,350 x g (12,000 rpm)
- Accomodates up to 6 x 8 tube strips, 6 x 5-tube strips or 48 x 0.2 mL PCR tubes
- Safe and easy handling without additional lid

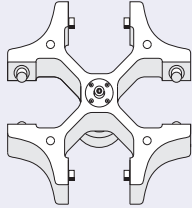
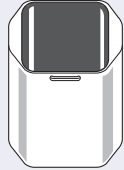
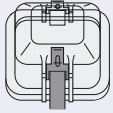
Drum Rotor T-60-11


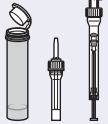

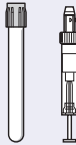
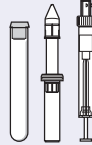
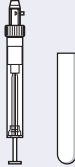



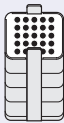

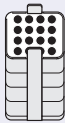


- Holds 60 x 1.5/2.0 mL tubes
- Horizontal centrifugation at high relative centrifugal force
- Ideal for low sample quantities
- Pellet formation at tube bottom
- At max. speed of 14,000 rpm (max. rcf: 16,400 x g) a temperature of 2 °C is maintained in Centrifuges 5804 R and 5810 R

Ordering information

Description	Max. rotational speed (rpm)	Max. rcf (x g)	Rotor radius (cm)	Order no.	
PCR strip Fixed-angle Rotor F-45-48-PCR					
Rotor F-45-48-PCR, for 6 x 8-tube PCR strips	12,000	15,350	9.5	5804 735.005	
60 x 1.5/2.0 mL Drum Rotor T-60-11					
Drum rotor T-60-11, with lid, without adapters	14,000	16,400	7.5	5804 730.003	
Adapter for 10 x 1.5/2.0 mL tubes (ø 11 mm), set of 6	14,000	16,400	7.5	5804 731.000	
Adapter for 20 x 0.4 mL tubes (ø 6 mm), set of 6	14,000	16,400	7.5	5804 732.006	

Rotors for Centrifuges 5810/5810 R

				
Description	A-4-81 Swing-bucket rotor, with rectangular buckets, 4 x 500 mL	Replacement rectangular buckets, 500 mL set of 4	Aerosol-tight lid set of 2	
Max. rcf (x g)	3,220			
Max. rotational speed (rpm)	4,000			
Order no.	5810 718.007	5810 730.007	5810 724.007	

Tube								
Tube capacity (mL)	1.5/2.0	1.2-5	2.6-5	2.6-7	3-15	7-17	15 mL Falcon®	
Max. tube length for all positions with the aerosol-tight lid (mm)*1	43	108	107	108	108	118	119	
Max. tube length for all positions without the aerosol-tight lid (mm)*1	43	118	118	118	118	118	121	
Adapter for 50 mL Falcon® skirted								
Adapter	-	-	-	-	-	-	-	
Order no. (set of 8 adapters)	-	-	-	-	-	-	-	
Adapter for 500 mL rectangular bucket								
Adapter								
Number of tubes per adapter/rotor	20/80	20/80	25/100	18/72	16/64	16/64	12/48	
Adapter bore (ø mm)	11	11	13	13	16	17.5	17.5	
Adapter bottom shape	flat	flat	flat with rubber mat	flat with rubber mat	flat with rubber mat	flat with rubber mat	conical	
Max. rcf (g-force)	2,950	3,000	3,000	3,000	3,000	3,000	3,100	
Centrifugation radius (mm)	165	168	168	168	168	168	173	
Max. rotational speed (rpm)	4,000	4,000	4,000	4,000	4,000	4,000	4,000	
Order no. (set of 2 adapters)	5810 745.004	5810 746.000	5810 720.001	5810 747.007	5810 748.003	5810 721.008	5810 722.004	

*1 Exceeding the maximum tube length may reduce the loading capacity of the rotor.

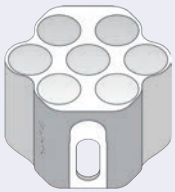
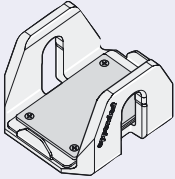
*2 Only Centriprep® tube without locking lid. Centriprep is a registered trademark of Millipore Corporation.






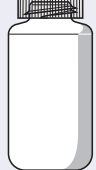

*3 Please note that these conical flasks need to be used together with a conical form insert provided by the flask manufacturer.

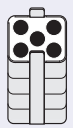
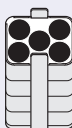


*4 Available as a set of 2 flasks (see ordering information). Adapters, lid and rotor are autoclavable at 121 °C, 20 min.

© Falcon is a registered trademark of Becton Dickinson.

Rotors for Centrifuges 5810/5810 R

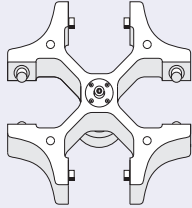
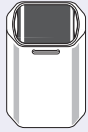
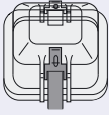
	
7 x 50 mL conical buckets	MTP/Flex bucket
set of 4	set of 4 set of 2
3,250	2,900
4,000	4,000
5825 730.003	5810 741.009 5810 742.005

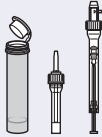

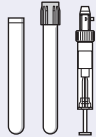
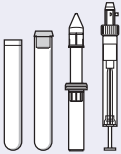
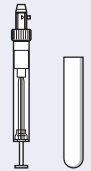
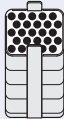




					
50 mL Falcon®	50 mL Centriprep® ^{*2}	50 mL Falcon® skirted	180-250 ^{*3}	Eppendorf 400 mL bottle ^{*4} (order no. 5810 729.009)	Eppendorf 500 mL bottle ^{*4} (order no. 5820 707.003)
116	-	-	-	-	+
122	121	119	133	+	+
-	-				
-	-	5804 737.008			

				
5/20	5/20	1/4	1/4	1/4
31	31	62	81	-
conical	flat with rubber mat	flat with rubber mat	flat, rubber	-
3,100	3,100	3,100	3,220	3,250
173	173	173	180	180
4,000	4,000	4,000	4,000	4,000
5810 723.000	5810 739.004	5825 722.000	5810 728.002	-

^{*2} Only Centriprep® tube without lid. Tested by the Centre of Emergency Preparedness and Response, Health Protection Agency, Porton Down, Great Britain
^{*3} Please note that these conical flasks need to be used together with a conical form insert provided by the flask manufacturer.
^{*4} Available as a set of 2 flasks (see ordering information). Adapters, lid and rotor are autoclavable at 121 °C, 20 min. © Falcon is a registered trademark of Becton Dickinson.

Rotors for Centrifuges 5810/5810 R

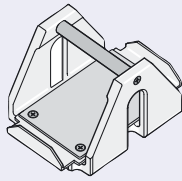
				
Description	A-4-62 Swing-bucket rotor, with rectangular buckets, 4 x 250 mL	Replacement rectangular buckets, 250 mL set of 4	Aerosol-tight lid set of 2	
Max. rcf (x g)	3,220			
Max. rotational speed (rpm)	4,000			
Order no.	5810 709.008	5810 716.004	5810 710.006	

Tube						
Tube capacity (mL)	1.2-5	1.5-2.0	2.6-7	3-15	7-17	
Max. tube length for all positions with the aerosol-tight lid (mm)*1	115	43	118	116	114	
Max. tube length for all positions without the aerosol-tight lid (mm)*1	123	43	121	121	118	
Adapter for 50 mL Falcon® skirted						
Adapter	-	-	-	-	-	
Order no. (set of 8 adapters)	-	-	-	-	-	
Adapter for 250 mL rectangular bucket						
Adapter						
Number of tubes per adapter/per rotor	25/100	16/64	15/60	12/48	12/48	
Adapter bore (ø mm)	11	11	13	16	17.5	
Adapter bottom shape	flat with rubber mat	flat	flat with rubber mat	flat with rubber mat	flat with rubber mat	
Max. rcf (g-force)	3,050	3,000	3,050	3,050	3,050	
Centrifugation radius (mm)	173	171	173	173	173	
Max. rotational speed (rpm)	4,000	4,000	4,000	4,000	4,000	
Order no. (set of 2 adapters)	5810 750.008	5810 751.004	5810 752.000	5810 753.007	5810 754.003	

Adapters, lid and rotor are autoclavable at 121 °C, 20 min.
* Falcon is a registered trademark of Becton Dickinson.

*1 Exceeding the maximum tube length may reduce the loading capacity of the rotor.
*2 When using 50 mL Falcon® tubes in the adapter 5810 763.002, the aerosol-tight lid can no longer be closed.

Rotors for Centrifuges 5810/5810 R



MTP bucket

set of 4
2,750
4,000
5810 702.003

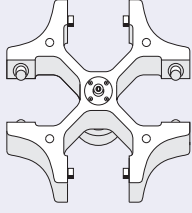

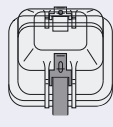

15 mL Falcon®	7-18	18-30	50 mL Falcon®	50 mL Falcon®	30-50	50 mL Falcon® skirted	50-75	80-120	180-250
121	119	116	116	-	113	-	118	125	127
127	126	119	122	122	115	119	122	138	136
-	-	-	-	-	-		-	-	-
-	-	-	-	-	-	5804 737.008	-	-	-
9/36	8/32	4/16	3/12	4/16	4/16	2/8	1/4	1/4	1/4
17.5	20	26	31	31	31	35	45	62	62
conical	flat with rubber mat	flat with rubber mat	conical	flat w. conical form insert	flat with rubber mat	flat with rubber mat	flat with rubber mat	flat with rubber mat	flat with rubber mat
3,150	3,050	3,050	3,150	3,050	3,050	3,050	3,050	3,050	3,220
178	173	173	178	173	173	173	173	173	180
4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000
5810 755.000	5810 756.006	5810 757.002	5810 758.009	5810 763.002	5810 759.005	5810 760.003	5810 761.000	5810 770.009	5810 770.009

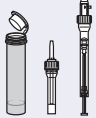

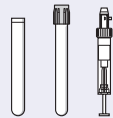
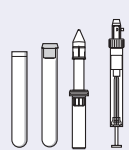
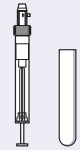







*3 Please note that these conical flasks need to be used together with a conical form insert provided by the flask manufacturer.

*4 For high g-forces we recommend using centrifuge tubes of Duran® glass. Duran is a registered trademark of Schott AG

*5 Reordering of 50 mL form inserts: 5804 728.009.

Rotors for Centrifuges 5804/5804 R and 5810/5810 R

				
Description	A-4-44 Swing-bucket rotor, with rectangular buckets, 4 x 100 mL	Replacement rectangular buckets, 100 mL set of 4	Aerosol-tight lid set of 2	2 x 50 mL conical tube buckets set of 4
Max. rcf (x g)	4,400			4,400
Max. rotational speed (rpm)	5,000			5,000
Order no.	5804 709.004	5804 741.005	5804 712.005	5804 706.005

Tube							
Tube capacity (mL)	1.2-5	1.5-2.0	2.6-7	3-15	7-17	15 mL Falcon®	
Max. tube length for all positions with aerosol-tight lid (mm)*1	102	43	106	106	106	-	
Max. tube length for all positions without aerosol-tight lid (mm)*1	105	43	108	108	110	121	
Adapter for 50 mL Falcon® skirted							
Adapter	-	-	-	-	-	-	
Order no. (set of 8 adapters)	-	-	-	-	-	-	
Adapter for 100 mL rectangular bucket							
Adapter							
Number of tubes per adapter/per rotor	14/56	12/48	9/36	7/28	6/24	4/16	
Adapter bore (ø mm)	11	11	13	16	17.5	17.5	
Adapter bottom shape	flat with rubber mat	flat with rubber mat	flat with rubber mat	flat with rubber mat	flat with rubber mat	conical	
Max. rcf (g-force)	4,200	4,100	4,200	4,200	4,200	4,300	
Centrifugation radius (mm)	150	148	150	150	150	155	
Max. rotational speed (rpm)	5,000	5,000	5,000	5,000	5,000	5,000	
Order no. (set of 2 adapters)	5804 750.004	5804 751.000	5804 752.007	5804 753.003	5804 754.000	5804 755.006	

Adapters, lid and rotor are autoclavable at 121 °C, 20 min.
*Falcon is a registered trademark of Becton Dickinson.

*1 Exceeding the maximum tube length may reduce the loading capacity of the rotor.
*2 Tube may only be centrifuged without the locking lid.

Rotors for Centrifuges 5804/5804 R and 5810/5810 R

15 mL Falcon®	7-18	18-30	50 mL Falcon®	50 mL Falcon®	50 mL Falcon®	*5	50 mL Falcon® skirted	*5	*5
121	104	100	-	119	-	108	108	108	100
121	107	110	122	122	120	122	119	114	
-	-	-	-	-		-		-	-
-	-	-	-	-	5804 728.009	-	5804 737.008	-	-
2/8	4/16	2/8	1/4	1/4	bucket*3,4	1/4	1/4	1/4	1/4
17.5	20	26	31	31	-	31	35	45	
conical	flat with rubber mat	flat with rubber mat	conical	conical	flat w. conical form insert	flat with rubber mat	flat with rubber mat	flat with rubber mat	
4,400	4,200	4,200	4,300	4,400	4,500	4,200	4,200	4,200	
157	150	150	155	157	161	150	150	150	
5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	
5804 717.007	5804 756.002	5804 757.009	5804 758.005	5804 718.003	5804 706.005*6	5804 759.001	5804 760.000	5804 761.006	

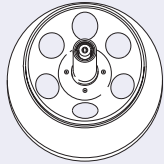
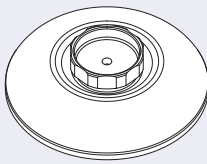
*3 Reordering of 50 mL form inserts: 5804 728.009.













*4 Filled conical tubes may be used in the 50 mL Falcon® buckets when they do not exceed a cumulative maximum weight of 0.14 kg.

*5 For high g-forces we recommend using centrifuge tubes of Duran® glass. Duran is a registered trademark of Schott AG.

*6 Set of 4 buckets.

Rotors for Centrifuges 5804/5804 R and 5810/5810 R

		
Description	F-34-6-38 High-speed fixed-angle rotor, with screw-on lid, for 6 x 85 mL tubes	Replacement lid for fixed-angle rotor F-34-6-38
Max. rcf (x g)	15,550/18,500 (in 5810 R)	
Max. rotational speed (rpm)	11,000/12,000 (in 5810 R)	
Order no.	5804 727.002	5804 727.509

Tube (Please observe the limits for the load-bearing capacity of the tubes as specified by the tube manufacturer)						
Tube capacity (mL)	1.5-2.0	2.6-7	2.6-7	7-15	15 mL Falcon®	15-18
Max. tube length for all positions under the rotor lid (mm)	43	80	107	112	123	123
Adapter for 6 x 100 mL fixed-angle rotor						
Adapter						
Number of tubes per adapter/per rotor	4/24	3/18	3/18	2/12	1/6	1/6
Adapter bore (ø mm)	11	13	13	16	17.5	18
Adapter bottom shape	round	flat	flat	round	conical	round
Max. rcf (g-force) at 11,000 rpm (5804/5804 R/5810)	15,300	14,339	15,422	15,150	14,450	14,750
Max. rcf (g-force) at 12,000 rpm (5810 R)	18,200	17,065	18,353	18,000	17,200	17,550
Centrifugation radius (mm)	113	106	114	112	107	109
Max. rotational speed for 4 °C	11,000	11,000	11,000	11,000	11,000	11,000
Order no. (set of 2 adapters)	5804 770.005	5804 738.004	5804 739.000	5804 771.001	5804 776.003	5804 772.008

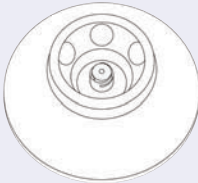
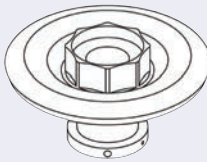
Adapters, lid and rotor are autoclavable at 121 °C, 20 min.
® Falcon is a registered trademark of Becton Dickinson.











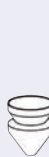
Rotors for Centrifuges 5804/5804 R and 5810/5810 R

			
20-30	50	50 mL Falcon®	85*1
123	123	121	121
			no adapter needed
1/6	1/6	1/6	-/6
26	29	29.5	38
round	round	conical	-
14,900	15,150	14,600	15,550
17,700	18,000	17,400	18,500
110	112	108	115
11,000	11,000	11,000	11,000
5804 773.004	5804 774.000	5804 775.007	

*1 Nominal volume

Rotors for Centrifuges 5804/5804 R and 5810/5810 R

		
Description	FA-45-6-30 Aerosol-tight rotor with incl. QuickLock™ rotor lid	Replacement lid for aerosol-tight rotor FA-45-6-30
Max. rcf (x g)	16,639/20,130 (5810 R)	
Max. rotational speed (rpm)	11,000/12,100 (5810 R)	
Order no.	5820 715.006	5820 716.002

Tube						
(Please observe the limits for the load-bearing capacity of the tubes as specified by the tube manufacturer)						
Tube capacity (mL)	7-15	15 mL Falcon®	15-18	20-30	35	50
Max. tube length for all positions under the rotor lid (mm)	115	125	125	125		121
Adapter for 6 x 50 mL fixed-angle rotor						
Adapter						No adapter needed
Number of tubes per adapter/per rotor	1/6	1/6	1/6	1/6	1/6	1/6
Adapter bore (ø mm)	16	17,5	18	26	29	29
Adapter bottom shape	round	conical	round	round	conical	conical
Max. rcf (g-force) at 11,000 rpm (5804/5804 R/5810)	16,233	16,233	16,233	14,204	15,151	16,369
Max. rcf (g-force) at 12,000 rpm (5810 R)	19,642	19,642	19,642	17,187	18,333	20,130
Centrifugation radius (mm)	120	120	120	105	112	123
Max. rotational speed for 4 °C	11,000	11,000	11,000	11,000	11,000	11,000
Order no. (set of 2 adapters)	5820 719.001	5820 717.009	5820 720.000	5820 721.006	5820 722.002	

Adapters, lid and rotor are autoclavable at 121 °C, 20 min.
 ® Falcon is a registered trademark of Becton Dickinson.

Captain Eppi™



Who is he/What is he?

- Your benchtop rotor key holder
- Eppendorf centrifuge tube mascot
- Made of durable plastic
- Versatile

Description

The days of disorder and chaos ruling the lab are over — behold Captain Eppi! He grabs hold of rotor keys so that they no longer disappear in cupboards or dark corners. And not only that: Captain Eppi provides a safe home for your pens and other lab utensils.

Captain Eppi is the mascot for world-renowned Eppendorf Tubes®, standing for quality, reliability and safety. We're certain that you'll soon be hearing in your lab, "Where is the rotor key?" – "Ask Captain Eppi!"



Join Captain Eppi in our Virtual Labs and learn more about interesting applications and products

www.eppendorf.com/virtuallab

Ordering information

Description	Order no.	
Captain Eppi		
1 piece	5703 350.102	
10 pieces	5703 350.110	
Rotor key		
for Models 5415 D/R	5425 350.015	
for Rotor FA-45-24-11-HS of Centrifuge 5430/5430 R	5427 730.001	
for Models 5417 C/R, 5418/5418 R, 5424/5424 R, 5430/5430 R, 5702/5702 R/5702 RH	5416 301.001	
for Models 5804/5804 R and 5810/5810 R (without A-4-81 and A-4-81-MTP/Flex)	5810 350.018	
for 4 x 500 mL rotor only (A-4-81 or A-4-81-MTP/Flex) on Models 5810 and 5810 R	5810 718.309	
Rotor stand		
fits all rotors for Centrifuges 5804/5804 R and 5810/5810 R	5804 720.008	

Concentrator plus centrifugal vacuum concentrator

NEW!



reddot design award
winner 2011



Complete system with an integrated service-free diaphragm pump

Basic concentrator for connecting to an existing vacuum pump.

Description

The new Concentrator plus quickly and efficiently concentrates DNA/RNA, nucleotides, proteins and other samples.

The new Concentrator plus features an LCD display, more capacity, a new design, and user-friendly control panel with clearly labeled function keys.

The new Concentrator plus from Eppendorf is available in two configurations:

- Complete system with an integrated service-free diaphragm pump
- Basic concentrator for connecting to an existing vacuum. Power to external vacuum pumps can be automatically controlled by using the AC receptacle in the rear of the concentrator.

The Concentrator's heating technology optimizes the evaporation process. No matter which configuration you choose, you're assured of quick and efficient—yet gentle—vacuum concentration of your samples (e.g. DNA/RNA, proteins).

The complete system includes a vapour condenser that purifies the exhaust air by up to 85 %. This serves as protection against unpleasant vapours. At the same time, an automatic condensate drain extends the service life of all components that come into contact with the vapours.

Concentrator plus and accessories

Product features

- Narrow 33 cm width saves valuable bench space
- Chemical-resistant PTFE diaphragm pump
- Chemical-resistant stainless steel chamber
- Extremely quiet operation, even with pump turned on
- Choice of three application modes (aqueous, alcohol, or high vapour pressure) to correspond with sample solvent reduction of processing time up to 20 %
- Choice of four heating levels (room temperature, 30 °C, 45 °C, 60 °C) allows safe and efficient concentration of various samples
- Centrifugation and Desiccator function
- Imbalance stop

Applications

- Timer selection between 1 min and 9:59 h as well as ∞
- Brake function
- Temperature preselection: room temperature, 30 °C, 45 °C, and 60 °C
- Mode/ vent function: Choose between three solvent modes
- Start/ Stop of concentration process



Concentrator junction system

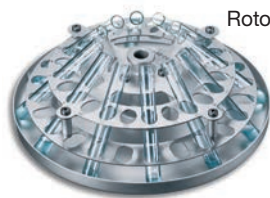
The complete "junction" system adds extra capability/flexibility. It allows you to use the integrated vacuum pump separately – without having to disconnect it from the system; simply connect the

port to any external device that requires vacuum (e.g. gel dryer).

Technical specifications

	complete system	basic device
Max. power consumption	350 W	150 W
Dimensions (W x D x H)	33 x 58 x 29 cm	33 x 37 x 23 cm
Weight without Rotor	31.5 kg	16.5 kg
Vacuum	20 hPa (20 mbar)	20 hPa (20 mbar)
Fixed rotation speed	1,400 rpm	1,400 rpm
Tube sizes	0.2-50 mL	0.2-50 mL
Capacity	max. 144 tubes/2 microplates	max. 144 tubes/2 microplates

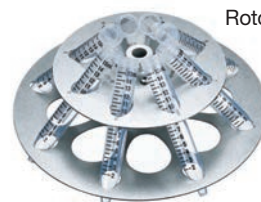
Concentrator plus and accessories



Rotor F-45-24-12

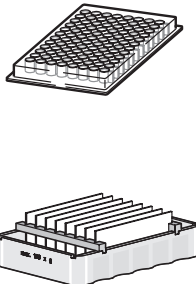






Rotor F-45-48-11



Rotor F-45-8-17

Ordering information

Plates	Max. tube capacity (mL)	Tube dimensions (mm)	Rotor	Order no.	
	Two buckets for <ul style="list-style-type: none"> ● 0.2 mL PCR tubes ● 5-tube or 8-tube strips ● PCR plates ● Microplates ● Cell culture plates ● Deepwell plates (max. height = 27 mm) 	128 x 86 x 27	A-2-VC	5490 045.009	
	<ul style="list-style-type: none"> ● Slides (with CombiSlide® adapter) 	26 x 75			
Tubes		(Ø x L)			
	72 x 0.5 mL	8 x 31	F-45-72-8*2	5490 034.007*2	
	70 x 1.5 mL	11 x 41	F-45-70-11	5490 032.004	
	70 x 2.0 mL	11 x 47			
	48 x 1.5 mL	11 x 41	F-45-48-11*2	5490 030.001*2	
	48 x 2.0 mL	11 x 47			
	24 x 6.0/8.0 mL	12 x 67-100*1,3	F-45-24-12	5490 036.000*3	
	8 x 15/20 mL	16 x 105-120*1	F-50-8-16	5490 041.003	
	8 x 15/20 mL	18 x 105-128*1	F-50-8-18	5490 042.000	
	8 x 15 mL Falcon® tubes	17 x 116-123*1	F-45-8-17	5490 038.002	
	6 x 50 mL Falcon® tubes	29.5 x 116-123*1	F-35-6-30	5490 047.001	
	36 x 1.5 mL	12 x 32	F-40-36-12	5490 040.007	
	36 x 3.0/5.0 mL	15 x 45-48*1	F-45-36-15	5490 035.003	
	16 x 6.5/10 mL	20 x 42 -55*1	F-45-16-20	5490 043.006	
	18 x 10 mL	19 x 66	F-40-18-19	5490 037.006	
	12 x 20 mL	31 x 55	F-45-12-31	5490 044.002	
	8 x 25 mL	24 x 86-105*1	F-35-8-24	5490 039.009	

*1 Min./max. tube length.

*2 Rotor is stackable for double capacity.

® Falcon is a registered trademark of Becton Dickinson.

*3 Tube length ≤75 mm: max capacity 24 tubes
Tube length >75 mm: max capacity 12 tubes

Interchangeable rotors for Concentrator plus

Swing-bucket rotor A-2-VC

- For use with MTPs, PCR plates and up to 2 x 96 0.2 mL PCR tubes and tube strips
- Load MTPs and PCR plates directly
- To spin down individual PCR tubes or tube strips, PCR plates and MTPs without frame, use the Work tray and Frame
- Rotor is autoclavable at 121 °C, 20 min
- Two MTPs can be accommodated for low speed centrifugation
- Holds CombiSlide® adapter



Product features

- Big choice of fixed angle rotors for different dimensions and formats
- A spacer allows additional stacking of 1.5 mL or 0.5 mL fixed angle rotors to F-45-48-11 and F-45-72-8 which raises the capacity up to 96 or 144 tubes
- Adaptor for the application of 0.2 mL PCR vessels and 0.5 mL microcentrifuge tubes in 1.5 mL rotor F-45-48-11
- Adaptor for 0.2 mL PCR vessels in 0.5 mL rotor F-45-72-8
- Application Note 016: You find "Using Concentrator plus in a sequencing laboratory" as well as further information for the Concentrator plus on the Eppendorf homepage at www.eppendorf.com/concentrator

NEW!




Rotor F-35-6-30

Ordering information

Description	Order no.	
Concentrator plus complete system		
with built-in diaphragm pump and 48 x 1.5/2.0 mL fixed-angle rotor	5305 000.304	
with built-in diaphragm pump, with junction for external devices (e.g. gel-dryer), without rotor	5305 000.703	
with built-in diaphragm pump, without rotor	5305 000.509	
Concentrator plus basic device		
with 48 x 1.5/2.0 mL fixed-angle rotor	5305 000.100	
Accessories		
Rotor spacer , required for stacking rotors F-45-72-8 and F-45-48-11	5301 316.005	
CombiSlide® , slide adapter, set of 2	5825 706.005	
Adapter , for 0.5 mL or 0.6 mL Microtainer® tubes, set of 6, for rotor F-45-48-11	5425 716.001	
Adapter , for 0.2 mL PCR tubes, set of 6, for rotor F-45-48-11	5425 715.005	
Adapter , for 0.2 mL PCR tubes, set of 6, for rotor F-45-72-8	5425 723.008	
Work trays , for 96 x 0.2 mL PCR tubes (set of 10) and plates without frame	0030 124.235	
Frame , for work tray (set of 5)	0030 124.243	

®: Microtainer is a registered trademark of Becton Dickinson.

 **Ordering information for other voltage options begins on page 471.**

Centrifuge & Rotor Performance Plans

Quality Management systems increasingly ask for regular inspection of centrifuges and rotors in an operational or disassembled state. To ensure a safe working environment an annual inspection for centrifuges and rotors by an Eppendorf certified service technician is highly recommended.

Performance checks ensure that all technical specifications like temperature accuracy, rotational speed verification and operating time meet the manufacturer's specifications. Rotors withstand extreme strains. Improper usage may lead to a reduced lifetime of the rotor due to corrosion through moisture and chemicals, scratches or even cracks.

Certification services are available for all Eppendorf centrifuges. Operational Qualification (OQ) is designed to safeguard your results as well as to satisfy legal, governmental and internal laboratory requirements with the necessary certification documents.



Performance Plans	Recommended service period	
Centrifuge Maintenance Service:		
Preventive Maintenance – incl. cleaning and lubricating	once per year	
Replacement of lid springs/gas spring	every second year	
Replacement of drive unit suspension/shock mounts for motor – Imbalance compensation check	every second year	
Replacement of rotor chamber seal	every second year	
Software upgrade		
Rotor Inspection Service:		
Visual Rotor Check Fixed-angle	once per year	
Visual Rotor Check Swing-bucket	once per year	
Certification Service:		
Operational Qualification (OQ) incl. electrical testing	once per year	
Electrical testing according to country-specific regulations	once per year	
Obligatory check of centrifuge according to country-specific regulations (e.g. applicable for 5804/5804 R and 5810/5810 R in Germany BGR 500)	once per year	
Obligatory check of rotor according to country-specific regulations (e.g. applicable for 5804/5804 R/5810/5810 R in Germany: BGR 500)	once per year	

Centrifuge & Rotor Performance Plans

epServices
for premium performance

Long-term benefits of preventive maintenance include:

- Eppendorf service quality and integrity
- Manufacturer-specific testing procedure and equipment
- Certified service reports

**Features of Eppendorf Performance Plans:**

- Highest safety in your laboratory
- GLP compliant audited system
- Longer lifetime of system

i For more information go to www.eppendorf.com/epservices.
In selected countries only.

	non-refrigerated w/o imbalance system MiniSpin®, MiniSpin® plus, 5418, 5424, 5415 D	refrigerated w/o imbalance system 5415 R, 5418 R, 5424 R	non-refrigerated imbalance system 5702, 5417 C, 5430, 5804, 5810	refrigerated imbalance system 5702 R, 5702 RH, 5417 R, 5430 R, 5804 R, 5810 R
	Order no.	Order no.	Order no.	Order no.
	5424 860.010	5426 860.017	5702 860.018	5811 860.010
	5424 860.052	5424 860.052	5424 860.052	5424 860.052
	5424 860.060	5424 860.060	5702 860.069	5811 860.060
		5426 860.041	5426 860.041	5426 860.041
			5426 860.076	5426 860.076
	5424 860.109	5424 860.109	5424 860.109	5424 860.109
			5810 860.113	5810 860.113
	5424 860.028	5426 860.025	5702 860.026	5811 860.028
	5424 860.087	5424 860.087	5424 860.087	5424 860.087
			5702 860.093	5811 860.109
			5424 860.150	5424 860.150

Summary of applications

Application	Product	Page
Instruments		
Conventional PCR	Mastercycler® pro	210
	Mastercycler® nexus Familie	214
Real-time PCR	Mastercycler ep <i>realplex</i>	218
PCR optimization	Mastercycler® pro,	210
	Mastercycler® nexus gradient	214
<i>in situ</i> PCR	Mastercycler® nexus und Mastercycler® nexus gradient mit <i>in situ</i> Adapter	214
Cycle Sequencing	Mastercycler® pro	210
	Mastercycler® nexus Familie	214
Heat sealing of 96- and 384-well PCR plates	Heat Sealer	230
Consumables		
Tubes, Plates and Accessories		
PCR with sample throughput	0.2/0.5 mL PCR Tube, thin-walled	228
PCR with medium sample throughput	0.2 mL PCR Tubes in strips of 5 or 8	229
	0.1 mL PCR Tubes in strips of 5 or 8	229
	twin.tec® PCR Plate 96, unskirted, divisible	224
PCR with medium to high sample throughput	twin.tec® PCR Plate 96, semi-skirted	223
	twin.tec® PCR Plate 96 skirted	223
PCR with medium to high sample throughput, usage in automatic devices	twin.tec® PCR Plate 96, skirted	223
PCR with high sample throughput, usage in automatic devices	twin.tec® PCR Plate 384	223
	twin.tec <i>real time</i> PCR Plate 384	227
Real-time PCR	twin.tec® <i>real-time</i> PCR Plates	227
	<i>real-time</i> PCR Tube Strips	229
PCR with bacterial templates	twin.tec® <i>microbiology</i> PCR Plate	224
Accessories		
Non-cooled	PCR Rack, work tray and frame	233
Cooled (0 °C and -21 °C)	IsoTherm-System®	143
Cooled (0 °C), color change for temperature control	PCR-Cooler	144
Sealing options		
Partial seal for <i>real-time</i> PCR and low volume PCR	Masterclear® Cap Strips	229
Partial seal of PCR plates and PCR strips	Cap Strips, Capping Aid	232
Heat sealing, transparent, non-removable, cannot be pierced (e.g. for colorimetric evaluation)	Heat Sealing Film	230
Heat sealing, non-transparent, removable, can be pierced	Heat Sealing Foil	230
Adhesive seal, transparent, removable, cannot be pierced	PCR Film	231
Adhesive seal, non-transparent, removable, can be pierced	PCR Foil	231
Adhesive seal, transparent, optically clear, removable, cannot be pierced	Masterclear® <i>real-time</i> PCR Film	232

Summary of applications

Application	Product	Page
Application tips for PCR		430
<p>This table shows a selection of particular applications from the PCR area and serves as an overview. The complete product portfolio of the Eppendorf PCR System is found on the following pages.</p> <p>A selection of particular PCR products shown on the following pages, can be provided as Customized Solutions. Further information on page 411.</p> <p>Register your Eppendorf products online now to benefit from numerous advantages! You receive bonus ep-points immediately for each Eppendorf device registered. You can also easily manage your devices online and are always kept up-to-date on any news.*</p>		



*Not available in all countries

epGreen Initiative

- Noise emission: Eppendorf PCR instruments are optimized to minimize noise emission.
- PCR consumables are made of virgin Polypropylene and Polycarbonate that is fully recyclable.
- All cardboard packaging is 100 % recyclable.
- Wherever possible, water-soluble laquer or paints without heavy metals are used.
- Mini-Satellite-system: By controlling up to 5 units of the Mastercycler pro with only 1 Control Panel, you can increase your PCR capacity by only increasing the parts needed, i.e.

the thermo module. There is no need to buy an entire additional system to increase your capacity.



For an overview on Eppendorf epGreen, see page 10 and Appendix page 444.

Mastercycler nexus, Mastercycler nexus gradient, Mastercycler nexus eco

Purchase of this instrument conveys a limited non-transferable immunity from suit for the purchaser's own use under certain non real-time thermal cycler patents licensed from Applied Biosystems, LLC.

Mastercycler ep realplex

This is a Licensed Real-Time Thermal Cycler or Licensed Real-Time Temperature Cycling Instrument under Applera's United States Patent No. 6,814,934 and corresponding claims in non-U.S. counterparts thereof, for use in research and for all other applied fields except human in vitro diagnostics. No right is conveyed expressly, by implication or by estoppel under any other patent claim.

Mastercycler® pro



vapo.protect technology

Evaporation in a PCR reaction vessel not only limits the ability to work with low reaction volumes, but also makes it very difficult to obtain reproducible results. For the Mastercycler pro it has been Eppendorf's aim to protect the PCR reaction from evaporation. While common PCR instruments press a metal plate onto the PCR consumables, the **vapo.protect** lid covers the PCR consumables with a cushion that fits to the shape of the consumables – no matter which consumables you use. The snug fit of the cushion, the high pressure of the lid and the excellent heating capabilities of the lid reduce evaporation to a minimum. Evaporation leads to increasing concentrations of the PCR master mix components, especially primers. This, in turn, leads to non-specific binding. Due to the ongoing evaporation, this increased concentration is even changing during the experiment and between experiments – a true nightmare for any scientist who tries to keep variables to a minimum.

Gradient with SteadySlope® technology

The gradient option of the Mastercycler pro features the SteadySlope® technology to ensure that the heating and cooling ramp rates are identical in both gradient and normal operation. Thus, you can expect identical temperature control characteristics in both optimization and routine experiments. Programming the gradient with the Control Panel and the CycleManager pro is easy and intuitive – so that novice users can get started quickly and safely.

Certified Quality

- Individual, documented quality control certificate
- Calibration accordingly to national and international standards: NIST (USA), DKD/PTB (Germany), UKAS/NPL (UK)
- UL listed

Description

Fastest speeds, highest precision, easy usage and absolute reliability united in a flexible concept – that is the Mastercycler pro.

Today's requirements for PCR in your lab are defined by today's research project. Tomorrow, new questions are arising and new experiments have to give the answers. That is why only an open and flexible system fit into today's lab. Eppendorf's Mastercycler pro offers ultimate flexibility:

- choose from three block formats
 - operate the Mastercycler pro in three different configurations
 - use any plate, tube or strip you want
- Unsurpassed speed can be achieved with Eppendorf's Impulse PCR, a device driven hot-start function that increases heating rates to 8 °C/s.

i Further information under www.eppendorf.com/mastercyclerpro

i For additional information see "Application tips for PCR" on page 430.

Mastercycler® pro



Product Features

- Extremely fast heating and cooling rates
- Ultimate reduction of evaporation
- Gradient blocks with SteadySlope® technology
- Intuitive graphic programming
- Display to indicate cycler number in a network
- Upgradable to real-time PCR
- 2 years warranty
- Optional self-test dongle available
- Stand alone system: Fits in every lab. Operated by Control Panel. Upgradeable to real-time PCR. Expandable to a Mini Satellite System or network
- Mini Satellite System: Operated by Control Panel. Control up to 5 units with one Control Panel. Combine any block format. Expandable to a network
- Computer Network: Combine up to 30 units for ultimate throughput. Operated by a computer and the Cycle-Manager pro software. Benefit from a client/server architecture and full software functionality

Technical specifications

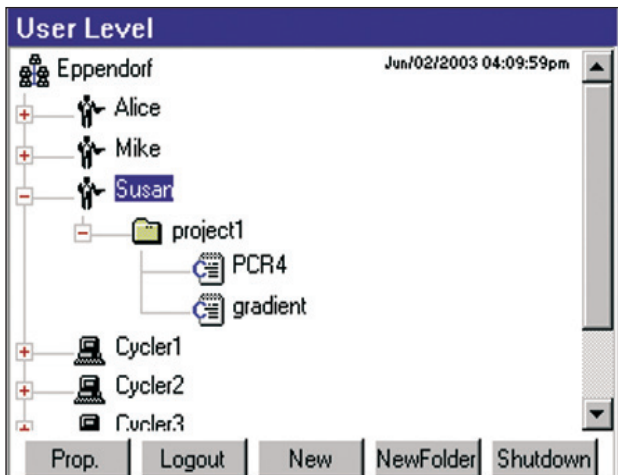
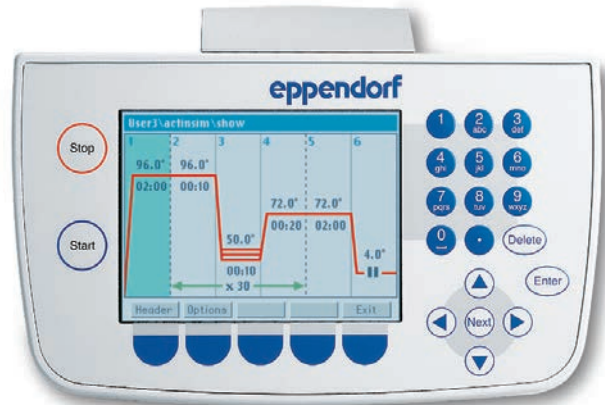
Description	Mastercycler pro	Mastercycler pro S	Mastercycler pro 384
Thermoblock	Aluminium	Silver	Aluminium
Sample capacity:	96 x 0.2 mL PCR tubes or 1 PCR plate 8 x 12 (unskirted, semi-skirted, skirted)		1 PCR plate 384
Temperature control range of the block:	4-99 °C	4-99 °C	4-99 °C
Temperature control mode:	Fast, Standard, Safe; all available in gradient mode		
Heating technology of the block:	Peltier elements, Triple Circuit technology		
Gradient block:	Over 12 rows	Over 12 rows	Over 24 rows
Gradient range:	1-20 °C	1-24 °C	1-20 °C
Gradient temperature range:	30-99 °C	30-99 °C	30-99 °C
Lid temperature range:	37-110 °C	37-110 °C	37-110 °C
Lid descent and closing pressure:	vapo.protect Technologie, with TSP		
Block homogeneity:	20-72 °C ±0.3 °C, 90 °C ±0.4 °C		
Control accuracy:	±0.2 °C	±0.2 °C	±0.2 °C
Heating rate*	approx. 4 °C/s	approx. 6 °C/s	approx. 4 °C/s
Cooling rate*	approx. 3 °C/s	approx. 4.5 °C/s	approx. 3 °C/s
Interfaces	1 x Centronics®, 1 x RS-232, Control panel, one each of CAN_in/CAN_out		
Dimensions (W x D x H):	26 x 41.5 x 37 cm	26 x 41.5 x 37 cm	26 x 41.5 x 37 cm
Weight	18.5 kg (40.8 lbs)	18.5 kg (40.8 lbs)	18.5 kg (40.8 lbs)
Power supply	115 V or 230 V, 50-60 Hz	115 V or 230 V, 50-60 Hz	115 V or 230 V, 50-60 Hz
Power consumption:	950 W	950 W	950 W

* Block temperature.

Mastercycler® pro

Programming features

- Highest degree of flexibility, intuitive graphic programming
- Variable ramp rates
- Emulation mode for temperature control speed and protocols of the original Mastercycler family
- Time and temperature increments
- Pause command
- Programmable alarm sound
- Freely configurable auto-restart dialogue



Regulatory documentation


Compliance with GMP/GLP guidelines is becoming increasingly important, particularly in the pharmaceutical and biotechnology industries. The Mastercycler pro system's programming and user management system provides a GLP-conforming environment for your PCR assays.

Program and user administration features

- One administrator to manage user and service functions
- Easy addition of new users with limited rights
- Ability for users to change their passwords; no administrator access to user passwords
- Password protection against unauthorized login
- A report file for each run, including total temperature profiling
- Development, testing and validation of the software using certified standards

Technical specifications of the Control Panel

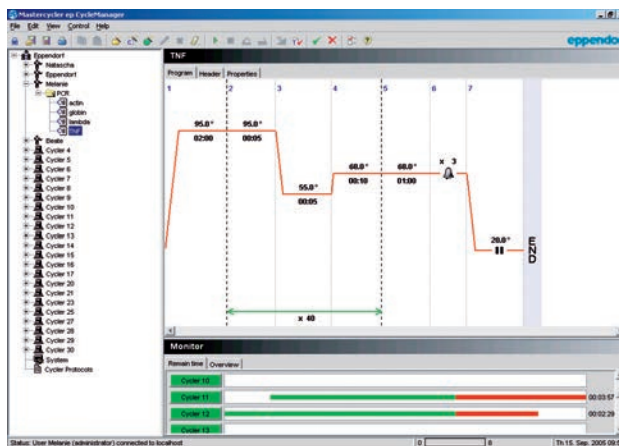
Number of Mastercycler pro cyclers that can be controlled	1-5
Memory capacity	16 MB, >700 programs
Memory expansion	2 x USB 2.0
Number of user-defined folders	>100
Dimensions (W x D x H)	25 x 16.5 x 11 cm
Interfaces	1 x PS/2 mouse, 2 x USB 2.0
Weight	1.2 kg
Power supply	via the connected thermal module

 **Ordering information for other voltage options begins on page 471.**

Mastercycler® pro and CycleManager pro

Product features

- Network and control up to 30 Mastercycler pro thermal cyclers with a PC; mix and match models of choice
- Multi-Mastercycler-Networking with a PC
- Intuitive Windows-like interface
- Icon-based creation and edit of programs
- Simultaneous control of all or selected Mastercycler pro cyclers
- GLP-conformity documentation of all PCR experiments
- User password protection
- Real-time acquisition of temperature data
- Easy installation and de-installation
- Compatible with Windows
- Easy transfer of PCR programs from the Control Panel to the PC



Ordering information

Description	Order no.	
Complete Mastercycler pro package:		
Mastercycler pro and Control Panel, 230 V/50-60 Hz	6321 000.515	
Mastercycler pro S and Control Panel, 230 V/50-60 Hz	6325 000.510	
Mastercycler pro 384 and Control Panel, 230 V/50-60 Hz	6324 000.516	
Individual Mastercycler pro modules:		
Control Panel, incl. connection cable*	6320 000.007	
Mastercycler pro, 230 V/50-60 Hz	6321 000.019	
Mastercycler pro S, 230 V/50-60 Hz	6325 000.013	
Mastercycler pro 384, 230 V/50-60 Hz	6324 000.010	
Accessories		
CAN-Bus connection cable*, 50 cm	5341 612.006	
CAN-Bus connection cable*, 150 cm	5341 611.000	
Self Test Dongle	6320 071.001	
MultiMediaCard	5075 780.003	
CycleManager pro, incl. installation manual, online help, and connection cable	5349 810.001	
CycleManager pro, incl. installation instructions, online help	5349 820.007	

* A Control Panel or CycleManager pro software (both sold separately) is required for operation; CAN_Bus connection cables are required to link cyclers together as a network.

i Technical specifications are available at
www.eppendorf.com/mastercyclerpro

Mastercycler® nexus

NEW!

Intuitive graphic programming

Stand-by function saves energy



USB port for data transfer or mouse connection

E-mail notification

Mastercycler® nexus



Mastercycler® nexus



Gradient with SteadySlope® Technology

The gradient option of the Mastercycler nexus features SteadySlope technology to ensure heating and cooling ramp rates are identical in both gradient and normal operation. Thus, you can expect identical temperature control characteristics in both optimization and routine experiments. Programming the gradient is easy and intuitive – so novice users can get started quickly and safely.

Easy testing

The self test function of the Mastercycler nexus provides the ability to check the peltier elements of the thermal block easily and provides a corresponding certificate. This way, the user can document the homogeneity of the instrument between regular testing intervals. In addition, Eppendorf offers a Temperature Validation System as an external testing device.

Certified Quality

- Individual, documented quality control certificate
- Calibration according to national and international standards: NIST (USA), DKD/PTB (Germany), UKAS/NPL (UK)
- UL / CUL listed

High quality consumables

Consumables of high quality, e.g. Eppendorf twin.tec® PCR plates, help to improve PCR results. For example, the raised rims of the Eppendorf twin.tec PCR plates are optimized to guarantee a tight seal in all wells.

For further information, please visit www.eppendorf.com/pcr

Description

The Mastercycler nexus brings the reliability and ease of use of an Eppendorf cyclers at a good price. Low energy consumption, easy extension to 3 units and a small footprint make it not only fit to your budget, but also to your precious lab space.

It can deal with all kinds of PCR consumables, from low volume all the way up to 0.5 mL PCR tubes. Of course, all common PCR plates fit – and if your throughput becomes even higher, you can just connect one or two Mastercycler nexus eco to your Mastercycler nexus.

Product Features

- Flexlid™ concept allows use of different consumables with automatic height adjustment of the lid
- Intuitive graphic programming
- Small footprint
- Universal block for ultimate flexibility
- Connect up to 2 Mastercycler nexus eco to your existing unit
- Available with 12 column gradient
- E-mail notification

i Further information under www.eppendorf.com/mastercyclernexus

i For additional information see „Application tips for PCR“ on page 430.

Mastercycler® nexus

Ordering information

Description	Order no.	
Mastercycler nexus gradient, 230 V/50-60 Hz	6331 000.017	
Mastercycler nexus, 230 V/50-60 Hz	6331 000.014	
Mastercycler nexus eco*, 230 V/50-60 Hz	6332 000.010	
Self test dongle	6320 071.001	
CAN-Bus connection cable*, 50 cm	5341 612.006	
CAN-Bus connection cable*, 150 cm	5341 611.000	

* A Mastercycler nexus gradient or Mastercycler nexus is needed to run a Mastercycler nexus eco. Up to 2 Mastercycler nexus eco can be controlled by one Mastercycler nexus gradient or Mastercycler nexus.

Temperature Verification System - Single Well



Ordering information

Description	Order no.	
Temperature Verification System - Single Well	0055 000.298	

Description

The Temperature Verification System - Single Well for the entire Mastercycler, Mastercycler ep and Mastercycler pro families enables simple and rapid validation and calibration of block temperature. The program for automatic measurement and calibration is integrated into the thermocycler software, thus providing an accurate and precise system that meets all documentation and detection requirements in the laboratory.

Product features

- Sensor for 0.2 mL tube position
- Optional: sensor for 384-well block, sold separately
- Simple, rapid validation and calibration
- Autocalibration with Mastercycler software, version 2.10 or higher
- Can be third-party calibrated

i Further information under www.eppendorf.com/mastercycler

⚡ Ordering information for other voltage options begins on page 471.

Mastercycler® ep *realplex***Description**

Continuing the Eppendorf focus on best design, the Mastercycler ep *realplex* combines highest performance with the most advanced features and capabilities of a 96-well *real-time* PCR system — and in a compact class!

Application

- Quantitative *real-time* PCR

Product features**High-speed real-time PCR**

- Load your plate — and get analyzed results in half an hour!
- Fast and easy programming
- Fast optical detection capabilities eliminate the need for long extension/elongation
- Standard aluminum block offers faster ramp rates than nearly any other supplier
- “S” model for highest speed
- Complete more experiments per day

No restrictions

- Use the reagents, kits and consumables of your choice
- Even the High-speed “S” model does not lock you in to special kits or plates

Gradient

- Optimize your two- or three-step protocols in a single plate/ experiment
- Test more distinct temperatures at once due to Triple Circuit thermal block design

Highly sensitive optics

- The new optical system of the Mastercycler ep *realplex* offers a new, exclusive Particle Protection* as well as Photomultipliers of the latest generation.

Highest reproducibility

- LEDs keep consistent intensity over time — other light sources may fade after a foreseeable amount of operation hours
- Each LED is normalized to equal intensity
- Trust Eppendorf’s expertise in optical systems since our first photometer over 55 years ago

Intuitive software

- All analysis modules are included
- Highly accurate calculation of C_t values using the CalQplex® algorithm
- QUICK START capability

Eppendorf design

- Quiet operation (≤ 54 dB(A))
- Small footprint

*New! Modified slip cover (light-transmissive cover for the optical openings of the heated plate assembly, US patent pending).

Mastercycler® ep *realplex*



Mastercycler ep *realplex*² and *realplex*² S

- These two-color systems meet the needs of most laboratories (Emission 520/550 nm)
- Designed for use with SYBR Green assays, FAM-labeled probes or duplex probe reactions.
- High reproducibility is possible at 10 µL total reaction volumes with calibrated Eppendorf pipettes. For lower volumes please see next page for automated *real-time* PCR set-up
- Comes with two-year warranty

This is a Licensed Real-Time Thermal Cycler or Licensed Real-Time Temperature Cycling Instrument under Applera's United States Patent No. 6,814,934 and corresponding claims in non-U.S. counterparts thereof, for use in research and for all other applied fields except human in vitro diagnostics. No right is conveyed expressly, by implication or by estoppel under any other patent claim.

Mastercycler ep *realplex*⁴ and *realplex*⁴ S

- This four-color system (Emission 520/550/580/605 nm) provides full flexibility for multiplexing
- High reproducibility is possible at 10 µL total reaction volumes with calibrated Eppendorf pipettes. For lower volumes please see next page for automated *real-time* PCR set-up
- Comes with two-year warranty

Mastercycler® ep *realplex*

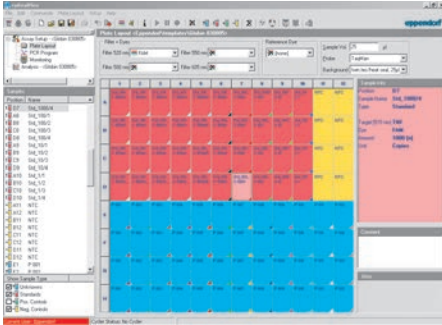
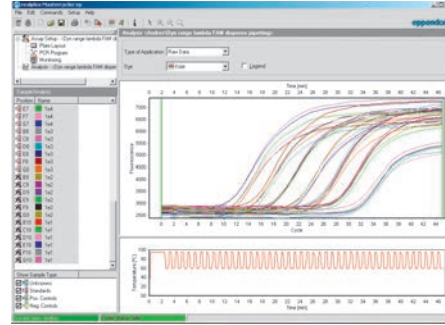


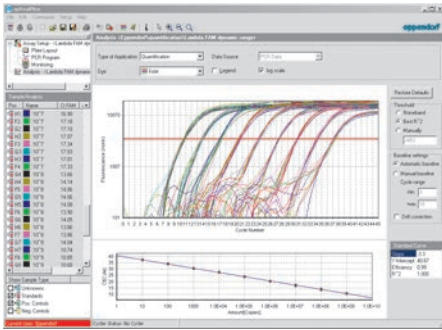
Plate layout

The clear and comprehensive organization of multiple viewing windows as well as intuitive options for selection within each view enable easy and fast plate setup when creating assays.



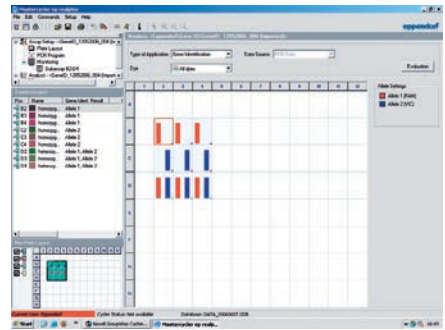
Raw data

This Mastercycler ep *realplex* software module makes it possible to observe the generated raw data in real time, which means that you can immediately evaluate your *real-time* PCR and interrupt the reaction as soon as the desired result is obtained.



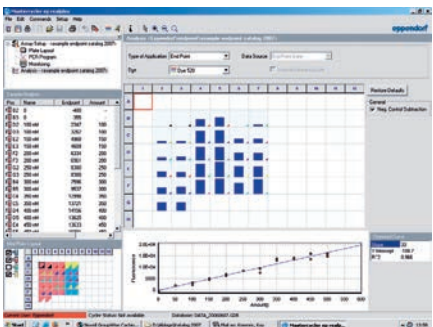
Quantification/relative quantification

Calculation from raw data for e. g. absolute quantification or relative quantification based on the $\Delta\Delta C_q$ method. C_q -values can be calculated by Eppendorf's highly accurate CalQplex® procedure.



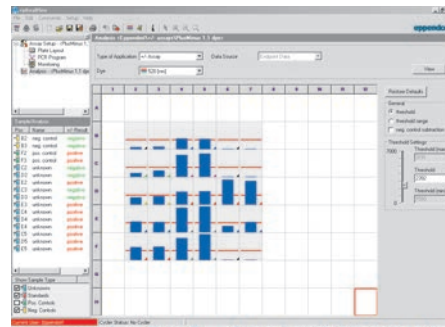
Gene identification

The selection of this analysis module option generates allele-discrimination results. Data previously generated in melting curve analyses, endpoint measurements or C_q -value determinations serves as the basis.



Endpoint

The analysis module option for endpoint measurements instructs the Mastercycler ep *realplex* to serve as a "plate fluorometer" and aids in the determination of absolute fluorescence intensities, regardless of previous method of DNA amplification.



+/- Assay

Critical threshold values can be defined through this analysis module option to enable the differentiation between positive and negative samples (e.g. for the detection of pathogens). Data from previous endpoint measurements serves as the source for such determinations.

Mastercycler® ep *realplex*


Technical specifications

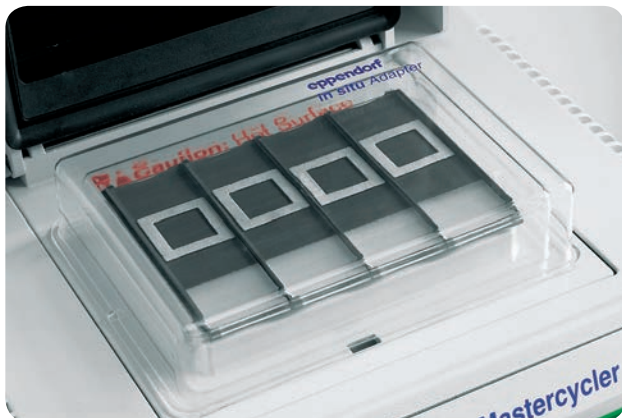
Optical module	
Excitation source	96 LEDs (470 nm)
Emission filters	520/550 nm (<i>realplex</i> ²) 520/550/580/605 nm (<i>realplex</i> ⁴)
Detector	1 photomultiplier tube (<i>realplex</i> ²) 2 photomultiplier tubes (<i>realplex</i> ⁴)
Dynamic range	8 orders of magnitude from starting copy number
Sensitivity	≤50 fmol fluorescein
Thermo module	
Sample capacity	96 x 0.2 mL PCR tubes or one 96 PCR plate (unskirted, semi-skirted, skirted— as per SBS standard)
Temperature control range of block	4-99 °C
Degree range of gradient, maximum	1-20 °C (aluminium block) 1-24 °C (silver block)
Temperature control range of gradient	30-99 °C
Temperature of lid	105 °C
Block homogeneity	20-72 °C ± 0.3 °C, 90 °C ± 0.4 °C
Control accuracy	± 0.2 °C
Heating speed*	approx. 4 °C/s (aluminium block) approx. 6 °C/s (silver block)
Cooling speed*	approx. 3 °C/s (aluminium block) approx. 4.5 °C/s (silver block)
Complete system	
Dimensions (W x D x H)	26 cm x 41 cm x 39.6 cm
Total weight	24 kg
Power supply	100–130 V, 50–60 Hz, 200–240 V, 50 Hz–60 Hz
Power consumption	800 W

* Measured at block

Ordering information

Description	Order no.	
Mastercycler ep <i>realplex</i>		
Mastercycler ep <i>realplex</i> ² , with aluminium block and two emission filters	6300 000.507	
Mastercycler ep <i>realplex</i> ² S, with silver block and two emission filters	6300 000.604	
Mastercycler ep <i>realplex</i> ⁴ , with aluminium block and four emission filters	6302 000.504	
Mastercycler ep <i>realplex</i> ⁴ S, with silver block and four emission filters	6302 000.601	
Optical module to upgrade Mastercycler pro/S		
<i>realplex</i> ²	6300 000.000	
<i>realplex</i> ⁴	6302 000.008	
System accessories		
twin.tec PCR Plates and twin.tec <i>real time</i> PCR Plates see page 222 or visit www.eppendorf.com		
Service		
Preventive maintenance contracts, see page 234		

 Ordering information for other voltage options begins on page 471.

in situ Adapter

Product features

- Easy to handle
- Perfect fit for optimal heat transfer
- Software supported, easy to program, extremely flexible
- Can accommodate four standard glass slides
- Transparent covering hood

Description

The *in situ* Adapter can be used to convert your Mastercycler or Mastercycler nexus to an *in situ* device as easily as if you were to insert a PCR plate. And the quality of the heat transfer is equally as high! With precise block homogeneity, the *in situ* Adapter has room for up to four standard glass slides.

Technical specifications

Sample capacity	Max. 4 glass slides 76 x 26 mm
Temperature range	4-99 °C

Ordering information

Description	Order no.	
<i>in situ</i> Adapter for Mastercycler nexus and Mastercycler	5331 220.002	

Eppendorf twin.tec® PCR Plates*



PCR Plates are registered trademarks in following colors: yellow, red, blue and green
* European Patent EP 1161994 and US patents US 7,347,977; US 7,767,153; US 6,340,589; US 6,528,302

General product features

- Extremely thin-walled polypropylene wells guarantee optimum temperature transfer
- Extremely stable polycarbonate rims ensure outstanding stiffness and torsion resistance
- Minimal well-to-well tolerance
- Almost all plates are also available with individual barcode
- Raised rims of the individual wells for effective and contamination-free closure
- Autoclavable (121 °C, 20 min)
- Certified free from human DNA, DNase, RNase and PCR-inhibitors*¹

*¹ Certificate, test procedures and detailed information on request.

➔ Further information on PCR tubes and plates at page 116.



Eppendorf twin.tec® PCR Plates



Product features of twin.tec PCR Plate 384

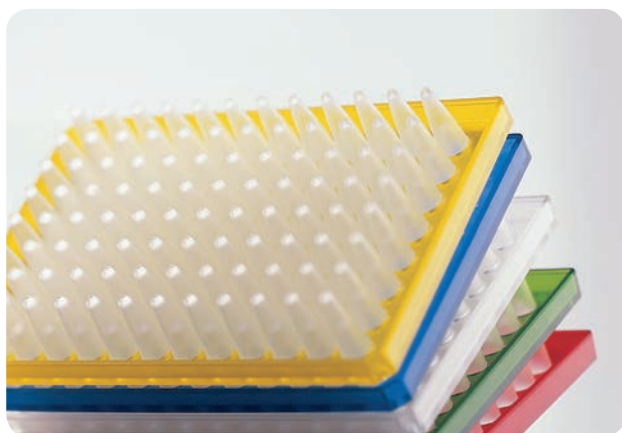
- Optimized rim for barcodes and automated work processes
- Stackable
- Within SBS footprint recommendations
- Ideal for most common 384-well thermocyclers, particularly for Eppendorf Mastercycler pro 384 (see page 210)
- 40 µL max. well volume

Eppendorf twin.tec Plates are registered trademarks in following colors: yellow, red, blue and green



Product features of twin.tec PCR Plate 96, skirted

- Optimized rim for barcodes and automated work processes
- Within SBS footprint recommendations (127.76 x 85.47 mm ± 0.25 mm)
- Stackable
- Eight holes in the skirt aid plate positioning and removal from the thermal cycler block
- Low profile design enhances efficiency of PCR and enables the highest efficiency for small sample volumes
- 150 µL max. well volume (when used with cap strips)



Product features of twin.tec PCR Plate 96, semi-skirted

- Semi-skirted for label and barcode
- Ideal for quantitative real-time PCR
- Fits most thermal cyclers
- 250 µL max. well volume (when used with cap strips)

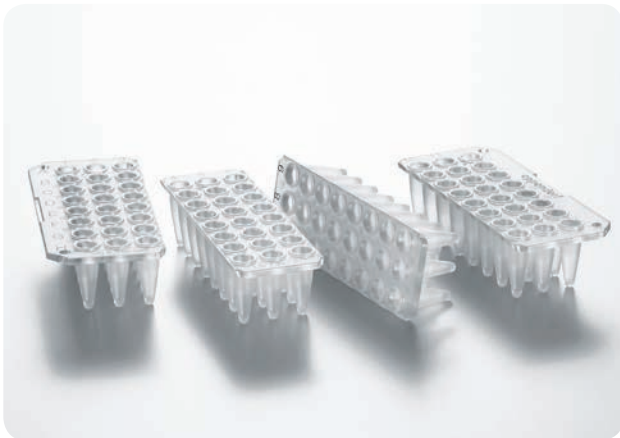
i Further information under www.eppendorf.com/twintecplates

Eppendorf twin.tec® PCR Plates



Product features of twin.tec PCR Plate 96, unskirted

- Fits even more thermal cyclers
- OptiTrack® matrix: high contrast labelling of alphanumeric grid
- Available with regular (250 µL) or low profile (150 µL) wells



Product features of twin.tec PCR Plate 96, unskirted, divisible

- Can be divided in 4 segments of 24 wells each
- Fits most common thermal cyclers
- OptiTrack® matrix: high contrast labelling of alphanumeric grid
- Available with regular (250 µL) or low profile (150 µL) wells
- Can be divided into 4 segments of 24 wells each to prevent waste and save money



Product features of twin.tec microbiology PCR Plate

- Sterile, individually blistered
- Certified PCR clean
- Additionally free of bacterial DNA
- For all applications that need ultimate purity or certified absence of bacterial DNA

Eppendorf twin.tec® PCR Plates

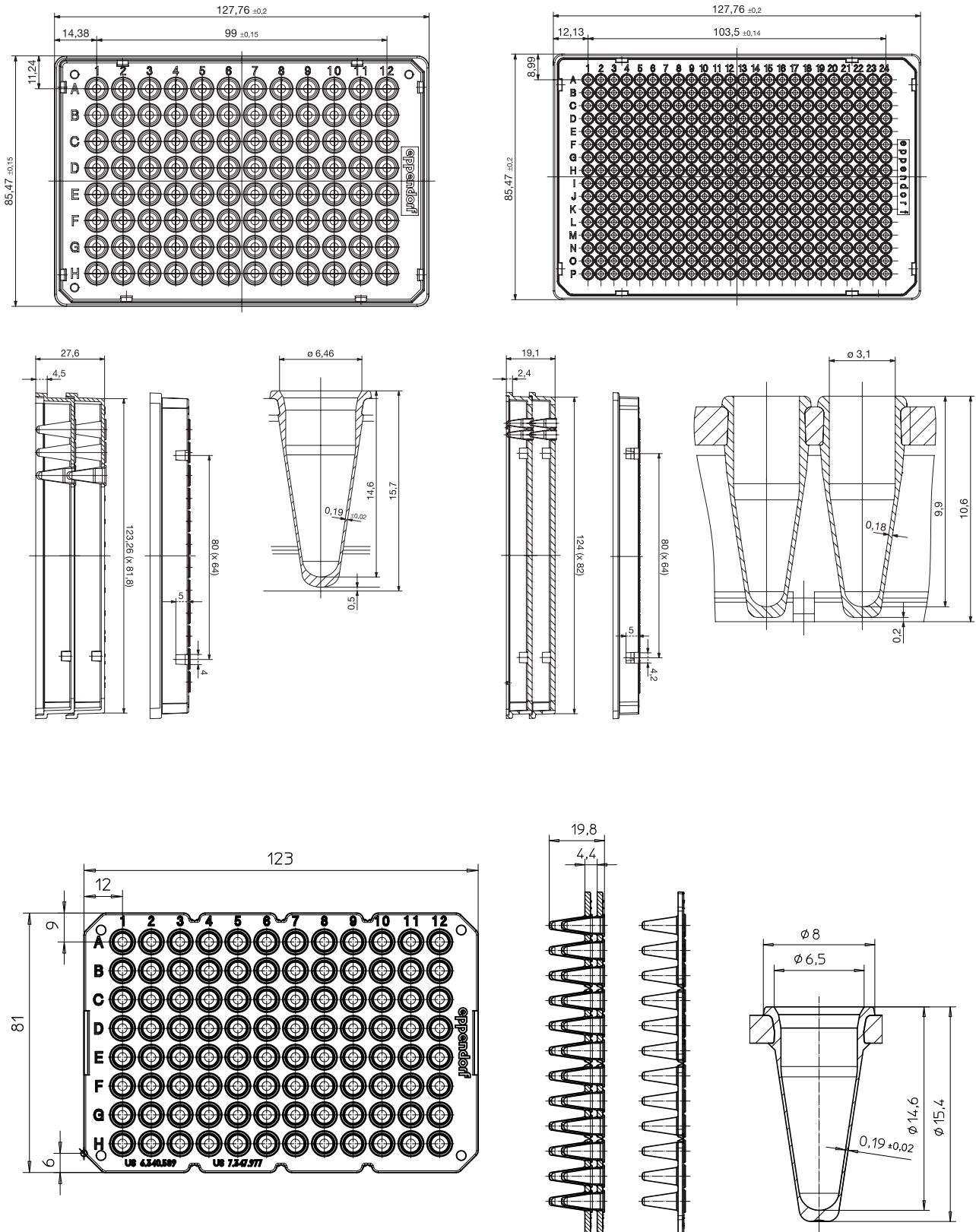


Fig. 1, 2 and 3: Technical specifications. All dimensions in millimeters.

Eppendorf twin.tec® PCR Plates

Ordering information

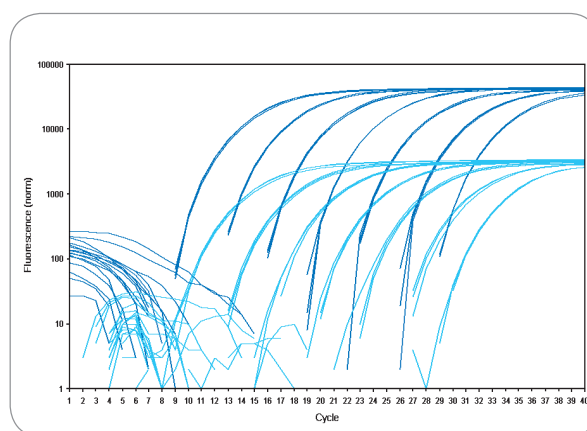
Description	Order no.	
twin.tec PCR Plate 96, skirted, set of 25 pcs.		
Clear	0030 128.648	
Yellow	0030 128.656	
Green	0030 128.664	
Blue	0030 128.672	
Red	0030 128.680	
twin.tec PCR Plate 96, semi-skirted, set of 25 pcs.		
Clear	0030 128.575	
Yellow	0030 128.583	
Green	0030 128.591	
Blue	0030 128.605	
Red	0030 128.613	
twin.tec PCR Plate 96, unskirted low profile, set of 20 pcs.		
Clear	0030 133.307	
Yellow	0030 133.315	
Green	0030 133.323	
Blue	0030 133.331	
Red	0030 133.340	
Clear, divisible	0030 133.358	
Blue, divisible	0030 133.382	
twin.tec PCR Plate 96, unskirted, 250 µL, set of 20 pcs.		
Clear	0030 133.366	
Blue	0030 133.390	
Clear, divisible	0030 133.374	
Blue, divisible	0030 133.404	
twin.tec <i>microbiology</i> PCR Plate 96, skirted, set of 10 pcs.		
Clear	0030 129.300	
Blue	0030 129.318	
twin.tec <i>microbiology</i> PCR Plate 96, semi-skirted, 10 pcs.		
Clear	0030 129.326	
Blue	0030 129.334	
twin.tec <i>microbiology</i> PCR Plate 384, set of 10 pcs.		
Clear	0030 129.342	
Blue	0030 129.350	
twin.tec PCR Plate 384, set of 25 pcs.		
Clear	0030 128.508	
Yellow	0030 128.516	
Green	0030 128.524	
Blue	0030 128.532	
Red	0030 128.540	

Eppendorf twin.tec® *real-time* PCR Plates**General product features**

Eppendorf twin.tec *real-time* PCR Plates offer all the advantages of regular twin.tec plates and give you the advantage of white wells for your real-time PCR. The limiting factor in low volume real-time PCR is often the remaining intensity of fluorescence. The white wells of the Eppendorf twin.tec *real-time* PCR Plates reflect fluorescence much better than clear or frosted wells. Thus, lower levels of fluorescence are still detectable with the same instrument – just by using the right consumables. Additionally, white wells significantly reduce interfering background fluorescence and lead to increased homogeneity of replicates and reproducible results. The rigidity of the polycarbonate frame ensure easy and reliable handling – manually or automated. The polypropylene wells guarantee excellent and fast temperature transfer to the sample.

Product features

- White wells for better reflection
- High mechanical stability
- Effective sealing by raised well rims
- Skirted and semi-skirted frames
- Optimal heat transfer due to reduced wall thickness
- Autoclavable (121 °C, 20 min)
- Available with barcode (upon request)

Reflection is up to 10-fold higher than with frosted wells

i Further information under www.eppendorf.com/realtime

Ordering information

Description	Order no.	
twin.tec 96 <i>real-time</i> PCR Plates, skirted, set of 25 pcs.		
White	0030 132.513	
Blue	0030 132.505	
Black	0030 132.521	
twin.tec 96 <i>real-time</i> PCR Plates, semi-skirted, set of 25 pcs.		
White	0030 132.548	
Blue	0030 132.530	
Black	0030 132.556	
twin.tec 96 <i>real-time</i> PCR Plates, unskirted low profile, set of 20 pcs.		
White	0030 132.700	
Blue	0030 132.718	
Black	0030 132.726	
twin.tec 384 <i>real-time</i> PCR plates, set of 25 pcs.		
White	0030 132.734	
Blue	0030 132.742	
Black	0030 132.750	



Eppendorf® PCR Tubes

More space for labeling due to improved lid design

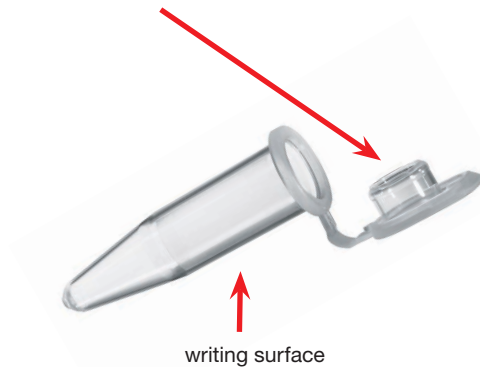


Fig. 1: 0.5 mL PCR Tube

Contamination shield prevents contact with inner lid surface

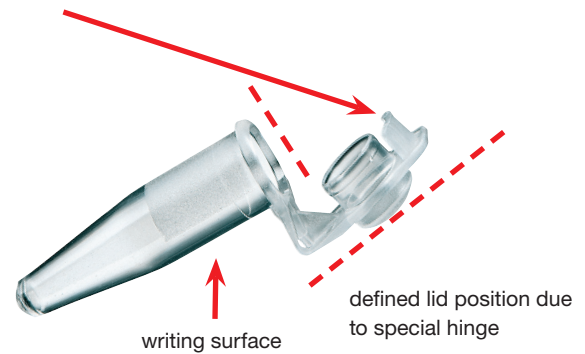


Fig. 2: 0.2 mL PCR Tube

Product features of 0.5 mL PCR Tubes, thin-walled

- Etched lid for labeling
- Tight sealing
- Easy to open
- For use with all thermal cyclers with 0.5 mL block format
- Certified free from human DNA, DNase, RNase and PCR inhibitors^{*1}

^{*1} Certificate, test procedures and detailed information on request.

Product features of 0.2 mL PCR Tubes, thin-walled

- Contamination shield on hinged lid
- Defined lid position due to special hinge
- High transparency even on the tube base
- Etched lid for labeling
- Tight sealing
- Easy to open
- For use with all thermal cyclers with 0.2 mL block format
- Also available in 8-tube strip format
- Certified free from human DNA, DNase, RNase and PCR inhibitors^{*1}

^{*1} Certificate, test procedures and detailed information on request.

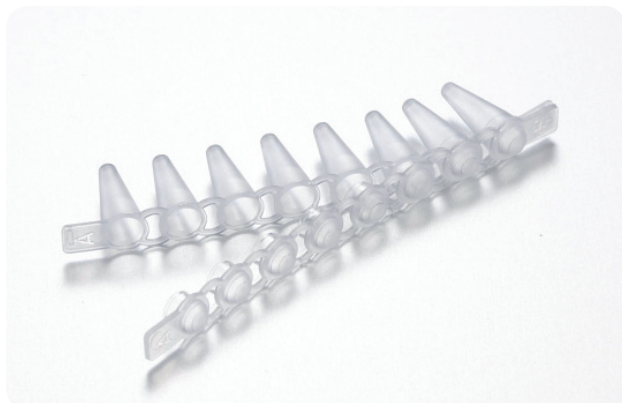
Description

Original Eppendorf PCR tubes are manufactured according to the highest Eppendorf quality standards. These thin-walled polypropylene tubes ensure efficient and homogenous heat transfer.

The purity grade PCR Clean is safeguarded by closed bags being inside an outer carton (please also refer to Eppendorf PCR clean).



PCR Tube Strips 0.1 mL



Product features of 0.1 mL PCR Tube Strips

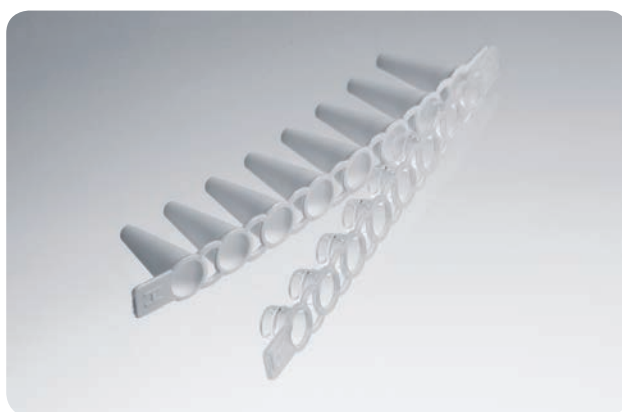
- 8 reaction tubes in strip-format – ideal for small sample volumes
- Easily adaptable for automation
- Sealable using flat or domed strip-lids
- Certified free from human DNA, DNase, RNase and PCR inhibitors^{*1}

^{*1} Certificate, test procedures and detailed information on request.

Ordering information

Description	Order no.	
0.2 mL Eppendorf PCR Tubes		
Clear, 1,000 pcs.	0030 124.332	
8-tube strip, for 0.2 mL PCR Tubes, pack of 120 (960 tubes total)	0030 124.359	
0.1 mL Eppendorf PCR Tubes, thin-walled		
PCR Tube Strips 0.1 mL, without lids (10 × 12 strips)	0030 124.804	
PCR Tube Strips 0.1 mL plus Cap Strips, domed (10 × 12 strips each)	0030 124.812	
PCR Tube Strips 0.1 mL plus Cap Strips, flat (10 × 12 strips each)	0030 124.820	
0.5 mL Eppendorf PCR Tubes, thin-walled with hinged lid		
Clear, 500 pcs.	0030 124.537	

Masterclear® Cap Strips and *real-time* PCR Tube Strips



Product features Masterclear Cap Strips

- Inverted dome to avoid scratching of the optic surface
- Inverted dome to reduce volume of the tubes
- Optimized for maximum light transmission

Product features *real-time* PCR Tube Strips

- White wells for better reflection
- High mechanical stability
- Extremely thin walls for optimal heat transfer

Ordering information

Description	Order no.	
<i>real-time</i> PCR Tube Strips without caps (10 × 12 pieces)	0030 132.882	
Masterclear Cap Strips and <i>real-time</i> PCR Tube Strips (10 × 12 pieces each)	0030 132.890	
Masterclear Cap Strips, (10 × 12 pieces)	0030 132.874	

Heat Sealer



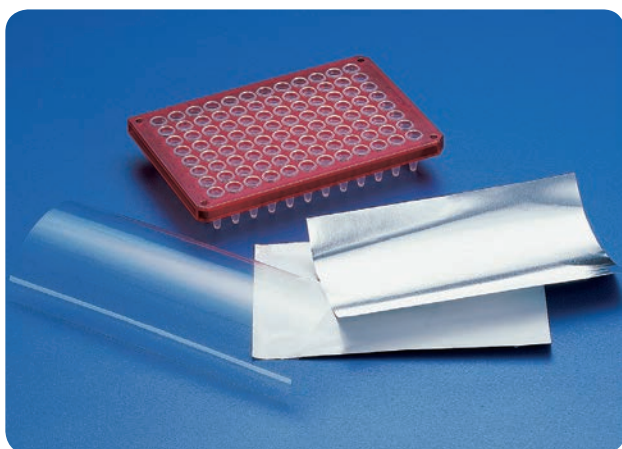
Product features

- Hermetic heat sealing of multiwell plates
- Eliminates evaporation in PCR, reducing cross-contamination
- Ideal for transportation and storage of samples
- Seals 96- and 384-well plates
- Suitable for plates of different heights
- Optimum sealing with Eppendorf Heat Sealing Foils and Films at a preset temperature
- Compact design, portable device
- Integrated thermostat prevents overheating
- Heating plate faces away for safety
- Improved mechanics for even easier sealing

Ordering information

Description	Order no.	
Heat Sealer, 230 V/50 Hz	5390 000.024	⚡
Base plate, for 384-well plate	5390 100.029	

Heat Sealing Film and Heat Sealing Foil



Product features

- Hermetic sealing of multiwell plates, especially recommended for low reaction volumes
- Best protection against evaporation during PCR
- Maximum adhesiveness at high temperatures during PCR

Ordering information

Description	Order no.	
Heat Sealing Film, 100 pcs.	0030 127.838	
Heat Sealing Foil, 100 pcs.	0030 127.854	

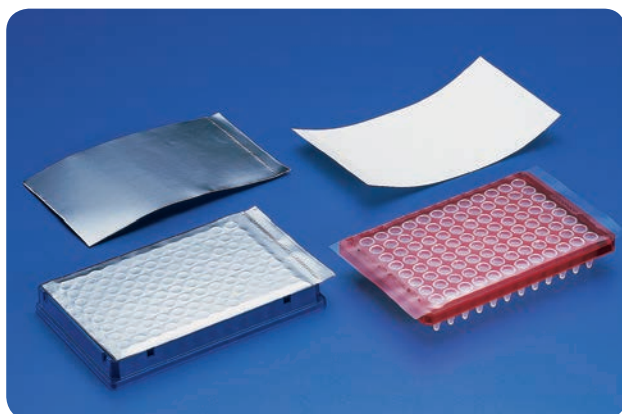
⚡ Ordering information for other voltage options begins on page 471.

Heat sealing materials

Technical specifications

Description	Heat Sealing Film	Heat Sealing Foil
Packaging unit	1 x 100 pcs.	1 x 100 pcs.
Features	<ul style="list-style-type: none"> ● Optically clear polyester/polypropylene laminate ● Extremely stable sealing option – cannot be removed or pierced 	<ul style="list-style-type: none"> ● Laminated aluminium foil ● Easily removable ● Easily pierceable, even with multichannel pipettes
Seal integrity	-80 °C to 100 °C	-80 °C to 100 °C
Sealing time with Eppendorf Heat Sealer	4 sec.	4 sec.
Weldable materials	<ul style="list-style-type: none"> ● Polypropylene 	<ul style="list-style-type: none"> ● Polypropylene
Special applications	<ul style="list-style-type: none"> ● Colorimetric applications ● Fluorescence applications, including real-time PCR ● Storage of hazardous samples 	<ul style="list-style-type: none"> ● Recommended for use in automated work processes

PCR Film (self-adhesive) and PCR Foil (self-adhesive)



Product features

- Effective adhesive sealing prevents evaporation loss during PCR
- Removal from the plate with no residue
- Autoclavable (121 °C, 20 min)

PCR Film:

- Sample can be visually monitored through the transparent film

PCR Foil:

- Easily pierced
- No sticking of the pipette tip (ideal for automated systems)

Ordering information

Description	Order no.	
PCR Film (self-adhesive), 100 pcs.	0030 127.811	
PCR Foil (self-adhesive), 100 pcs.	0030 127.820	

Masterclear® *real-time* PCR Film



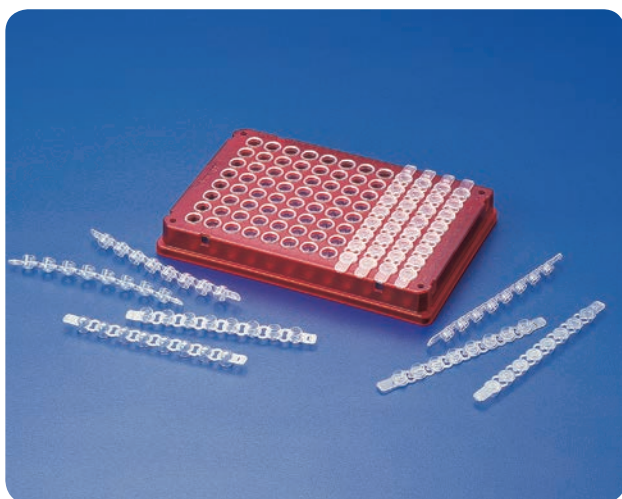
Product features

- Optimized for maximum light transmission
- Optimized for tight sealing
- Optimized packaging for your convenience

Ordering information

Description	Order no.	
Masterclear <i>real-time</i> PCR Film, (self-adhesive), 100 pieces	0030 132.904	

Cap Strips



Product features

- Strips with eight microcaps for 0.1 and 0.2 mL wells
- Easy and rapid sealing of Eppendorf® twin.tec PCR Plates, PCR strips and other standard multiwell plates
- Flat Cap Strips are suitable for real-time PCR
- Autoclavable (121 °C, 20 min)

Ordering information

Description	Order no.	
Cap Strips (8-strips), domed, 10 x 12 pcs.	0030 124.839	
Cap Strips (8-strips), flat, 10 x 12 pcs.	0030 124.847	

Capping Aid



Product features

- Tool for easy and fast sealing of 0.1 and 0.2 mL PCR test tubes and twin.tec PCR Plates with Cap Strips
- Several wells and tubes can be sealed simultaneously
- Minimal force required for an effective seal
- Minimizes losses due to evaporation

Ordering information

Description	Order no.	
Capping Aid, 1 pcs.	0030 127.153	

Work tray and frame



Product features

- Frame with work tray serves as a 2-part polycarbonate rack for 96 x 0.2 mL PCR tubes
- All tubes can be directly transferred to a thermoblock
- Autoclavable (121 °C, 20 min)

Ordering information

Description	Order no.	
Work tray, for 96 x 0.2 mL PCR tubes, set of 10	0030 124.235	
Frame, for work tray, set of 5	0030 124.243	

PCR Rack



Product features

- Rack for handling and storing tubes and plates
- For 0.1 mL, 0.2 mL and 0.5 mL tubes, as well as 96-well plates
- Stackable
- Can be stored down to -90 °C
- Autoclavable (121 °C, 20 min)

Ordering information

Description	Order no.	
PCR Rack, 10 pcs.	0030 124.545	

Mastercycler® ep *realplex* – Performance Plans**Value of Preventive Maintenance**

The principles of real-time PCR are based upon a very limited tolerance for uncontrolled variables. Eppendorf helps to ensure continually reproducible results by offering Performance Plans that monitor the performance of your Mastercycler ep *realplex* through defined timelines and procedures.

Preventive maintenance, performed by Eppendorf professionally trained repair and maintenance specialists, consists of thorough cleaning and testing of the instrument.

Because the Mastercycler ep *realplex* contains sensitive high-end components such as fibre optics, photo-multipliers and LED arrays it is advisable to recalibrate the system at certain intervals.

Long-term benefits of preventive maintenance include:

- Ensures consistent, reliable system operation
- Confidence in results
- Audited system for GLP compliance

Depending on parameters such as frequency of usage or environmental conditions of the laboratory, a color calibration should be performed every 12 months.

A PCR validation assay to validate the overall performance of the system is often recommended or even required in GLP-compliant environments.

Thus, our Performance Plans are tailored to address these different levels of demand and meet your particular laboratory requirements.

Features of Eppendorf Performance Plans:

- Eppendorf quality and integrity maintained
- Certified calibration reports provided
- Programs are clearly outlined with no hidden fees – makes choosing and budgeting for them easy

i For more information go to www.eppendorf.com/epservices.
In selected countries only.

Performance Plans	Mastercycler ep <i>realplex</i> BASIC	Mastercycler ep <i>realplex</i> STANDARD	Mastercycler ep <i>realplex</i> PREMIUM
Order no. 1 Preventive Maintenance per year	6302 000.120	6302 000.138	6302 000.146
Order no. 2 Preventive Maintenances per year	6302 070.022	6302 070.057	6302 070.065
Basic maintenance includes cleaning instrument surface and block, a functional test of the thermoblock including a temperature validation protocol, and a full system check including background calibration.	●	●	●
A dedicated color calibration protocol is carried out by the service specialist. Based on this recalibration procedure, the last issued certificate is updated.	Not included	Color calibration (1 calibration included)	Color calibration (1 calibration included)
The validation assay is based on a qPCR run with specifically designed primers and DNA templates to cover all major performance aspects such as dynamic range and reproducibility. Based on this validation protocol, the last issued certificate is updated.	Not included	Not included	PCR validation assay (1 assay included)

Mastercycler® – Performance Plans

**Value of Preventive Maintenance**

Preventive maintenance provides cleaning of the surface and thermoblock with special brushes and/or compressed air. It also includes a check of following parts and features: display, key pad, thermoblock, lid, stability, instrument statistics (e.g. error codes) and if applicable a software update. This maintenance service in accordance to manufacturer's SOPs ensures that your thermal cycler is performing to the specifications.

Temperature verification of selected well positions and adjustment of the cycler block temperature if necessary is highly recommended to assure instrument consistency and accuracy. The temperature verification is a very accurate and precise method and meets all documentation and detection requirements in the laboratory according to all national and international standards, e.g.: NIST (USA), DKD/PTB (Germany), UKAS/NPL (UK), COFRAC/LNE (France), NMIA (Australia), MSL (New Zealand). The applicable standards for all other countries apply as well.

A full reference list can be found at www.bipm.org/en/cipm-mra/.

Operational Qualification (OQ) includes in addition to the complete preventive maintenance program also a professional cleaning and inspection of all internal sensitive parts (e.g. printed circuit, fans), and an electrical testing according to country-specific regulations. A subsequent temperature verification will be performed.

Long-term benefits of preventive maintenance:

- Highest confidence in results
- Permanently reliable and reproducible results
- GLP compliant audited systems

Features of Eppendorf Performance Plans:

- Eppendorf service quality and integrity
- Certified reports
- Customized service options

i For more information go to www.eppendorf.com/epservices.
In selected countries only.

Performance Plans	Mastercycler	Mastercycler ep, Mastercycler pro, Mastercycler Nexus (PC and Control Panel versions)
Recommended service period is once per year.	Mastercycler, Mastercycler gradient, Mastercycler personal, Mastercycler 384	Mastercycler ep gradient, Mastercycler ep gradient 384, Mastercycler ep gradient S, Mastercycler pro, Mastercycler pro 384, Mastercycler pro S, Mastercycler Nexus, Mastercycler Nexus gradient, Mastercycler Nexus eco
Preventive Maintenance:	Order no.	Order no.
Preventive Maintenance*	5331 877.001	6321 896.004
Temperature Verification/Adjustment:		
Temperature verification with single-well tool	5331 878.008	6321 897.000
Certification Service:		
Operational Qualification (OQ) incl. internal and external cleaning and inspection of all parts and electrical testing according to country-specific regulations	5331 879.004	6321 898.007
Electrical testing according to country-specific regulations	5331 880.002	6321 899.003
Additional Service:	Order no.	
Adjustment of Temperature Verification System - single-well		0055 000.360

*Spare parts that may be required are not included and will be invoiced additionally.
For cycler services on instruments of other manufacturers please inquire at your local Eppendorf office.

Eppendorf BioSpectrometer®

Eppendorf epGreen Initiative

- A new mold for the production of Eppendorf's disposable UV/VIS-transparent cuvette, the UVette®, has been put into operation to reduce the amount of waste.
- The UVette routine pack offers a guaranteed Eppendorf quality product in a bulk package size of 200 pieces which reduces the needed packaging material.
- The Xenon flash lamp of Eppendorf Photometers reduces the energy consumption by emitting pulsed light only during the measuring process.
- No warm-up is required which makes the Photometer a power saving instrument. In addition, BioSpectrometer displays automatically dim after a certain period of inactivity.

- Eppendorf Photometers are packaged in 100% recyclable material.

An overview of Eppendorf epGreen measures can be found on page 10 and in the Appendix on page 444.



NEW!



Description

The new Eppendorf BioSpectrometers are small, very compact spectralphotometers for analyses in the UV and visible range. They are designed for recording spectra or performing single wavelength measurements in a spectral range from 200 nm to 830 nm. The cuvette shaft of the BioSpectrometer kinetic can also be temperature-controlled in a range of +20°C to +42°C, allowing the direct measurement of enzyme and substrate kinetics in this version. No additional accessories for temperature control are required.

The large 5.7" color display clearly shows all input fields as well as the results and the spectra in an easy-to-read format. The Eppendorf BioSpectrometer software guides the user step-by-step through the individual methods. This enables users to enter and check all parameters immediately before the first measurement and also minimizes the risk of forgetting required entries. The parameters are automatically included in the subsequent evaluation and display of results. In addition to pre-programmed methods for standard measurements, modified and newly de-

veloped methods can also be stored. To facilitate quick access, frequently used methods can be stored in a directly accessible Favorites folder.

In addition to standard cuvettes such as the Eppendorf UVette, special microliter measuring cells can also be used for measuring small volumes. Thus, Eppendorf BioSpectrometers not only cover a wide range of methods but also a large concentration and volume range.

Eppendorf BioSpectrometer® basic



Description

The Eppendorf BioSpectrometer basic offers a wide variety of methods for photometric applications in the UV and visible range. You have the option of accessing pre-programmed methods or writing new methods. With freely selectable wavelengths this device offers great flexibility, making it ideally suited for future applications. Featuring small size and low weight, the device can also be operated solely via the integrated 5.7" color display. The software is designed to keep programming effort to a minimum to enable a quick start. The Eppendorf SpectraZoom® method enables the user to directly view selected spectral ranges on the display. This view can be saved and exported so that the data does not need to be sent to a PC for postprocessing. User guidance minimizes the risk of making incorrect entries or forgetting required entries. The entire operating sequence is accompanied by a help box that explains each step. This also enables inexperienced users to use the device safely and to achieve reliable results.

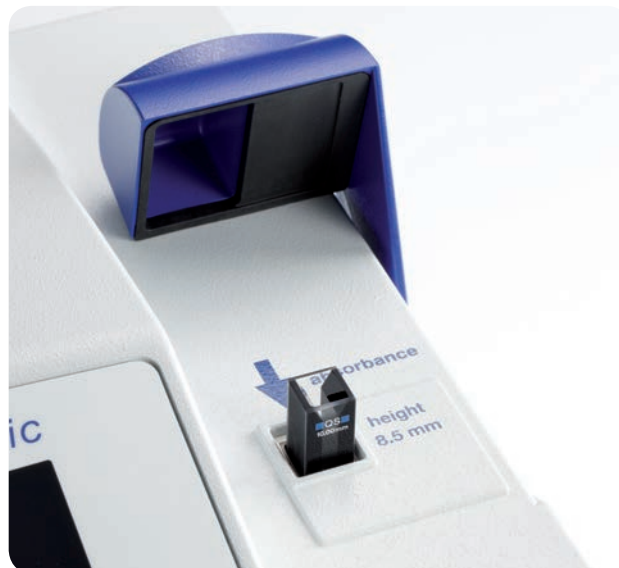
Application

- Absorbance measurement at one or more wavelengths
- Recording of wavelength scans
- Methods with evaluation via factor, standard or standard series
- Two-wavelength method with evaluation of subtraction and division
- Concentration via standard series (incl. linear and nonlinear regression, linear interpolation)

Product features

- UV/Vis spectral range from 200 nm to 830 nm
- Freely selectable wavelengths throughout the entire spectral range (increment: 1 nm)
- Pre-programmed methods for quick setup
- Integrated method and results memory
- Data transfer via USB port
- Direct printer connection possible (RS-232 port)
- Fast measurements thanks to photodiode array technology
- Xenon flash lamp virtually lasts a lifetime
- 5.7" VGA TFT display
- Guided software workflow to minimize errors
- Help box with an explanation of each step in 5 languages
- Direct device operation, no PC necessary
- Eppendorf SpectraZoom® method
- Compatible with microliter cells and standard cuvettes

Eppendorf BioSpectrometer® kinetic



Description

The Eppendorf BioSpectrometer kinetic offers all the options available with the Eppendorf BioSpectrometer basic plus the option of enzyme and substrate kinetic determination. The temperature-controlled cuvette shaft can be adjusted in 0.1°C increments in the range of +20°C to +42°C. The temperature is controlled via a built-in Peltier element. This guarantees extremely precise temperature control, even over a longer period. In addition to the variety of methods available with the BioSpectrometer basic, the BioSpectrometer kinetic software also offers pre-programmed and freely pre-programmed kinetic methods. Linear regression, end-point and two-point determinations are available as kinetic methods. The time window can be subsequently modified, thus enabling optimized regression analysis of the kinetic curve on the unit.

Application

- All options of the BioSpectrometer basic (see above)
- Kinetic methods: End-point, two-point and linear regression
- Substrate and enzyme kinetic determination

Product features

- All options of the BioSpectrometer basic (see page 237)
- Built-in Peltier element for controlling the temperature of the cuvette shaft
- Freely selectable cuvette shaft temperature control in 0.1°C increments in the range of +20°C to +42°C
- Pre-programmed and freely programmable kinetic methods
- Subsequent modification of the time window for the regression analysis of the kinetic curve

Eppendorf BioSpectrometer® basic and kinetic

Technical specifications



	BioSpectrometer basic	BioSpectrometer kinetic
Optical system:	Absorption single-beam photometer with reference beam	
Light source:	Xenon flash lamp	
Light beam height:	8.5 mm	
Cuvette shaft:	12.5 mm × 12.5 mm, not temperature-controlled	12.5 mm × 12.5 mm, temperature-controlled
Temperature control of cuvette shaft:	—	20°C to 42°C, smallest increment: 0.1°C
Receiver:	CMOS photodiode array	
Wavelengths:	200 nm to 830 nm, smallest increment: 1 nm	
Spectral bandwidth:	≤ 4 nm	
Photometric measuring range:	0 A to 3.0 A at 260 nm	
Photometric random error:	≤ 0.002 at A = 0 ≤ 0.005 (0.5 %) at A = 1	
Photometric systematic error:	±1% at A = 1	
Method memory:	Method memory: >100 method programs	
Measured value and calibration memory:	Memory for >1000 results with all result and standard evaluation data, sample number, sample name, date and parameter set used for method program. (The number of stored results depends on the number of stored methods.)	
Methods:	<p>Pre-programmed and freely programmable methods for all measurement and evaluation procedure:</p> <ul style="list-style-type: none"> • Absorbance measurements at one or more wavelengths, scans • Nucleic acids and proteins, OD600, dye methods (parallel measurement of biomolecule and dye label), • Methods with evaluation via factor, standard or standard series • Two-wavelength method with subtraction and division evaluation 	<p>Pre-programmed and freely programmable methods for all measurement and evaluation procedure:</p> <ul style="list-style-type: none"> • Absorbance measurements at one or more wavelengths, scans • Nucleic acids and proteins, OD600, dye methods (parallel measurement of biomolecule and dye label), • Methods with evaluation via factor, standard or standard series • Two-wavelength method with subtraction and division evaluation • Kinetic methods: End-point, two-point and linear regression
Method-dependent evaluation:	<p>Absorbance, concentration via factor and standard. Concentration via standard series:</p> <ul style="list-style-type: none"> • Linear regression (2 to 10 standards) • Nonlinear regression (2nd and 3rd degree polynomial) • Spline analysis • Linear interpolation (point-to-point calculation) <p>Absorbance calculations via subtraction and division Additional data for nucleic acids: Ratio 260/280 and 260/230; molar concentration, total yield additional data for dye methods: FOI (frequency of incorporation, marking density) Scans: Zoom, peak evaluation</p>	<p>Absorbance, concentration via factor and standard. Concentration via standard series:</p> <ul style="list-style-type: none"> • Linear regression (2 to 10 standards) • Nonlinear regression (2nd and 3rd degree polynomial) • Spline analysis • Linear interpolation (point-to-point calculation) <p>Absorbance calculations via subtraction and division Additional data for nucleic acids: Ratio 260/280 and 260/230; molar concentration, total yield additional data for dye methods: FOI (frequency of incorporation, labeling density) Scans: Zoom, peak evaluation Kinetics: Subsequent modification of the time window for the regression analysis</p>


Eppendorf BioSpectrometer® basic and kinetic

Technical specifications

	BioSpectrometer basic	BioSpectrometer kinetic
Interfaces:	USB master: For USB stick; USB slave: For connection to a PC. Interface for Eppendorf thermal printer: Serial RS-232	
Power requirement:	Approx. 15 W in operation, approx. 5 W when display is dimmed	Approx. dimmed display 30 W in operation, approx. 5 W when display is dimmed and temperature control is switched off
Power supply:	100 to 240 V ± 10%/50 to 60 Hz ± 5%	
Dimensions (W x D x H):	Width: 295 mm, depth: 400 mm, height: 150 mm	
Weight:	5.4 kg	5.5 kg
Display:	5.7" VGA TFT display	
Languages for accompanying texts:	English, French, Spanish, Italian, German	
Cuvettes:	<p>For measurements in the UV range: Quartz glass or UV-transparent plastic (Eppendorf UVette, 220 nm to 1600 nm)</p> <p>For measurements in the visible range: Glass or plastic (e.g., Eppendorf UVette)</p>	<p>For measurements in the UV range: Quartz glass or UV-transparent plastic (Eppendorf UVette, 220 nm to 1600 nm)</p> <p>For measurements in the visible range: Glass or plastic (e.g., Eppendorf UVette) For kinetic measurements: see recommendation in the Operating Manual</p>

Ordering information

Description	Order No.	
BioSpectrometer basic, 230 V/50-60 Hz	6135 000.009	
BioSpectrometer kinetic, 230 V/50-60 Hz	6136 000.002	
BioSpectrometer Reference Filter Set, filter set for verifying photometric and wavelength accuracy (NIST traceable)	6135 928.001	
Thermal printer DPU 414, incl. power supply 230 V and printer cable	6131 011.006	
Thermal paper for thermal printer DPU 414, 5 rolls	0013 021.566	
UVette 220 nm - 1,600 nm, Original Eppendorf UV-transparent plastic cuvette, individually packaged, PCR-clean, certified, (e.g., DNase and protein free) 80 pcs.	0030 106.300	
UVette routine pack 220 nm - 1,600 nm, Eppendorf Quality purity level, reclosable box, 200 pcs.	0030 106.318	
Cuvette holder for UVette, for 16 cuvettes	4308 078.006	

 Ordering information for other voltage options begins on page 471.

Eppendorf BioPhotometer® plus



Product features

- Pre-programmed methods for quantification of nucleic acids and proteins as well as incorporation rate of fluorescent dyes
- Assay methods at 340 nm, 405 nm, and 490 nm
- Automatic calculation of dilution factors
- Measurement of single wavelengths without any calculation
- Storage of the last 100 results and all corresponding data
- Simple user guidance for error-free operation
- Compact design and robust housing
- No pre-warming required
- Short measuring time
- Stand-alone unit without need for PC connection
- Xenon flash lamp with long lifetime and high light intensity

Description

The BioPhotometer plus is a compact UV/VIS photometer for routine applications in molecular biology, biochemistry and cell biology laboratories. The photometer provides instant access to 32 routine methods, of which nine are freely programmable. Both measurements and calculations are performed at the push of a button. The results including all the relevant measured values are displayed at a glance, which allows all essential values to be read directly. In addition to its low weight the photometer is small and stable with a robust metal housing. This makes for safe transport and easy cleaning. The BioPhotometer plus is designed for use with standard cuvettes such as the Eppendorf UVette®, but is also optimized for measurement of small volumes through the use of microliter cells.

Application

- Fast and reliable analysis of nucleic acids and proteins, cell density measurements, determination of incorporation rates of fluorescent dyes in biomolecules, absorption measurement of single wavelengths, and endpoint detection

i Quantification made easy: For further information on photometric quantification, see page 429.



➔ Further information under www.eppendorf.com/biophotometerplus


Eppendorf BioPhotometer® plus

Technical Specifications

Optical system:	Absorption single-beam photometer with reference beam
Light source:	Xenon flash lamp
Light beam height:	8.5 mm
Measuring wavelengths:	230, 260, 280, 340, 405, 490, 550, 595, 650 nm
Spectral bandwidth:	5 nm at 230-340 nm, 7 nm at 405-650 nm
Wavelength systematic error:	±1 nm at 230-280 nm, ±2 nm at 340-650 nm
Photometric measuring range:	0 to 3 E (2 E at 340 nm); Dye Methods: 2 E at 550 nm/650 nm
Photometric random error:	±0.002 E at 0 E; ±0.005 E at 1 E
Photometric systematic error:	±1 % at 1 E
Method-dependent calculation (Absorbance):	<ul style="list-style-type: none"> – Concentration via factor – Concentration via calibration with 1 to 10 standards – One-point calibration (1 standard) – Linear regression (2 to 10 standards) – Non-linear regression (3rd degree polynom; 4 or 5 to 10 standards), 1 ×, 2 × or 3 × determination – Ratio 260/280, ratio 260/230, molar concentration, total yield – For dye methods: FOI (frequency of incorporation)
Calibration memory:	For all calibration procedures
Results memory:	For 100 results with absorbance and ratio values, sample number, sample dilution, date and time
Interface:	RS-232 C, serial, PC connection optional
Power requirement:	Approx. 20 W in operation, approx. 10 W in Standby mode
Power supply:	100-240 V, ±10 %, 50-60 Hz, ±5 %
Dimensions (W × D × H):	20 × 32 × 10 cm
Weight:	3 kg
Accessories:	Thermal printer DPU 414, 40 characters/line, Secondary UV-VIS filter set for verifying photometric and wavelength accuracy (NIST traceable), BioPhotometer data transfer software
Cuvettes:	UVette, Hellma® TrayCell, and common rectangular cuvettes of suitable glass or plastic materials

Ordering information

Description	Order no.	
BioPhotometer plus , 230 V/50-60 Hz	6132 000.008	
BioPhotometer Data Transfer Software , software package for online data transfer to PC	6132 854.007	
Secondary UV-VIS-Filter , test set for verifying photometric and wavelength accuracy (NIST-traceable)	6131 928.007	
Thermal Printer DPU 414 serial printer, incl. power supply 230 V unit	6131 011.006	

 Ordering information for other voltage options begins on page 471.

 You can obtain information on compatibility with your PC system from our hotline: support@eppeendorf.com

BioPhotometer™ Data Transfer Software



Description

The BioPhotometer Data Transfer Software transfers all measurement and calibration data from the BioPhotometer and BioPhotometer plus to a PC.

The program is ideal for:

- Data export to Excel and other data processing software
- Printing the results using the PC
- Archiving measurement data (with optional user administration)

Date	ID	sDNA	Unit	260/280	260/230	A280	A290	A300	A340
21.08.2008	DNA Extrac. 02.08.08	50,6	µg/ml	1,85	2,05	0,493	1,012	0,547	0,006
21.08.2008	DNA Extrac. 02.08.08	74,1	µg/ml	1,85	2,11	0,703	1,482	0,799	0,009
21.08.2008	DNA Extrac. 02.08.08	99	µg/ml	1,86	2,1	0,944	1,979	1,005	0,009
21.08.2008	DNA Extrac. 02.08.08	8,1	µg/ml	1,81	1,89	0,086	0,162	0,089	0,006

Measuring results can be displayed either in tabular or display view.

Date	sDNA	Unit	260/280	260/230	A280	A290	A300	A340
21.08.2008	74,4	µg/ml	1,86	2,12	0,7	1,487	0,768	0
21.08.2008	50,9	µg/ml	1,85	2,07	0,491	1,039	0,552	0,01
21.08.2008	8,2	µg/ml	1,83	1,89	0,087	0,164	0,09	0,006
21.08.2008	99	µg/ml	1,86	2,11	0,939	1,979	1,003	0
21.08.2008	21	µg/ml	1,96	1,71	0,245	0,42	0,214	0,007
21.08.2008	96,6	µg/ml	1,84	2,11	0,924	1,973	1,07	0,004
21.08.2008	50,6	µg/ml	1,85	2,05	0,493	1,012	0,547	0,006
21.08.2008	74,1	µg/ml	1,85	2,11	0,703	1,482	0,799	0,009
21.08.2008	99	µg/ml	1,86	2,1	0,944	1,979	1,005	0,009
21.08.2008	8,1	µg/ml	1,81	1,89	0,086	0,162	0,089	0,006

A comfortable search function helps working with archived measuring results.

Accessories for BioSpectrometer – Reference filter set



Description

The secondary UV/Vis reference filter set is used for verifying photometric and wavelength accuracy. It can be used for both the BioSpectrometer basic and the BioSpectrometer kinetic.

Product features

- NIST-traceable filters
- Each certificate is valid for two years
- Filter re-certification by Eppendorf (contact: Eppendorf Service)
- Pre-programmed verification protocol in the device
- Verification of wavelength accuracy and precision at 260 nm, 280 nm and 800 nm.
- Verification of photometric accuracy and precision in the range of 260 nm to 800 nm.
- In addition to the average value of 15 measurements, the coefficient of variation is also indicated
- Contains 7 filters (1x blank filter, 3x wavelength accuracy and precision verification filters, 3 x photometric verification filters)

Ordering information

Description	Order no.	
BioSpectrometer Reference Filter Set , filter set for verifying photometric and wavelength accuracy (NIST traceable)	6135 928.001	

Accessories BioPhotometer plus® – secondary UV-VIS-Filter test set



Description

The secondary UV-VIS-Filter test set enables both photometric and wavelength accuracy to be verified.

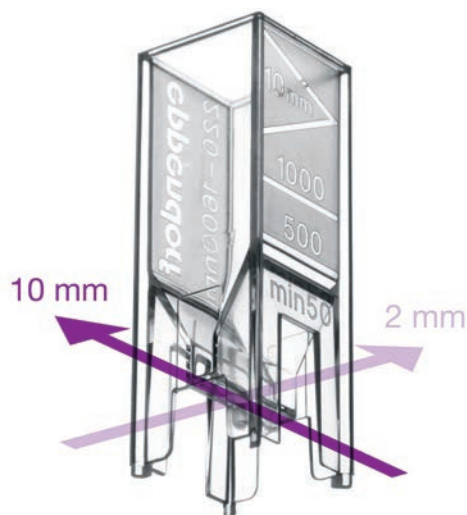
Product features

- Filters are NIST traceable
- Certificate is valid two years
- Examination protocol is pre-programmed within BioPhotometer plus
- Verification of wavelength accuracy and precision at 260 nm and 280 nm
- Verification of photometric accuracy and precision for all wavelengths of the BioPhotometer plus
- Includes 6 filters (1x blank filter, 2 x filters for verification of wavelength accuracy and precision, 3 x filters for photometric verification)

Ordering information

Description	Order no.	
Secondary UV-VIS-Filter , test set for verifying photometric and wavelength accuracy (NIST-traceable)	6131 928.007	

UVette®



Product features

- Suitable for small volumes ($\geq 50\mu\text{L}$)
- UV-transparent and VIS-transparent from 220-1,600 nm
- Volume marking at 500 and 1,000 μL
- Two layer thicknesses (2 mm and 10 mm) for measuring various concentrations
- Available in individual blister packs for contamination-free work and recovery of the sample
- Deep inset optical surfaces prevent scratches
- Funnel-shaped tube base for best liquid containment
- Abraded gripping surface for good labeling
- Optimal for use in the Eppendorf Photometer
- Adapter available for use in commercial spectrophotometers of other manufacturers (see page 247)

Description

Since its introduction as the first UV-transparent disposable cuvette, the patented Eppendorf UVette has become an indispensable tool for the most versatile applications in many laboratories. Our experience in the field of optical precision and plastics processing guarantees the following features:

Precision in plastic

The plastic material of the UVette offers a transparency range of 220–1,600 nm. It allows for measurements in the UV-range and the entire VIS-range. Filling can be optimally monitored through the clear plastic material and, even with the pipette tip, can be successfully completed entirely free of bubbles – even with the smallest sample volumes of 50 μL . The capillary action is minimized by the funnel-shaped design of the tube base.

Perfect Form

Two layer thicknesses in one cuvette! Samples with normal concentrations can be measured with the 10 mm layer thickness. For the measurement of samples with higher concentrations, simply rotate the UVette 90° and use the small layer thickness of 2 mm. In many cases, dilution is therefore no longer necessary.

Universality

The UVette is ideal for measurements in Eppendorf photometers. An adapter must be used in other photometers or spectrophotometers. This adapter adjusts the UVette to the corresponding light beam height and simultaneously fulfills the function of a diaphragm. Thus, optimal distribution of light is achieved.

Application

- Spectrophotometric analyses in the UV-range and visual range from 220–1,600 nm.

US Patent: 6249345

Technical specifications

Material:	UV-transparent plastic, free of fluoropolymers and other halogenated hydrocarbons
Spectral range:	220-1,600 nm
Volume:	50-2,000 μL
Light center height:	8.5 mm
No. of optical windows:	4
Optical path lengths:	10 and 2 mm
Basic absorbance:	$\leq 0.5 A$ at 260 nm
External dimensions (W x D x H):	12.5 x 12.5 x 36 mm

i Further information under
www.eppendorf.com/uvette

UVette®

**UVette – certified purity**

Clean room production and individual packaging guarantees PCR clean quality (e.g., free from RNase and DNase see page 437) and absence of protein as well as protection against contamination and dust. These cuvettes are ideal for RNA applications and work that is required to be contamination-free. You can even recover your samples without the risk of contamination or degradation.

- Individually packaged for contamination-free work and sample recovery
- PCR clean (free of human DNA, RNase, DNase and PCR inhibitors), and protein-free

**UVette routine pack – safety in numbers**

An economical choice for applications that do not necessarily require highest purity, our UVette routine pack gives you convenient access to each UVette while still safeguarding them against dust and/or scratches.

- Ideal cuvettes for routine applications
- Safe storage in a re closable box

Ordering information

Description	Order no.	
UVette , 80 original Eppendorf disposables, individually packed, certified PCR clean and protein-free	0030 106.300	
UVette routine pack , Eppendorf Quality purity level, re closable box of 200 pcs.	0030 106.318	
UVette Starter set , includes 80 individually packaged cuvettes (certified RNase-, DNA- and protein-free) and one universal adapter for 8.5 mm and 15 mm light path heights (e.g. GeneQuant® I/II)	4099 100.007	
Adapter*1 for photometer/spectrophotometer with light path height:		
8.5 mm	4099 001.009	
10 mm	4099 002.005	
15 mm	4099 003.001	
20 mm	4099 005.004	
GeneQuant I/II	4099 004.008	
Cuvette stand	4308 078.006	

*1 Additional adapters on page 247.

Quantification made easy: For further information on photometric quantification, see page 429.

UVette® Adapter

Description

The UVette is ideal for use with Eppendorf photometers. In other common photometers and/or spectrophotometers, the UVette is inserted with the aid of an adapter, which performs two functions:

- It aligns the UVette to the height of the photometer's light beam
- Diaphragm function for an optimal distribution of light

i For further information and current adapter lists, please visit www.eppendorf.com/uvette



Compatibility list— which adapter for which device?^{1,2}

Manufacturer	Device	UVette adapter/size	Comments
Varian	Cary 50	15 mm	Proven by customers
	Cary 100	8.5 mm	–
GE Healthcare®	GeneQuant® I/II	GeneQuant I/II	–
	GeneQuant devices other than GeneQuant I/II	15 mm	–
	GeneQuant™ 1300	15 mm	–
Agilent Technologies	8542A UV-Vis Spectroscopy system	15 mm	Proven by customers
	8543 UV-Visible Spectrophotometer	15 mm	Proven by customers
Analytik Jena	SPECORD series	8.5 mm or 15 mm	When using the adjustable cuvette holder for 8.5 mm or 15 mm light path height
	SPEKOL series	8.5 mm	When using the adjustable cuvette holder for 8.5 mm or 15 mm light path height
Bio-Rad®	SmartSpec 3000	8.5 mm	–
Eppendorf®	BioPhotometer/BioPhotometer plus	–	No adapter is required
	BioSpectrometer basic	–	No adapter is required
	BioSpectrometer kinetic	–	No adapter is required
Hitachi®	UV-series	UBA 410–1500	Only available in Europe. For further information: support@eppendorf.com
	Hitachi U1800	15 mm	Proven by customers
	Hitachi U2900	10 mm	Proven by customers
	GeneSpec I/II	UBA 410–1500	Only available in Europe. For further information: support@eppendorf.com
Jenway	Genova	Adapter from Jenway	Please contact your local Techne or Jenway representative
Implen	NanoPhotometer	15 mm	–
PerkinElmer®	Lambda Serie, except EZ series	15 mm	–
	Lambda EZ 201 and EZ 210	8.5 mm	When using the micro cell holder
Shimadzu®	UV-Serie	15 mm	When using the standard cell holder
	UV Multispec-1500	15 mm	–
	BioSpec®	15 mm	–
Techne®	Genova	Adapter from Jenway	Please contact your local Techne or Jenway representative
	Specgene	Adapter from Jenway	Please contact your local Techne or Jenway representative
Thermo Fisher Scientific®	BioMate series	15 mm	When using the single-cell holder
	Helios series	15 mm	When using the single-cell holder
	Genesys 10S	–	Proven by customers

¹ Recommended by the manufacturer. Eppendorf AG assumes no responsibility for the accuracy and completeness of the manufacturer information. For all manufacturers please refer to page 446. Technical specifications subject to change! September 2003 ² So far tested devices. For an updated compatibility list please refer to our homepage or contact the Eppendorf Application Support team.

Photometry Performance Plans



Benefits of preventive maintenance

Regular cleaning, inspection and maintenance of your Eppendorf Photometers ensures that these instruments are consistently operating at peak performance and are ready for use. This is particularly important for precision instruments designed to achieve permanently reproducible measurement results.

Certification Service

Our Operational Qualification service (OQ) includes the performance of comparative measurements with certified reference materials, the cleaning of internal parts and electrical testing to ensure that your instrument is in perfect working order. We recommend that you have your instrument calibrated at regular intervals. This is the only way to ensure that it complies with manufacturer specifications or that it can be correctly readjusted if necessary.

You are also able to verify photometric and wavelength accuracy and the respective precision using the Secondary

UV-VIS Filter Set. In the event your instrument does not conform to specifications, you must have it checked and properly adjusted by a trained service technician.

The filter sets themselves must be inspected every two years as part of a test equipment inspection as their spectral properties can change over time. Your filter set must be tested, maintained and certified directly by the manufacturer at Eppendorf's plant.

i For more information go to www.eppendorf.com/epservices. In selected countries only.

Performance Plans	
(Recommended service period is once per year)	
Maintenance*:	
Cleaning/inspection of housing, cuvette shaft; test of display, keyboard, stability, serial interfaces (printer, USB); log file evaluation; software update, function test with test filter	
Certification Service	
Operational Qualification (OQ) including cleaning and inspection of all internal parts and electrical testing; testing/adjustment of wavelength accuracy/precision and photometric accuracy/precision; temperature check/adjustment of Eppendorf BioSpectrometer kinetic	
Photometer test (wavelength accuracy and precision and photometric accuracy and precision)	
Electrical testing according to country-specific regulations**	
Additional service:	
Inspection of light path	
Adjustment of number of flashes	
Certification of Eppendorf BioPhotometer Secondary UV-VIS Filter Set according to NIST	
Certification of Eppendorf BioSpectrometer Reference Filter Set according to NIST	

* Spare parts that may be required are not included and will be invoiced additionally.
 ** Electrical testing/test duty in Germany is to be performed every 12 months!

Photometry Performance Plans

epServices
for premium performance

**Long-term benefits of preventive maintenance:**

- Reliable system operation over the total system lifetime
- GLP compliant documentation

Features of Eppendorf Performance Plans:

- Eppendorf customer care and quality commitment
- Only use of genuine and quality inspected Eppendorf parts
- Certified service and calibration reports

BioPhotometer, Eppendorf BioPhotometer, Eppendorf BioPhotometer plus	BioSpectrometer, Eppendorf BioSpectrometer basic, Eppendorf BioSpectrometer kinetic
Order No.	Order No.
6132 005.000	6135 005.000
6132 005.018	6135 005.019
6132 005.026	6135 005.027
6132 005.034	6132 005.034
6132 005.042	6132 005.042
6132 005.050	6132 005.050
6131 928.104	–
–	6135 928.109

New Brunswick freezer overview

Three Lines. Over a Dozen Models. All Energy Efficient and Reliable. Which One is Right For You?

Space-Saving Innova® Freezers – provide up to 30 % more storage capacity than freezers of equal size. The space savings are achieved by using thermally-superior Vacuum Insulation Panel technology in combination with traditional urethane foam insulation to reduce the wall thickness from 130 mm to just 80 mm.

Economical Premium Freezers – offer the same top-quality construction and many of the same advanced features as the Innova line, but use conventional foam insulation for a cost-saving alternative.

High Efficiency, HEF® and Green Freezers – These freezers reduce energy consumption by up to 35 % compared to Premium models, making them among the most energy-efficient in the market today. Compare these savings to any other freezer and the choice will be clear. Offered in four sizes.

Accessories – a wide array of back-up systems, racking and more are offered.



- Industry-leading energy efficiency; and the new HEF® line reduces consumption even further.
- Specialized low-temperature door gaskets and seals to prevent cold air loss.
- A single, quiet, energy-efficient condenser fan.
- Efficient control system to reduce compressor cycling times.
- Non-global warming hydrocarbon refrigerants in the 50 Hz Green and HEF lines.
- Refrigerants that do not contain CFC or HCFC gases to reduce greenhouse gases.
- CE and UL certified, and meets WEEE directives.

Five Considerations When Selecting A ULT Freezer

True value is often determined by more than just price. When it comes to the safe storage of your samples, you may want to consider these factors:

Reliability

New Brunswick Freezers use only the very best quality components to ensure reliability, including:

- High-quality compressors to ensure longevity and maintenance-free operation.
- Control systems designed to maximize performance while minimizing compressor stress.
- Durable gaskets to maintain a proper seal and reduce icing.

Performance

New Brunswick Freezers offer these advantages:

- Rapid “pull down” – the time needed for your freezer to return to setpoint after door opening – to maintain sample integrity.
- Superior temperature uniformity to ensure all samples are well protected.
- Insulated inner doors to minimize cold loss during sample access, for rapid temperature recovery and sample stability.

Energy Efficiency

Because they run 24/7 and need to maintain very low temperatures, ULT freezers are traditionally high-energy consumers. With today’s high cost of electricity, and a renewed focus on the environment, minimizing energy usage is paramount. Therefore, New Brunswick Freezers feature:

Footprint

With the high cost and low availability of lab space, your ULT freezer should seamlessly integrate into your space without being physically or audibly obtrusive.

- Innova models provide up to 30 % more storage capacity than freezers of equal size, by utilizing Vacuum Insulation Paneling.
- All New Brunswick freezers offer significant advantages in exterior width and depth dimensions, allowing them to be easily integrated into laboratories and hallways.
- Low noise output means the units will be less obtrusive.
- Novel-sized Innova U101 and U360 models fit in the tightest of spaces.

Customer Service

Because an entire department’s work can be stored in one ULT freezer, any problem with the system requires an immediate response. Therefore, your freezer vendor should be your partner, not just a supplier. New Brunswick Freezers are supported by:

- A global, dedicated team of customer service and technical service technicians to provide a courteous and rapid response.
- A network of highly-trained service personnel that can quickly respond to critical issues.

New Brunswick ULT Freezers – The Eco-Logical Choice!

Go green and save operating costs and the environment with New Brunswick Ultra-Low Temperature Freezers.

New Brunswick -86 °C Freezers are among the most energy-efficient in the industry, reducing energy consumption by thousands of kilowatt hours over our competition. Additionally, New Brunswick Freezers are 95 % recyclable by weight, so they can be disposed of in an environmentally friendly manner with very little impact to the environment.

And, with models in ten sizes, 101 - 725 liters, you'll never have to buy a freezer larger than you actually need, further reducing energy usage, operating costs, and the carbon footprint.

What is a carbon footprint?

One way to measure the amount of pollution produced is by calculating your carbon footprint – the amount of carbon dioxide (CO₂) produced through burning fossil fuels for electricity. For simplicity, CO₂ is expressed in tons emitted per year.

Offset with New Brunswick freezers

The standard rule of thumb is you produce 351 grams of carbon dioxide with each kilowatt hour of electricity you use. In other words, for every kilowatt hour of electricity you **DO NOT** use, you save 351 grams of carbon dioxide from entering the atmosphere.

On average, by selecting a New Brunswick freezer over a competitive unit, you can save up 10 metric tons of CO₂ from entering the atmosphere over the lifetime of the unit. In comparison, when you switch from halogen light bulbs to compact fluorescent bulbs, you save 45 kilograms of CO₂ per bulb per year. The average vehicle traveling 15000 kilometers each year consuming 5.5 liters gasoline per 100 km emits more than 2310 kilograms of carbon dioxide per year.

Not only do you help save the environment, but also substantially reduce your operating costs. To see how much you can save, see the worksheet below.



Less Power Consumption. Smaller Carbon Footprint. Save using New Brunswick Freezers.

New Brunswick freezer model	Capacity (L)	kWh/Day New Brunswick freezers	kWh/day competitor's freezer	kWh/day savings with New Brunswick freezer	Average cost per kWh**	New Brunswick energy savings over 10 years	Reduction in CO ₂ emission tons over 10 years***	Energy savings for 25 units over 10 years
Innova U360 ²	360	11.7	19.1	7.4	€ 0.15	€ 4,051.50	9.5	€ 101,287.50
Innova U725-G* ¹	725	15.2	22.4	7.2		€ 3,942.00	9.2	€ 98,550.00
Innova U725 ²	725	16.4	28.6	12.2		€ 6,679.50	15.6	€ 166,987.50
Premium U410 ²	410	13.0	19.2	6.2		€ 3,394.50	7.9	€ 84,862.50
HEF U410 ²	410	8.6	19.2	10.6		€ 5,803.50	13.6	€ 145,087.50
Premium U570 ²	570	14.1	21.0	6.9		€ 3,777.75	8.8	€ 94,443.75
HEF U570 ²	570	12.2	21.0	8.8		€ 4,818.00	11.3	€ 120,450.00

¹ 50 Hz







² 60 Hz

* Hydrocarbon based model

** according to the European Commission eurostat

*** electricity sources in Europe emit 350.9 g CO₂ per kWh, according to the International Energy Agency (IEA)

New Brunswick freezers guide

Innova (page 255)							
Freezers	Upright				Chest		
							
Model	U101	U360	U535	U725	C585	C760	
Page	256	257	258	259	260	260	
Technical specifications							
Capacity (Liters)	101	360	535	725	585	760	
External dimensions (H x W* x D) cm**	83 x 90 x 56.6	195 x 60 x 86.7	195 x 80 x 86.7	195 x 102.5 x 86.7	109.2 x 169 x 78.5	109.2 x 205 x 78.5	
Net weight (kg)	116	230	250	315	240	285	
Voltage	230 V, 50 Hz	230 V, 50 Hz	230 V, 50 Hz	230 V, 50 Hz	230 V, 50 Hz	230 V, 50 Hz	
Plug provided	Schuko & UK	Schuko & UK	Schuko & UK	Schuko & UK	Schuko & UK	Schuko & UK	
Full load amp draw (A)	5.5	6.5	5	9.5	5.5	9.5	
Performance data							
Power consumption kWh/day	8.8	11.8	13.2	15.8	13.6	16	
Heat Output (Watts)	440	590	720	750	700	750	
Pull down time (hrs)***	3.7	5.6	5.3	5.6	4.5	5.8	
Voltage stabilizer, external	Optional	Optional	Optional	Optional	Optional	Optional	
Caster wheels	Standard	Standard	Standard	Standard	Standard	Standard	
Capacity							
Freezer racks							
Max racks per shelf	3	3	4	6	N/A	N/A	
Number of shelves	2		3		N/A	N/A	
Max racks per freezer	6	9	12	18	32	44	
Rack dimensions (H x W x D) cm	29.25 x 14.1 x 30.8	41.05 x 14.1 x 56.5			75.2 x 13.9 x 13.6		
Box capacity per rack							
5 cm box (H)	10		28		13		
7.5 cm box (H)	6		20		9		
10 cm box (H)	4		12		6		
Box capacity per freezer							
5 cm box (H)	60	252	336	504	416	572	
7.5 cm box (H)	36	180	240	360	288	396	
10 cm box (H)	24	108	144	216	192	264	
Sample capacity							
5 cm box (H)	6,000	25,200	33,600	50,400	41,600	57,200	
7.5 cm box (H)	3,600	18,000	24,000	36,000	28,800	39,600	
10 cm box (H)	2,400	10,800	14,400	21,600	19,200	26,400	





* Door open adds up to 15 cm.

** To allow for handles and hinges, add 80 mm to width of upright freezers and 110 mm to the depth of chest freezers.

*** To -85 °C, empty freezer, from 20–25 °C ambient conditions.

New Brunswick freezers guide

Premium (page 262)

	Upright		Chest	
				
	U410	U570	C340	C660
	263	264	265	265
Technical specifications				
	410	570	340	660
	191.5 x 80 x 85.2	192.5 x 102.5 x 85.25	107.5 x 134 x 84	107.5 x 205 x 84
	235	265	200	280
	230 V, 50 Hz	230 V, 50 Hz	230 V, 50 Hz	230 V, 50 Hz
	Schuko & UK	Schuko & UK	Schuko & UK	Schuko & UK
	5.8	6	4.5	6
Performance data				
	12.6	13.6	10.1	14.3
	650	700	580	650
	5.3	5.2	3.8	5.8
	Optional	Optional	Optional	Optional
	Standard	Standard	Standard	Standard
Capacity				
Freezer racks				
	3	5	N/A	N/A
		5	N/A	N/A
	15	25	20	40
	23.5 x 14.1 x 56.5		75.2 x 13.9 x 13.6	
Box capacity per rack				
	16		13	
	12		9	
	8		6	
Box capacity per freezer				
	240	400	260	520
	180	300	180	360
	120	200	120	240
Sample capacity				
	24,000	40,000	26,000	52,000
	18,000	30,000	18,000	36,000
	12,000	20,000	12,000	24,000

New Brunswick freezers guide

Freezers	Green and HEF® (page 267)			
	Upright			Chest
				
Model	U725-G	HEF U410	HEF U570	HEF C660
Page	268	269	270	271
Technical specifications				
Capacity (Liters)	725	410	570	660
External dimensions (H x W* x D) cm**	195 x 102.5 x 86.7	191.5 x 80 x 85.2	192.5 x 102.5 x 85.25	107.5 x 205 x 84
Floor weight (kg)	315	235	265	280
Voltage	230 V, 50 Hz	230 V, 50 Hz	230 V, 50 Hz	230 V, 50 Hz
Plug provided	Schuko & UK	Schuko & UK	Schuko & UK	Schuko & UK
Full load amp draw (A)	9.5	5	6	6
Performance data				
Power consumption kWh/day	15.2	8.4	8.7	11.4
Heat Output (Watts)	730	505	520	580
Pull down time (hrs)***	5.2	4.1	5.3	6
Voltage stabilizer, external	—	Optional	Optional	Optional
Caster wheels	Standard	Standard	Standard	Standard
Capacity				
Freezer racks				
Max racks per shelf	6	3	5	N/A
Number of shelves	3	5	5	N/A
Max racks per freezer	18	15	25	40
Rack dimensions (H x W x D) cm	41.05 x 14.1 x 56.5	23.5 x 14.1 x 56.5		75.2 x 13.9 x 13.6
Box capacity per rack				
5 cm box (H)	28	16	16	13
7.5 cm box (H)	20	12	12	9
10 cm box (H)	12	8	8	6
Box capacity per freezer				
5 cm box (H)	504	240	400	520
7.5 cm box (H)	360	180	300	360
10 cm box (H)	216	120	200	240
Sample capacity				
5 cm box (H)	50,400	24,000	40,000	52,000
7.5 cm box (H)	36,000	18,000	30,000	36,000
10 cm box (H)	21,600	12,000	20,000	24,000

* Door open adds up to 15 cm.

** To allow for handles and hinges, add 80 mm to width of upright freezers and 110 mm to the depth of chest freezers.

*** To -85 °C, empty freezer, from 20–25 °C ambient conditions.

Innova® freezer features

Description

Space-saving Innova Freezers offer up to 30 % more internal capacity than freezers of equal size. Six models are offered, U101, U360, U535, U725, C585 and C760. Vacuum insulation paneling reduces wall thickness providing up to 30 % more storage capacity than traditionally-insulated freezers, without impacting footprint.



Innova U101, unique on or under the counter freezer is ideal for clinical trials or labs short on space



Innova U360, ultra-slim U360 is just 67 cm wide including the handle



Innova U535 offers 535 liters of storage space



Innova U725 offers the most capacity (725 liters) and is the most popular Innova upright



Innova C585 offers 585 liters of storage space



Innova C760 is the largest chest freezer available from any manufacturer at 760 liters

Product features

- Quick pull down and recovery times with reliable heavy-duty compressors
- Inner doors in upright models are gasketed and insulated creating three separate compartments minimizing cold air loss while accessing your samples (two in U101)
- Inner doors can be quickly removed without tools for easier defrosting
- Adjustable height shelves for storage flexibility. Each shelf is adjustable in 1.3 cm increments
- High-grade seals for outer door on all upright and chest models allow for rapid temperature recovery
- Stainless steel interior is easily cleaned and eliminates the possibility of oxidation
- Significantly reduced noise levels achieved through advanced compressor housing with noise-reducing insulation enabling placement of the freezer directly in your work area
- Unique heated air vent with plunger to clear ice buildup and to relieve vacuum formation to gain immediate access to the freezer
- SMART Plus™ diagnostics which allows system engineers to diagnose most issues over the phone, saving you time and money
- Each freezer slides effortlessly through a standard doorway simplifying installation
- Easy-to-read LED display with display of system alarms and diagnostics
- Advanced security features include four-digit password to protect temperature and alarm settings; keyed door lock with optional padlock adapter; lockable security plate to protect power and alarm on-off switches; and remote alarm contacts for connection to your external building alarm/monitoring system

Innova® U101 upright freezers



Product features

General product features of the Innova family are listed on page 255. Specific features for Innova U101 include:

- Capacity: 101 L, up to 60 boxes or 6,000 samples
- Under the counter design for immediate access to personal samples and for labs tight on floor space, occupying only 90 x 56 cm of floor space
- For added storage space, an additional U101 can be stacked on top of one another doubling the capacity while utilizing the same floor space
- Engineered with optimal air flow in mind allowing the unit to be placed flush up against the wall

Description

Keep your samples safe, secure and easily accessible with the space saving Innova U101. This unique, personal sized upright freezer packs in all the features of our full uprights into one small package. The U101 fits easily on or under your lab bench or can be stacked two high.



Model U101 is a unique, personal-size upright freezer that fits on or under your lab bench, or stacks two high.

Technical specifications

Description	Innova U101
Insulation type	Vacuum insulation paneling
Electrical	230 V, 50 Hz
Ambient to -85 °C pull down	3.7 hrs
Power consumption	8.8 kWh/day 367 Watts
No. of inner doors	2
No. of cascading compressors	2
Capacity	101 L
Racks per freezer	6
5 cm box capacity	60
7.5 cm box capacity	36
10 cm box capacity	24
External dimensions (H x W x D)	83 x 90 x 56.6 cm
Internal dimensions (H x W x D)	64 x 48 x 33 cm
Net weight	116 kg

Ordering information

Description	Order no.	
U101 under the counter upright, 101 L internal capacity		
230 V, 50 Hz	U9420-0001	⚡
Back-up systems		
LN ₂ * 230 V, 50 Hz	U9044-0004	⚡
CO ₂ * 230 V, 50 Hz	U9043-0004	⚡
U101 racks		
5 cm box (H), 10 boxes per rack	K0641-3003	
7.5 cm box (H), 6 boxes per rack	K0641-3004	
10 cm box (H), 4 boxes per rack	K0641-3005	
U101 stacking kit		
U101 stacking kit	P0625-0020	
Inner shelf	P0625-0180	

* Factory installed at no extra charge if purchased with the freezer at the same time.

Innova® U360 upright freezers



Description

Model U360 provides advanced design and sophisticated controls for labs tight on space. Ultra-slender at 67 cm wide, the U360 is the first of the Innova line to feature our advanced new controller with extra-large display and graphing capability. The U360 offers all the quality construction and system advantages as our original Innova models plus much more.

Product features

General product features of the Innova family are listed on page 255. Specific features for Innova U360 include:

- Capacity: 360 L, up to 252 boxes or 25,200 samples
- Ultra-slender design for labs tight on floor space, occupying only 60 x 86.7 cm
- Bright, eye level backlit LCD display (12 x 6.8 cm) provides immediate review of important parameters “at a glance” from a distance
- On-screen system messaging: displays setpoints, details of alarms, door openings and operating conditions with time-date stamp
- Automated data logging: temperature, alarms and door opening data are stored for up to 30 days, for on-screen graphing
- Flexible alarm programming helps avoid false temperature alarms and allows greater user flexibility in alarm control

Technical specifications

Description	Innova U360
Insulation type	Vacuum insulation paneling
Electrical	230 V, 50 Hz
Ambient to -85 °C pull down	5.6 hrs
Power consumption	11.8 kWh/day 492 Watts
No. of inner doors	3
No. of cascading compressors	2
Capacity	360 L
Racks per freezer	9
5 cm box capacity	252
7.5 cm box capacity	180
10 cm box capacity	108
External dimensions (H x W x D)	195 x 60 x 86.7 cm
Internal dimensions (H x W x D)	135 x 44 x 61.5 cm
Net weight	230 kg

Ordering information

Description	Order no.	
U360 ultra-slim upright, 360 L internal capacity		
230 V, 50 Hz	U9425-0001	⚡
Back-up systems		
LN ₂ * 230 V, 50 Hz	U9044-0004	⚡
CO ₂ * 230 V, 50 Hz	U9043-0004	⚡
U360 racks		
5 cm box (H), 28 boxes per rack	K0641-3000	
7.5 cm box (H), 20 boxes per rack	K0641-3001	
10 cm box (H), 12 boxes per rack	K0641-3002	

* Factory installed at no extra charge if purchased with the freezer at the same time.

⚡ **Ordering information for other voltage options begins on page 471.**

Innova® U535 upright freezers



Description

The U535 is a versatile Innova upright. With a footprint occupying 80 x 86.7 cm, it can be placed almost anywhere and still hold a significant number of samples.

Product features

General product features of the Innova family are listed on page 255. Specific features for Innova U535 include:

- Capacity: 535 L, up to 336 boxes or 33,600 samples
- Vacuum insulation panel design occupies virtually the same footprint as a traditionally-foamed 410 Liter ULT-Freezer, but holds over 25 % more samples
- Bright, eye level, easy to read and reach front mounted LED control panel, provides temperature readout and fault codes

Technical specifications

Description	Innova U535
Insulation type	Vacuum insulation paneling
Electrical	230 V, 50 Hz
Ambient to -85 °C pull down	5.3 hrs
Power consumption	13.2 kWh/day 550 Watts
No. of inner doors	3
No. of cascading compressors	2
Capacity	535 L
Racks per freezer	12
5 cm box capacity	336
7.5 cm box capacity	240
10 cm box capacity	114
External dimensions (H x W x D)	195 x 80 x 86.7 cm
Internal dimensions (H x W x D)	136.5 x 64 x 61.5 cm
Net weight	250 kg

Ordering information

Description	Order no.	
U535 upright, 535 L internal capacity		
230 V, 50 Hz	U9430-0001	⚡
Back-up systems		
LN ₂ * 230 V, 50 Hz	U9044-0004	⚡
CO ₂ * 230 V, 50 Hz	U9043-0004	⚡
U535 racks		
5 cm box (H), 28 boxes per rack	K0641-3000	
7.5 cm box (H), 20 boxes per rack	K0641-3001	
10 cm box (H) 12 boxes per rack	K0641-3002	

* Factory installed at no extra charge if purchased with the freezer at the same time.

Innova® U725 upright freezers



Description

The most popular upright freezer in our lineup is the U725, the perfect balance of power and efficiency. The U725 offers fast pull-down and recovery between door openings while consuming only 15.8 kWh/day.

Product features

General product features of the Innova family are listed on page 255. Specific features for Innova U725 include:

- Capacity: 725 L, up to 504 boxes or 50,400 samples
- Vacuum insulation integrated design with 725 liter internal capacity. Occupies approximately the same footprint as a traditional foamed 570 liter ULT-Freezer, but holds over 25 % more samples
- Bright, eye level, easy to read and reach front mounted LED control panel, provides temperature readout and fault codes
- Energy-efficient design reduces power consumption by 40-50 % and increases compressor life

Technical specifications

Description	Innova U725
Insulation type	Vacuum insulation paneling
Electrical	230 V, 50 Hz
Ambient to -85°C pull down	5.6 hrs
Power consumption	15.8 kWh/day 660 Watts
No. of inner doors	3
No. of cascading compressors	2
Capacity	725 L
Racks per freezer	18
5 cm box capacity	504
7.5 cm box capacity	360
10 cm box capacity	216
External dimensions (H x W x D)	195 x 102.5 x 86.7 cm
Internal dimensions (H x W x D)	136.5 x 86.5 x 61.5 cm
Net weight	315 kg

Ordering information

U725 upright, 725 L internal capacity		
230 V, 50 Hz	U9440-0001	⚡
Back-up systems		
LN ₂ * 230 V, 50 Hz	U9044-0004	⚡
CO ₂ * 230 V, 50 Hz	U9043-0004	⚡
U725 racks		
5 cm box (H), 28 boxes per rack	K0641-3000	
7.5 cm box (H), 20 boxes per rack	K0641-3001	
10 cm box (H), 12 boxes per rack	K0641-3002	

* Factory installed at no extra charge if purchased with the freezer at the same time.

⚡ **Ordering information for other voltage options begins on page 471.**

Innova® C585 and Innova® C760 chest freezers



Description

New Brunswick chest freezers combine the high efficiency and superior capacity with ergonomic operation while maintaining their reputation of long-term durability and quality construction. The Innova line of chest freezers includes the efficient C585 and large-capacity C760.

Product features

General product features of the Innova family are listed on page 255. Specific features for Innova C585 and C760 include:

- The C760 has the largest capacity in its class: 760 L, up to 572 boxes or 57,200 samples
- The C585, with 585 liter capacity, offers storage for up to 46,000 samples. It consumes only 13.9 kWh/day, reducing your facility's carbon footprint
- Bright, easy to read and reach front mounted LED control panel provides temperature readout and fault codes
- 30 mm thick inner lids, constructed from molded insulation

Technical specifications

Description	Innova C585	Innova C760
Insulation type	Vacuum insulation paneling	
Electrical	230 V, 50 Hz	230 V, 50 Hz
Ambient to -85 °C pull down	4.5 hrs	5.8 hrs
Power consumption	13.6 kWh/day 565 Watts	16 kWh/day 665 Watts
No. of cascading compressors	2	2
Capacity	585 L	760 L
Racks per freezer	32	44
5 cm box capacity	416	572
7.5 cm box capacity	288	396
10 cm box capacity	192	264
External dimensions (H x W x D), cm	109.2 x 169 x 78.5	109.2 x 205 x 78.5
Internal dimensions (H x W x D), cm	78 x 120 x 62.5	78 x 156 x 62.5
Net weight	240 kg	285 kg

Ordering information

Description	Order no.	
C585 chest, 585 L internal capacity		
230 V, 50 Hz	U9400-0001	⚡
C760 chest, 760 L internal capacity		
230 V, 50 Hz	U9410-0001	⚡
Back-up systems		
LN ₂ * 230 V, 50 Hz	U9044-0004	⚡
CO ₂ * 230 V, 50 Hz	U9043-0004	⚡
Racks, C585 & C760		
5 cm box (H), 13 boxes per rack	K0641-1690	
7.5 cm box (H), 9 boxes per rack	K0641-1700	
10 cm box (H), 6 boxes per rack	K0641-1750	

* Factory installed at no extra charge if purchased with the freezer at the same time.

⚡ **Ordering information for other voltage options begins on page 471.**

Racks for Innova® and "G" Green freezers

U101 Racks



For 5 cm tall boxes, 6 per freezer. Each rack holds 10 boxes. Order No. K0641-3003



For 7.5 cm tall boxes, 6 per freezer. Each rack holds 6 boxes. Order No. K0641-3004



For 10 cm tall boxes, 6 per freezer. Each rack holds 4 boxes. Order No. K0641-3005

U360, U535, U725 and U725-G Upright Freezer Racks



For 5 cm tall boxes. Fits U360, U535 and U725 and holds 9/12/18 racks per freezer, respectively. Each rack holds 28 boxes. Order No. K0641-3000



For 7.5 cm tall boxes. Fits U360, U535 and U725 and holds 9/12/18 racks per freezer, respectively. Each rack holds 20 boxes. Order No. K0641-3001



For 10 cm tall boxes. Fits U360, U535 and U725 and holds 9/12/18 racks per freezer, respectively. Each rack holds 12 boxes. Order No. K0641-3002



C585 & C760 Chest Freezer Racks

For 5 cm tall boxes. Each rack holds 13 boxes. Order No. K0641-1690

For 7.5 cm tall boxes. Each rack holds 9 boxes. Order No. K0641-1700

For 10 cm tall boxes. Each rack holds 6 boxes. Order No. K0641-1750

Boxes and additional accessories begin on page 272. For rack dimensions see page 252.

Premium freezer features

Description

Economical Premium Freezers are conventionally-insulated, providing a cost effective alternative, with many of the same features and quality as the Innova models. Four models are available: U410, U570, C340 and C660.

- Two large-capacity uprights – for easy access to samples, choose the U410 or U570, each with five insulated compartments and four adjustable-height shelves
- Two chests – if a chest style is preferred, choose C340 or C660, each with insulated sub-lids that provide added sample protection
- CO₂ and LN₂ back-up systems, racking and more are available



Premium U410, the smallest Premium upright offers 410 liters of storage space



Premium U570, (570 liters) combines both storage capacity and energy efficiency



Premium C340, the smallest chest freezer offers 340 liters of storage

Product features

- Polyurethane foam insulation provides efficient insulation protection
- Quick pull down and recovery times with reliable heavy-duty compressors
- Inner doors are insulated minimizing cold air loss while accessing your samples in one of five compartments
- Five compartments, each accepts New Brunswick racks and other brands without shelf adjustment
- Adjustable-height shelves for storage flexibility. Each shelf is adjustable in 1.3 cm increments for odd size rack setup.
- Low temperature outer door seals allow gaskets to remain flexible at -86 °C temperatures
- Stainless steel interior is easily cleaned and eliminates the possibility of oxidation and cross contamination
- Significantly reduced noise levels achieved through advanced compressor housing with noise-reducing insulation enabling placement of the freezer directly in your work area
- Unique heated air vent with plunger to clear ice buildup and to relieve vacuum formation to gain immediate access to the freezer
- Password protection of alarm and temperature setpoints to prevent unauthorized users from altering settings
- SMART Plus™ diagnostics which allows system engineers to diagnose most issues over the phone, saving you time and money
- Each freezer slides effortlessly through a standard doorway simplifying installation



Premium C660 is the largest Premium chest freezer, offering 660 liters of storage space

Premium U410 upright freezers



Description

The U410 is the smallest Premium upright freezer providing excellent performance. Pull down time from ambient to -85°C is 5.3 hours while consuming only 12.6 kWh/day. The U410 will provide years of maintenance-free, reliable operation with minimal energy consumption compared to competitive models.

Product features

General product features of the Premium family are listed on page 262. Specific features for Premium U410 include:

- Capacity: 410 L, up to 240 boxes or 24,000 samples
- Five compartments each with insulated inner doors. Accepts New Brunswick and other brand racks without shelf adjustment.
- Bright, eye level, easy to read and reach front-mounted LED control panel provides temperature readout and fault codes

Technical specifications

Description	Premium U410
Insulation type	Polyurethane Foam
Electrical	230 V, 50 Hz
Ambient to -80°C pull down	5.3 hrs
Power consumption	12.6 kWh/day 525 Watts
No. of inner doors	5
No. of cascading compressors	2
Capacity	410 L
Racks per freezer	15
5 cm box capacity	240
7.5 cm box capacity	180
10 cm box capacity	120
External dimensions (H x W x D)	191.5 x 80 x 85.2 cm
Internal dimensions (H x W x D)	126.5 x 55 x 57.5 cm
Net weight	235 kg

Ordering information

Description	Order no.	
U410 upright, 410 L internal capacity		
230 V, 50 Hz	U9260-0001	⚡
Back-up systems		
LN ₂ * 230 V, 50 Hz	U9044-0008	⚡
CO ₂ * 230 V, 50 Hz	U9043-0008	⚡
U410 racks		
5 cm box (H), 16 boxes per rack	K0641-1900	
7.5 cm box (H), 12 boxes per rack	K0641-1890	
10 cm box (H), 8 boxes per rack	K0641-1880	

* Factory installed at no extra charge if purchased with the freezer at the same time.

⚡ Ordering information for other voltage options begins on page 471.

Premium U570 upright freezers



Description

The U570 is the largest upright freezer in the Premium line. The U570 will provide years of maintenance-free, reliable operation with minimal energy consumption compared to competitive models.

Product features

General product features of the Premium family are listed on page 262. Specific features for Premium U570 include:

- Capacity: 570 L, up to 400 boxes or 40,000 samples
- Five compartments each with insulated inner doors. Accepts New Brunswick and other brand racks without shelf adjustment.
- Bright, eye level, easy to read and reach front-mounted LED control panel provides temperature readout and fault codes
- Energy-efficient design reduces power consumption and increases compressor life

Technical specifications

Description	Premium U570
Insulation type	Polyurethane foam
Electrical	230 V, 50 Hz
Ambient to -80 °C pull down	5.2 hrs
Power consumption	13.6 kWh/day 565 Watts
No. of inner doors	5
No. of cascading compressors	2
Capacity	570 L
Racks per freezer	25
5 cm box capacity	400
7.5 cm box capacity	300
10 cm box capacity	200
External dimensions (H x W x D)	192.5 x 102.5 x 85.2 cm
Internal dimensions (H x W x D)	126.5 x 76.5 x 57.5 cm
Net weight	265 kg

Ordering information

Description	Order no.	
U570 upright, 570 L internal capacity		
230 V, 50 Hz	U9270-0001	⚡
Back-up systems		
LN ₂ * 230 V, 50 Hz	U9044-0008	⚡
CO ₂ * 230 V, 50 Hz	U9043-0008	⚡
U570 racks		
5 cm box (H), 16 boxes per rack	K0641-1900	
7.5 cm box (H), 12 boxes per rack	K0641-1890	
10 cm box (H), 8 boxes per rack	K0641-1880	

* Factory installed at no extra charge if purchased with the freezer at the same time.

Premium C340 and Premium C660 chest freezers



Description

New Brunswick chest freezers combine the high efficiency and superior capacity with ergonomic operation while maintaining their reputation of long-term durability and quality construction. The Premium line of chest freezers offers a cost-saving alternative for those who need a reliable freezer but do not require the space-saving advantages of the Innova line.

Product features

General product features of the Premium family are listed on page 262. Specific features for Premium C340 and C660 include:

- C660 offers 660 L of internal capacity and holds up to 520 boxes or 52,000 samples
- C340 offers 340 L of internal capacity and holds up to 260 boxes or 26,000 samples
- Bright, easy to read and reach front-mounted LED control panel provides temperature readout and fault codes
- 10 mm thick insulated inner lids with stainless steel trim

Technical specifications

Description	Premium C340	Premium C660
Insulation type	Polyurethane foam	
Electrical	230 V, 50 Hz	230 V, 50 Hz
Ambient to -85 °C pull down	3.8 hrs	5.8 hrs
Power consumption	10.1 kWh/day 420 Watts	14.3 kWh/day 595 Watts
No. of cascading compressors	2	2
Capacity	340 L	660 L
Racks per freezer	20	40
5 cm box capacity	260	520
7.5 cm box capacity	180	360
10 cm box capacity	120	240
External dimensions (H x W x D)	107.5 x 134 x 84 cm	107.5 x 205 x 84 cm
Internal dimensions (H x W x D)	76 x 76 x 59 cm	76 x 147 x 59 cm
Net weight	205 kg	280 kg

Ordering information

Description	Order no.	
C340 chest, 340 L internal capacity		
230 V, 50 Hz	U9230-0001	⚡
C660 chest, 660 L internal capacity		
230 V, 50 Hz	U9250-0001	⚡
Back-up systems		
LN ₂ * 230 V, 50 Hz	U9044-0008	⚡
CO ₂ * 230 V, 50 Hz	U9043-0008	⚡
Racks, C340 & C660		
5 cm box (H), 13 boxes per rack	K0641-1690	
7.5 cm box H, 9 boxes per rack	K0641-1700	
10 cm box (H), 6 boxes per rack	K0641-1750	

* Factory installed at no extra charge if purchased with the freezer at the same time.

⚡ **Ordering information for other voltage options begins on page 471.**

Racks for Premium and HEF® freezers

U410 & U570 Upright Freezer Racks



For 5 cm tall boxes.

Holds 15 or 25 racks/freezer, respectively. Each rack holds 16 boxes. Order No. K0641-1900



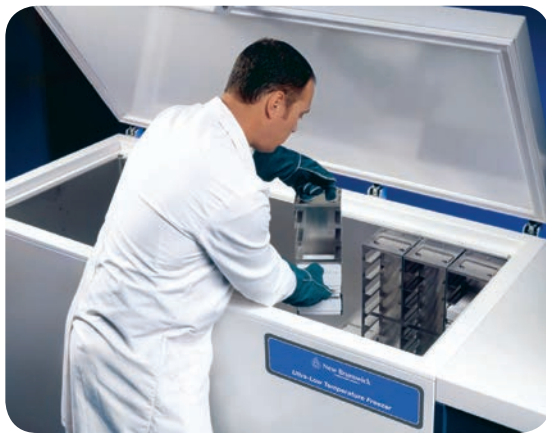
For 7.5 cm tall boxes.

Holds 15 or 25 racks/freezer, respectively. Each rack holds 12 boxes. Order No. K0641-1890



For 10 cm tall boxes.

Holds 15 or 25 racks/freezer, respectively. Each rack holds 8 boxes. Order No. K0641-1880



C340 & C660 Chest Freezer Racks

For 5 cm tall boxes.

Fits C340 and C660 and holds 20 or 40 racks/freezer, respectively. Each rack holds 13 boxes. Order No. K0641-1690

For 7.5 cm tall boxes.

Fits C340 and C660 and holds 20 or 40 racks/freezer, respectively. Each rack holds 9 boxes. Order No. K0641-1700

For 10 cm tall boxes.

Fits C340 and C660 and holds 20 or 40 racks/freezer, respectively. Each rack holds 6 boxes. Order No. K0641-1750

Boxes and additional accessories begin on page 272. For rack dimensions see page 253.

Green and HEF® high-efficiency freezer features

Description

Energy-saving HEF® and Green Freezers are among the most energy-efficient ULT freezers in the industry. They reduce energy consumption by up to 35 % compared to our already energy-saving Innova and Premium models. If your goal is to safely store your samples while saving operating expense and being good to the environment, these are the models to choose.



HEF C660 is a large-capacity chest freezer, with 660 liters of storage space

Product features

- The HEF models are identical in all respects to the same-sized Premium freezer models, but use a 130 mm thick combination of super-insulating Vacuum Insulation Panels and traditional foam, instead of urethane alone, to achieve exceptional energy efficiency
- HEF models are offered in three capacities, 410 and 570 liter uprights, as well as a 660 liter chest
- 50 Hz HEF models additionally use hydrocarbon-based refrigerants to further reduce energy consumption by another 10 %
- Green model U725-G is our largest high-efficiency upright freezer, at 725 liters
- U725-G is identical to the Innova® U725 in all respects, but uses hydrocarbon-based refrigerants to reduce energy consumption and greenhouse gases. Offered with air cooling or with water-cooling option for further energy savings
- For more product features see the Innova U725, or Premium U410, U570 or C660 pages



HEF U410 offers 410 liters of storage capacity in an upright design



HEF U570 is a mid-sized upright offering 570 liters of storage capacity



U725-G is our largest capacity upright, offering 725 liters of storage capacity

U725-G Green Upright Freezer



Description

For large-capacity needs, New Brunswick's U725-G "Green" freezer is one of the most environmentally friendly, energy efficient ULT freezers on the market. It is identical in all respects to Innova U725 except that in addition to eliminating all use of CFCs and HCFCs, this model is also free of hydrofluorocarbons (HFCs) to further reduce energy consumption and greenhouse gases.

Product features

- Capacity: 725 L, up to 504 boxes or 50,400 samples
- Uses safe and reliable hydrocarbon-based refrigerants in place of traditional refrigerants to reduce energy consumption by another 10 % over our already energy-efficient U725 freezer
- Air cooled and water cooled models offered. Water-cooling with energy-saving heat recapture provides maximum energy and environmental savings
- Space saving design uses Vacuum Insulation Panel technology coupled with traditional urethane foam in an 80 mm thick wall to maximize storage capacity. 725 liter system occupies approximately the same footprint as a 570 liter ULT freezer
- Identical construction, quality and features as the standard model Innova U725

Technical specifications

Description	U725-G Green
Insulation type	Vacuum insulation paneling
Electrical	230 V, 50 Hz
Ambient to -80 °C pull down	5.4 hrs
Power consumption	15.2 kWh/day 635 Watts
No. of inner doors	3
No. of cascading compressors	2
Capacity	725 L
Racks per freezer	18
5 cm box capacity	504
7.5 cm box capacity	360
10 cm box capacity	216
External dimensions (H x W x D)	195 x 102.5 x 86.7 cm
Internal dimensions (H x W x D)	136.5 x 86.5 x 61.5 cm
Net weight	315 kg

Ordering information

Description	Order no.	
U725-G Green upright, 725 L internal capacity		
230 V, 50 Hz	U9440-0005	⚡
230 V, 50 Hz, water cooled	U9440-0004	⚡
Back-up systems		
LN ₂ * 230 V, 50 Hz	U9044-0004	⚡
CO ₂ * 230 V, 50 Hz	U9043-0004	⚡
U725-G Green racks		
5 cm box (H), 28 boxes per rack	K0641-3000	
7.5 cm box (H), 20 boxes per rack	K0641-3001	
10 cm box (H), 12 boxes per rack	K0641-3002	

* Factory installed at no extra charge if purchased with the freezer at the same time.

HEF® U410 High Efficiency Upright Freezer

**Description**

New Brunswick's HEF freezers are among the most environmentally friendly, energy efficient ULT freezers on the market. The most compact model in the HEF line, upright HEF U410 is identical to the Premium U410, except that it further reduces energy consumption by another 33 %.

Product features

- Capacity: 410 L, up to 240 boxes or 24,000 samples
- Achieves energy savings through use of a 130 mm-thick layer of insulation, composed of Vacuum Insulation Panels and traditional urethane foam
- 50 Hz models additionally use reliable and safe hydrocarbon-based refrigerants for 10 % further energy savings
- Identical construction, quality and features as the standard model Premium U410, including five compartments, four adjustable shelves, heated-air vent with ice-clearing plunger, advanced security and more

Technical specifications

Description	HEF U410
Insulation type	Polyurethane Foam
Electrical	230 V, 50 Hz
Ambient to -85 °C pull down	5.6 hrs
Power consumption	8.4 kWh/day 350 Watts
No. of inner doors	5
No. of cascading compressors	2
Capacity	410 L
Racks per freezer	15
5 cm box capacity	240
7.5 cm box capacity	180
10 cm box capacity	120
External dimensions (H x W x D)	191.5 x 80 x 85.2 cm
Internal dimensions (H x W x D)	126.5 x 55 x 57.5 cm
Net weight	235 kg

Ordering information

Description	Order no.	
HEF U410 upright, 410 L internal capacity		
230 V, 50 Hz	U9260-0008	⚡
Back-up systems		
LN ₂ * 230 V, 50 Hz	U9044-0008	⚡
CO ₂ * 230 V, 50 Hz	U9043-0008	⚡
HEF U410 racks		
5 cm box (H), 16 boxes per rack	K0641-1900	
7.5 cm box (H), 12 boxes per rack	K0641-1890	
10 cm box (H), 8 boxes per rack	K0641-1880	

* Factory installed at no extra charge if purchased with the freezer at the same time.

⚡ **Ordering information for other voltage options begins on page 471.**

HEF® U570 High Efficiency Upright Freezer

**Description**

Like all New Brunswick HEF high efficiency freezers, the HEF U570 is one of the most environmentally friendly, energy efficient -86°C freezers on the market. The HEF U570 is identical to New Brunswick's Premium U570 upright freezer, except that it further reduces energy consumption by another 35,6 %.

Product features

- Capacity: 570 L, up to 400 boxes or 40,000 samples
- Achieves energy savings through use of a 130 mm-thick layer of insulation, composed of Vacuum Insulation Panels and traditional urethane foam
- 50 Hz models additionally use reliable and safe hydrocarbon-based refrigerants for 10 % further energy savings
- Identical construction, quality and features as the Premium U570, including five compartments, four adjustable shelves, heated-air vent with ice-clearing plunger, advanced security and more

Technical specifications

Description	HEF U570
Insulation type	Polyurethane foam
Electrical	230 V, 50 Hz
Ambient to -80 °C pull down	5.5 hrs
Power consumption	8.7 kWh/day 364 Watts
No. of inner doors	5
No. of cascading compressors	2
Capacity	570 L
Racks per freezer	25
5 cm box capacity	400
7.5 cm box capacity	300
10 cm box capacity	200
External dimensions (H x W x D)	192.5 x 102.5 x 85.2 cm
Internal dimensions (H x W x D)	126.5 x 76.5 x 57.5 cm
Net weight	295 kg

Ordering information

Description	Order no.	
HEF U570 upright, 570 L internal capacity		
230 V, 50 Hz	U9270-0008	⚡
Back-up systems		
LN ₂ * 230 V, 50 Hz	U9044-0008	⚡
CO ₂ * 230 V, 50 Hz	U9043-0008	⚡
HEF U570 racks		
5 cm box (H), 16 boxes per rack	K0641-1900	
7.5 cm box (H), 12 boxes per rack	K0641-1890	
10 cm box (H), 8 boxes per rack	K0641-1880	

* Factory installed at no extra charge if purchased with the freezer at the same time.

HEF® C660 High Efficiency Chest Freezer

**Description**

The large-capacity HEF C660 is one of the most energy efficient, eco-friendly chest freezers available on the market today. It is identical to New Brunswick's Premium C660, except that it further reduces energy consumption by another 25 %.

Product features

- Capacity: 660 L, up to 520 boxes or 52,000 samples
- Achieves energy savings through use of a 130 mm-thick layer of insulation, composed of Vacuum Insulation Panels and traditional urethane foam
- 50 Hz models additionally use reliable and safe hydrocarbon-based refrigerants for 10 % further energy savings
- Identical construction, quality and features as the standard model Premium 660, including three insulated subblids made of 10 mm thick panels with stainless steel edge, large bright LED, battery backup, heated-air vent with ice-clearing plunger, advanced security and more

Technical specifications

Description	HEF C660
Insulation type	Polyurethane foam
Electrical	230 V, 50 Hz
Ambient to -85 °C pull down	5 hrs
Power consumption	11.4 kWh/day 475 Watts
No. of cascading compressors	2
Capacity	660 L
Racks per freezer	40
5 cm box capacity	520
7.5 cm box capacity	360
10 cm box capacity	240
External dimensions (H x W x D)	107.5 x 205 x 84 cm
Internal dimensions (H x W x D)	76 x 147 x 59 cm
Net weight	315 kg

Ordering information

Description	Order no.	
HEF C660 chest, 660 L internal capacity		
230 V, 50 Hz	U9250-0008	⚡
Back-up systems		
LN ₂ * 230 V, 50 Hz	U9044-0008	⚡
CO ₂ * 230 V, 50 Hz	U9043-0008	⚡
HEF C660 racks		
5 cm box (H), 13 boxes per rack	K0641-1690	
7.5 cm box (H), 9 boxes per rack	K0641-1700	
10 cm box (H), 6 boxes per rack	K0641-1750	

* Factory installed at no extra charge if purchased with the freezer at the same time.

⚡ **Ordering information for other voltage options begins on page 471.**

Freezer accessories

**New Brunswick cardboard boxes**

- White cardboard box with water resistant coating, designed to withstand ultra-low temperatures
- Available in 50 mm, 70 mm and 100 mm tall boxes
- Compatible with box dividers 7 x 7 to 10 x 10 (dividers sold separately)

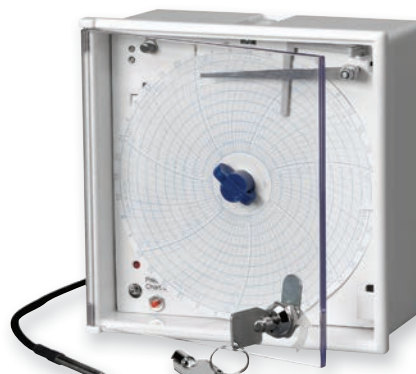
Freezer box dividers

- Available in 7 x 7, 8 x 8, 9 x 9 and 10 x 10 configurations
- Compatible with Innova cardboard boxes (boxes sold separately)

Ordering information

Description	Order no.	
Accessories		
5 cm tall white cardboard storage boxes	B50-SQ	
7.5 cm tall white cardboard storage boxes	B75-SQ	
10 cm tall white cardboard storage boxes	B95-SQ	
Divider 7 x 7, 17.4 mm max. tube diameter, holds 49 tubes	D49	
Divider 8 x 8, 15 mm max. tube diameter, holds 64 tubes	D64	
Divider 9 x 9, 13 mm max. tube diameter, holds 81 tubes	D81	
Divider 10 x 10, 11.8 mm max. tube diameter, holds 100 tubes	D100	

Freezer accessories



Freezer back-up systems

- Equipped with a battery back-up to temporarily protect the contents of your freezer in case of power failure.
- Available in either liquid CO₂ and LN₂. Liquid CO₂ can maintain temperature down to -86 °C
- Both systems can be factory installed with your freezer order at no additional charge or retrofitted on location

Chart recorder

- Includes 7-day chart recorder, thermocouple, keys, 100 x chart recorder paper and chart recorder pens
- Can be factory installed with your freezer order at no additional charge or retrofitted on location

Ordering information

Description	Order no.	
Accessories		
Innova and Green CO ₂ back-up, 230 V, 50 Hz	U9043-0004	⚡
Premium and HEF CO ₂ back-up, 230 V, 50 Hz	U9043-0008	⚡
Innova and Green LN ₂ back-up, 230 V, 50 Hz	U9044-0004	⚡
Premium and HEF LN ₂ back-up, 230 V, 50 Hz	U9044-0008	⚡
Chart recorder with reverse scale charts, temperature sensor	K0440-0355	
Chart recorder paper, pack of 100 charts, for K0440-0355	K0540-0025	
Chart recorder pens, 3, for K0440-0355	K0660-0051	
U101 stacking kit	P0625-0020	
Padlock adapter kit upright models	P0625-1170	
BioCommand® SFI Automated Data Logging Software, see page 274	M1291-1002	

⚡ Ordering information for other voltage options begins on page 471.

BioCommand® SFI data logging software



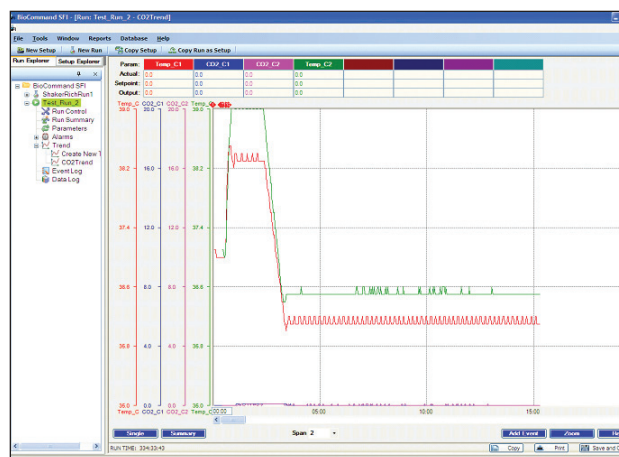
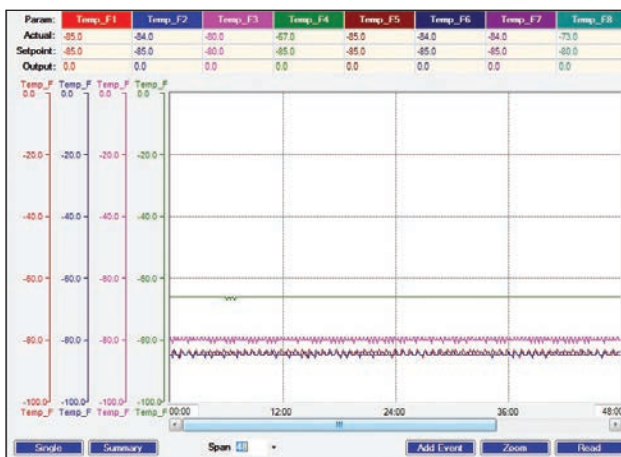
Graphical representation of the output

Description

BioCommand SFI Software: The BioCommand SFI software package is designed specifically for standard laboratory equipment including shakers, CO₂ incubators and ULT-Freezers¹. The software package allows you to track key operational information such as time, temperature, shaking speed, CO₂ concentrations and humidity.

Product features

- Track the operational parameters of your choice with the option to design and save templates
- Monitor multiple units from the same PC
- Trend and archive critical data including temperature, agitation speed and gas concentration for up to 32 units simultaneously
- Provides indications of alarm conditions identified by the product



Ordering information

Description	Order no.
BioCommand SFI packages¹	
ULT-Freezer package	M1291-1002
Shaker package	M1291-1000
CO ₂ incubator package	M1291-1001
To connect additional units²	
ULT-Freezer cable set, 15 m, includes RS-485 board	M1291-5001
Shaker cable, 7.6 m	M1291-8001
CO ₂ incubator cable, 4.5 m	P0620-7012
4-port RS-232/485 to USB converter	P0460-7751
8-port RS-232/485 to USB converter	P0460-7750

¹ Includes software, and cable to connect one shaker, freezer or CO₂ incubator. Computer requires an RS-232 or USB port. Shaker/incubator/freezer requires RS-232 or RS-485 port.

² When connecting multiple shakers, CO₂ incubators or freezers, in addition to a single software package, one additional cable is required for each additional system you monitor/log. Shakers and CO₂ incubators additionally require a 4- or 8-port converter.

Freezer spare parts

Ordering information*1

Description	Order no.	
Accessories and replacement parts		
Battery 6 V, 2.8 Ah, all models	K0480-0170	
Air filter, U101	K0200-0506	
Air filter, U360	P0625-1110	
Air filter, upright models	K0200-0511	
Air filter, chest models	K0200-0516	
Air filter grille, U101	K0200-0505	
Air filter grille, U360	P0625-1100	
Air filter grille, upright models	K0200-0510	
Air filter grille, chest models	K0200-0515	
Inner lid, C585	K0160-0777	
Inner lid, C760	K0160-0776	
Inner lid, C340	K0280-1041	
Inner lid, C660	K0280-1043	
Inner shelf, U101	P0625-0180	
Extra shelf, U360. Includes four mounting clips.	P0625-1180	
Extra shelf, U535. Includes four mounting clips.	K0280-1034	
Extra shelf, U725. Includes four mounting clips.	K0280-1036	
Extra shelf, U410. Includes four mounting clips.	K0280-1031	
Extra shelf, U570. Includes four mounting clips.	K0280-1030	
Shelf clips only, stainless steel, pack of four, upright models	K0280-0550	
Alarm connector plug, all models	K0380-0451	

*1 For a complete parts list, refer to your user manual.



The Eppendorf PiezoXpert is used for piezo-assisted micro manipulation and allows the easy penetration of cells for subsequent micro injection or manipulation. Piezo-assisted micro manipulation increases yield and productivity for a number of micro injection processes. Here, our lab team is using the PiezoXpert for the injection of sperms into mouse egg cells (ICSI*) and is placing egg cells that have already been treated into the Galaxy CO₂ incubator.



3. Cell Handling

- **Electroporators** 280
- **Electroporation cuvettes** 281
- **Cell fusion chambers** 284
- **Micromanipulators** 288
- **Microinjectors** 290
- **Capillaries** 301
- **Biological Shakers** 310
- **CO₂ Incubators** 348
- **Fermenters/Bioreactors** 362

Summary of applications

Application	Product	Page
Instruments		
Electroporation of eukaryotic cells (except for yeasts)	Multiporator®	282
Electrofusion of mammalian cells, plant cells and oocytes	Multiporator® with cell fusion module	284
Electroporation of bacteria, yeasts and other microorganisms	Eppendorf Eporator®	280
	Multiporator® with bacteria module	285
Piezo-assisted micromanipulation	Eppendorf PiezoXpert	288
Semi-automatic microinjection into adherent cells	InjectMan® NI 2	291
	FemtoJet®	296
Microinjection into small organisms and early-stage embryos	InjectMan® NI 2	291
	PatchMan NP 2	294
	FemtoJet® or FemtoJet® express	296
	CELLTRAM® Air	298
Manipulation of suspension cells, ICSI	TransferMan® NK 2	293
	CELLTRAM® Air/Oil	298
Transfer of ES cells	TransferMan® NK 2	293
	CELLTRAM® Air/vario	298
Blastomere biopsy and similar techniques, e.g. for PGD	TransferMan® NK 2	293
	TwinTip-Holder	292
	CELLTRAM® Air/Oil/vario	298
Consumables		
Electroporation	Electroporation cuvettes	281
Semi-automatic microinjection into adherent cells	Femtotips®	301
	Femtotip® II	301
	Microloader	301
Microinjection into suspension cells	Femtotip® II	301
	VacuTip	302
	Microloader	301
Manipulation of suspension cells, ICSI	VacuTip	302
	TransferTip® (ICSI)	303
Transfer of ES cells	VacuTip	302
	TransferTip® (ES)	305
Blastomere biopsy, Polar body biopsy	Polar Body Biopsy Tip MML/FCH	304
Sperm selection	IMSI/TESE Tip	305
Precision capillary for Piezo-assisted mouse ICSI	Piezo Drill Tip Mouse ICSI	306
Precision capillaries for Piezo-assisted transfer of embryonic stem cells	Piezo Drill Tip ES	306
Microdissection	MicroChisel	307
	Filtertip MDS	307
	TransferTip® (MDS)	307

Summary of applications

Application	Product	Page
Reagents		
Electroporation of animal cells	Electroporation buffer, isoosmolar/hypoosmolar	285
Electrofusion of animal cells	Electrofusion buffer, isoosmolar/hypoosmolar	285
Complete workstations		287
Training on microinjection in into cultured cells, oocytes and embryos		308
<p>This table shows a selection of particular applications from the Cell Technology area and serves as an overview. The complete product portfolio of the Eppendorf Cell Technology System is found on the following pages.</p> <p>Register your Eppendorf products online now to benefit from numerous advantages! You receive bonus ep-points immediately for each Eppendorf device registered. You can also easily manage your devices online and are always kept up-to-date on any news.*</p>		



*Not available in all countries

Eppendorf epGreen Initiative

Wherever possible, product packaging, padding and filling material made of recyclable cardboard is used and the use of synthetic materials is minimized.

Water-soluble lacquer/paints without heavy metals are being used whenever possible.

To reduce our aviation carbon footprint, we use sea transport whenever possible.



For an overview on Eppendorf epGreen, see page 10 and appendix page 444.

Eppendorf Eporator®



USB interface on the Eporator



Product features

- Self-explanatory, display-driven operation
- Functional keys are quickly and freely programmable
- High safety is provided by the integrated cuvette holder
- Compact, space-saving design
- USB port for data transfer and GLP compliant documentation

Description

The Eppendorf Eporator is a compact instrument designed for fast and controlled electroporation of bacteria, yeasts and other micro-organisms. The instrument is unique due to its intuitive operation and user-friendly programming of standard methods, as well as its USB port, via which experimental data may be easily exported and documented.

Technical specifications

Pulse voltage	200–2,500 V
Pulse form	Exponentially diminishing
Time constant	5 ms (nominal)
Resistance	600 Ω
Capacitor	10 μF
Dimensions (L x W x H)	27.5 x 19 x 12.5 cm
Weight	3.2 kg
Special feature	Electronic safety switch for eliminating short-circuits, Interface USB 2,0

Ordering information

Description	Order no.	
Eppendorf Eporator, for bacteria and yeasts	4309 000.019	

➔ Updated protocols are available at:
www.eppendorf.com/eporator

Technical specifications subject to change.

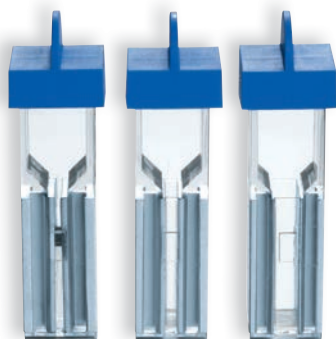
Eppendorf Eporator®



The Eppendorf Eporator integrates ideally into the broad selection of Eppendorf products for molecular and microbiological laboratories:

We support the complete laboratory process, from DNA amplification in the Mastercycler® pro and concentration determination using the BioPhotometer plus, all the way to incubation in the Thermomixer® comfort and Electroporation.

Electroporation cuvettes



Product features

- Plastic cuvette with aluminum electrodes
- Three sizes with 100 μ L, 400 μ L and 800 μ L filling capacity (1 mm, 2 mm and 4 mm gap width)
- Individually wrapped and gamma-irradiated to ensure sterility
- Design ensures correct positioning in the cuvette holder
- Gap width marked on the side of every cuvette to simplify identification
- Frosted area permits easy labeling

Ordering information

Description	Order no.	
Electroporation cuvettes		
gap width 1 mm, 100 μ L, sterile, 50 pcs.	4307 000.569	
gap width 2 mm, 400 μ L, sterile, 50 pcs.	4307 000.593	
gap width 4 mm, 800 μ L, sterile, 50 pcs.	4307 000.623	
Cuvette stand for 16 electroporation cuvettes	4308 078.006	

➔ Updated protocols are available at:
www.eppendorf.com/eporator

Multiporator® System



The Multiporator with a variety of inserts and chambers: Insert with Helix fusion chamber, insert for connecting external electrodes, insert for Micro fusion chambers, cuvette holder (from left to right) and two Micro fusion chambers (in front).

Product features

- Compact unit is easily portable
- Easy to disinfect
- Easy to operate with clear, user-friendly display
- RS-232 interface for data documentation with a printer or PC
- Outstanding safety levels provided by the built-in cuvette chamber
- CE-, UL- and CAS-approved
- Connectors for external electrodes
- Upgrade with optional functional modules
- Two-year warranty

Description

The basic unit of the Multiporator is made up of a module designed to electroporate eukaryotic cells.

Two optional function modules extend the application range of the Multiporator to either cell fusion (p. 284) or the transformation of bacteria and yeasts (p. 285). No additional devices or external parts are necessary.

Together with the buffers, cuvettes and chambers that are precisely suited for the corresponding applications, the Multiporator forms the perfect system.

Applications

- Electroporation of eukaryotic cells
- Electrofusion of eukaryotic cells
- Electroporation of bacteria, yeasts and other microorganisms

➔ Further information at www.eppendorf.com/multiporator

➔ Updated protocols are available at: www.eppendorf.com/eukaryotic

Multiporator® for eukaryotic cells



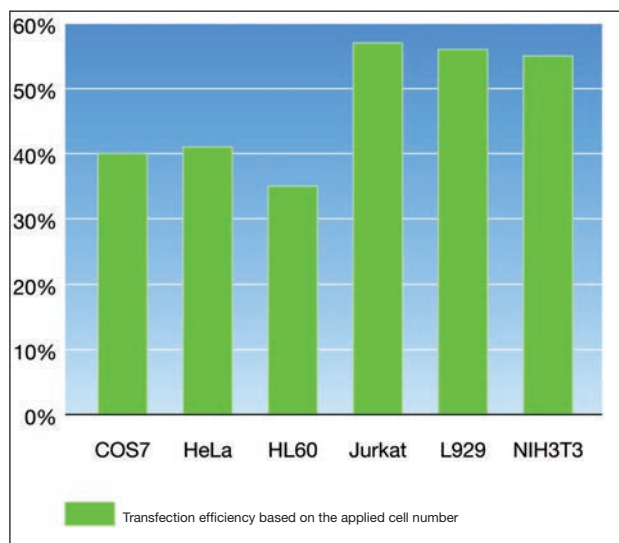
Product features

- Directly adjustable voltage and time constants
- Soft Pulse technology
- Patented microprocessor-controlled pulse discharge^{*1}
- Optimized buffer system

^{*1} US Patent 6008038

Transient transfection of various adherent and suspension cell lines

Cells were electroporated with the plasmid pEGFP using the Multiporator; over 50 % transient transfection is possible based on the number of cells used.



Applications

- Electroporation of animal and human cells, primary cells, plant cells and embryonic stem cells
- Stable and transient transfection of eukaryotic cells
- Efficient and gentle transfer of siRNA

Electroporation of eukaryotic cells

The Multiporator in combination with the specially designed electroporation buffers is optimally balanced for efficient and gentle electroporation of eukaryotic cells.

Soft Pulse® technology applies extremely short electric pulses for the highest survival rates. Cell-damaging influences, such as changes in pH values, aluminium release and electrophoresis of the cell content, are minimized. The relevant parameters of voltage and pulse duration are directly set, and the patented electronic pulse discharge ensures that they will be maintained exactly — independent of the sample resistance — for reliable and reproducible results.

The hypoosmolar buffer system enables the cell to swell up, thus enabling easier membrane penetration which leads to high transfection rates. The ion composition is adapted to the inner cell environment and stabilizes the Na⁺/K⁺-gradient across the cell membrane.

Applications include the transfection of animal and human cell lines, embryonic stem cells, primary cells, oocytes and plant cells.

Recent experiments have proven that the Multiporator is specially suited for the transfer of siRNA into cell lines and primary cells.^{*2, 3, 4}

^{*2} Sergio Gonzalez, Daniela Castanotto, Haitang Li, Simon Olivares, Michael C. Jensen, Stephen J. Forman, John J. Rossi, Laurence J.N. Cooper: Amplification of RNAi-Targeting HLA mRNAs (Molecular Therapy, Vol. 11, 2005).

^{*3} Reena P. Vishwanath, Christine E. Brown, Jamie R. Wagner, Hunsar B. Meechooet, Araceli Naranjo, Christine L. Wright, Simon Olivares, Dajun Qian, Laurence J.N. Cooper, Michael C. Jensen: A quantitative high-throughput chemotaxis assay using bioluminescent reporter cells (Journal of Immunological Methods, 2005).

^{*4} Lindsay M. Shafer and Lee W. Slice: Anisomycin induces COX-2 mRNA expression through p38MAPK and CREB independent of small GTPases in intestinal epithelial cells, (Biochimica et Biophysica Acta (BBA) – Molecular Cell Research, 2005).

Technical specifications

Eukaryotic module	
Pulse voltage	20-1,200 V
Pulse form	Exponentially diminishing, electronically controlled
Time constant	15-500 µs, in increments of 5 µs
Multiple pulsing	1-99, with 1 min time interval
Interface	RS-232

➔ Updated protocols are available at: www.eppendorf.com/eukaryotic

Multiporator® with module for cell fusion

Cell fusion

The fusion module expands the Multiporator's capabilities with highly efficient electrical cell fusion. Cells are brought into contact with one another in an electrical alternating-current environment and then fused with a direct-current pulse. Optimize your cell fusion parameters using the Electrofusion Buffer System with only a few cells in the Micro fusion chamber. When using the 0.2 mm Micro fusion chamber, the ideal parameters determined in this way can be directly transferred to the cell fusion in the Helix fusion chamber.

Product features

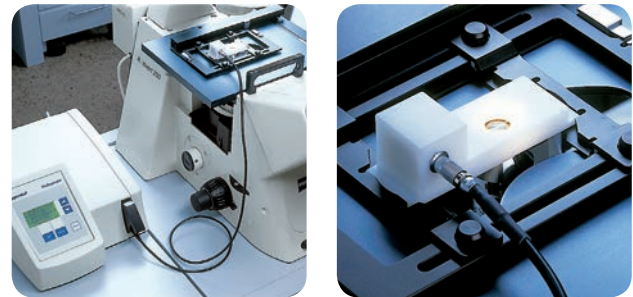
- Space-saving inner device module
- Definable alignment and pulse parameters
- Square wave pulse
- Optimized buffer system
- Micro fusion chamber for optimization



Multiporator with cell fusion module and Helix fusion chamber: Helix fusion chamber: High-precision chamber with two platinum wires wound in parallel (0.2 mm gap width) feature a 250 μ L capacity. The Electrofusion Buffer System is mycoplasma-tested, sterile and endotoxin-free.

Applications

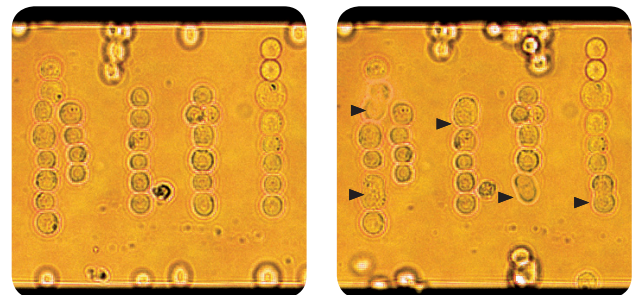
- Generation of tetraploid blastocysts
- Cloning of mammals
- Fusion of plant protoplasts
- Generation of hybridoma cells for the production of monoclonal antibodies
- Fusion of lipid vesicles



Multiporator with Micro fusion chamber for controlling and optimizing electrofusion under the microscope. Ideal for experiments with low cell counts.

Technical specifications

Fusion module	
Pulse voltage	5-300 V
Pulse width	15-300 μ s, in increments of 5 μ s
Pulse form	Square-wave pulse
Multiple pulsing	1-99, in time intervals of 1 s
Sinus voltage	1-10 V _p , symmetrically to 0 V
Frequency	2 MHz Sinus
Time range	0-95 s before and after pulses



Microscopic image of cells in the Micro fusion chamber. Alignment (left), fusion products (right, labeled)

➔ Updated protocols are available at: www.eppendorf.com/fusion

Multiporator® with module for bacteria and yeasts

Product features

- Programmable voltage and optimized, fixed pulse times
- Preadjusted voltages for the most frequent applications
- Electronic safety circuit to prevent arcing

Applications

- Electroporation of bacteria, yeasts and other microorganisms

Technical specifications

Bacteria and yeast module	
Pulse voltage	200-2,500 V
Pulse form	Exponentially diminishing
Time constant	5 ms (nominal)
Resistance	600 Ω
Capacitor	10 μF
Special feature	Electronic safety switch for eliminating short-circuits

Ordering information

Description	Order no.	
Multiporator		
for eukaryotic cells*	4308 000.015	
for eukaryotic cells, bacteria and yeasts*	4308 000.023	
for eukaryotic cells and cell fusion, with 1 Helix fusion chamber and 1 Micro fusion chamber*	4308 000.031	
for eukaryotic cells, bacteria, yeasts and cell fusion, with 1 Helix fusion chamber and 1 Micro fusion chamber	4308 000.040	
Insert for connecting external electrodes (electrofusion/electroporation)	4308 021.004	
Electroporation Buffer System		
Hypoosmolar, sterile, 100 mL	4308 070.501	
Isoosmolar, sterile, 100 mL	4308 070.510	
Electrofusion Buffer System		
Hypoosmolar, sterile, 100 mL	4308 070.528	
Isoosmolar, sterile, 100 mL	4308 070.536	
Fusion chambers		
Helix fusion chamber, for cell fusion	4308 014.008	
Micro fusion chamber, gap width 0.2 mm	4308 030.003	
Micro fusion chamber, gap width 0.5 mm	4308 031.000	
Stand , for 10 Helix fusion chambers	4308 017.007	

* This version can be retrofitted with other modules in a variety of ways.

➔ Updated protocols are available at:
www.eppendorf.com/bacteria
www.eppendorf.com/eukaryotic
www.eppendorf.com/fusion

System solutions for cell and molecular biology



InjectMan® NI 2 control panel

Description

Take advantage of our complete product systems that include precision micromanipulators, microinjectors, capillaries and accessories — and tailor your workstation to suit your applications. Our modular systems allow you to combine existing Eppendorf devices with new components, providing the utmost in flexibility for continual upgrades and expansion. By integrating customer needs into our product development process, we bring the future of micromanipulation to you. We have improved standard features, while keeping the precision and reliability of the micromanipulators.



InjectMan® NI 2 motor module with Femtotip II

Easy Mounting

- Small and compact units
- “Plug-and-play” setup
- Flexible adaptations for all current applications
- Enhanced capabilities for integration with systems solutions

High performance, easy operation

- High speed for efficient penetration of rigid structures (V_{\max} 7,500 $\mu\text{m/s}$)
- Motors with high resolution for smooth, step-free motions; resolutions per step: 40 nm
- Easy preset of speed or work area via control unit
- Menu-controlled programming
- Storage of user profiles

Technical specifications

Description	InjectMan® NI 2	TransferMan® NK 2	PatchMan NP 2
Main field of application	microinjection into adherent cells, serial microinjection into small organisms and early stage embryos	suspension cells	microinjection into small organisms and early-stage embryos
Mode of movement	dynamic	proportional	dynamic
Mounting	X, Y, axial	X, Y, Z cartesian	X, Y, Z cartesian
Angle of inclination	30-60 °	n/a	n/a
Range of X-head	n/a	0-90 °	0-90 °
Range of speed	coarse/fine	coarse/fine/extra fine	coarse/fine/extra fine
Display-/menu controlled	yes	yes	n/a
Operation	10 buttons + positioning wheel	9 buttons + positioning wheel	7 buttons + positioning wheel
Connection to microinjector	yes	n/a	n/a
Fixing of modules	n/a	n/a	yes
Storage of positions	yes: 2, 10 via menu	yes: 3	yes: 1

Workstations for cell technology



FemtoJet® Microinjector

Microinjection of DNA into oocytes at pronuclear stage

- 2 x TransferMan® NK 2
- 1 x Adapter for inverted microscope
- 1 x FemtoJet or FemtoJet express
- 1 x Foot control FemtoJet
- 1 x CellTram Air
- 5 x 20 FemtoTip II
- 4 x 25 VacuTips
- 2 x 96 Microloader
- 1 x Eppendorf pipette Research® 0.5-10 µL



CellTram Oil



TwinTip Holder



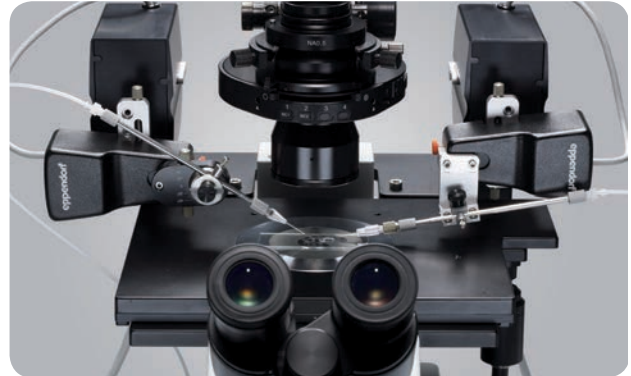
CellTram Air



CellTram vario

Semiautomatic microinjection into adherent cells

- 1 x InjectMan NI 2
- 1 x Adapter for inverted microscope
- 1 x FemtoJet or FemtoJet express
- 5 x 20 Femtotips II or Femtotips
- 2 x 96 Microloader
- 1 x Minispin
- 1 x Eppendorf pipette Research® 0.5-10 µL



TransferMan® NK 2 Micromanipulator

Manipulation of suspension cells**Workstation for the transfer of embryonic stem cells in (tetraploid) mouse embryos:**

- 2 x TransferMan® NK 2
- 1 x Adapter for inverted microscope
- 1 x CellTram Air
- 1 x CellTram vario
- 4 x 25 VacuTips
- 4 x 25 TransferTips (ES)
- 1 x Multiporator, optional with Fusion-Module
- 2 x Electroporation Buffer hypo- and isoosmolar or optionally only hypoosmolar
- 2 x Electroporation Cuvettes, gap width 4mm
- 1 x Eppendorf PiezoXpert®
- 4 x 25 Piezo Drill Tip ES

Manipulation of suspension cells**ICSI:**

- 2 x TransferMan® NK 2
- 1 x Adapter for inverted microscope
- 1 x CellTram Air
- 1 x CellTram Oil or CellTram vario
- 4 x 25 VacuTips
- 4 x 25 TransferTips (ICSI)
- for mouse ICSI: 1 x Eppendorf PiezoXpert®

Blastomere biopsy or similar techniques, e.g. for PGD:

- 2 x TransferMan® NK 2
- 1 x Adapter for inverted microscope
- 1 x CellTram Air (for holding the blastocyst)
- 1 x CellTram Oil (for acid dosing)
- 1 x TwinTip-Holder (for example, for retrieval of blastomeres)
- 4 x 25 VacuTips
- 4 x 25 Polar Body Biopsy Tip MML

⊕ Customized system configurations on request. Workstations, updated protocols and films at: www.eppendorf.com/virtual-lab

Piezo-assisted micromanipulation

NEW!



Product characteristics

- Fast and simple sample processing using intuitive operation
- Reproducible parameter setting
- Program keys to save your experimental parameters
- Trigger impulses with an ergonomic foot control or rotary knobs right on the device
- Optical feedback of triggered impulses
- Additional cleaning functions for simple removal of capillary contamination



Eppendorf PiezoXpert actuator mounted onto the TransferMan NK 2

Description

The Eppendorf PiezoXpert® provides piezo-assisted micromanipulation, enabling simple penetration in cells for microinjection or micromanipulation.

Penetration of the cell membranes is supported by piezo impulses which are directly transferred to the capillary without loss. Piezo-assisted micromanipulation improves the results of a host of applications:

- Transfer of embryonic or induced pluripotent stem cells into blastocysts
- Mouse ICSI (intracytoplasmic sperm injection)
- Enucleation/nuclear transfer

Installation

- Simple and reproducible installation of the actuator on all Eppendorf micromanipulators and other systems.
- Fixed actuator clamping in the micromanipulator capillary holder allows impulses to be transferred to the capillary without loss.

Eppendorf PiezoXpert



For over 20 years, Eppendorf micromanipulator systems have excelled with superb quality and performance. As the ideal complement to our time-tested micromanipulators and microinjectors, the Eppendorf PiezoXpert continues this trend. With the PiezoXpert, we are optimally expanding our selection of system solutions for your individual workplace.

Ordering information

Description	Order no.	
Eppendorf PiezoXpert for piezo-assisted micromanipulation Actuator Foot control Spacer plate*	5194 000.016	
Piezo Drill Tip ES, set of 25 (see p. 306)	5175 250.001	
Piezo Drill Tip Mouse ICSI, set of 25 (see p. 306)	5175 220.005	
VacuTip**, set of 25 (see p. 302)	5175 108.000	
VacuTip FCH**, set of 25 (see p. 302)	5175 240.006	
2 grip heads 0 for micro-capillaries, outer diameter 1.0-1.1 mm*** (see p. 278)	5176 210.003	

* For mounting the PiezoXpert onto the TransferMan NK 2, PatchMan NP 2. (The PiezoXpert is not intended for use in human reproductive medicine.)

** The capillaries for assisted reproduction are registered in Europe as medical products (in accordance with the European Medical Devices Directive MDD 93/42/ECC).

***Grip head 0 is included in the CellTram Air, CellTram Oil, CellTram vario delivery packages.

➔ **Additional information on Eppendorf PiezoXpert and Eppendorf micromanipulator systems can be found at:**
www.eppendorf.com/micromanipulation

Technical specification

Mains connection	100 V-240 V, 50 Hz-60 Hz, voltage is automatically adjusted
Power consumption	18 W
Interface	USB (for technical service) RS-232 (connection to foot control)
Dimensions (L x W x H)	23 x 17 x 11.5 cm
Weight	2.8 kg
General parameter settings	
Intensity (Int)	1-50 (1-22 adjustable in increments of 1, 22-50 adjustable in increments of 4)
Speed (Speed)	1-10 (1-10 adjustable in increments 1, 1 Hz per increment)
Number of impulses (Pulse)	1-10, ∞ (adjustable in increments of 1)
Parameter settings for Clean function	
Intensity (Int)	1-86 (1-22 adjustable in increments of 1, 22-86 adjustable in increments of 4)
Speed (Speed)	1-40 (1-40 adjustable in increments of 1, 1-10: 1 Hz per step, 10-20: 2 Hz per step, 20-34: 5 Hz per step, 34-40: 25 Hz per step)

InjectMan® NI 2



Workstation for microinjection into adherent cells:
InjectMan NI 2 and FemtoJet microinjection workstation,
shown with Zeiss AxioObserver® microscope



Workstation for microinjection into fish embryos:
InjectMan NI 2, Zeiss SteREO Discovery.V12 and microinjector
FemtoJet express

Product features

- Integrated coarse and fine manipulator with dynamic control via central joystick
- Work range: 20 mm per axis
- Automated axial injection movement
- Programmable Z-axis limit at defined injection level avoids capillary breakage
- Automated Home function for rapid capillary exchange
- Adjustable injection angle and injection speed for different complex injection processes
- Axial mounting of Z motor module
- Special Inject mode for applications in developmental biology
- Fine adjustment of work speed made easy with positioning wheel
- Menu-controlled programming via display
- Save and download user profiles
- External control for automatic processes
- Can be adapted to all common microscopes

Description

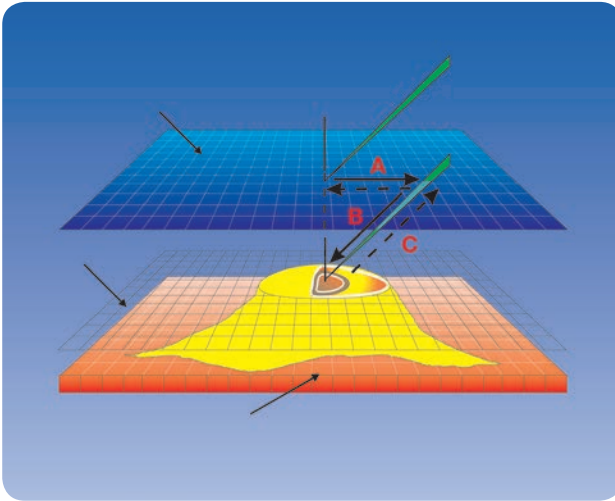
As a menu-controlled, programmable micromanipulator, the InjectMan NI 2 is especially suitable for microinjection into adherent cells. Combining InjectMan NI 2 with FemtoJet or FemtoJet express (p. 296) ensures rapid and safe microinjection. The semiautomatic microinjection allows a coordinated process of manipulation and injection: first, the injection parameter is set on the FemtoJet; second, the injection level is fixed via pressing a button on the InjectMan NI 2. The exact axial injection movement ensures a minimum mortality rate, and its high speed facilitates the penetration of rigid structures.

Applications

- Semiautomatic microinjection into adherent cells
- Serial microinjection into fish larvae, insect embryos, etc.

➔ Customized system configurations on request. Workstations, protocols and films under www.eppendorf.com/injectman

InjectMan® NI 2

**Semi-automatic microinjection into adherent cells**

As described on p. 296, the electronic coupling of the InjectMan NI 2 with the FemtoJet/FemtoJet express allows for uniquely fast and safe microinjection into adherent cells. This semiautomatic sequence of manipulation and injection occurs first by programming the injection parameters on the FemtoJet and then establishing the injection level (Z-limit) by pressing a button on the InjectMan NI 2.

By activating the joystick key, the patented axial injection movement of the capillary (A,B) and the programmed pressure increase on the FemtoJet can be simultaneously triggered. Following the preset injection time, the pressure decreases in the capillary and is triggered simultaneously with the movement of the capillary back to its starting position (C). Thus, the capillary tip serves as a “pointer” for the target location in the cell, and the exact axial injection movement secures the highest survival rate (Peloquin et al. 1997, *BioTechniques* 22, 496-499). With the help of this technology, it is now possible to process more than 40 cells per minute simply, efficiently and reproducibly.

Technical specifications

Control	Via central joystick; dynamic kinetics
Drive	Disc stepper motor
Resolution	approx. 40 nm per micro step
Max. movement (each axis)	approx. 20 mm
Angle of inclination	30–60° to object table
Max. speed of tool	7,500 µm/s
Dimensions (W x D x H) X/Y module	12.0 x 10.0 x 6.8 cm
Dimensions (W x D x H) X module	12.0 x 6.0 x 5.0 cm
Dimensions (W x D x H) Control panel	27.0 x 20.5 x 16.0 cm
Weight Module unit, complete	1.4 kg
Weight Control panel with power supply	2.7 kg

Ordering information

Description	Order no.	
InjectMan® NI 2 manipulator for semiautomatic microinjection into adherent cells	5181 000.017	⚡
Connecting cable, for InjectMan NI 2 and Transjector 5246 or Microinjector 5242	5181 150.060	
Connecting cable, for InjectMan NI 2, FemtoJet and FemtoJet express	5181 070.015	
Foot pedal control, for InjectMan NI 2	5181 150.051	
Interface cable for PC	5181 150.094	
Microscope adapters, see page 295		
Antivibration Pads, see page 295		

⚡ **Ordering information for other voltage options begins on page 471.**

TransferMan® NK 2



TransferMan NK 2 control panel



TwinTip-Holder

Product features

- Integrated coarse and fine manipulator with proportional control via central joystick
- Work range: 20 mm per axis
- Programmable Z-axis limit for defined injection level avoids capillary breakage
- Automated Home function for rapid capillary exchange
- Precise and graduated adjustment of toolholder for bent holding and injection needles
- Ergonomic adjustment of work radius with turn dial
- Recall of three stored radii (coarse/fine/extrafine) at the press of a button
- Storage of three independent work positions
- Menu-controlled programming via display
- Storage and recall of user profiles
- External control for automatic processes
- Can be adapted to all common microscopes

The TransferMan NK 2 is suited for assisted reproduction. The TransferMan NK 2 is registered in Europe as a medical product (medical products directive MDD 93/42/European Economic Community).

Product features of TwinTip-Holder for TransferMan NK 2

- For special manipulation techniques e.g. polar body biopsy
- For independent control of two capillaries on one TransferMan NK 2
- Control via piezo stacks

Description

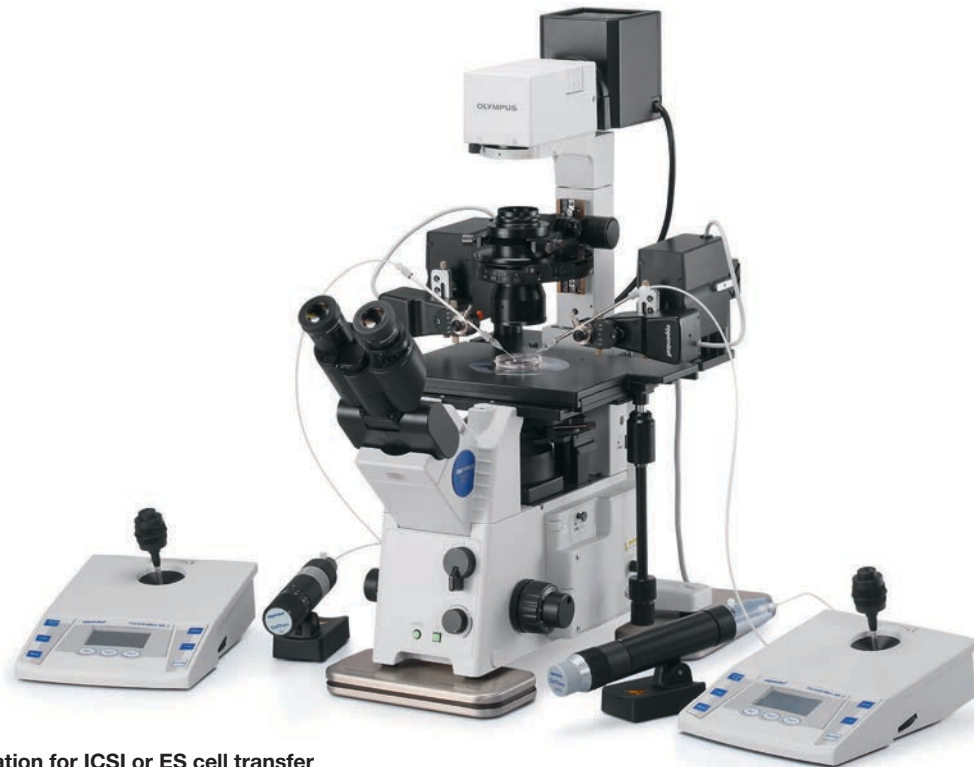
The TransferMan NK 2 combines simplicity and innovation in a user-friendly system that satisfies even the most sophisticated user requirements. Precision proportional kinetics allows intuitive operation. Smart functions such as storage and recall of positions allow the most complex micromanipulation techniques to be carried out rapidly, easily and precisely.

Applications

- Micromanipulation of suspension cells
- Transgenic animals
- Pronuclear injection
- ES cell transfer
- Nuclear transfer
- Reproductive medicine
- ICSI
- Biopsy techniques, e.g. PGD or polar body biopsy

Further information at
www.ependorf.com/transferman

TransferMan® NK 2


**Workstation for ICSI or ES cell transfer**

2 x TransferMan NK 2 micromanipulators with CellTram Air and CellTram vario microinjectors, shown with Olympus® IX 71 microscope.


Olympus® is a registered trademark of Olympus Optical Co.

Technical specifications

Control	Via central joystick; proportional kinetics
Drive	Disc stepper motor
Resolution	approx. 40 nm per micro step
Max. movement (each axis)	approx. 20 mm
Max. speed of tool	7,500 µm/s
Dimensions (W x D x H) X/Y/Z module	12.0 x 10.0 x 6.8 cm
Dimensions (W x D x H) X module	12.0 x 6.0 x 5.0 cm
Dimensions (W x D x H) Control panel	27.0 x 20.5 x 16.0 cm
Weight Module unit, complete	1.4 kg
Weight Control panel with power supply	2.7 kg

 **Ordering information for other voltage options begins on page 471.**

Ordering information

Description	Order no.	
TransferMan® NK 2 micromanipulator for suspension cells, with menu-controlled programming	5188 000.012	
10° adapter for TransferMan® NK 2 and PatchMan NP 2	5188 110.004	
A-head¹ for 10° assembly	5181 150.027	
XY-Extension plate (for TwinTip-Holder or for other applications which require assembly expansion into X or Y directions)	5181 236.002	
TwinTip-Holder, for TransferMan® NK 2, twin capillary holder for special manipulation techniques, e. g., biopsy	5188 200.011	

Microscope adapters, see page 295

Antivibration Pads, see page 295

¹ The assembly of the 10° adapters, together with the A-head, enables work with very shallow injection angles (e.g., for injection into the pronucleus of mouse embryos).

PatchMan NP 2



PatchMan NP 2 and FemtoJet[®] workstation, shown with Leica[®] DMI6000 B microscope

Leica[®] is a registered trademark of Leica Technocolore.

Product features

- Integrated coarse and fine movement via dynamic joystick control
- Adjustable speed from less than 100 $\mu\text{m/s}$ to 7,500 $\mu\text{m/s}$ in three speed ranges
 - Turn dial to easily adjust injection speed
 - Easily recall stored speed of each range with the press of a button
- Large work range of 20 mm
- Axial injection by coordinated movement of X/Z axis
- Stored work position facilitates rapid exchange of capillaries
- Separate control board eliminates potential oscillation/vibration from affecting your work
- Can be installed on left or right side of all commonly used microscopes (e.g., inverted microscopes, upright microscopes and stereo microscopes)

Applications

- Microinjection into small organisms and early-stage embryos
- *Drosophila melanogaster*
- Zebrafish and Medaka
- *Xenopus laevis*
- *Caenorhabditis elegans*
- Other techniques that require precise positioning and smooth, continuous movement

Description

PatchMan NP 2 is an easy-to-use basic micromanipulator for a broad range of applications that require precise positioning and smooth, continuous movement. It is especially suited for the injection of small organisms and early-stage embryos. Loaded with features for delicate and convenient microinjection, the PatchMan NP 2 easily handles the tips and ensures a high survival rate of the embryos after injection has occurred. The device can be installed on both inverted and stereo microscopes (an optional universal stand is available), and the direct adapter attachment on the unit may be conveniently positioned at the left or right side.

Technical specifications


Control	via central joystick; dynamic kinetics
Drive	Disc stepper motor
Resolution	approx. 40 nm per microstep
Max. movement (each axis)	approx. 20 mm
Mounting angle of the X head	0–90° to object table
Max. speed of tool	7,500 $\mu\text{m/s}$
Dimensions (W x D x H) Y/Z module	12.0 x 10.0 x 6.8 cm
Dimensions (W x D x H) X module	12.0 x 6.0 x 5.0 cm
Dimensions (W x D x H) Control panel	27.0 x 20.5 x 16.0 cm
Weight Module unit, complete	1.4 kg
Weight Control panel with power supply	2.7 kg

Ordering information

Description	Order no.	
PatchMan NP 2 , Micromanipulator with dynamic control for applications in the area of developmental biology	5183 000.014	

Microscope adapters, see page 295

Antivibration Pads, see page 295

 **Ordering information for other voltage options begins on page 471.**

Antivibration Pad



Description

Our antivibration pads are specifically designed to protect your microscope, its components and your work from external oscillations/vibrations. The pads, which consist of two metal sheets with isolating, vibration-proof material “sandwiched” in-between, should be placed directly under each corner of your microscope. Choose the size—from XS to XL—that best suits your microscope and external vibration source.

Your selection of pads depends on the total weight of your complete workstation (including all mounted accessories) and on the distribution of this load onto the three (or four) individual feet.¹

Technical specifications

Pad	Weight
XS	4.5–6.0 kg
S	6.0–8.0 kg
M	8.0–10.0 kg
L	10.0–12.5 kg
XL	12.5–16.5 kg

¹ The proper selection of the pad weight range is essential; choosing a smaller or larger pad size will impact performance. See www.eppendorf.com for details or contact our application hotline.

Ordering information

Description	Order no.	
Antivibration Pad XS	5181 301.009	
Antivibration Pad S	5181 303.001	
Antivibration Pad M	5181 305.004	
Antivibration Pad L	5181 307.007	
Antivibration Pad XL	5181 309.000	

Microscope adapters for micromanipulators

Additional microscopes, adapters, video equipment and application-specific accessories may be required for workstations.

Ordering information

Description	Order no.	
Microscope adapters for micromanipulator InjectMan® NI 2, TransferMan® NK 2 and PatchMan NP 2		
Hund Wilovert 30	5181 234.000	
Leica® DM IL LED	5181 201.004	
Leica® DMIRE 2 and DMIRB/E/HC	5181 202.000	
Leica® DMI3000 B/4000 B/6000 B	5181 203.007	
Nikon Diaphot®/Diaphot TMD* ¹	5181 210.003	
Nikon Eclipse® Diaphot 200/300, Ti-E, Ti-U, Ti-S, TE200/300/2000* ^{1,2}	5181 214.009	
Nikon Eclipse® TS100	5181 212.006	
Olympus® CK-30/CK-40/CK-X40/CK-X41	5181 222.001	
Olympus® IMT-2	5181 221.005	
Olympus® IX 50/51/70/71/IX II 80/IX II 81	5181 220.009	
Zeiss Axiovert® 10/35	5181 233.003	
Zeiss Axiovert® 100/135	5181 230.004	
Zeiss Axiovert® 200/AxioObserver	5181 235.006	
Zeiss Axiovert® 25/25, C/40, C/40 CFL	5181 237.009	
Universal Stand ³ suitable for the mounting of manipulators on upright microscopes and stereo microscopes independent of the microscope tripod used	5181 250.005	
Spacer for usage of Universal Stand on stereo microscopes with extended dimensions	5181 255.007	

¹ Nikon Diaphot and Diaphot TMD form a tripod family. The tripods of the Nikon Diaphot 200 and the Diaphot 300 already correspond for the most part to those of the later Eclipse TE model.

² The previously available adapters (Order no. 5181 213.009) have been reworked to also enable optimal assembly on the current Nikon Eclipse TE 2000 tripods.

³ The universal stand is suitable for the assembly of manipulators independent of the microscope tripod used.

FemtoJet® and FemtoJet® express

Microinjection, an overview

For more than 20 years now, researchers have been introducing foreign molecules, such as DNA, RNA, proteins, toxins and dyes, into living cells using microinjection. This technique offers many advantages, including the targeting of individual cells and/or subcellular structures as well as the ability to reproducibly inject a defined amount of solution into these targets.

Applications include transfection and analysis experiments, signal transduction, cytotoxicity tests and more.

In addition to an ultra-precise microinjection device, accurate and reproducible microinjection also requires ultra-fine glass capillaries – they allow the targeting of very specific cell areas, such as the nucleus and the cytoplasm. For optimal efficiency

and viability, microinjection systems (consisting of microinjectors, micromanipulators and capillaries) must be accurate and precise, perform fast yet smooth movement with gentle yet effective penetration, have a user-friendly interface and a large operating range and, finally, be solidly constructed for complete reliability. Eppendorf Cell Technology systems have always met these requirements – in fact, we continually set new standards for performance, efficiency, reproducibility and reliability: For example, the FemtoJet and FemtoJet express microinjectors feature a broad range of pressure settings for precise and accurate microinjection with solutions as small as femtoliters (10^{-9} μL) on up to 1 μL and above.



FemtoJet

For injecting small to intermediate volumes (up to 100 μl), the original FemtoJet is perfectly suited, featuring a wide range of functionality, simple operation and built-in compressor to independently deliver the required pressure. It is ideal for injecting aqueous solutions into adherent cells (and makes the ideal partner with our InjectMan NI 2 and InjectMan 5179, as well as Model 5171) and suspension cells (with TransferMan NK 2). The FemtoJet forms the perfect system with Eppendorf micromanipulators, and it integrates just as easily with non-Eppendorf microinjection systems.

Applications

- Semiautomatic injection into adherent cells with InjectMan NI 2 (and older models 5171 and InjectMan 5179)
- Suspension cell injection with TransferMan NK 2
- Pronuclear injections into mouse embryos
- Serial injection volumes from femtoliter up to 100 μL




FemtoJet express

If your research demands injecting volumes greater than 100 μl and/or longer series at higher pressures – increasingly seen in functional genomics and developmental biology applications – the FemtoJet express with its external pressure supply (not included) delivers the precise and continuous pressure required. Featuring the same quality design and compatibility features as our original FemtoJet, the express model is your “heavy duty” device for those more demanding applications.

Applications

- Microinjection into small organisms or embryos at early developmental stages: e.g., *Drosophila melanogaster*, *Xenopus laevis*, *Caenorhabditis elegans*, Zebrafish, Medaka, etc.
- Pronuclear injections into mouse embryos
- Serial injection volumes from 100 μl up to 1 μL

 **Ordering information for other voltage options begins on page 471.**

FemtoJet® and FemtoJet® express

Common product features

- Programmable injection ensures reproducibility
- Injection volumes range from femtoliters to microliters
- User-friendly interface with large LCD for easy operation
- Inject and Clean functions triggered via control button on instrument, supplied mouse or optional foot control
- Electronic linkage to InjectMan NI 2 and older models 5171 and InjectMan 5179
- Easily combined with all common micromanipulation systems
- Small footprint

Additional feature of FemtoJet

- Independent pressure supply with built-in compressor

Additional feature of FemtoJet express

- External pressure supply (not included) delivers higher pressure at longer intervals for long series experiments, larger volumes and/or larger targets

Technical specifications

Description	FemtoJet	FemtoJet express
Pressure supply	Integrated compressor	External pressure source
Injection pressure	0; 5–6,000 hPa (87 psi) can be set in increments of 1 hPa	
Compensation pressure	0; 5–6,000 hPa, can be set in increments of 1 hPa	
Rinsing pressure	max. 7,000 hPa (102 psi)	
Dimensions	22 x 28 x 17 cm (W x D x H)	
Weight	6.2 kg	4.7 kg

Typical Injection Volume	FemtoJet		FemtoJet express	
Cell nucleus of adherent cells	10 ⁻¹⁵	10 ⁻¹²		
Cytoplasm of adherent cells		10 ⁻¹²		
Pronucleus of fertilized mouse oocytes			10 ⁻⁹	
<i>Caenorhabditis elegans</i>				10 ⁻⁹
Fish embryos in early development phases				10 ⁻⁶
<i>Xenopus laevis</i> oocytes				10 ⁻⁶
Volume (liter, logarithm, measurement unit)	10 ⁻¹⁵	10 ⁻¹²	10 ⁻⁹	10 ⁻⁶
Unit	femtoliter	picoliter	nanoliter	microliter

FemtoJet is suitable for applications that require lower volume ranges; FemtoJet express is better suited for applications that require higher volume ranges. Both feature the same injection time and pressure parameters.

Ordering information

Description	Order no.	
FemtoJet , programmable microinjector with integrated pressure supply	5247 000.013	
FemtoJet express , programmable microinjector with external pressure supply (not included)	5248 000.017	
Foot control , for triggering inject function	5247 623.002	
Universal capillary holder , for mounting Femtotips, Femtotip II or grip heads*	5176 190.002	
2 positioning aids , for universal capillary holder	5171 130.001	
Accessories		
2 pcs. grip head 0 for microcapillaries* , outer diameter 1.0–1.1 mm	5176 210.003	
2 pcs. grip head 1 for microcapillaries , outer diameter 1.2–1.3 mm	5176 212.006	
2 pcs. grip head 2 for microcapillaries , outer diameter 1.4–1.5 mm	5176 214.009	
2 pcs. grip head 3 for microcapillaries , outer diameter 0.7–0.9 mm	5176 207.002	
Spare parts		
O-ring , includes seals and tool, set of 10	5176 196.000	
Service kit , includes O-ring set plus Femtotip adapter	5176 195.004	
Pressure tube , 2 m, for connecting universal capillary holder to FemtoJet/FemtoJet express	5246 164.004	
Pressure tube for FemtoJet express , 2.5 m, includes coupling G. 1/4 inch**	5248 200.008	

* Universal capillary holder, O-ring, Femtotip adapter and grip head 0 are included with the purchase of the FemtoJet or FemtoJet express.

** Pressure tube for FemtoJet express is included with the purchase.

CELLTRAM® Air/Oil/vario

Common product features

- Maintenance-free piston/cylinder system
- Large, ergonomic dials
- Stable, non-slip base plate
- Universal capillary holder for mounting onto all common micromanipulators



Description

CellTram Air, CellTram Oil and CellTram vario, manual microinjectors for pressure control, manual microinjection and liquid dispensing, have been designed with special emphasis on optimal ergonomics, operational comfort and high precision. They can be used with all common micromanipulation systems.

Product features of CellTram Air

- Optimized resolution for holding suspension cells
- Work point can be set easily via pressure-compensation valve
- Very easy to use, no oil filling necessary

Applications: CellTram Air

- Gentle holding of suspension cells (e.g., oocytes)
- Manual microinjection and dispensing of aqueous solutions



Product features of CellTram Oil

- QuickValve™ system for simple, rapid filling
- Max. pressure: 20,000 hPa (see page 299)
- Biological compatibility ensured by embryo-tested oil

Applications: CellTram Oil

- Uptake and dispensing of small cells (e.g., sperm)
- Manual microinjection under high pressure (e.g., into plants)



Product features of CellTram vario

- Variable transmission ratio (1:1 and 1:10) for applications that demand high resolution and sensitivity
- QuickValve system for simple, rapid filling
- Biological compatibility ensured by embryo-tested oil

Applications: CellTram vario

- Transfer of suspension cells (e.g., ES cells)
- Transfer of organelles (e.g., nuclear transfer)
- Extraction of cells (e.g., microdissection, polar body biopsy, blastomere biopsy)
- Uptake and dispensing of small cells (e.g. sperm cells)

CellTram Air/Oil/vario is suited for assisted reproduction.
CellTram Air/Oil/vario is registered in Europe as a medical product (medical products directive MDD 93/42/European Economic Community).

CELLTRAM® Air/Oil/vario and QuickValve System

**QuickValve system**

With the QuickValve system, filling of the CellTram vario and CellTram Oil is quick and easy. A special valve screw allows the oil to be filled directly into the piston chamber. The optimized piston/cylinder system minimizes friction in the piston chamber, providing the utmost reliability and ultrafine sensitivity.

Technical specifications

Description	CellTram Air	CellTram Oil	CellTram vario
Generation of pressure	piston/cylinder system; air-filled, maintenance-free	piston/cylinder system; oil-filled, maintenance-free	piston/cylinder system; with gears, oil-filled, maintenance-free
Volume change per revolution	88 µL	9.6 µL	9.6 µL/960 nL (coarse/fine)
Total volume that can be set	2,640 µL	960 µL	960 µL
Minimum volume that can be set	<200 nL	<20 nL	<20 nL/<2 nL (coarse/fine)
Maximum pressure	2,900 hPa	20,000 hPa	20,000 hPa

Ordering information

Description	Order no.	
CellTram Air , pneumatic manual microinjector	5176 000.017	
CellTram Oil , hydraulic manual microinjector	5176 000.025	
CellTram vario , hydraulic manual microinjector, with gears	5176 000.033	
Accessories		
2 pcs. grip head 0 for microcapillaries* , outer diameter 1.0–1.1 mm	5176 210.003	
2 pcs. grip head 1 for microcapillaries , outer diameter 1.2–1.3 mm	5176 212.006	
2 pcs. grip head 2 for microcapillaries , outer diameter 1.4–1.5 mm	5176 214.009	
2 pcs. grip head 3 for microcapillaries , outer diameter 0.7–0.9 mm	5176 207.002	
Universal capillary holder , for Femtotips, Femtotip II or grip heads*	5176 190.002	
Positioning aids , for universal capillar holder, set of 2	5171 130.001	
Spare parts		
O-ring , includes seals and tool, set of 10	5176 196.000	
Service kit , includes O-ring set plus Femtotip adapter	5176 195.004	
Pressure tube , 1 m, for connecting the CellTrams to the universal capillary holder	5176 114.004	

* Universal capillary holder and grip head 0 for microcapillaries are included with your CellTram Air/Oil/vario purchase.

i Further information under www.eppendorf.com/celltram

Eppendorf microcapillaries



Capillary Safe, an extremely safe transport packaging system that protects microcapillaries from breakage prior to removal.

Description

Applications in cellular and molecular biology continue to grow in number, while samples continue to get smaller in size. Microinjection into living cells is the method of choice in various areas of research and in assisted human reproduction.

Eppendorf offers a wide range of excellent microcapillaries, designed to give you fast, efficient and reproducible results for the most common applications:

- VacuTip and TransferTips for Intracytoplasmic Sperm Injection (ICSI)
- TransferTip (ES), for embryonic stem cells (page 305)
- TransferTips (MDS), for microdissection (page 307)
- FemtoTips for microinjection of minimal volumina (page 301)
- Piezo Drill Tip for Piezo-assisted micromanipulation (page 306)

All Eppendorf microcapillaries offer you reproducible quality through narrowly defined specifications and intensive quality control, as well as the greatest security through effective sterilization methods.

Expensive and complicated devices for the manufacturing and control of self-made capillaries are no longer necessary. Fluctuations in quality and specifications can no longer put your experiments at risk.

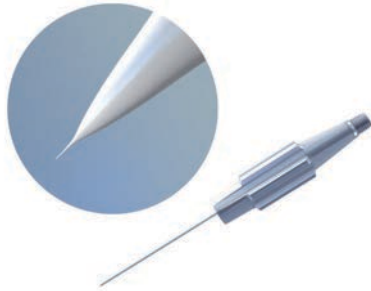
Applications

- Capillary Safe provides safe transport and protects your TransferTip and VacuTip capillaries until they are used

Application	Microcapillaries	Page
Microinjection of the smallest volumes into adherent cells	Femtotips and Femtotip II	301
Generation of transgenic mice and related techniques	VacuTip holding capillary	302
	Femtotip II	301
	TransferTip (ES) for embryonic stem cells	305
	Piezo Drill Tip (ES)	306
Intracytoplasmic sperm injection (ICSI)	VacuTip holding capillary	302
	TransferTip R, F, and RP injection capillaries	303
	Piezo Drill Tip (Mouse ICSI)	306
Polar body biopsy and related techniques	VacuTip holding capillary	302
	Polar Body Biopsy Tip MML	304
Sperm selection	IMSI/TESE Tip	305

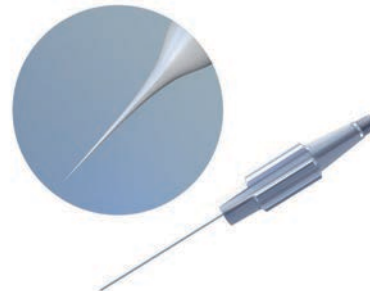
 Further information at www.eppendorf.com/microcapillaries

Femtotips®, Femtotip II and Microloader



Femtotips

- Microinjection capillary for reproducible injection of adherent cells or injection close to the surface, for example in fish embryos
- Defined opening with 0.5 µm inner diameter
- Screw-thread for rapid mounting
- 100 % individual testing of every Femtotip using a flow parameter



Femtotip II

- Microinjection capillary for reproducible injection of adherent cells and suspension cells
- Pronuclear injection into mouse embryos
- Microinjection into small organisms or embryos at early developmental stages
- 100 % individual testing of every Femtotip II using a flow parameter



Microloader

- Pipette tip for filling the microinjection capillaries
- Rack package can be sterilized
- Ideal for recovering surplus solution from the capillary



Rear filling of microinjection capillaries using Microloader

Product features of Femtotips and Femtotip II

- Sterile
- Every tip is individually tested
- Defined opening
- Screw-thread for simple mounting

Description

Femtotip microinjection capillaries and Microloader enable rapid, precise microinjection with the utmost reproducibility. Stringent quality-control procedures ensure the best possible quality. The combination of InjectMan NI 2, FemtoJet and Femtotips ensures exact results with high-throughput experiments.

Applications

- Microinjection into adherent, suspension cells and small organisms or embryos at early developmental stages

Ordering information

Description	Order no.	
Femtotips, sterile injection capillary, 0.5 µm inner diameter, set of 20	5242 952.008	
Femtotip II, sterile injection capillary, 0.5 µm inner diameter, set of 20	5242 957.000	
Microloader, 2 racks of 96	5242 956.003	

Precision capillaries for holding suspension cells

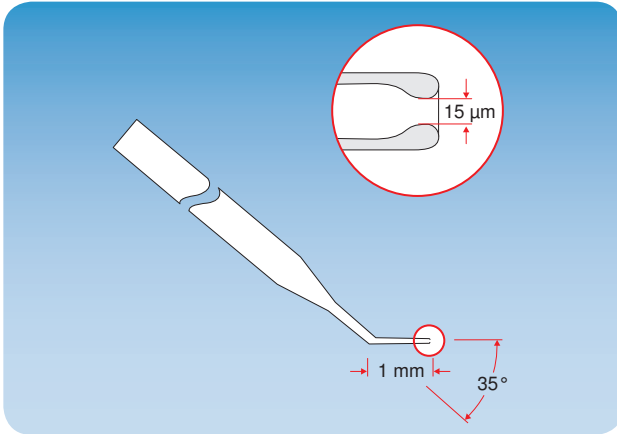
Description

We offer two versions of holding capillaries to provide you with the perfect capillaries for your application.

Shared product features

Glass microcapillaries to hold suspension cells (e.g., oocytes or blastocysts)

- Medical product certified according to European law
- Sterilized by validated gamma irradiation
- Non cytotoxic (as proven by the mouse embryo development test)
- Capillary Safe for optimum protection



VacuTip product characteristics

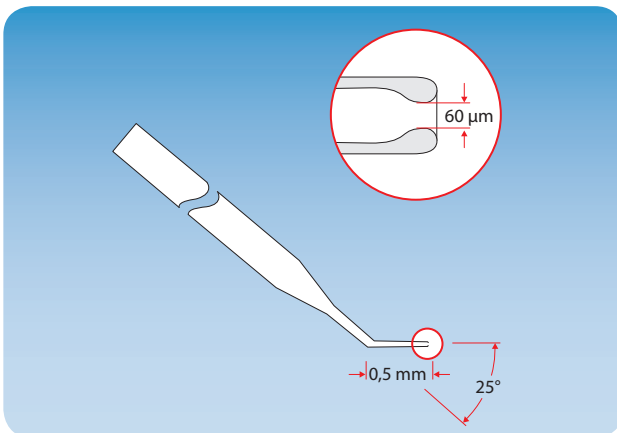
For holding suspension cells (e.g., oocytes or blastocysts)

- 15 µm inner diameter
- 35° tip angle

Ordering information

Description	Order no.	
VacuTip, inner diameter 15 µm, sterile, set of 25	5175 108.000	

The VacuTip capillary is registered as a medical device (according to Medical Device Directive MDD 93/42/EEC).



VacuTip FCH product characteristics

For holding suspension cells (e.g., oocytes or blastocysts)

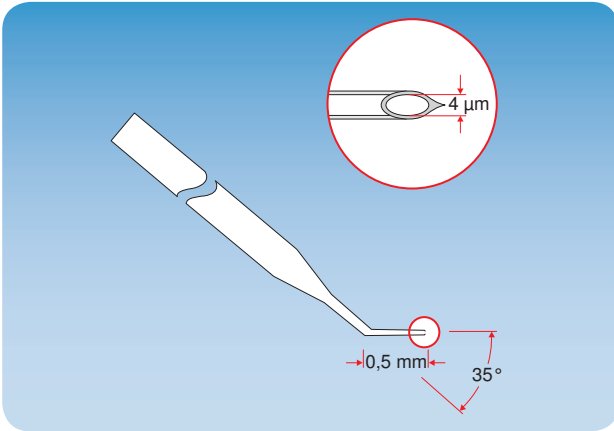
- 60 µm inner diameter
- 25° tip angle

Ordering information

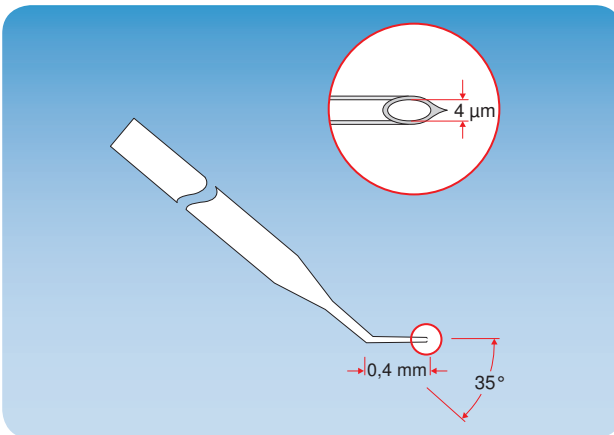
Description	Order no.	
VacuTip FCH, inner diameter 60 µm, sterile, set of 25	5175 240.006	

The VacuTip FCH capillary is registered as a medical device (according to Medical Device Directive MDD 93/42/EEC).

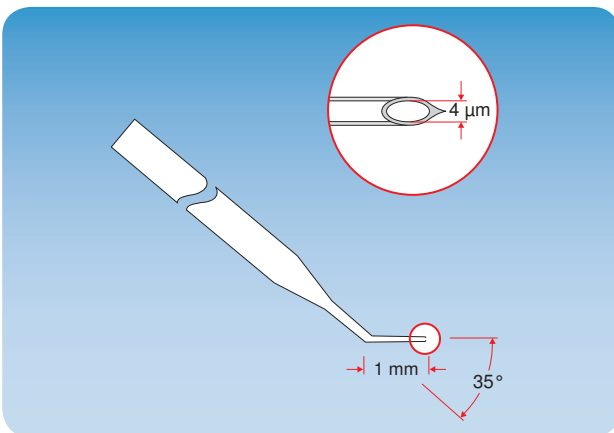
Precision capillaries for assisted reproduction



TransferTip RP, rigid, parallel flange, 0.5 mm long



TransferTip F, flexible flange, 0.4 mm long



TransferTip R, rigid flange, 1 mm long

Additional features of TransferTip (ICSI)

For sperm injection using the ICSI technique/injection of human cells

- 4 µm inner diameter
- Heat-formed spike eases penetration
- 35° tip angle

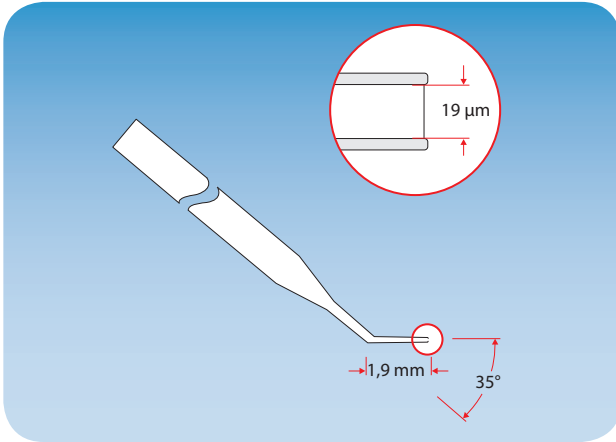
Ordering information

Description	Order no.	
TransferTip RP (ICSI) , sterile, set of 25	5175 114.000	
TransferTip F (ICSI) , sterile, set of 25	5175 106.008	
TransferTip R (ICSI) , sterile, set of 25	5175 113.004	

The TransferTip RP/F/R (ICSI) are registered in Europe as a medical device (according to Medical Device Directive MDD 93/42/EEC).

i Further information at www.eppendorf.com/microcapillaries

Precision capillaries for Polar Body Biopsy



Applications

- Laser-supported polar body biopsy according to Dr. Markus Montag

Product features Polar Body Biopsy Tip MML*

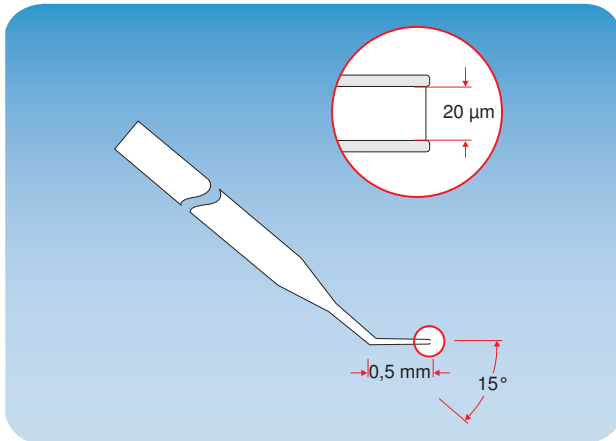
- 19 µm inner diameter
- 35° tip angle
- Rigid flange, length 1,900 µm
- Rounded
- Sterilized by validated gamma irradiation
- Non-cytotoxic (as proven by the mouse embryo development test)
- Capillary Safe for optimum protection

* Polar Body Biopsy Tip MML is equivalent to the specifications of the CustomTip 5175 110.005 (02/240).

Ordering information

Description	Order no.	
Polar Body Biopsy Tip MML, sterile, set of 25	5175 210.000	

The Polar Body Biopsy Tip MML capillary is registered in Europe as a medical device (according to Medical Device Directive MDD 93/42/EEC).



Product features Polar Body Biopsy Tip FCH

- 20 µm inner diameter
- 15° tip angle
- Rigid flange
- Rounded
- Sterilized by validated gamma irradiation
- Non-cytotoxic (continuous inspection using mouse embryo test)
- Capillary safe for optimal protection

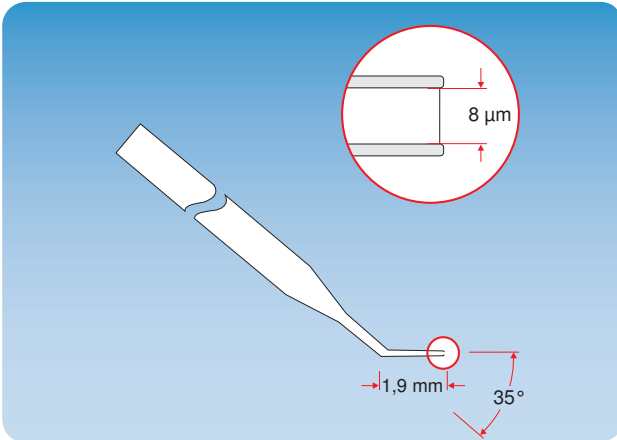
Ordering information

Description	Order no.	
Polar Body Biopsy Tip FCH	5175 230.000	

The Polar Body Biopsy Tip FCH capillary is registered in Europe as a medical device (according to Medical Device Directive MDD 93/42/EEC).

i Further information at www.eppendorf.com/microcapillaries

Precision capillary for IMSI and TESE



Applications

- Testicular sperm extraction from biopsy tissue (TESE) for ICSI
- Intracytoplasmic morphologically selected sperm injection (IMSI): Sperm selection by morphological criteria, using high resolution microscopy
- Both applications serve the selection and transfer of sperm for subsequent ICSI

Product features IMSI/TESE Tip

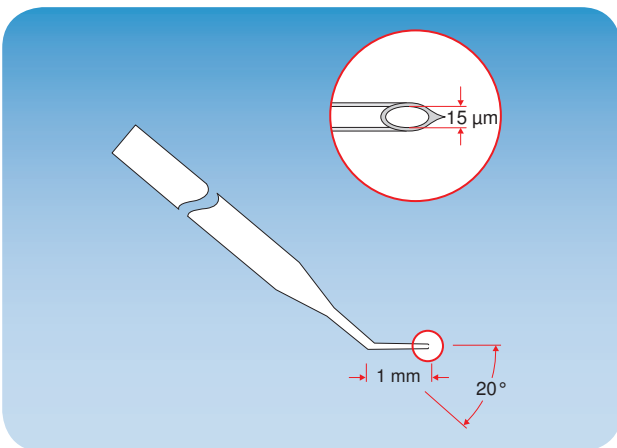
- 8 µm inner diameter
- 35° tip angle
- Rigid flange, length 1,900 µm
- Jagged, non polished
- Sterilized by validated gamma irradiation
- Non-cytotoxic (as proven by the mouse embryo development test)
- Capillary Safe for optimum protection

Ordering information

Description	Order no.	
IMSI/TESE Tip, sterile, set of 25	5175 117.000	

The IMSI/TESE Tip capillary is registered in Europe as a medical device (according to Medical Device Directive MDD 93/42/EEC).

Precision capillaries for transferring embryonic stem cells



Applications

- Production of transgenic animals by embryonic stem cell transfer

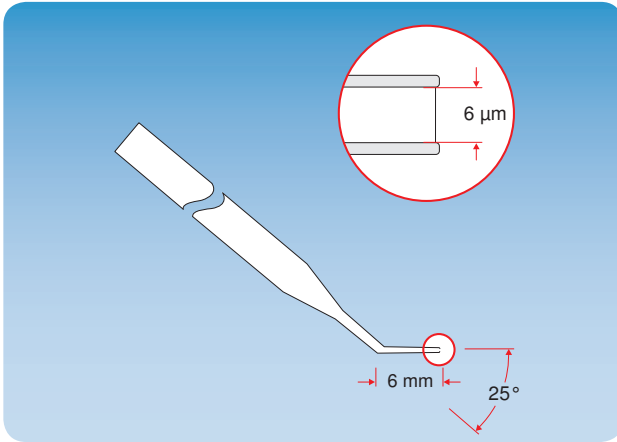
Product features of TransferTip® (ES)

- 15 µm inner diameter
- 20° tip angle
- Rigid flange, 1 mm long
- Heat-formed spike eases penetration
- Sterilized by validated gamma irradiation
- Capillary Safe for optimum protection

Ordering information

Description	Order no.	
TransferTip (ES), sterile, set of 25	5175 107.004	

Precision capillary for piezo-assisted mouse ICSI

**Applications**

- Transfer of mouse spermatocytes to cytoplasm of unfertilized mouse oocytes

Product features

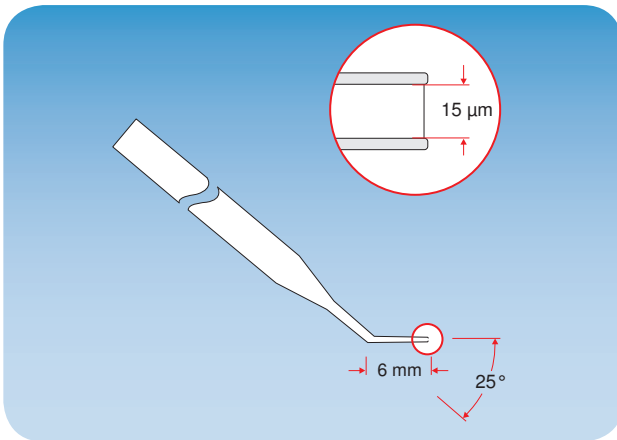
- 6 µm inner diameter
- 25° tip angle
- Rigid flange, 6 mm long
- Jagged, non-polished
- Sterilized by validated gamma irradiation
- Capillary Safe for optimum protection

Ordering information

Description	Order no.	
Piezo Drill Tip Mouse ICSI, for piezo-assisted mouse ICSI, sterile, set of 25	5175 220.005	

i Further information at
www.ependorf.com/microcapillaries

Precision capillaries for piezo-assisted transfer of embryonic stem cells

**Applications**

- Piezo-assisted transfer of embryonic stem cells to blastocysts

Product features

- 15 µm inner diameter
- 25° tip angle
- Rigid flange, 6 mm long
- jagged, non polished
- Sterilized by validated gamma radiation
- Capillary Safe for optimal protection

Ordering information

Description	Order no.	
Piezo Drill Tip ES, for piezo-assisted transfer of mouse ES cells, set of 25	5175 250.001	

Disposables for microdissection

Ordering information

Description	Order no.	
MicroChisel extremely fine metal needle for microdissection, 10 pcs.	5190 204.008	
Filtertips (MDS) sterile pipette tips with filter, 96 pcs.	5190 043.004	
TransferTips (MDS), sterile glass capillaries for aspirating cells, 10 pcs.	5190 042.008	

Visit our Virtual Lab



Our new Eppendorf Virtual Lab completely emulates workstations for micromanipulation, *epMotion* and *real-time* PCR and allows any user to zoom and focus into a variety of lab settings.

Optional, an animated version of our mascot, Captain Eppli, explains the different set-ups, instruments and tools.

The Virtual Lab allows you to choose the optimal equipment for their individual workstations and applications. It also comes with a set of educational materials such as links to protocols, application notes and movies of our equipment in action.

Virtual Lab is freely available with currently a library of eight applications to choose from:

- Intracytoplasmic sperm injection (ICSI)
- Embryonic stem cell transfer
- Pronucleus injection
- Microinjection into adherent cells
- Transgenics „Zebrafish“
- *epMotion*
- Fast PCR

www.eppendorf.com/virtual-lab

Microinjection into cultivated cells, egg cells and embryos



Eppendorf is your competent partner for all questions about cell biology. Our training provides an introduction to the most important areas of micromanipulation.

Target group

Scientists and technicians in all biomedical research areas—basic experience working with tissue culture cells and light microscopes is helpful

Goals of seminar

To obtain detailed knowledge on the technical aspects of microinjection; examples of usage in current research will be discussed in the lectures

At the end of the seminar, participants will be able to prepare and carry out microinjections into cells as well as evaluate the experiments with imaging systems

Seminar content

Microinjection into adherent cells:

- Sample preparation for microinjection
- Semiautomated microinjection into adherent cells and the expression of GFP fusion proteins
- Detection of GFP-marked proteins via fluorescence microscopy

Microinjection techniques for the production of transgenic mice:

- Injection of DNA into the pronucleus of fertilized mouse oocytes
- Transfer of embryonic stem cells into blastocysts

Injection into fish embryos as a model for experiments in developmental biology:

- Microinjection of DNA into Medaka
- Configuration of workspaces for microinjection



In cooperation with the renowned European Molecular Biology Laboratory (EMBL) in Heidelberg, additional courses are offered at the new Advanced Training Centre (ATC). Information about course contents is available at www.eppendorf.com/training



➔ Further information on this and other Eppendorf training courses is available at www.eppendorf.com/training

Cell Technology Performance Plans

epServices
for premium performance

Value of Preventive Maintenance

Periodically inspection and preventive maintenance of your instruments ensure that the cell manipulation instruments are consistently operating at peak performance and are ready for use. This is extremely important for human In Vitro Fertilization (IVF) techniques like: Intracytoplasmic Sperm Injection (ICSI) and Pre-Implantation Genetic Diagnosis (PGD).

This includes cleaning of all external parts, visual checking of all sensitive parts and stability testing. Where applicable the following services are also included: checking leak tightness, analyzing device data, and exchange of oil and wear and tear parts. A complete and final system test will be performed.

Certification Service

Installation and Operational Qualification (IQ/OQ) services are available for all instruments. IQ/OQ assures that your Eppendorf instrumentation is delivered, installed and operating according to manufacturer specifications. This service also includes cleaning of internal assemblies and electrical testing where applicable. We support you with establishing your documentation in regulated working areas issuing OQ certificate.

Long-term benefits:

- Reliable system operation over the total system lifetime
- GLP compliant documentation

**Features of Eppendorf Performance Plans**

- Eppendorf customer care and quality commitment
- Only use of genuine and quality inspected Eppendorf parts
- Certified service reports

i For more information go to www.eppendorf.com/epservices.
In selected countries only.

Performance Plans	Elektroporators Elektroporator 2510 ^M , Eppendorf Eporator, Multiporator	Microinjectors CellTram Air	Microinjectors CellTram Oil, CellTram vario	Microinjectors FemtoJet, FemtoJet express	Micromanipulators InjectMan NI 2, PatchMan NP 2, TransferMan NK 2
Recommended service period is once per year.	Order no.	Order no.	Order no.	Order no.	Order no.
Preventive Maintenance*	4309 870.005	5176 870.003	5176 871.000	5247 870.000	5188 870.009
Certification Service: Operational Qualification (OQ) according to manufacturer specification.	4309 870.102	5176 870.100	5176 871.107	5247 870.107	5188 870.106
Electrical testing according to country-specific regulations	4309 870.200			4309 870.200	4309 870.200
Additional Service:					
Software upgrade	4309 870.307			4309 870.307	4309 870.307
Eppendorf PiezoXpert Actuator Verification Order no. 5194 075.016					

*Spare parts that may be required are not included and will be invoiced additionally.
For technical support for the Eppendorf Microdissector please inquire separately.

New Brunswick shakers – dependable and reliable

Description

New Brunswick Scientific laboratory shakers are known throughout the world for dependable operation and innovative design. New Brunswick manufactures the widest selection of shakers in the industry, with more than 40 models available to suit your exact needs. Select from a broad range of open-air, incubated, or incubated/refrigerated models.

Our top-of-the-line **Innova® Lab Shakers** feature New Brunswick's triple-eccentric drive for uniform motion and superb reliability under the most adverse conditions. Innova temperature-controlled models provide the convenience of programmable controls to automate ramping temperature and speed up and down, and cycling optional photosynthetic and UV lighting on and off at pre-set intervals. Budget-saving **Excella®** shakers feature microprocessor-controls for accurate control, and heavy-duty counterbalanced drives for dependable performance.

Innovative designs and unparalleled fabrication provide you with day-in and day-out worry-free operation, often for decades of continuous use.

Product features

- Advanced microprocessor controls ensure reproducible results and operator convenience
- “Set it and forget it” programming in Innova incubated and incubated/refrigerated models enable you to store and recall multiple parameter multi-step programs for convenient, automated operation
- Numerous safety features are built in to protect you, your cultures and your shaker
- We offer the most comprehensive warranty in the industry
- We offer the largest selection of shakers in the industry – nearly 20 models in our Innova line alone, to meet virtually any culturing or molecular biology application

For incubator shakers, see pages 314–327.

For open air shakers, see pages 332–341.

For water bath shakers, see pages 342–345.



What makes Innova® shakers so reliable?

Description

Dependable operation is due in large part to the New Brunswick triple-eccentric counterbalanced drive.

Our **Excella® Shaker line** provides good performance and value for less demanding applications.

We also offer the I26 stackable incubator shaker with triple-eccentric drive, high temperature water bath shakers, as well as a wide range of platforms and accessories.



Product features

- Components are fabricated to exacting specifications. Drive shafts, for example, are machined to tolerances of 0.0051 mm, ensuring stable vibration-free operation even when operated at speeds up to 500 rpm
- Ultimate precision is ensured as **each and every triple-eccentric mechanism is checked and measured using a Computer Aided Measurement (CAM) System.** They are NOT batch tested.
- With the highest quality materials, superior design and precision fabrication, we guarantee our shakers will provide worry-free operation for many years to come

New Brunswick's often-imitated but never duplicated heavy-duty, counterbalanced triple-eccentric drive ensures uniform motion is imparted to every flask, regardless of position on the platform. Heavy-duty construction allows us to guarantee that our shakers will perform to our specifications, even when fully loaded and operating at top speed.

Selecting the correct platform for your New Brunswick shaker



Universal platform shown with accessory clamps, test tube racks and sticky tape.







Dedicated platforms – when a single-size flask will be used, these platforms maximize capacity, and come with clamps already mounted.

Platforms for New Brunswick shakers must be purchased separately. A wide range of interchangeable accessory platforms are offered to accommodate all your glassware.

Universal platforms – have multiple holes enabling you to mix different-sized clamps, as well as mount an assortment of microtiter plates and test tube racks onto a single platform, for maximum versatility. Clamps and accessories for Universal Platforms are sold separately – see pages 328 & 346.




Dedicated platforms – when just one size flask will be used on the shaker, (i.e., 250 mL flasks), dedicated platforms come with flask clamps already mounted. Dedicated platforms generally will hold a greater number of flasks than the universal platform, but do not offer the versatility.

New Brunswick shaker selection guide – incubated/refrigerated models

Enclosed incubator shakers		Innova®							
Balanced drive mechanism	Triple-eccentric with permanently lubricated ball bearings								
Motor type	Solid state, DC brushless motor								
Audible and visual alarms	Yes								
cETLus and CE marked	Yes								
Timer	0.1 – 99.9 hrs								
Model	40	40R	42	42R	43	43R	44	44R	
(Images not to scale)					3 units shown				
Page	314		316		318		320		
Accessories page	328		328		328		328		
Platform size (W x D), cm	46 x 46		46 x 46		76 x 46		76 x 46		
Benchtop (B), Under bench (U), Console (C) or Floor stackable (S)	B		B, U, S (x2)		C		C, S (x3)		
Orbit diameter, cm	1.9 or 2.5		1.9 or 2.5		2.5 or 5.1		2.5 or 5.1		
RPM range	25 to 500		25 to 400		25 to 500		25 to 400		
Temperature range (in °C) [A = Ambient]	A +5 to 80	A –15 to 80	A +5 to 80	A –20 to 80	A +5 to 80	A –20 to 80	A +5 to 80	A –20 to 80	
CO ₂ control									
Refrigerated		Yes		Yes		Yes		Yes	
Active humidification									
Multi-step programming	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Space saving glide up doors							Yes	Yes	
Slide out platform							Yes	Yes	
In chamber power receptacle			Yes	Yes					
Internal convenience light			Yes	Yes			Yes	Yes	
Com port	RS-232	RS-232	RS-232	RS-232	RS-232	RS-232	RS-232	RS-232	
Available options									
O ₂ control									
Humidity monitor			Yes	Yes	Yes	Yes	Yes	Yes	
Photosynthetic lighting				Yes		Yes		Yes	
Gassing manifold			Yes	Yes	Yes	Yes	Yes	Yes	
UV germicidal lamp				Yes		Yes		Yes	
Dedicated platform									
Maximum capacity									
50 mL Erlenmeyer flasks	64		64		108		—		
125 mL Erlenmeyer flasks	34		34		60		60		
250 mL Erlenmeyer flasks	25		25		40		40		
500 mL Erlenmeyer flasks	16		16		24		24		
1 L Erlenmeyer flasks	9		9		15		15		
2 L Erlenmeyer flasks	5		5		12		12		
2.8 L Fernbach flasks	4		4		6		6		
4 L Erlenmeyer flasks	—		4		6		6		
6 L Erlenmeyer flasks	—		—		4		—		
Universal platform									
Maximum capacity									
10 mL Erlenmeyer flasks	109		109		183		187		
25 mL Erlenmeyer flasks	64		64		92		93		
50 mL Erlenmeyer flasks	45		45		92		91		
125 mL Erlenmeyer flasks	21		21		39		39		
250 mL Erlenmeyer flasks	18		18		30		30		
500 mL Erlenmeyer flasks	14		14		18		24		
1 L Erlenmeyer flasks	8		8		12		14		
2 L Erlenmeyer flasks	5		5		8		8		
2.8 L Fernbach flasks	4		4		6		6		
4 L Erlenmeyer flasks	—		4		6		6		
5 L Erlenmeyer flasks	—		4		6 ¹		6 ¹		
6 L Erlenmeyer flasks	—		2 ¹		4 ¹		—		
Dimensions (W x D x H), cm	55.9 x 76.2 x 61		62 x 75.4 x 82		115.6 x 81.3 x 103.1		135 x 84.3 x 73.5		
Weight, kg	60.3	79.4	98.5	121	202	216	238	257	

¹ Using Sticky Tape – less with clamps. Max flask size is 4 L when using photosynthetic lighting option.

New Brunswick shaker selection guide – incubated/refrigerated models

		Excella®			
		Heavy-duty with permanently lubricated ball bearings			
		Solid state, DC brushless motor			
		Yes			
		Yes			
		0.1 - 99.9 hrs			
I26	I26R	E24	E24R	E25	E25R
	2 shown on optional base				
322		324		326	
328		328		328	
76 x 46		46 x 46		76 x 46	
S (x3)		B		C	
2.5		1.9		2.5	
25 to 400		50 to 400		50 to 400	
A +5 to 60	A -15 to 60	A +7 to 60	A -15 to 60	A +7 to 60	A -15 to 60
	Yes		Yes		Yes
Yes	Yes				
RS-232	RS-232	RS-232	RS-232	RS-232	RS-232
Available options					
Dedicated platform					
—		64		108	
60		34		60	
40		25		40	
24		16		24	
15		9		15	
12		5		12	
6		4		6	
—		—		6	
—		—		4	
Universal platform					
187		109		—	
93		64		—	
93		45		91	
39		21		39	
30		18		30	
24		14		18	
12		8		12	
8		5		8	
6		4		6	
—		—		6	
—		—		—	
—		—		4	
128.3 x 77 x 70		56 x 76.2 x 61		127 x 77 x 105.9	
168	186	60	80	167	196

Innova® 40 benchtop incubator shakers and 40R with added refrigeration



Description

Innova 40 incubator shakers provide very broad temperature capabilities for culturing a wide variety of organisms in flasks up to 3 L. Refrigeration module is built into the Innova 40R, or can be easily added to Model 40, at any time.

Product features

- **Compact benchtop model** – fits on the bench and holds flasks up to 3 L
- **Programmable Innova controls** – automatically changes temperature and speed at customer-programmed, timed intervals
- **See-through lid** – provides clear visibility to view cultures. Lifts easily to access all samples
- **Innova 40 can be upgraded with refrigeration**

Technical specifications

Description	Innova 40	Innova 40R
Platform size (W x D)	46 x 46 cm	
Temperature range	Ambient + 5°C to 80°C	15°C below ambient to 50°C (min. 4°C)
Speed (rpm)	25 to 500	
Orbit	1.9 or 2.5 cm	
Temperature uniformity	+/-0.25°C at 37°C	
Innova control programmer		
Timer	0.1 to 99.9 hours + continuous operation	
Memory	Non volatile with automatic power failure restart	
Available program modes	<ul style="list-style-type: none"> ● Constant speed and temperature ● Timed shaking ● Programmable multi-steps ● RS-232 control 	
Multi-step programming		
Stored programs	4	
Steps per program	15	
Dimensions (W x D x H)	55.9 x 76.2 x 61 cm (101.6 cm depth with lid open)	
Net weight	60.3 kg	79.4 kg





Easy to view LCD shows all important parameter settings at a glance.

Prog 1	STEP #1	STEP #2
Time	0:00	9:00
C	37.0	45.0
RPM	250	350
UV	Off	Off
←→	Save	Cancel

Multi-step programming and program storage provide reproducible runs, time after time.

Innova® 40 benchtop incubator shakers and 40R with added refrigeration


Ordering information

Model	Power supply	Order no. 1.9 cm orbit	Order no. 2.5 cm orbit	
40 Incubated	230 V, 50 Hz	M1299-0082	M1299-0092	
40R Incubated/ Refrigerated	230 V, 50 Hz	M1299-0086	M1299-0096	
Factory installed options				
Refrigerated module to upgrade Innova 40 to Innova 40R			M1299-0061	
Remote alarm			M1320-8029	

Shaker does not include platforms which must be ordered separately.

Ordering information

Description	Clamps	Order no.	
Innova 40 and 40R interchangeable platforms , 46 x 46 cm phenolic resin unless otherwise stated. For a complete list of flask clamps and platform attachments, see pages 328–329.			
Universal platform, aluminum	—	M1250-9902	
Drip pan for universal platform M1250-9902	—	M1250-9906	
Utility carrier holds glassware between rubber-cushioned cross bars	—	M1194-9909	
Rod kit for utility carrier (one additional rod)	—	M1194-9923	
Utility tray with non-skid surface	—	M1194-9910	
50 mL Erlenmeyer flask dedicated platform, phenolic resin	64	M1194-9903	
125 mL Erlenmeyer flask dedicated platform, phenolic resin	34	M1194-9904	
250 mL Erlenmeyer flask dedicated platform, phenolic resin	25	M1194-9905	
500 mL Erlenmeyer flask dedicated platform	16	M1194-9906	
1 L Erlenmeyer flask dedicated platform	9	M1194-9907	
2 L Erlenmeyer flask dedicated platform	5	M1194-9908	
2.8 L Fernbach flask dedicated platform	4	M1233-9932	
Sticky pad platform, (pads sold separately)	—	M1250-9903	
Quick-change platform kit, enables platform attachment without tools	—	M1192-9901	

 Ordering information for other voltage options begins on page 471.

Innova® 42 stackable, on- or under-bench incubator shakers and 42R with added refrigeration



Shown stacked two units high.
Stationary shelf and internal power receptacle are standard.

Technical specifications

Description	Innova 42	Innova 42R
Platform size (W x D)	46 x 46 cm	
Temperature range	Ambient +5°C to 80°C	20°C below ambient to 80°C
Speed (rpm)	25 to 400	
Orbit	1.9 or 2.5 cm	
Temperature uniformity	+/-0.25°C at 37°C	
Internal electric receptacle		
Innova control programmer		
Timer	0.1 to 99.9 hours + continuous operation	
Memory	Non volatile with automatic power failure restart	
Available program modes	<ul style="list-style-type: none"> ● Constant speed and temperature ● Timed shaking ● Programmable multi-steps ● RS-232 control 	
Multi-step programming		
Stored programs	4	
Steps per program	15	
Dimensions (W x D x H)	62 x 75.4 x 82 cm (131 cm depth with door open)	
Net weight	98.5 kg	121 kg

Baffled flasks will reduce maximum speed. When stacked, maximum speed is 400 rpm with 250/500 mL flasks; maximum 300 rpm or lower with larger flasks.

Description

The Innova 42 and refrigerated Innova 42R provide labs with the most flexible options on the market today. These units are compact enough to fit on top of a lab bench, underneath the counter, or can be stacked two high on the floor for maximum capacity with minimal floor space.

Product features



- **Our most versatile model** – fits on the bench, under the counter, on the floor or can easily be double stacked to provide large capacity in minimal space.
- **Programmable Innova controls** – automatically change temperature, speed and optional photosynthetic and UV germicidal lights at timed programmed intervals
- **Internal moisture-proof power receptacle** – allows for the use of powered equipment inside the incubator
- **Large viewing window and internal light** – for easy viewing of samples without the need to open the door
- **Accommodates flasks up to 6 L**
- **Multi-function reservoir with built in drain** – humidifies chamber to reduce sample evaporation and protects unit from spills
- **Internal shelf** provides a stable surface for incubating samples not requiring shaking. Fully adjustable height provides maximum flexibility in accommodating samples.



New Brunswick's unique culture drawer option reduces sample desiccation while the samples are incubating.

Innova® 42 stackable, on- or under-bench incubator shakers and 42R with added refrigeration


Ordering information

Model	Power supply	Order no. 1.9 cm orbit	Order no. 2.5 cm orbit	
42 Incubated	230 V, 50 Hz	M1335-0002	M1335-0012	
42R Incubated/ Refrigerated	230 V, 50 Hz	M1335-0006	M1335-0016	
Factory installed options				
Photosynthetic light bank, programmable (Innova 42R only)			M1335-0300	
UV germicidal light, programmable (Innova 42R only)			M1335-0400	
12-port gassing manifold			M1335-0600	
Humidity monitor			M1335-0500	
Remote alarm			M1320-8029	

Shaker does not include platforms which must be ordered separately.

Ordering information

Description	Clamps	Order no.	
Innova 42 and 42R interchangeable platforms , 46 x 46 cm phenolic resin unless otherwise stated. For a complete list of flask clamps and platform attachments, see pages 328–329.			
Universal platform, aluminum	—	M1250-9902	
Drip pan for universal platform M1250-9902	—	M1250-9906	
Utility carrier holds glassware between rubber-cushioned cross bars	—	M1194-9909	
Rod kit for utility carrier (one additional rod)	—	M1194-9923	
Utility tray with non-skid surface	—	M1194-9910	
50 mL Erlenmeyer flask dedicated platform, phenolic resin	64	M1194-9903	
125 mL Erlenmeyer flask dedicated platform, phenolic resin	34	M1194-9904	
250 mL Erlenmeyer flask dedicated platform, phenolic resin	25	M1194-9905	
500 mL Erlenmeyer flask dedicated platform	16	M1194-9906	
1 L Erlenmeyer flask dedicated platform	9	M1194-9907	
2 L Erlenmeyer flask dedicated platform	5	M1194-9908	
2.8 L Fernbach flask dedicated platform	4	M1233-9932	
4 L Erlenmeyer flask dedicated platform	4	M1233-9930	
Sticky pad platform, (Sticky pads sold separately)	—	M1250-9903	
Quick-change platform kit, enables platform attachment without tools	—	M1192-9901	
Culture drawer, prevents plates from drying	—	M1335-0501	
Stacking kit, required when stacking 42/42R units (see also M1335-0810 below)		M1335-0800	
Stacking kit, to stack Innova 4200/4230 units on top of Innova 42/42R shakers		M1335-0810	
Additional perforated shelf and brackets		M1335-0080	

 **Ordering information for other voltage options begins on page 471.**

Innova® 43 programmable console incubator shakers and 43R with added refrigeration



Description

The large capacity incubated Innova 43 and incubated/refrigerated Innova 43R shakers accommodate numerous culture flasks, up to 6 L. Flask loading and unloading is easily accomplished with the foot pedal release and easy open lid design. Standard swivel casters provide easy mobility.

Product features

- **Console style incubated and incubated/refrigerated shaker with triple-eccentric drive** – provides large capacity shaking for flasks up to 6 L
- **Programmable Innova controls** – automatically changes temperature, speed and optional photosynthetic and UV germicidal lights at customer-programmed, timed intervals
- **Top mounted controls and display** – for easy, ergonomic viewing and setting
- **Foot pedal release with easy opening lid** – provides hands-free operation
- **Lighted interior** – for easy sample viewing through thermal glass
- **RS-232 port** for data logging and control
- **Multi-function reservoir with built in drain** – humidifies chamber to reduce sample evaporation and protects unit from spills

Technical specifications

Description	Innova 43	Innova 43R
Platform size (W x D)	76 x 46 cm	
Temperature range	+5 °C above ambient to 80 °C	17 °C below ambient to 80 °C
Temperature uniformity	+/-0.25 °C at 37 °C	
Speed (rpm)		
2.5 cm orbit	25 to 500	
5.1 cm orbit	25 to 300	
Innova control programmer		
Timer	0.1 to 99.9 hours + continuous operation	
Memory	Non volatile with automatic power failure restart	
Available program modes	<ul style="list-style-type: none"> ● Constant speed and temperature ● Timed shaking ● Programmable multi-steps ● RS-232 control 	
Multi-step programming:		
Stored programs	4	
Steps per program	15	
Dimensions (W x D x H)	115.6 x 81.3 x 103.1 cm (165.1 cm depth with door open)	
Net weight	202 kg	216 kg





Foot pedal activated lid for hands-free opening.



Top-mounted controls for easy viewing and setting.

Innova® 43 console incubator shakers and 43R with added refrigeration


Ordering information

Model	Power supply	Order no. 2.5 cm orbit	Order no. 5.1 cm orbit	
43 Incubated	230 V, 50 Hz	M1320-0002	M1320-0012	
43R Incubated/Refrigerated	230 V, 50 Hz	M1320-0006	M1320-0016	
Factory installed options				
Photosynthetic light bank (Innova 43R only)			M1320-0300	
UV germicidal light, in the airflow path outside the chamber reduces the bio-burden of circulated air (Innova 43R only)			M1320-0400	
12-port gassing manifold, permits direct gassing into flasks			M1320-0500	
Humidity monitor			M1320-0600	
Remote alarm			M1320-8029	

Shaker does not include platforms which must be ordered separately.

Ordering information

Description	Clamps	Order no.	
Innova 43 and 43R interchangeable platforms, 76 x 46 cm aluminum.			
For a complete list of flask clamps and platform attachments, see pages 328–329.			
Universal platform	—	M1250-9920	
Microplate platform. Holds 105 standard or 21 deepwell plates.	—	M1243-2500	
Utility tray with non-skid surface	—	AG-00	
50 mL Erlenmeyer flask dedicated platform	108	M1191-9908	
125 mL Erlenmeyer flask dedicated platform	60	M1191-9909	
250 mL Erlenmeyer flask dedicated platform	40	M1191-9910	
500 mL Erlenmeyer flask dedicated platform	24	M1191-9911	
1 L Erlenmeyer flask dedicated platform	15	AG-1	
2 L Erlenmeyer flask dedicated platform	12	AG-2	
2.8 L Fernbach flask dedicated platform	6	AG-28	
4 L Erlenmeyer flask dedicated platform	6	AG-4	
6 L Erlenmeyer flask dedicated platform, (cannot be used with light bank)	4	AG-6	
Sticky platform, (sticky pads sold separately)	—	M1250-9904	
Utility basket for incubating/refrigerating stationary glassware	—	M1320-0700	

 **Ordering information for other voltage options begins on page 471.**

Innova® 44 stackable, programmable incubator shakers and 44R with added refrigeration



3 shakers shown with standard slide-out mechanism

Technical specifications

Description	Innova 44	Innova 44R
Platform size (W x D)	76 x 46 cm	
Temperature range	+5 °C above ambient to 80 °C	20 °C below ambient to 80 °C
Temperature uniformity	+/-0.25 °C at 37 °C	
Speed (rpm)		
2.5 cm orbit	25 to 400	
5.1 cm orbit or 2 stacked units	25 to 300	
5.1 cm orbit or 3 stacked units	25 to 250	
Innova control programmer		
Timer	0.1 to 99.9 hours + continuous operation	
Memory	Non volatile with automatic power failure restart	
Available program modes	<ul style="list-style-type: none"> ● Constant speed and temperature ● Timed shaking ● Programmable multi-steps ● RS-232 control 	
Multi-step programming:		
Stored programs	4	
Steps per program	15	
Dimensions (W x D x H)	135 x 84.3 x 73.5 cm (open door requires additional 53.3 cm height)	
Net weight	238 kg	257 kg

Description

The flagship of the Innova incubated and incubated/refrigerated shaker line provides superior shaking and control with its triple-eccentric drive mechanism for worry-free, 24/7 shaking. Large LCD panel displays all pertinent parameters. The Innova 44/44R system provides space-saving design with stacking capabilities, a glide-up door and an ergonomic slide-out platform.

Product features

- **Innova programmable controller** – provides “set it and forget it” convenience. Automatically changes temperature, speed, optional photosynthetic and UV germicidal lights at customer-programmed, timed intervals.
- **Slide-out platform mechanism** – provides easy and effortless access to flasks located in the front and back of the shaker/incubator
- **Glide up front door** – requires very little space when opened
- **Stackable** – up to three units high, both saving space and increasing capacity
- **Double pane thermal glass** – provides excellent insulation coupled with easy viewing
- **Interior chamber light**
- **Holds flasks up to 5 L**
- **Multi-function reservoir with built in drain** – humidifies chamber to reduce sample evaporation and protects unit from spills



Universal platform shown with accessory clamps, test tube racks and sticky tape.



Dedicated platforms – when a single-size flask will be used, these platforms maximize capacity, and come with clamps already mounted.

Innova® 44 stackable, programmable incubator shakers and 44R with added refrigeration

Ordering information

Model	Power supply	Order no.	
		2.5 cm orbit	5.1 cm orbit
44 Incubated	230 V, 50 Hz	M1282-0002	M1282-0012
44R Incubated/Refrigerated	230 V, 50 Hz	M1282-0006	M1282-0016
Factory installed options			
Photosynthetic light bank (for 44R Model only)		M1282-9922	
12-port gassing manifold		M1282-0291	
Humidity monitor		M1282-5011	
UV germicidal light (for 44R Model only)		M1282-9921	
Remote alarm		M1282-8038	


Shaker does not include platforms which must be ordered separately.

Ordering information

Description	Clamp	Order no.
76 x 46 cm aluminum platforms for Innova 44/44R shakers only. (Not interchangeable with other 76 x 46 cm platforms). For a complete list of flask clamps and platform attachments, see pages 328–329.		
Universal platform, (can be used with sticky pad/tape)	—	M1282-9904
125 mL Erlenmeyer flask dedicated platform	60	M1282-9905
250 mL Erlenmeyer flask dedicated platform	40	M1282-9906
500 mL Erlenmeyer flask dedicated platform	24	M1282-9907
1 L Erlenmeyer flask dedicated platform	15	M1282-9908
2 L Erlenmeyer flask dedicated platform	12	M1282-9909
2.8 L Fernbach flask dedicated platform	6	M1282-9910
4 L Erlenmeyer flask dedicated platform	6	M1282-9911
Sticky pad platform (pads sold separately)	—	M1282-9913
Heavy duty 0.95 cm-thick aluminum plate platform for Innova 44/44R shakers only. (Not interchangeable with other 76 x 46 cm platforms.) Heavy-duty platforms are recommended for shaking full loads of flasks, 1 L and larger, containing more than 20 % volume or with baffles. For a complete list of flask clamps and platform attachments, see pages 328–329.		
Universal platform, heavy duty	—	M1282-9915
1 L Erlenmeyer flask dedicated platform, heavy duty	15	M1282-9925
2 L Erlenmeyer flask dedicated platform, heavy duty	12	M1282-9926
2.8 L Fernbach flask dedicated platform, heavy duty	6	M1282-9927
4 L Erlenmeyer flask dedicated platform, heavy duty	6	M1282-9928

Ordering information, optional accessories

Description	Order no.
Riser bases , increases the height of the shaker for easier access	
10.2 cm base riser, short	M1282-0600
30.5 cm base riser, medium	M1282-0800
40.6 cm base riser, tall	M1282-0700
Stacking kit , bolts together shakers for secure mounting	
Stacking kit, for stacking one additional 44 or 44R	M1282-0500

 **Ordering information for other voltage options begins on page 471.**

126 stackable incubator shakers and I26R with added refrigeration



Stacks up to 3 shakers. 2 shakers shown on a medium base

Description

Stackable, incubated I26 and incubated/refrigerated I26R shakers feature New Brunswick's triple-eccentric drive for uniform motion and dependable operation. Based on the design concepts of the Innova® shakers, the I26 and I26R offer excellent performance at a value price.

Product features

- **Advanced features, including triple-eccentric drive,** at an economical price
- **Slide out platform** provides easy access to all samples, including ones located in the back
- **Accepts flasks up to 2.8 Liters**
- **Stack up to 3 units** for maximum capacity while taking up minimal space
- **Large LED display** can be easily seen from across the room



Universal platform shown with clamps, test tube racks and sticky tape.

Technical specifications



Description	I26	I26R
Platform size (W x D)	76 x 46 cm	
Temperature range	+5 °C above ambient to 60 °C	15 °C below ambient to 60 °C
Temperature uniformity	+/-0.25 °C at 37 °C	
Orbit	2.5 cm	
Speed (rpm)		
1 unit	25 to 400	
2 stacked units	25 to 300	
3 stacked units	25 to 250	
Innova control programmer		
Timer	0.1 to 99.9 hours + continuous operation	
Memory	Non volatile with automatic power failure restart	
Dimensions (W x D x H)	128.3 x 77 x 70 cm (open door adds 48.4 cm to depth)	
Net weight	168 kg	186 kg



Dedicated platform

126 stackable incubator shakers and I26R with added refrigeration

Ordering information

Model	Power supply	Order no.	
I26 Incubated	230 V, 50 Hz	M1324-0002	
I26R Incubated/ Refrigerated	230 V, 50 Hz	M1324-0006	


Shaker does not include platform which must be ordered separately.

Ordering information

Description	Clamps 1 Shaker	Clamps 2 Shaker	Clamps 3 Shaker	Order no.	
76 x 46 cm aluminum, slide-out platforms for I26 and I26R shakers only. (Platforms are not interchangeable with other 76 x 46 cm platforms). Clamps and accessories sold separately. See pages 328–329.					
Universal platform	—	—	—	M1324-9904	
125 mL Erlenmeyer flask dedicated platform	60	120	180	M1324-9905	
250 mL Erlenmeyer flask dedicated platform	40	80	120	M1324-9906	
500 mL Erlenmeyer flask dedicated platform	24	48	72	M1324-9907	
1 L Erlenmeyer flask dedicated platform	15	30	45	M1324-9908	
2 L Erlenmeyer flask dedicated platform	12	24	36	M1324-9909	
2.8 L Fernbach flask dedicated platform	6	12	18	M1324-9910	
Sticky pad platform, (sticky pads sold separately)	—	—	—	M1324-9911	

Ordering information, optional accessories

Description	Order no.	
Riser bases , increases the height of the shaker for easier access		
10.2 cm base riser, short	M1324-0600	
33 cm base riser, medium	M1324-0800	
43.2 cm base riser, tall	M1324-0700	
Stacking kit , bolts together shakers for secure mounting		
Stacking kit, for stacking one additional I26 or I26R	M1324-0500	

 Ordering information for other voltage options begins on page 471.

Excella® E24 benchtop incubator shakers and E24R with added refrigeration



Description

The benchtop Excella E24 (incubated) and E24R (incubated/refrigerated) shaker provides superior performance and advanced features at an affordable price. A wide variety of platforms, clamps and test tube racks provide for virtually unlimited flexibility. The Excella E24 and E24R offer field calibration of temperature and speed through the microprocessor-controlled touch pad.

Product features



- **Heavy-duty counterbalanced drive** provides long life and quiet and dependable operation for most loads
- **Large 46 x 46 cm accessory platform** (sold separately) accommodates flasks up to 2.8 L
- **Microprocessor controls** enable precise settings of speed and incubation temperature
- **Unique acceleration/deceleration circuitry** prevents sudden starts and stops protecting your cells
- **Open lid cut off switch** immediately stops shaking when lid is open
- **Clear large lid** provides excellent visibility minimizing the need to open the lid to view samples

Technical specifications

Description	Excella E24	Excella E24R
Platform size (W x D)	46 x 46 cm	
Temperature range	+7 °C above ambient to 60 °C	15 °C below ambient to 60 °C
Temperature uniformity	+/-0.5 °C at 37 °C	
Speed (rpm)	50 to 400	
Orbit	1.9 cm	
Dimensions (W x D x H)	56 x 76.2 x 61 cm (open lid requires additional 53.3 cm height)	
Net weight	60 kg	80 kg

Excella® E24 benchtop incubator shakers and E24R with added refrigeration


Ordering information

Model	Power supply	Order no.	
E24 Incubated	230 V, 50 Hz	M1352-0002	
E24R Incubated/Refrigerated	230 V, 50 Hz	M1352-0006	

Shaker does not include platforms which must be ordered separately.

Ordering information

Description	Clamps	Order no.	
Excella E24 and E24R interchangeable platforms, 46 x 46 cm phenolic resin unless otherwise stated.			
Clamps and accessories sold separately. See pages 328–329.			
Universal platform, aluminum	—	M1250-9902	
Drip pan for universal platform M1250-9902	—	M1250-9906	
Utility carrier holds glassware between rubber-cushioned cross bars	—	M1194-9909	
Rod kit for utility carrier (one additional rod)	—	M1194-9923	
Utility tray with non-skid surface	—	M1194-9910	
50 mL Erlenmeyer flask dedicated platform	64	M1194-9903	
125 mL Erlenmeyer flask dedicated platform	34	M1194-9904	
250 mL Erlenmeyer flask dedicated platform	25	M1194-9905	
500 mL Erlenmeyer flask dedicated platform	16	M1194-9906	
1 L Erlenmeyer flask dedicated platform	9	M1194-9907	
2 L Erlenmeyer flask dedicated platform	5	M1194-9908	
2.8 L Fernbach flask dedicated platform	4	M1233-9932	
Quick-change platform kit, enables platform attachment without tools	—	M1192-9901	
Sticky pad platform, (sticky pads sold separately)	—	M1250-9903	
Spare parts kit, E24 and E24R	—	M1352-6000	

 Ordering information for other voltage options begins on page 471.

Excella® E25 console incubator shakers and E25R with added refrigeration



Description

The large-capacity console Excella 25 (Incubated) and Excella 25R (Incubated/refrigerated) shaker provides superior performance and advanced features at an affordable price. A wide variety of clamps and test tube racks provide for virtually unlimited flexibility. The microprocessor controls precisely control temperature and shaking speed and the feedback control and fans provide for rapid temperature recovery when lid is open and accurate and uniform temperatures.

Product features



- **Heavy-duty counterbalanced drive** provides long life and quiet and dependable operation for most loads
- **Large 76 x 46 cm accessory platform** (sold separately) accepts flasks up to 6 L
- **Large insulated viewing window** in the lid allows for clear viewing of the samples without opening the chamber
- **Microprocessor controls** enable precise setting of speed and incubation temperature
- **RS-232** provided for data logging

Technical specifications

Description	Excella E25	Excella E25R
Platform size (W x D)	76 x 46 cm	
Temperature range	+7 °C above ambient to 60 °C	15 °C below ambient to 60 °C
Temperature uniformity	+/-0.5 °C at 37 °C	
Speed (rpm)	50 to 400	
Orbit	2.5 cm	
Dimensions (W x D x H)	127 x 77 x 105.9 cm (open door requires additional 59.1 cm height)	
Net weight	167 kg	196 kg

Excella® E25 console incubator shakers and E25R with added refrigeration


Ordering information

Model	Power supply	Order no.	
E25 Incubated	230 V, 50 Hz	M1353-0002	
E25R Incubated/ Refrigerated	230 V, 50 Hz	M1353-0006	

Shaker does not include platforms which must be ordered separately.

Ordering information

Description	Clamps	Order no.	
Excella E25 and E25R interchangeable platforms, 76 x 46 cm aluminum.			
Clamps and accessories sold separately. See pages 328–329.			
Universal platform	—	M1250-9920	
Utility tray with non-skid rubber surface	—	AG-00	
50 mL Erlenmeyer flask dedicated platform	108	M1191-9908	
125 mL Erlenmeyer flask dedicated platform	60	M1191-9909	
250 mL Erlenmeyer flask dedicated platform	40	M1191-9910	
500 mL Erlenmeyer flask dedicated platform	24	M1191-9911	
1 L Erlenmeyer flask dedicated platform	15	AG-1	
2 L Erlenmeyer flask dedicated platform	12	AG-2	
2.8 L Fernbach flask dedicated platform	6	AG-28	
4 L Erlenmeyer flask dedicated platform	6	AG-4	
6 L Erlenmeyer flask dedicated platform	4	AG-6	
Platform for sticky pad, (sticky pads sold separately)	—	M1250-9904	
Microplate platform holds 105 standard or 21 deepwell plates	—	M1243-2500	

 Ordering information for other voltage options begins on page 471.

Clamps and accessories for universal platforms

Model	Innova 40/40R	Innova 42/42R	Innova 43/43R	
	Excella E24/E24R		Excella E25/ E25R	
Accessory				
10 mL Erlenmeyer flask clamp	109	109	183	
25 mL Erlenmeyer flask clamp	64	64	92	
50 mL Erlenmeyer flask clamp with spring retainer	45	45	92	
125 mL Erlenmeyer flask clamp with spring retainer	21	21	39	
250 mL Erlenmeyer flask clamp with spring retainer	18	18	30	
500 mL Erlenmeyer flask clamp with spring retainer	14	14	18	
1 L Erlenmeyer flask clamp	8	8	12	
2 L Erlenmeyer flask clamp	5	5	8	
2 L Lauber Thompson clamp	5	5	8	
2.8 L Fernbach clamp	4	4	6	
4 L Erlenmeyer flask clamp	—	4	6	
5 L Erlenmeyer flask clamp	—	4	6 ¹	
6 L Erlenmeyer flask clamp	—	2	4 ¹	
Microplate rack (stack)	8	8	16	
Microplate rack (1 layer)	2	2	4	
Small test tube rack	5	5	9	
Medium test tube rack	5	5	9	
Large test tube rack	4	4	7	
Platform size, cm	46 x 46	46 x 46	76 x 86	

¹ Less when used with optional photosynthetic lights. ² Using Sticky Tape – less with clamps. Max flask size is 4 L when using photosynthetic lighting option.

Small test tube racks

Diameter	Tubes/rack	Order no.	
8–11 mm	48	M1289-0001	
12–15 mm	34	M1289-0002	
15–18 mm	24	M1289-0003	
18–21 mm	18	M1289-0004	
22–26 mm	13	M1289-0005	
26–30 mm	12	M1289-0006	

Medium test tube racks

Diameter	Tubes/rack	Order no.	
8–11 mm	60	M1289-0010	
12–15 mm	44	M1289-0020	
15–18 mm	31	M1289-0030	
18–21 mm	23	M1289-0040	
22–26 mm	16	M1289-0050	
26–30 mm	16	M1289-0060	

Large test tube racks

Diameter	Tubes/rack	Order no.	
8–11 mm	80	M1289-0100	
12–15 mm	60	M1289-0200	
15–18 mm	42	M1289-0300	
18–21 mm	30	M1289-0400	
22–26 mm	22	M1289-0500	
26–30 mm	20	M1289-0600	

Ordering information

Description	Order no.	
Sticky Tape, 500 x 4.06 cm	M1250-9600	
Sticky Pad, 20.3 x 20.3 cm	M1250-9700	
Sticky Pad Adapter Kit	M1250-9904	
Angled Test Tube Rack Holder	TTR-210	
Spacer for TTR-210	TTR-215	
1 L Media Bottle Clamp	ACSB-1000S	

Clamps and accessories for universal platforms

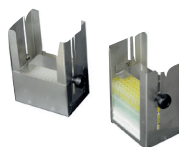
	Innova 44/44R	I Series I26/I26R	Order no.	
	187	187	ACE-10S	
	93	93	M1190-9004	
	91	93	M1190-9000	
	39	39	M1190-9001	
	30	30	M1190-9002	
	24	24	M1190-9003	
	14	12	ACE-1000S	
	8	8	ACE-2000S	
	8	8	M1190-9005	
	6	6	ACFE-2800S	
	6	—	ACE-4000S	
	6 ^{1,2}	—	ACE-5000S	
	—	—	ACE-6000S	
	16	16	M1289-0700	
	4	4	TTR-221	
	9	9	see below	
	9	9	see below	
	7	7	see below	
	76 x 46	76 x 46		



Universal platform shown with accessory clamps, test tube racks and sticky tape



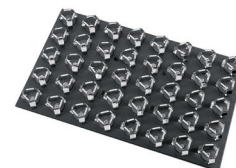
Flask clamp, of one-piece stainless steel, fitted with springs for stability at elevated speeds. Includes mounting screws



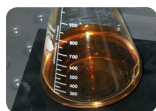
Microplate racks



Test tube racks, small, medium and large



Dedicated platforms come with clamps of one size pre-installed



Sticky Pad (shown) and sticky tape
Replace clamps for speeds up to 250 rpm. (Not for use in water bath shakers.) Sticky Pad requires an anodized aluminum surface




Utility trays
Utility trays provide a non-slip surface for low-speed applications




Utility carriers
Utility carriers secure vessels between adjustable, cushioned rods

Shaker selection guide – open air models

Open air shakers		Innova®						
Balanced drive mechanism	Triple-eccentric with permanently lubricated ball bearings							
Motor type	Solid state, DC brushless motor							
Audible and visual alarms	Yes							
cETLus and CE marked	Yes							
Timer	0.1 – 99.9 hrs							
(Images not to scale)								
Model	2000	2050	2100	2150	2300	2350	5000	
Page	333	333	334	334	335	335	337	
Accessories page	346	346	346	346	346	346	346	
Platform size (W x D), cm	33 x 28	40.6 x 30.5	45.7 x 45.7	61 x 45.7	76.2 x 45.7	91.4 x 61	Up to Six 82.5 x 68	
Benchtop (B) or Console (C)	B	B	B	B	B	B	C	
Orbit diameter, cm	1.9	1.9	1.9	1.9	2.5 or 5.1	2.5 or 5.1	5.1	
rpm range	25–500	25–500	25–500	25–500	25–500	25–500	25–350	
rpm control	±1 rpm	±1 rpm	±1 rpm	±1 rpm	±1 rpm	±1 rpm	±1 rpm	
Maximum capacity	Dedicated platform							
10 mL Erlenmeyer flasks	60	86	–	–	–	–	300 x 6 (1800)	
25 mL Erlenmeyer flasks	32	48	–	–	–	–	248 x 6 (1488)	
50 mL Erlenmeyer flasks	20	35	64	80	108	–	161 x 6 (966)	
125 mL Erlenmeyer flasks	12	20	34	48	60	96	99 x 6 (594)	
250 mL Erlenmeyer flasks	8	12	25	35	40	70	64 x 6 (384)	
500 mL Erlenmeyer flasks	6	8	16	20	24	40	42 x 6 (252)	
1 L Erlenmeyer flasks	–	6	9	12	15	–	23 x 6 (138)	
2 L Erlenmeyer flasks	–	–	5	8	12	–	70	
2.8 L Fernbach flasks	–	–	4	–	6	–	42	
4 L Erlenmeyer flasks	–	–	–	–	6	–	18	
5 L Erlenmeyer flasks	–	–	–	–	–	–	–	
6 L Erlenmeyer flasks	–	–	–	–	4	–	16	
Maximum capacity	Universal platform							
10 mL Erlenmeyer flasks	60	86	109	–	183	–	264 x 6 (1584)	
25 mL Erlenmeyer flasks	20	32	64	–	92	–	143 x 6 (858)	
50 mL Erlenmeyer flasks	15	32	45	63	92	–	143 x 6 (858)	
125 mL Erlenmeyer flasks	11	16	21	35	39	75	72 x 6 (432)	
250 mL Erlenmeyer flasks	6	10	18	24	30	50	42 x 6 (252)	
500 mL Erlenmeyer flasks	4	8	14	20	18	30	33 x 6 (198)	
1 L Erlenmeyer flasks	–	–	8	12	12	24	17 x 6 (102)	
2 L Erlenmeyer flasks	–	–	5	6	8	15	12 x 6 (72)	
2.8 L Fernbach flasks	–	–	4	5	6	12	8 x 6 (48)	
4 L Erlenmeyer flasks	–	–	4	5	6	10	16	
5 L Erlenmeyer flasks	–	–	4	4	6	10	12	
6 L Erlenmeyer flasks	–	–	2	3	4	8	12	
Temperature range (in °C) [A = Ambient]								
Automatic water level control								
Dimensions (W x D x H), cm	35.7 x 37 x 14.6	43 x 37 x 14.6	48 x 55.5 x 16.3	60.1 x 59.1 x 16.3	76.2 x 56.6 x 16.3	91.4 x 61 x 16.3	157 x 96.5 x 135	
Net weight (kg)	15	16	34	36	48	52	640.1	

1 Half-size platforms also available.

Shaker selection guide – open air models

Excella®				Water bath shakers	
Heavy-duty with permanently lubricated ball bearings				Triple-eccentric	Eccentric
Solid state, DC brushless motor				DC brushless	Variable speed AC
Yes				Yes	Yes
Yes				cETL & CE	cETL & CE
0.1–99.9 hrs				0.1–99.9 hrs	0.1–99.9 hrs
					
E1	E2	E5	E10	Innova 3100	C76
338	339	340	341	342	344
346	346	346	346	346	346
33 x 28	33 x 28	45.7 x 45.7	76.2 x 45.7	30.5 x 42	30.5 x 42
B	B	B	B	B	B
1.9	1.9	1.9	2.5	1.3	1.3
50–400	50–400	50–400	50–400	25–400	50–300
±2 rpm	±2 rpm	±2 rpm	±2 rpm		
Dedicated platform				Dedicated platform¹	
60	60	–	–	–	–
32	32	–	–	–	–
20	20	64	108	31	31
12	12	34	60	22	22
8	8	25	40	13	18
6	6	16	24	8	8
–	–	9	15	6	6
–	–	5	12	2	2
–	–	4	6	–	–
–	–	–	6	–	–
–	–	–	–	–	–
–	–	–	4	–	–
Universal platform				Universal platform	
60	60	109	183	59	59
20	20	64	92	35	35
15	15	45	92	18	18
11	11	21	39	18	18
6	6	18	30	8	8
4	4	14	18	6	6
–	–	8	12	4	4
–	–	5	8	2	2
–	–	4	6	–	–
–	–	4	6	–	–
–	–	4	6	–	–
–	–	2	4	–	–
				A+5 to 80	A+7 to 80
				Yes	No
40 x 45.5 x 21.6	40 x 45.5 x 21.6	52 x 45.5 x 21.6	76 x 68.3 x 21.6	43 x 70 x 37	54 x 68 x 47
15.9	15.9	39	42	47.6	52

Innova® 2000, 2100 and 2300 Series benchtop open air shakers



Description

Low-profile shakers with triple-eccentric drive for uniform motion and long life, with microprocessor controls for accurate regulation of shaking speeds between 25 and 500 rpm (less with baffled flasks). Includes audible and visual alarms, timer (0–99.9 hrs) with continuous operation or automatic shut-off at the end of the timed study. Models 2000, 2100 and 2300 provide for small, intermediate and large-capacity shaking, respectively. Models 2050, 2150 and 2350 come with additional stabilizing feet and/or counterweight to balance larger loads on oversized platforms.

Technical specifications

Model No.	Innova 2000	Innova 2050	Innova 2100	Innova 2150	Innova 2300	Innova 2350
Page	333	333	334	334	335	335
Platform size (cm)	33 x 28	40.6 x 30.5	45.7 x 45.7	61 x 45.7	76.2 x 45.7	91.4 x 61
Capacity/flask size ¹	6 x 500 mL	3 x 2 L	5 x 2 L	8 x 2 L	4 x 6 L	6 x 6 L
Orbit (cm)	1.9	1.9	1.9	1.9	2.5 or 5.1	2.5 or 5.1
Overall dimensions, W x D x H (cm)	35.5 x 37 x 14.6	43 x 37 x 14.6	48 x 55.5 x 16.3	60.1 x 59.1 x 16.3	76.2 x 56.6 x 16.3	91.4 x 61 x 16.3
Net weight (kg)	15	16	34	36	48	52

¹ Indicates number of largest flask size with dedicated platform. Universal platform capacity may be less.

Innova® 2000 and 2050 Series benchtop open air shakers



Innova 2000

Innova 2050 with larger platform
for increased capacity

Ordering information

Description	Clamps	Order no.	
Innova 2000 , 220/230 V, 50/60 Hz (platform sold separately)		M1190-0002	⚡
Innova 2000 interchangeable platforms and accessories , 33 x 28 cm stainless steel. Clamps and accessories sold separately. See pages 346–347.			
Universal platform	—	M1001-0240	
Utility carrier holds a variety of glassware between rubber-cushioned cross bars	—	AG2-UT	
Utility tray with non-skid rubber surface	—	AG2-00	
Rod kit for utility carrier (one additional rod)	—	M1001-9920	
10 mL Erlenmeyer flask dedicated platform	60	AG2-10	
25 mL Erlenmeyer flask dedicated platform	32	M1190-9919	
50 mL Erlenmeyer flask dedicated platform	20	M1190-9915	
125 mL Erlenmeyer flask dedicated platform	12	M1190-9916	
250 mL Erlenmeyer flask dedicated platform	8	M1190-9917	
500 mL Erlenmeyer flask dedicated platform	6	M1190-9918	
Capacity upgrade kit, converts Model 2000 to a Model 2050	—	M1190-9910	
Temperature and speed monitoring kit for recording on an external chart recorder	—	M1190-9909	

Ordering information

Description	Clamps	Order no.	
Innova 2050 , 220/230 V, 50/60 Hz (platform sold separately)		M1190-0012	⚡
Innova 2050 interchangeable platforms , 40.6 x 30.5 cm stainless steel. Clamps and accessories sold separately. See pages 346–347.			
Universal platform	—	M1190-9900	
Utility carrier holds a variety of glassware between rubber-cushioned cross bars	—	M1190-9907	
Rod kit for utility carrier (one additional rod)	—	M1190-9920	
Utility tray with non-skid rubber surface	—	M1190-9908	
10 mL Erlenmeyer flask dedicated platform	86	M1190-9901	
25 mL Erlenmeyer flask dedicated platform	48	M1190-9902	
50 mL Erlenmeyer flask dedicated platform	35	M1190-9903	
125 mL Erlenmeyer flask dedicated platform	20	M1190-9904	
250 mL Erlenmeyer flask dedicated platform	12	M1190-9905	
500 mL Erlenmeyer flask dedicated platform	8	M1190-9906	
1 L Erlenmeyer flask dedicated platform	6	M1190-9911	

⚡ Ordering information for other voltage options begins on page 471.

Innova® 2100 and 2150 Series benchtop open air shakers



Innova 2100



Innova 2150 with stabilizing feet and larger platform for increased capacity

Ordering information

Description	Clamps	Order no.	
Innova 2100 , 220/230 V, 50/60 Hz (platform sold separately)		M1194-0002	⚡
Innova 2100 interchangeable platforms and accessories , 45.7 x 45.7 cm phenolic resin unless otherwise stated. Clamps and accessories sold separately. See pages 346–347.			
Universal platform, aluminum	—	M1250-9902	
Drip pan to catch accidental spills for use with universal platform M1250-9902	—	M1250-9906	
Utility carrier holds a variety of glassware between rubber-cushioned cross bars	—	M1194-9909	
Rod kit for utility carrier (one additional rod)	—	M1194-9923	
Utility tray with non-skid rubber surface	—	M1194-9910	
50 mL Erlenmeyer flask dedicated platform	64	M1194-9903	
125 mL Erlenmeyer flask dedicated platform	34	M1194-9904	
250 mL Erlenmeyer flask dedicated platform	25	M1194-9905	
500 mL Erlenmeyer flask dedicated platform	16	M1194-9906	
1 L Erlenmeyer flask dedicated platform	9	M1194-9907	
2 L Erlenmeyer flask dedicated platform	5	M1194-9908	
2.8 L Fernbach flask dedicated platform	4	M1233-9932	
Sticky pad platform (sticky pad sold separately)	—	M1250-9903	
Capacity upgrade kit to convert a Model 2100 to a Model 2150	—	M1194-9926	
Quick-change platform kit, enables platform attachment without tools	—	M1192-9901	
Temperature and speed monitoring kit for recording on an external chart recorder. For Models 2100, 2150, 2300 and 2350 shakers.	—	M1194-9924	

Ordering information

Description	Clamps	Order no.	
Innova 2150 , 220/230 V, 50/60 Hz (platform sold separately)		M1194-0012	⚡
Innova 2150 interchangeable platforms and accessories , 61 x 45.7 cm phenolic resin. Clamps and accessories sold separately. See pages 346–347.			
Universal platform	—	M1194-9912	
Utility carrier holds a variety of glassware between rubber-cushioned cross bars	—	M1194-9921	
Rod kit for utility carrier (one additional rod)	—	M1194-9925	
Utility tray with non-skid rubber surface for low-speed applications	—	M1194-9922	
50 mL Erlenmeyer flask dedicated platform	80	M1194-9915	
125 mL Erlenmeyer flask dedicated platform	48	M1194-9916	
250 mL Erlenmeyer flask dedicated platform	35	M1194-9917	
500 mL Erlenmeyer flask dedicated platform	20	M1194-9918	
1 L Erlenmeyer flask dedicated platform	12	M1194-9919	
2 L Erlenmeyer flask dedicated platform	8	M1194-9920	
Temperature and speed monitoring kit for recording on an external chart recorder. For Models 2100, 2150, 2300 and 2350 shakers.	—	M1194-9924	
Quick-change platform kit, enables platform attachment without tools	—	M1194-9927	

Innova® 2300 and 2350 Series benchtop open air shakers



Innova 2300



Innova 2350 with stabilizing feet and larger platform for increased capacity

Ordering information

Description	Clamps	Order no.	
Innova 2300 , 2.5 cm orbit, 220/230 V, 50/60 Hz (platform sold separately)		M1191-0002	⚡
Innova 2300 , 5.2 cm orbit, 220/230 V, 50/60 Hz (platform sold separately)		M1191-0022	⚡
Innova 2300 interchangeable platforms and accessories , 76.2 x 45.7 cm aluminum. Clamps and accessories sold separately. See pages 346–347.			
Universal platform	—	M1250-9920	
Drip pan to catch accidental spills for use with universal platform, M1250-9920	—	M1250-9921	
Utility tray with non-skid rubber surface for low-speed applications	—	AG-00	
50 mL Erlenmeyer flask dedicated platform	108	M1191-9908	
125 mL Erlenmeyer flask dedicated platform	60	M1191-9909	
250 mL Erlenmeyer flask dedicated platform	40	M1191-9910	
500 mL Erlenmeyer flask dedicated platform	24	M1191-9911	
1 L Erlenmeyer flask dedicated platform	15	AG-1	
2 L Erlenmeyer flask dedicated platform	12	AG-2	
4 L Erlenmeyer flask dedicated platform	6	AG-4	
6 L Erlenmeyer flask dedicated platform	4	AG-6	
2.8 L Fernbach flask dedicated platform	6	AG-28	
Sticky pad platform (sticky pad sold separately)	—	M1250-9904	
Capacity upgrade kit to convert a Model 2300 to a Model 2350	—	M1191-9905	
Quick-change platform kit, enables platform attachment without tools	—	M1191-9904	
Temperature and speed monitoring kit for recording on an external chart recorder. For Models 2100, 2150, 2300 and 2350 shakers.	—	M1194-9924	

Ordering information

Description	Clamps	Order no.	
Innova 2350 , 2.5 cm orbit, 220/230 V, 50/60 Hz (platform sold separately)		M1191-0012	⚡
Innova 2350 , 5.1 cm orbit, 220/230 V, 50/60 Hz (platform sold separately)		M1191-0032	⚡
Innova 2350 interchangeable platforms and accessories , 91.4 x 61 cm marine plywood unless otherwise stated. Clamps and accessories sold separately. See pages 346–347.			
Universal platform	—	PTL-386	
Universal platform, aluminum	—	PTL-393	
Utility tray with non-skid rubber surface	—	AG-21-00	
125 mL Erlenmeyer flask dedicated platform	96	M1191-9912	
250 mL Erlenmeyer flask dedicated platform	70	M1191-9913	
500 mL Erlenmeyer flask dedicated platform	40	M1191-9914	
Temperature and speed monitoring kit for recording on external recorder. For Models, 2100, 2150, 2300 and 2350 shakers.	—	M1194-9924	

⚡ **Ordering information for other voltage options begins on page 471.**

Innova® 5050/5051 racking systems for Innova 2300 shakers



Innova 5050 and 5051 Extension Racks shown. Shakers sold separately.

Description

Model 5050 consists of a sturdy, stainless-steel rack to hold up to 4 Innova 2300 shakers. Innova 5051 rack extension can be added to support an additional 4 shakers, bringing the total number to 8 Innova 2300 shakers.

Product features

- **Each unit includes an electrical strip** for powering the shakers. Shakers must be ordered separately. See page 335 for Innova 2300 shaker and platform ordering information.
- **Maximum speed** – 400 rpm for 2.5 cm orbit, and 300 rpm for 5.1 cm orbit shakers. See chart below for rack capacities.
- **Overall dimensions** 5050 or 5051 – W x D x H: 99.1 x 68.6 x 182.9 cm
- **Net weight** – 227 kg

Ordering information

Model	Description	Power supply	Order no.	
Innova 5050 and 5051	5050 Rack System	230/240 V, 50/60 Hz	M1232-0101	⚡
	5051 Rack Extension	230/240 V, 50/60 Hz	M1232-0111 ¹	⚡

Product features

Flask size	Max. shakers per rack	Max. flasks with Innova 2300	Max. flasks with Innova 5050 Rack	Max. flasks with Innova 5051 Extension
50 mL	4	108	432	864
125 mL	4	60	240	480
250 mL	4	40	160	320
500 mL	4	24	96	192
1 L	3	15	45	90
2 L ²	3	12	36	72

¹ Must be used with 5050 Rack system.

² Larger flasks can be used by removing one or more adjustable-height shelves.

Innova® 5000 multi-tier shaker – an industrial workhorse



Simultaneously agitate hundreds of samples on up to 6 accessory platforms.

Description

Culture hundreds of samples on this industrial workhorse.

Product features

- **Speed:** 25 to 350 rpm (less for baffled flasks)
- **Orbit:** 5.1 cm counterbalanced shaker provides uniform agitation to all samples without being bolted to the floor. Cantilevered design provides unobstructed access to all glassware
- **6 removable platforms** – 82.5 x 68 cm accommodate flasks from 10 mL to 6 L. (Platforms sold separately.) Digital display indicates speed, setpoint, running time and alarm conditions
- **Overall dimensions** – W x D x H: 157.5 x 96.5 x 135 cm
- **Net weight:** 640 kg

Ordering information

Model	Power supply	Order no.	
Innova 5000	220 V, 50/60 Hz	M1196-0002	

Shaker does not include platforms which must be ordered separately.

Ordering information

Description	No. of flasks per platform	No. of flasks per machine	Order no.	
Clamps and accessories sold separately. See pages 346–347.				
Universal platform (each)	—	—	M1196-9447	
125 mL Erlenmeyer flask dedicated platform	99	594	M1196-9900	
250 mL Erlenmeyer flask dedicated platform	64	384	M1196-9901	
500 mL Erlenmeyer flask dedicated platform	42	252	M1196-9902	
1 L Erlenmeyer flask dedicated platform	23	138	M1196-9903	
2 L Erlenmeyer flask dedicated platform	14	70	M1196-9904 ¹	
2.8 L Fernbach flask dedicated platform	9	54	M1196-9905 ¹	
4 L Erlenmeyer flask dedicated platform	9	18	M1196-9906 ²	
6 L Erlenmeyer flask dedicated platform	8	16	M1196-9907 ²	

¹When used on bottom tier, can only use front half of platform. ²For use on top tier only.

⚡ Ordering information for other voltage options begins on page 471.

Excella® benchtop open air shakers – excellent performance and value

Description

These open air biological shakers from New Brunswick Scientific are offered in 4 models to suit a wide variety of culturing applications. Excella open air shakers combine sleek looks, microprocessor controls and heavy-duty counterbalanced drives to provide years of continuous, quiet operation.

User-friendly keypad and digital displays are provided on all models except the analog E1. Excella shakers are offered with a large selection of accessories to accommodate a wide range of flasks, test tubes and general labware. Platforms are interchangeable with those used on current as well as earlier model New Brunswick shakers. All Excella shakers meet cETLus and CE standards.

Excella E1 analog-controlled compact open air shakers



Description

Compact and economical E1 shakers easily fit your budget and your bench!

Product features

- **Benchtop shakers** for agitating test tubes and flasks up to 500 mL with analog control
- **Heavy-duty, counterbalanced drive** with DC brushless motor and permanently lubricated ball bearings provides long life and is virtually maintenance free
- **Reference calibrations** allow the shaker to be set manually for reproducible results from one run to the next

Technical specifications

Description	Excella E1
Platform size (W x D)	33 x 28 cm
Controls	Analog dial
Speed (rpm)	50 to 400
Orbit	1.9 cm
Dimensions (W x D x H)	40 x 45.5 x 21.6 cm
Net weight	15.9 kg

Excella E2 microprocessor controlled and E1 analog-controlled compact open air shakers



Technical specifications


Description	Excella E2
Platform size (W x D)	33 x 28 cm
Controls	Digital LCD
Speed (rpm)	50 to 400
Orbit	1.9 cm
Timer	0.1 to 99.9 hrs, or continuous
Alarms	Audible and visual <ul style="list-style-type: none"> ● End of run ● Speed deviates +/-5 rpm from setpoint
Dimensions (W x D x H)	40 x 45.5 x 21.6 cm
Net weight	15.9 kg

Description



Compact and economical Excella E2 shakers easily fit your budget and your bench. Excella E2 offers microprocessor control for precise setting of speed and running times.

Product features

- **Benchtop shakers** for agitating test tubes and flasks up to 500 mL with microprocessor control
- **Heavy-duty, counterbalanced drive** with DC brushless motor and permanently lubricated ball bearings provides long life and is virtually maintenance free
- **Acceleration circuit** prevents sudden starts and stops to minimize splashing in Excella E2

 **Ordering information for other voltage options begins on page 471.**

Ordering information

Model	Power supply	Order no.	
E2 Open Air	230 V, 50/60 Hz	M1350-0001	
E1 Open Air	230 V, 50/60 Hz	M1354-0001	

Shakers do not include platforms which must be ordered separately.

Ordering information

Description	Clamps	Order no.	
Excella E2 and E1 interchangeable platforms, 33 x 28 cm stainless steel.			
Clamps and accessories sold separately. See pages 346–347.			
Universal platform	—	M1001-0240	
Utility carrier holds a variety of glassware between rubber-cushioned cross bars	—	AG2-UT	
Utility tray with non-skid rubber surface	—	AG2-00	
Rod kit for utility carrier (one additional rod)	—	M1001-9920	
10 mL Erlenmeyer flask dedicated platform	60	AG2-10	
25 mL Erlenmeyer flask dedicated platform	32	M1190-9919	
50 mL Erlenmeyer flask dedicated platform	20	M1190-9915	
125 mL Erlenmeyer flask dedicated platform	12	M1190-9916	
250 mL Erlenmeyer flask dedicated platform	8	M1190-9917	
500 mL Erlenmeyer flask dedicated platform	6	M1190-9918	

Excella® E5 mid-sized benchtop open air shakers



Description

Microprocessor-controlled benchtop open air shakers for agitating test tubes and flasks up to 6 L.

Product features

- **Mid-sized shaker** accommodates flasks as large as 2.8 liters on a dedicated platform or flasks up to 6 liters on a universal platform
- **Accessory universal platform** accommodates tubes, plates and flasks
- **Heavy-duty, counterbalanced drive** with DC brushless motor and permanently lubricated ball bearings provides long life and is virtually maintenance free

Technical specifications

Description	Excella E5
Platform size (W x D)	45.7 x 45.7 cm
Speed (rpm)	50 to 400
Orbit	1.9 cm
Timer	0.1 to 99.9 hrs
Alarms	Audible and visual <ul style="list-style-type: none"> ● End of run ● Speed deviates +/-5 rpm from setpoint
Dimensions (W x D x H)	52 x 45.5 x 21.6 cm
Net weight	39 kg

Ordering information

Model	Power supply	Order no.	
E5 Open Air	230 V, 50/60 Hz	M1355-0001	

Shaker does not include platforms which must be ordered separately.

Ordering information

Description	Clamps	Order no.	
Excella E5 interchangeable platforms , 45.7 x 45.7 cm phenolic resin unless otherwise stated. Clamps and accessories sold separately. See pages 346–347.			
Universal platform, aluminum	—	M1250-9902	
Drip pan to catch accidental spills for use with universal platform M1250-9902	—	M1250-9906	
Utility carrier holds a variety of glassware between rubber-cushioned cross bars	—	M1194-9909	
Rod kit for utility carrier (one additional rod)	—	M1194-9923	
Utility tray with non-skid rubber surface	—	M1194-9910	
50 mL Erlenmeyer flask dedicated platform	64	M1194-9903	
125 mL Erlenmeyer flask dedicated platform	34	M1194-9904	
250 mL Erlenmeyer flask dedicated platform	25	M1194-9905	
500 mL Erlenmeyer flask dedicated platform	16	M1194-9906	
1 L Erlenmeyer flask dedicated platform	9	M1194-9907	
2 L Erlenmeyer flask dedicated platform	5	M1194-9908	
2.8 Liter Fernbach dedicated platform	4	M1233-9932	
Sticky pad platform, (sticky pads sold separately)	—	M1250-9903	

Technical specifications subject to change.

Excella® E10 large-capacity benchtop open air shakers



Description

Large-capacity, microprocessor-controlled shakers with digital display.

Product features

- **Durable, large capacity shaker** holds up to four 6 L flasks
- **Easy to program control panel** and bright LED readout displays all important parameters
- **Heavy-duty, counterbalanced drive** with DC brushless motor and permanently lubricated ball bearings provides long life and is virtually maintenance free

Technical specifications

Description	Excella E10
Platform size (W x D)	76.2 x 45.7 cm
Speed (rpm)	50 to 400
Orbit	2.5 cm
Timer	0.1 to 99.9 hrs
Alarms	Audible and visual <ul style="list-style-type: none"> ● End of run ● Speed deviates +/-5 rpm from setpoint
Dimensions (W x D x H)	76 x 68.3 x 21.6 cm
Net weight	42 kg

⚡ Ordering information for other voltage options begins on page 471.

Ordering information

Model	Power supply	Order no.
E10 Open Air	230 V, 50/60 Hz	M1351-0001

Shaker does not include platforms which must be ordered separately.

Ordering information

Description	Clamps	Order no.
Excella E10 interchangeable platforms, 76.2 x 45.7 cm aluminum. Clamps and accessories sold separately. See pages 346–347.		
Universal platform	—	M1250-9920
Drip pan to catch accidental spills, for universal platform M1250-9920	—	M1250-9921
Utility tray with non-skid rubber surface	—	AG-00
50 mL Erlenmeyer flask dedicated platform	108	M1191-9908
125 mL Erlenmeyer flask dedicated platform	60	M1191-9909
250 mL Erlenmeyer flask dedicated platform	40	M1191-9910
500 mL Erlenmeyer flask dedicated platform	24	M1191-9911
1 L Erlenmeyer flask dedicated platform	15	AG-1
2 L Erlenmeyer flask dedicated platform	12	AG-2
2.8 L Fernbach flask dedicated platform	6	AG-28
4 L Erlenmeyer flask dedicated platform	6	AG-4
6 L Erlenmeyer flask dedicated platform	4	AG-6
Platform for sticky pad, (sticky pads sold separately)	—	M1250-9904
Microplate platform holds 105 standard or 21 deepwell plates	—	M1243-2500

Innova® 3100 high-temperature water bath shakers



For flasks up to 2 liters

Description

High-temperature water bath shakers for temperatures up to 80°C. Large-capacity orbital shakers with microprocessor control of speed and temperature. One-piece stainless steel bath.

Product features

- **Adjustable water-level control** automatically replenishes evaporated water. Has drain, water-in and overflow lines.
- **Acceleration circuit** builds up speed slowly avoiding sudden stop/starts and unwanted splashing
- **Deep bath with rounded corners** and baffles allow elevated speeds with minimal splashing or turbulence
- **Heat loss is minimized** with use of optional gable covers
- **Cooling coil optional** for near-ambient and below ambient applications



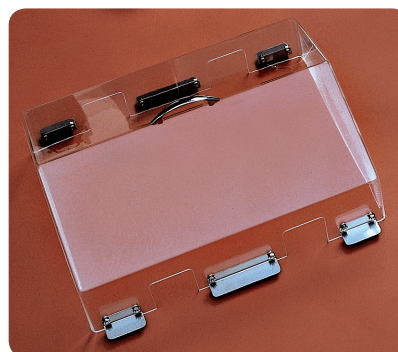
Half-size platforms with clamps already mounted, provide maximum capacity for shaking different sized flasks on a single water bath shaker.



For high-temperature applications up to 80 °C, choose the stainless steel gable cover.

Technical specifications


Description	Innova 3100
Platform size (W x D)	30.5 x 42 cm
Temperature range	+ 5°C above ambient to 80°C
Temperature uniformity	+/-0.25°C at 37°C
Speed (rpm)	25 to 400
Orbit	1.3 cm
Innova control programmer	
Timer	0.1 to 99.9 hours + continuous operation
Memory	Non volatile with automatic power failure restart
Dimensions (W x D x H)	43 x 70 x 37 cm
Net weight	47.6 kg



Optional Plexiglas® gable cover minimizes evaporation and speeds heat-up, in applications up to 60°C.

Innova® 3100 high-temperature water bath shakers

Ordering information

Model	Power supply	Order no.	
3100 Water Bath (platform sold separately)	220/230 V, 50/60 Hz	M1231-0002	

Elevated temperatures attained with aid of a gable cover using bath liquid with a high boiling point to minimize evaporation.
For lower temperatures an optional cooling assembly is available.

Ordering information

Description	Clamps	Order no.	
Innova 3100 interchangeable platforms, 30.5 x 42 cm stainless steel. Clamps and accessories sold separately. See pages 346–347.			
Universal platform	—	M1231-9930	
50 mL Erlenmeyer flask dedicated platform	31	M1231-9933	
125 mL Erlenmeyer flask dedicated platform	22	M1231-9934	
250 mL Erlenmeyer flask dedicated platform	13	M1231-9935	
500 mL Erlenmeyer flask dedicated platform	8	M1231-9936	
1 L Erlenmeyer flask dedicated platform	6	M1231-9937	
2 L Erlenmeyer flask dedicated platform	2	M1231-9938	
Sub-platform for mounting dedicated half-size platforms containing flasks and test-tube racks. Sub-platform holds 2 half-size flask platforms or 4 racks.	—	M1231-9939	
Gable cover, Plexiglas®, for temperatures ≤60 °C		M1231-2010	
Gable cover, stainless steel		M1231-2000	
Cooling coil, factory-installed		M1231-9920	
Spare set of suspension arms		M1231-0730	
Space-saving dolly, for under lab bench operation, 46 cm x 72 cm, W x L Height, shaker on cart 51 cm		M1195-1020	
Portable cart, 57 x 87 cm W x L. Height, shaker on cart 108 cm.		M1020-1220	


Ordering information

Description	Half platforms per bath	Clamps per platform	Order no.	
Innova 3100 half-size dedicated platforms, (half platforms require sub-platform listed above)				
50 mL Erlenmeyer flask half platform	2	13	AG7-50	
125 mL Erlenmeyer flask half platform	2	8	AG7-125	
250 mL Erlenmeyer flask half platform	2	5	AG7-250	

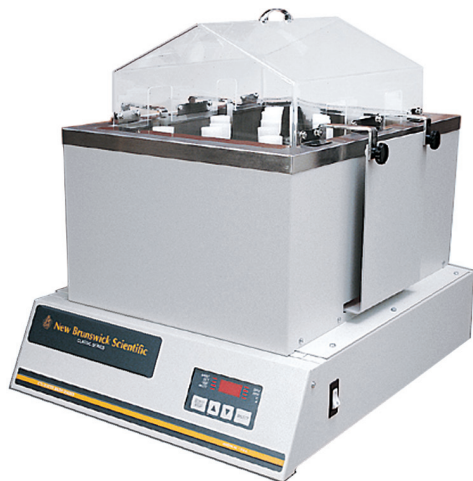
Ordering information

Description	Racks per bath	Tubes per rack	Order no.	
Innova 3100 test tube racks				
Rack for 13 mm tubes	4	60	AG7-TT13	
Rack for 16 mm tubes	4	36	AG7-TT16	
Rack for 20 mm tubes	4	29	AG7-TT20	
Rack for 25 mm tubes	4	18	AG7-TT25	

For additional options see pages 346–347.

 **Ordering information for other voltage options begins on page 471.**

C76 high-temperature water bath shakers



Shown with accessory Plexiglas® gable cover

Description

Microprocessor-controlled orbital shaker for applications up to 80°C.

Product features

- **High capacity shaking water bath** for all your critical incubations
- **One piece seamless bath with rounded corners** ensures even heating and easy cleaning
- **Feedback control of temperature and agitation rate** for reproducible results
- **Holds up to two 2 L flasks**



Deep-drawn round-cornered bath has no seams or crevices to simplify cleaning. Front and rear snap-in baffles, which minimize splashing, have been removed to show details.


Technical specifications

Description	C76
Platform size (W x D)	30.5 x 42 cm
Temperature range	+ 7°C above ambient to 80°C
Speed (rpm)	50 to 300
Orbit	1.3 cm
Innova® control programmer	
Timer	0.1 to 99.9 hours + continuous operation
Dimensions (W x D x H)	54 x 68 x 47 cm
Net weight	52 kg

Technical specifications subject to change.

C76 high-temperature water bath shakers

Ordering information

Model	Power supply	Order no.	
C76 Water Bath	230/240 V, 50/60 Hz	M1248-0003	

Shaker does not include platform which must be ordered separately. See below. Elevated temperatures attained with aid of a gable cover using bath liquid with a high boiling point to minimize evaporation. For lower temperatures an optional cooling assembly is available.

Ordering information

Description	Clamps	Order no.	
C76 interchangeable platforms and accessories, 30.5 x 42 cm stainless steel. Clamps and accessories sold separately. See pages 346–347.			
Universal platform	—	M1231-9930	
50 mL Erlenmeyer flask dedicated platform	31	M1231-9933	
125 mL Erlenmeyer flask dedicated platform	22	M1231-9934	
250 mL Erlenmeyer flask dedicated platform	13	M1231-9935	
500 mL Erlenmeyer flask dedicated platform	8	M1231-9936	
1 L Erlenmeyer flask dedicated platform	6	M1231-9937	
2 L Erlenmeyer flask dedicated platform	2	M1231-9938	
Sub-platform for mounting half-size platforms containing flasks and test tube racks. Sub-platform holds 2 half-size flask platforms or 4 racks.	—	M1231-9939	
Gable cover, stainless steel		M1231-2000	
Gable cover, Plexiglas®, for temperatures ≤60 °C		M1231-2010	
Cooling coil, factory-installed		M1231-9920	
Spare set of arms for affixing platform to water bath		M1248-0730	


Ordering information

Description	Half platforms per bath	Clamps per platform	Order no.	
C76 half-size dedicated platforms, (half platforms require sub-platform listed above)				
50 mL Erlenmeyer flask half platform	2	13	AG7-50	
125 mL Erlenmeyer flask half platform	2	8	AG7-125	
250 mL Erlenmeyer flask half platform	2	5	AG7-250	

Ordering information

Description	Racks per bath	Tubes per rack	Order no.	
C76 test tube racks				
Rack for 13 mm tubes	4	60	AG7-TT13	
Rack for 16 mm tubes	4	36	AG7-TT16	
Rack for 20 mm tubes	4	29	AG7-TT20	
Rack for 25 mm tubes	4	18	AG7-TT25	

For additional options see pages 346–347.

 **Ordering information for other voltage options begins on page 471.**

Clamps and accessories for universal platforms – open air shakers and water baths

Innova® models	Innova 2000	Innova 2050	Innova 2100	
Excella® models	Excella E1, E2		Excella E5	
Accessory				
10 mL Erlenmeyer flask clamp	60	86	109	
25 mL Erlenmeyer flask clamp	20	32	64	
50 mL Erlenmeyer flask clamp with spring retainer	15	32	45	
125 mL Erlenmeyer flask clamp with spring retainer	11	16	21	
250 mL Erlenmeyer flask clamp with spring retainer	6	10	18	
500 mL Erlenmeyer flask clamp with spring retainer	4	8	14	
1 L Erlenmeyer flask clamp			8	
2 L Erlenmeyer flask clamp			5	
2.8 L Fernbach clamp			4	
4 L Erlenmeyer flask clamp			4	
5 L Erlenmeyer flask clamp			4	
6 L Erlenmeyer flask clamp			2	
Microplate rack (stack)	3	6	8	
Microplate rack (1 layer)			2	
Small test tube rack	3	4	5	
Medium test tube rack		3	5	
Large test tube rack			4	
Platform size, cm	33 x 28	40.6 x 30.5	45.7 x 45.7	

Small racks

Diameter	Tubes/rack	Order no.	
8–11 mm	48	M1289-0001	
12–15 mm	34	M1289-0002	
15–18 mm	24	M1289-0003	
18–21 mm	18	M1289-0004	
22–26 mm	13	M1289-0005	
26–30 mm	12	M1289-0006	

Medium racks

Diameter	Tubes/rack	Order no.	
8–11 mm	60	M1289-0010	
12–15 mm	44	M1289-0020	
15–18 mm	31	M1289-0030	
18–21 mm	23	M1289-0040	
22–26 mm	16	M1289-0050	
26–30 mm	16	M1289-0060	

Large racks

Diameter	Tubes/rack	Order no.	
8–11 mm	80	M1289-0100	
12–15 mm	60	M1289-0200	
15–18 mm	42	M1289-0300	
18–21 mm	30	M1289-0400	
22–26 mm	22	M1289-0500	
26–30 mm	20	M1289-0600	

Ordering information

Description	Order no.	
Sticky Tape, 500 x 4.06 cm	M1250-9600	
Sticky Pad, 20.3 x 20.3 cm	M1250-9700	
Sticky Pad Adapter Kit	M1250-9904	
Angled Test Tube Rack Holder	TTR-210	
Spacer for TTR-210	TTR-215	
1 L Media Bottle Clamp	ACSB-1000S	

Clamps and accessories for universal platforms – open air shakers and water baths

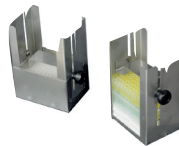
	Innova 2150	Innova 2300 Excella E10	Innova 2350	Innova 3100 C76	Order no.
		183		59	ACE-10S
		92		35	M1190-9004
	63	92		18	M1190-9000
	35	39	75	18	M1190-9001
	24	30	50	8	M1190-9002
	20	18	30	6	M1190-9003
	12	12	24	4	ACE-1000S
	6	8	15	2	ACE-2000S
	5	6	12		ACFE-2800S
	5	6	10		ACE-4000S
	4	6	10		ACE-5000S
	3	4	8		ACE-6000S
	12	16	27	6	M1289-0700
	3	4	8		TTR-221
	8	9	18	4	see below
	7	9	13	3	see below
	6	7	12		see below
	61 x 45.7	76.2 x 45.7	91.4 x 61	30.5 x 42	



Universal platform shown with accessory clamps, test tube racks and sticky tape



Flask clamp, of one-piece stainless steel, fitted with springs for stability at elevated speeds. Includes mounting screws



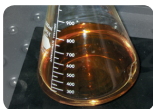
Microplate racks



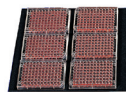
Test tube racks, small, medium and large



Dedicated platforms come with clamps of one size pre-installed



Sticky Pad (shown) and sticky tape
Replace clamps for speeds up to 250 rpm. (Not for use in water bath shakers.) Sticky Pad requires an anodized aluminum surface



Utility trays
Utility trays provide a non-slip surface for low-speed applications



Utility carriers
Utility carriers secure vessels between adjustable, cushioned rods

New Brunswick Galaxy® CO₂ incubators



Description

Since 1991, New Brunswick CO₂ incubators have offered researchers and clinical labs a reliable and user-friendly system for culturing cells. **Now, New Brunswick Scientific's Galaxy incubators have been improved to offer even more standard features, better performance and a wider range of options.**

Galaxy CO₂ incubators were the first to offer a direct heat, fanless design – transforming the way cell culture is accomplished and making traditional water-jacketed incubators a rusty relic of the past. By providing more incubation capacity, in a smaller footprint, with more options and a significant decrease in contamination risk compared to water-jacketed systems, Galaxy CO₂ incubators are easier to maintain, setup and utilize, while providing superior performance. These elements have made Galaxy systems a favorite among discerning scientists in *in-vitro* fertilization (IVF), stem cell research, as well as traditional cell culture.

Three sizes and models – 14 to 170 Liters

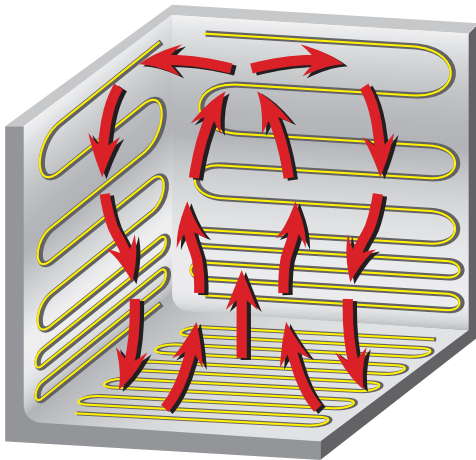
New Brunswick Galaxy incubators are offered in a range of sizes and models, with an unrivaled number of options.

Choose advanced R Series incubators in 48 L and 170 L capacities, or S Series models in 14, 48 and 170 L capacities.

New Brunswick Galaxy® CO₂ incubators

All CO₂ incubators feature:

Six-sided, direct-heating profile – pioneered in Galaxy incubators, the unique direct-heat profile provides a very gentle convection circulation of chamber atmosphere for exceptionally uniform temperature and incubator environment. Unlike traditional forced-air culture systems, our system guards against the wide fluctuations in temperature and CO₂ that can stress cells.



New Brunswick's unique six-sided direct-heating profile produces a very gentle convection circulation of chamber atmosphere for exceptionally uniform temperature and incubator environment. (Three sides shown.)

Fanless design – Galaxy incubators pioneered elimination of conventional fans, replacing them with our unique heating profile, which sets up a gentle circulation of air. By removing the fan, Galaxy incubators have eliminated a classic source of repeated contamination, allowing the entire incubator – including upper shelf – to be utilized while maintaining uniformity. In addition, since there is no fan, there is no need for an expensive internal HEPA filter that needs to be replaced frequently.

IR CO₂ sensor – standard in all models, is our unique InfraRed (IR) CO₂ sensor. This sensor offers specific measurement and accurate control of CO₂ levels. The traditional thermal conductivity (TC) sensor is highly sensitive to changes in chamber humidity and temperature fluctuations, and is therefore fundamentally unsuitable for use in CO₂ incubators. Uniquely, the Galaxy IR sensor can remain in the chamber during the entire high-temperature disinfection cycle, ensuring that all chamber components are sterilized.






Simplified cleaning – on all models, the chambers are pressed from a single sheet of stainless steel, with no welds or seams, eliminating potential sources of contamination. In combination with the easily-removable, replaceable shelves, this makes chamber cleaning a rapid and efficient process, so more time can be spent engaged in science and less with instrument maintenance.

More advanced features

- 25 mm access port – provided on all models for adding instrumentation or additional probes
- RS-232 port – provided on all models for communication and external instrument logging
- Track and trend key operational data using BioCommand® SFI software (see page 360 for details)
- Perforated shelves – optimizes temperature, CO₂ and especially RH recovery to minimize the effects of door openings and closings. Standard on 170 L models; optional on 48 L and 14 L models
- Sealed, inner glass door – On 170 L models provides clear viewing of the chamber while maintaining complete sample and environmental integrity. Minimizes costly CO₂ and N₂ consumption

Options – CO₂ incubators come with a wide variety of options allowing customization to meet your exact requirements and level of sophistication. High-temperature disinfection (HTD), three levels of oxygen control, and new active humidification are just a few of the many available options.

New Brunswick Galaxy® incubators CO₂ guide

CO ₂ incubators					
Standard features					
Direct-heating system	Yes				
Fanless design	Yes				
Seamless chambers	Yes				
IR CO ₂ sensor	Yes				
Model	Galaxy 14 S	Galaxy 48 S	Galaxy 48 R	Galaxy 170 S	Galaxy 170 R
(Images not to scale)					
Page	352	354	354	356	356
Capacity					
L	14	48	48	170	170
Dimensions, W x D x H (cm)					
Internal	23.4 x 20.8 x 29.2	40.1 x 30.5 x 40.1	40.1 x 30.5 x 40.1	53.3 x 44.4 x 69.1	53.3 x 44.4 x 69.1
External	31.2 x 27.9 x 45.2	48.3 x 47.5 x 64.5	48.3 x 47.5 x 64.5	68.6 x 67.8 x 84.3	68.6 x 67.8 x 84.3
Benchtop (B), Under Bench (U), Console (C) or Stackable (S)	B, S (x2)	B, S (x2)	B, C, S (x2)	B, U, C, S (x2)	B, U, C, S (x2)
Features					
Temperature range (°C)	Ambient +4 °C to 50 °C	Ambient +4 °C to 50 °C	Ambient +4 °C to 50 °C	Ambient +4 °C to 50 °C	Ambient +4 °C to 50 °C
Digital display	LED	LED	LCD	LED	LCD
Number of shelves	2	3	3	4	4
25 mm access port	Yes	Yes	Yes	Yes	Yes
Outside door viewing window		Yes	Yes		
Sealed inner glass doors				Yes	Yes
Comm port	RS-232	RS-232	RS-232	RS-232	RS-232
Perforated shelves	Optional	Optional	Optional	Yes	Yes
On-board data logging			Yes		Yes
Net weight (kg)	12.7	31.8	31.8	89.9	89.9
Factory installed options – see page 358 for available combinations					
High-temp disinfection			Yes	Yes	Yes
Active humidification					Yes
O ₂ control 0.1 to 19 %			Yes		Yes
O ₂ control 1–95 %			Yes		Yes
Refrigeration system					Yes
Split inner doors 2		Yes	Yes		
Split inner doors 4				Yes	Yes
Split inner doors 8				Yes	Yes
Humidity alert package			Yes		Yes
Internal sealed power supply		Yes	Yes	Yes	Yes
Building management system relays	Yes	Yes	Yes	Yes	Yes
Copper chamber, seamless				Yes	Yes

Advanced features and options



S Series LED display, standard on 170 S, 48 S and 14 S models

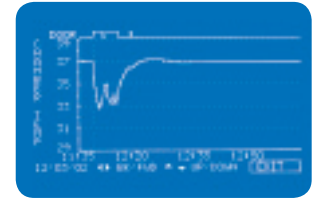


1 piece seamless chamber minimizes contamination risk and simplifies cleaning



Sealed inner glass doors, standard in 170 L models, allows viewing access while maintaining sample integrity

Alarm relay option – available on all models, allows integration with building alarm system



R Series LCD display, standard on 170 R and 48 R models



Split inner door option – improves uniformity and reduces gas consumption. 4- & 8-Split doors available on 170 L models. 2-Split doors available on 48 L models.



O₂ control option

- Up to 3 levels of control options: 1–19 %, 0.1–19 % and 1–95 %
- Ideal for stem cell, oncology and IVF studies
- Available on Galaxy® 14 S, 48 R and 170 R

Galaxy® 14 S, 14 liter capacity

**Description**

The Galaxy 14 S is a micro-sized incubator allowing specific applications to be carried out in isolation from general culture. A 1–19 % O₂ option turns this unit into a hypoxic chamber. Their compact size reduces consumption of costly gases.

Product features



- Unique size is ideal for stem cell research, IVF work and isolation of patient-specific samples. (See page 359.)
- Easily fits in IVF workstations and under laminar flow hoods
- Seamless, fanless chamber; RS-232 and 25 mm access ports; 1–19 % O₂ and perforated shelf options


Technical specifications

Description	Galaxy 14 S
Volume	14 L
Internal dimensions (W x D x H)	23.3 x 20.8 x 29.2 cm
External dimensions (W x D x H)	31.3 x 28.5 x 45.1 cm
Shelves	2
Temperature range	4 °C above ambient to 50 °C
Uniformity	+/-0.2 °C
LED display readout	Temperature and CO ₂ level
Net weight	13 kg

Galaxy® 14 S, 14 liter capacity

Ordering information

Model	Factory installed options	Order no.	
		230 V, 50/60 Hz	
Galaxy 14 S	–	CO14S-230-0000	
	1–19 % O ₂ control	CO14S-230-0200	
Additional factory installed options – see page 358 for available combinations			
Building management system relays		P0628-6300	
Single inner glass door		P0628-6210	
Accessories – gas management and analysis			
CO ₂ supply line HEPA filters (2)		P0628-5020	
CO ₂ in-line pressure regulator		P0628-5030	
CO ₂ cylinder auto-changeover controller		P0628-5000	
CO ₂ gas analyzer kit		P0628-5040	
Spare CO ₂ gas analyzer tubes (10)		P0628-5050	
Electronic CO ₂ gas analyzer		P0628-6150	
Electronic CO ₂ and O ₂ gas analyzer		P0628-6831	
Temperature probe, 5 mm tip for accessory gas analyzer		P0628-7881	
Temperature probe, 100 mm tip for accessory gas analyzer		P0628-7880	
Calibration gas 5 %, 20 L disposable canister		P0628-7211	
Accessories – shelves, pans and stacking stand			
Multi-position shelf rack		P0628-6170	
Additional shelf, non-perforated		P0628-6180	
Additional shelf, perforated		P0628-7200	
Stacking frame for stacking 2 incubators		P0628-6230	
Accessories – electronics and software			
BioCommand® SFI software		M1291-1001	

 Ordering information for other voltage options begins on page 471.

Galaxy[®] 48 R and S, 48 liter capacity

Galaxy 48 R

Description

Galaxy 48 R and S incubators are specifically designed for smaller laboratories and applications requiring a higher level of isolation. They provide many of the same standard features as the 170 L systems to provide sophisticated performance in a smaller package, and include a viewing window on the outside door.

Galaxy R Series incubators feature a large backlit display with on screen help menus, control and data logging of temperature, humidity, CO₂, door openings, alarms and optional O₂ gases.

Galaxy 48 S Series incubators are entry-level models, offering the same superior performance as 48 R models, but with an easy-to-use keypad and LED display.

Product features

- Small footprint with mid-sized capacity
- Seamless chamber and fanless design
- RS-232 port and 25 mm access port
- User-friendly LCD display on R models and LED display on S models
- IR sensor
- Low gas consumption
- O₂ control options for hypoxic applications

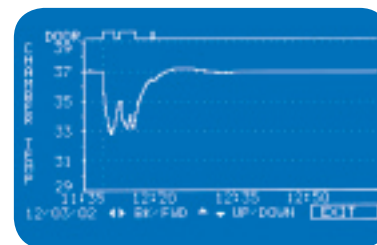
Technical specifications

Description	Galaxy 48 R	Galaxy 48 S
Volume	48 L	
Internal dimensions (W x D x H)	40.1 x 30.8 x 40.1 cm	
External dimensions (W x D x H)	48.4 x 47.5 x 64.5 cm	
Shelves	3	
Temperature range	4 °C above ambient to 50 °C	
Uniformity	+/-0.2 °C	
Display readout	Temperature and CO ₂ level 72-hour data / chart logger alarm settings	Temperature and CO ₂ level
Net weight	32 kg	



Viewing window with insulated door eliminates need to open chamber. Included in 48 R and S models.

Galaxy® 48 R and S, 48 liter capacity



Galaxy 48 R incubators feature a large back-lit display, providing a detailed record of chamber conditions – including an automated 72-hr. record of historical data.

Ordering information

Model	Factory installed options	Order no.	
		230 V, 50/60 Hz	
Galaxy 48 R	–	CO48R-230-0000	
	high-temp disinfection	CO48R-230-1000	
	1–19 % O ₂ Control	CO48R-230-0200	
	high-temp disinfection, 1–19 % O ₂ control	CO48R-230-1200	
Galaxy 48 S	–	CO48S-230-0000	
Additional factory installed options – see page 358 for available combinations			
	O ₂ Control, 0.1–19 % (48 R only)	P0628-6280	
	O ₂ Control, 1–95 % (48 R only)	P0628-5260	
	Building management system relays (48 R)	P0628-5340	
	Building management system relays (48 S)	P0628-5341	
	Split inner doors - 2	P0628-5330	
	Humidity monitor package (display and alarm)	P0628-6770	
	Internal sealed power supply (IP66)	P0628-5350	
Accessories – gas management and analysis			
	CO ₂ supply line HEPA filters (2)	P0628-5020	
	CO ₂ in-line pressure regulator	P0628-5030	
	CO ₂ cylinder auto-changeover controller	P0628-5000	
	CO ₂ gas analyzer kit	P0628-5040	
	Spare CO ₂ gas analyzer tubes (10)	P0628-5050	
	Electronic CO ₂ gas analyzer	P0628-6150	
	Electronic CO ₂ and O ₂ gas analyzer	P0628-6831	
	Temperature probe, 5 mm tip	P0628-7881	
	Temperature probe, 100 mm tip	P0628-7880	
	Calibration gas 5 %, 20 L disposable canister	P0628-7211	
	Control valve and flow indicator for 20 L canister	P0628-6061	
	Calibration gas 5 %, 105 L disposable canister	P0628-7210	
	0.3 L/min flow regulator with pressure gauge	P0628-7221	
Accessories – shelves, pans and stacking stand			
	Multi-position shelf rack	P0628-5100	
	Additional shelf, non-perforated	P0628-5070	
	Additional shelf, perforated	P0628-5080	
	Lower stacking frame, with casters	P0628-5090	
	Upper stacking frame	P0628-6720	
Accessories – electronics and software			
	BioCommand® SFI software	M1291-1001	

Ordering information for other voltage options begins on page 471.

Galaxy® 170 R and S, 170 liter capacity

**O₂ control option (170 R)**

- 3 control options: 0.1–19 %, 1–19 %, 1–95 %
- Ideal for stem cell, oncology and IVF studies

**Active humidification system AHS option (170 R)**

- Provides rapid, non-condensing humidification of the CO₂ chamber
- Ideal for low sample volume and microtiter plate applications
- External UV disinfection of humidified atmosphere

**New cooling system option (170 R)**

- Allows for studies at or below ambient temperature
- Refrigerant-free cooling to 10 °C below ambient temperature

Technical specifications

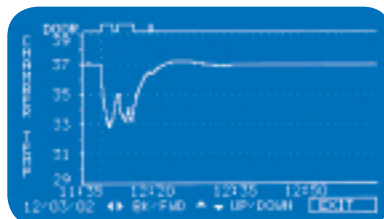
Description	Galaxy 170 R	Galaxy 170 S
Volume	170 L	
Internal dimensions (W x D x H)	54 x 44.4 x 69.3 cm	
External dimensions (W x D x H)	68.7 x 8 x 84.4 cm	
Shelves	4	
Temperature range	4 °C above ambient to 50 °C	
Uniformity	+/-0.2 °C	
Display readout	Temperature and CO ₂ level 72-hour data / chart logger alarm settings	Temperature and CO ₂ level
Net weight	90 kg	

Description

Galaxy 170 incubators offer 170 L of a highly controlled incubation environment, and a tremendous amount of usable space. These units can be used on or under the bench, and are stackable with optional stand. Shelving is easily removable without tools for a rapid wipe down. Offered in both R and S Series models.

Product features







- Standard features include:
 - IR CO₂ sensor
 - sealed inner glass door
 - RS-232 communications port
 - perforated shelves
 - and a 25 mm access port
- R Series – feature an integrated controller for simple on-screen programming of alarms and settings. The R Series allows for the full range of options including O₂ Control, Active Humidification (AHS), humidity monitoring package, high-temperature disinfection, Active UV-Sterilization and Cooling.
- S Series – A full-featured unit with an LED control system and high-temperature disinfection option



170 R Series display screens.


Galaxy® 170 R and S, 170 liter capacity

Ordering information

Model	Factory installed options	Order no.	
	230 V, 50/60 Hz	230 V, 50/60 Hz	
Galaxy 170 R	with single glass interior door	CO170R-230-0000	
	high-temp disinfection	CO170R-230-1000	
	1–19 % O ₂ control	CO170R-230-0200	
	high-temp disinfection, 1–19 % O ₂ control	CO170R-230-1200	
Galaxy 170 S	with single glass interior door	CO170S-230-0000	
	high-temp disinfection	CO170S-230-1000	
Additional factory installed options – see page 358 for available combinations			
O ₂ Control, 0.1–19 % (170 R only)		P0628-5410	
O ₂ Control, 1–95 % (170 R only)		P0628-5400	
Cooling system (170 R only)		P0628-6810	
Active humidification (170 R only)		P0628-6800	
Building management system relays (170 R)		P0628-5540	
Building management system relays (170 S)		P0628-5651	
Split inner doors – 4		P0628-6780	
Split inner doors – 8		P0628-6781	
Humidity monitor package (display and alarm) for 170 R		P0628-6820	
Internal sealed power supply (IP66)		P0628-5560	
Copper chamber		P0628-5612	
Accessories – gas management and analysis			
CO ₂ supply line HEPA filters (2)		P0628-5020	
CO ₂ in-line pressure regulator		P0628-5030	
CO ₂ cylinder auto-changeover controller		P0628-5000	
CO ₂ gas analyzer kit		P0628-5040	
Spare CO ₂ gas analyzer tubes (10)		P0628-5050	
Electronic CO ₂ gas analyzer		P0628-6150	
Electronic CO ₂ and O ₂ gas analyzer		P0628-6831	
Temperature probe, 5 mm tip for gas analyzer		P0628-7881	
Temperature probe, 100 mm tip for gas analyzer		P0628-7880	
0.3 L/min flow regulator with pressure gauge ¹		P0628-7221	
Accessories – shelves, pans and stacking stand			
Multi-position shelf rack (standard on 170 R, optional on 170 S)		P0628-6390	
Additional shelf, non-perforated		P0628-6241	
Additional shelf, perforated		P0628-6251	
Lower and upper stacking frame, with casters		P0628-6270	
Lower stacking frame, with casters		P0628-6490	
Accessories – electronics and software			
BioCommand® SFI software		M1291-1001	

Note: Units equipped with optional Cooling System not available with high-temperature disinfection.

¹ For reusable 105 L cylinder.

 Ordering information for other voltage options begins on page 471.

Combining the additional factory installed options for Galaxy® 14, 48 and 170 incubators

Galaxy incubators are offered with multiple options, but not every option can be combined. These charts indicate available combinations. Select a standard or pre-configured incubator from column one. Read across. Bullets identify additional available

options. Order both the incubator (part no. listed in column one) and the additional option order no. (i.e. P0628-xxxx). For other options, contact your sales representative.

Factory installed options available on Galaxy 14 S

Model	Alarm relay	Inner glass door
Order no.	P0628-6300	P0628-6210
Galaxy 14 S, Standard CO14S-230-0000	•	•
Galaxy 14 S, O ₂ control (1–19 %) CO14S-230-0200	•	•

Factory installed options available on Galaxy 48 R and 48 S

Model	O ₂ control 1–19 %	O ₂ control 1–95 %	Alarm relay	Split inner glass door	Internal power receptable	Humidity alert package
Order no.	P0628-6280	P0628-5260	P0628-5340 ¹ P0628-5341 ²	P0628-5330	P0628-5350	P0628-6770
Galaxy 48 S, Standard CO48S-230-0000			•	•	•	
Galaxy 48 R, Standard CO48R-230-0000	•	•	•	•	•	•
Galaxy 48 R, High-Temp Disinfection CO48R-230-1000	•	•	•	•	•	•
Galaxy 48 R, O ₂ control (1–19 %) CO48R-230-0200			•	•	•	•
Galaxy 48 R, High-Temp Disinfection and O ₂ control (1–19 %) CO48R-230-1200			•	•	•	•

¹ for Galaxy 48 R. ² for Galaxy 48 S.

Factory installed options available on Galaxy 170 R and 170 S

Model	O ₂ control 0.1–19 %	O ₂ control 1–95 %	4-Split inner door	8-Split inner door	Peltier cooling system	Active humidifi- cation	Humidity alert package	Copper chamber
Order no.	P0628-5410	P0628-5400	P0628-6780	P0628-6781	P0628-6810	P0628-6800	P0628-6820	P0628-5612
Galaxy 170 S, Standard CO170S-230-0000			• ³	• ⁴				•
Galaxy 170 S, High-Temp Disinfection CO170S-230-1000			• ³	• ⁴				•
Galaxy 170 R, Standard CO170R-230-0000	•	•	• ³	• ⁴	• ⁵	• ⁶	•	•
Galaxy 170 R, High-Temp Disinfection CO170R-230-1000	•	•	• ³	• ⁴	• ⁵	• ⁶	•	•
Galaxy 170 R, O ₂ control (1–19 %) CO170R-230-0200			• ³	• ⁴	• ⁵	• ⁶	•	•
Galaxy 170 R, High-Temp Disinfection and O ₂ control (1–19 %) CO170R-230-1200			• ³	• ⁴	• ⁵	• ⁶	•	•

Most combinations are available, however some are not. 3 cannot be combined with 4. 5 cannot be combined with 6 (i.e. Galaxy CO-170R + 1–95 % O₂ + 8 Split-Door + Humidity Package is not available whereas Galaxy CO-170R + 1–19 % O₂ + 8 Split Door + Humidity Package is available.)

Galaxy® CO₂ incubators – ideal for stem cell and IVF applications

Stem cell applications

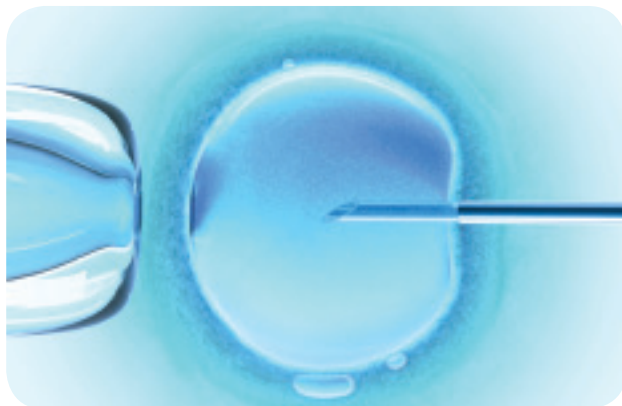
Stem cell research is advancing at a rapid pace and recent studies have shown that for many cell types, an environment closer to the physiological oxygen concentrations (2–5 %) the cells normally encounter in-vivo can result in:

- Smaller cells with reduced complexity
- Reduced spontaneous differentiation
- Increased clonogenicity
- Reduced spontaneous chromosomal aberration frequencies
- Extensive propagation of specialized clonal derivative cells

New Brunswick CO₂ incubators offer a direct-heating system which gently bathes cells in warm convected air. In addition, we offer highly regulated CO₂ and O₂ environments with the

ability to closely mimic physiological normoxic conditions and to provide the optimal environment for stem cell work. Rapidly emerging stem cell technology requires a greater sophistication in the incubation process than traditional incubators can provide.

With the availability of three different ranges of oxygen control (0.1–19 %, 1–19 %, 1–95 % O₂ ranges) New Brunswick incubators offer stem cell scientists greater choice and flexibility in controlling cellular O₂ levels than any other brand of CO₂ incubator. The features and design of New Brunswick incubators make them ideal for this critical and sensitive emerging field of study.



The small size of Galaxy 14 and 48 incubators make them ideally suited to critical applications such as *in vitro* fertilization, where sample isolation is imperative.

IVF applications

New Brunswick CO₂ incubators allow clinicians and embryologists to closely and reliably mimic the environmental conditions that sperm, oocytes, blastocysts and developing embryos encounter in vivo. Each Galaxy incubator is custom-manufactured, giving practitioners the largest choice of optional features. Many features can be also be retrofitted at a later date, allowing modifications to operating parameters, as optimal IVF incubation conditions are further defined.

Choose from 3 sizes:

Galaxy 14 is ideal for culturing 1 to 2 patient samples; and for incubation while samples undergo observation and manipulation.

Galaxy 48 is compact, stackable, and easily capable of incubating up to 6 patient samples.

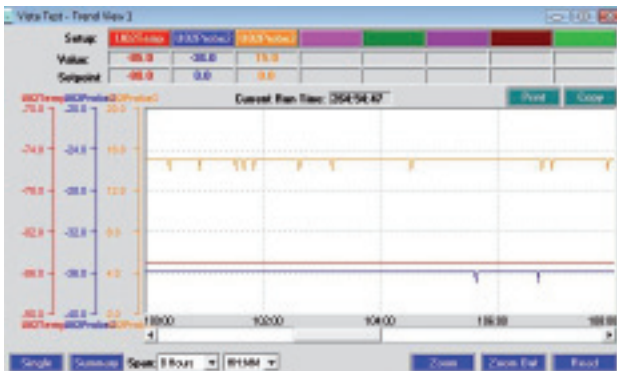
Galaxy 170 is ideal for high cycle throughput clinics and for media storage.

O₂ control option

1–19 %.

With the many unique advantages that New Brunswick CO₂ incubators offer, together with unparalleled support and service, it is not surprising that they have become the incubators of choice in IVF clinics.

BioCommand® SFI Track and Trend data logging software



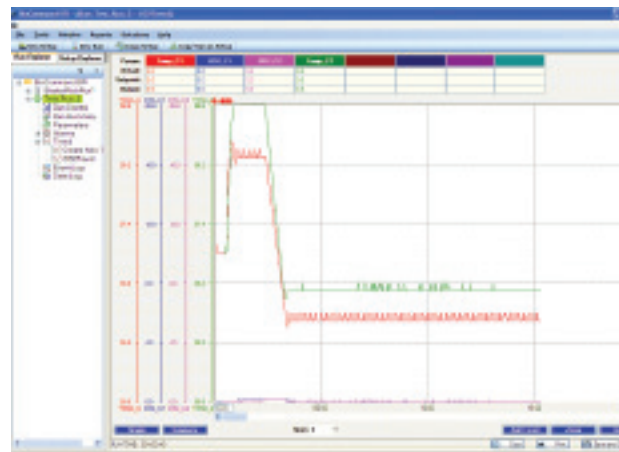
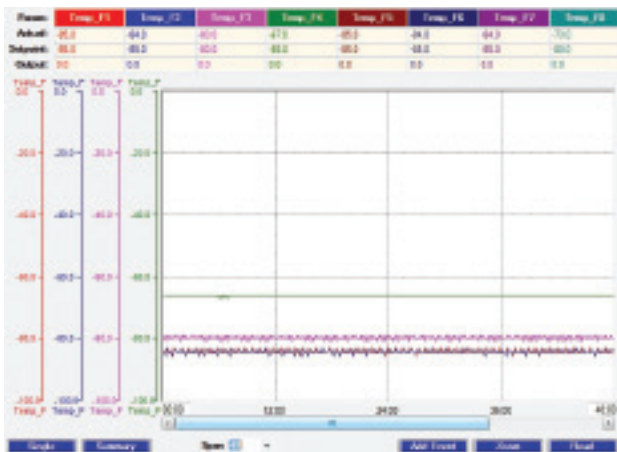
Graphical representation of the output

Description

BioCommand SFI Track and Trend Software: The BioCommand SFI software package is designed specifically for standard laboratory equipment including shakers, CO₂ incubators and ULT-Freezers¹. The software package allows you to track key operational information such as time, temperature, shaking speed, CO₂ concentrations and humidity.

Product features

- Track the operational parameters of your choice with the option to design and save templates
- Monitor multiple units from the same PC
- Trend and archive critical data including temperature, agitation speed and gas concentration for up to 32 units simultaneously
- Provides indications of alarm conditions identified by the equipment



Ordering information

Description	Order no.
BioCommand SFI Track and Trend packages¹	
Shaker package	M1291-1000
CO ₂ incubator package	M1291-1001
ULT-Freezer package	M1291-1002
To connect additional units²	
Shaker cable, 7.6 m	M1291-8001
CO ₂ incubator cable, 4.5 m	P0620-7012
ULT-Freezer cable set, 15 m	M1291-5001 ³
4-port RS-232/485 to USB converter	P0460-7751
8-port RS-232/485 to USB converter	P0460-7750

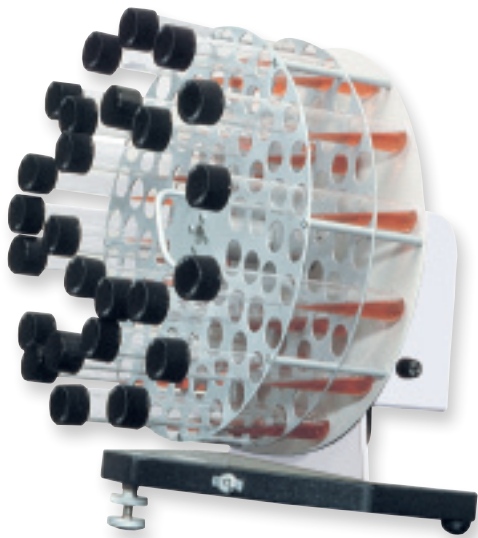
¹ Includes software, and cable to connect one shaker, freezer or CO₂ incubator. Computer requires an RS-232 or USB port. Shaker/incubator/freezer requires RS-232 or RS-485 port.

² When connecting multiple shakers, CO₂ incubators or freezers, in addition to a single software package, one additional cable is required for each additional system you monitor/log.

Shakers and CO₂ incubators additionally require a 4- or 8-port converter.

³ Includes RS-485 Board.

Tissue/Microbial culture roller drum, TC-7 and TC-8



**Description**

The TC-7 and TC-8 Roller Drums are precision tools designed for the growth of mini preps, tissue, viral and bacterial cultures by the roller tube method. They are quiet running and ruggedly built to provide many years of continuous service, even under incubated temperatures. A powerful ball-bearing drive imparts uniform rotary motion to all tubes, maintaining constant speed with heavy workloads.

Product features


- Interchangeable drums – accommodate 13 mm, 16 mm, 18 mm and 25 mm test tubes and 50 mL centrifuge tubes. Drums can be used as carrying trays or storage racks. Sold separately.
- Speed: 6 to 56 rpm in Model TC-7 and 0.2 to 3.5 in Model TC-8
- Overall dimensions: 37.4 x 34 x 46 cm (W x D x H max.) (Height varies dependent on angle adjustment)
- Net weight: 7.3 kg

Ordering information





Model	Speed (rpm)	Power supply	Order no.	
TC-7	6–56	220/230 V, 50/60 Hz	M1053-4005	
TC-8	0.2–3.5	220/230 V, 50/60 Hz	M1053-5005	

Ordering information







Description	Order no.	
Interchangeable roller drums, 36 cm diameter		
Holds 164 test tubes 16 mm and smaller	ATC-TT16	
Holds 164 test tubes 18 mm and smaller	M1053-0450	
Holds 80 test tubes 25 mm and smaller	ATC-TT25	
Holds 46 size 50 mL centrifuge tubes, 30 mm and smaller	M1053-0360	
Holds 311 test tubes, 13 mm diameter x 100 mm length	M1053-0306	

 Ordering information for other voltage options begins on page 471.

New Brunswick fermentor/bioreactor selection guide

Model	CelliGen® BLU Single-Use Bioreactor	BioFlo®/CelliGen 115 Fermentor/Bioreactor	BioFlo 310 Fermentor	CelliGen 310 Bioreactor
				
Page	366	371	378	382
Total Volume	5.0- 14.0 L	1.3- 14.0 L	2.5- 14.0 L	2.5- 14.0 L
Working Volume	1.3- 10.5 L	0.4- 10.5 L	0.8- 10.5 L	0.8- 10.5 L
Sterilization Method	Single-Use	Autoclavable	Autoclavable	Autoclavable
Bacteria/Yeast/Fungi		Yes	Yes	
Plant/Algae		Yes	Yes	Yes
Mammalian/Animal	Yes	Yes	Yes	Yes
Insect	Yes	Yes	Yes	Yes
Interchangeable Vessels	Yes	Yes	Yes	Yes
Controller	Reactor Process Controller	Reactor Process Controller	Reactor Process Controller	Reactor Process Controller
Touchscreen Controller	Yes	Yes	Yes	Yes
Heat Induction			Yes	
Air Flow Control	Rotameter or Thermal Mass Flow Controller	Rotameter or Thermal Mass Flow Controller	Rotameter or Thermal Mass Flow Controller	Rotameter or Thermal Mass Flow Controller
Gas Mixing Options	3/4 Gas	2/3/4 Gas	2/3/4 Gas	2/3/4 Gas
Validatable	Yes		Yes	Yes

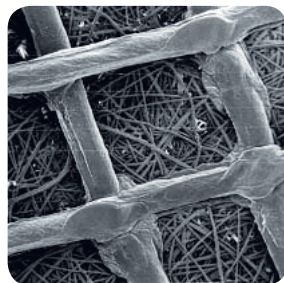
New Brunswick fermentor/bioreactor selection guide

	BioFlo 415 Fermentor	BioFlo 510 Fermentor	CelliGen 510 Bioreactor	BioFlo 610 Fermentor	BioFlo Pro Fermentor	CelliGen Pro Bioreactor
						
	387	389	389	391	393	393
	7.0 - 19.5 L	19.5 - 40.0 L	19.5 - 40.0 L	65.0 - 125 L	75.0 - 3000 L	75.0 - 650 L
	2.0 - 15.5 L	5.2 - 32.0 L	5.2 - 32.0 L	13.0 - 100 L	32.0 - 2400 L	18.8 - 520 L
	Sterilizable-in-Place	Sterilizable-in-Place	Sterilizable-in-Place	Sterilizable-in-Place	Sterilizable-in-Place	Sterilizable-in-Place
	Yes	Yes		Yes	Yes	
	Yes	Yes	Yes	Yes	Yes	Yes
			Yes			Yes
			Yes			Yes
	Yes					
	Reactor Process Controller	Reactor Process Controller / Programmable Logic Controller	Reactor Process Controller / Programmable Logic Controller	Reactor Process Controller	Programmable Logic Controller	Programmable Logic Controller
	Yes	Yes	Yes	Yes	Yes	Yes
	Yes	Yes		Yes	Yes	
	Rotameter or Thermal Mass Flow Controller	Rotameter or Thermal Mass Flow Controller	Rotameter or Thermal Mass Flow Controller	Rotameter or Thermal Mass Flow Controller	Rotameter or Thermal Mass Flow Controller	Rotameter or Thermal Mass Flow Controller
	2/3/4 Gas	1/2 Gas	3/4 Gas	1/2 Gas	1/2 Gas	4 Gas
	Yes	Yes	Yes	Yes	Yes	Yes

Fibra-Cel disks: a solid-support growth matrix for mammalian, animal and insect cells



Fibra-Cel disks



High resolution micrograph of Fibra-Cel Disks showing polyester mesh with polypropylene support

Description

Fibra-Cel is a solid support growth matrix for mammalian, animal and insect cells, used predominantly for production of secreted products such as recombinant proteins and viruses. Fibra-Cel enables sustained long-term periods of high-density growth in perfusion, without danger of clogging; and eliminates the need for cell filtration to separate cells from the end product. It is used in New Brunswick's CelliGen® BLU, 310, 510 and Pro Bioreactors, and is available for use with disposable bags or other bioreactor systems.

Technical specifications

Disk Diameter	6 mm
Autoclavable	Yes
Endotoxin Tested	Yes
Bioburden Tested	Yes
Cytotoxicity Tested	Yes
USP Class VI	Yes
Typical Quantity of Fibra-Cel Used	
FibraStage	10 g
2.5 L Vessel	50 g
5.0 L Vessel	150 g
7.5 L Vessel	250 g
14.0 L Vessel	500 g
Cells Successfully Grown on Fibra-Cel Disks	
Hybridoma	DA4.4, 123A, 127A, GAMMA, 67-9-B
Anchorage-Dependent	Human Osteosarcoma, MRC-5, BHK, VERO, CHO, rCHO-tPA, rCHO - Hep B Surface Antigen, HEK 293, rHEK 293, rC127 - Hep Surface Antigen, Normal Human Fibroblasts, Stroma, Hepatocytes
Insect	Tn-368, SF9, rSF9, Hi-5

Product features

- **Anchorage-dependent cultures:** cell density and productivity can be up to ten times higher when using Fibra-Cel disks instead of ordinary microcarriers
- **Suspension cultures:** disks are electrostatically treated to facilitate suspension cells adhering to the disk and becoming entrapped in the disks' fiber system, where they remain throughout the process
- **Disk composition:** manufactured to cGMP guidelines, composed of USP Class VI polypropylene and polyester non-woven fiber
- **Attachment:** cells can attach within 15-60 minutes on Fibra-Cel, compared to approximately six hours for cells to attach to ordinary microcarriers. Fibra-Cel bed is inoculated in a single step – no periodic stoppage needed to stir cells
- **Convenient harvesting:** simple and efficient separation of biomass from secreted products
- **Advantages over standard microcarriers:**
 - Low pressure drop across the bed for easier scale-up
 - High surface-to-volume ratio increases the total biomass that can be maintained in the bioreactor for higher productivity
 - Cells are less susceptible to shear forces from impeller blades and sparger gas bubbles as they remain entrapped in the disk bed, shielded from turbulence
 - Higher mass transfer of nutrients and oxygen across the disk bed results in cells that are just as viable at the bottom of the bed as they are at the top

Ordering information

Description	Order no.	
Fibra-Cel Disks, 50 g	M1292-9984	
Fibra-Cel Disks, 250 g	M1292-9988	

FibraStage replacement parts

Ordering information

Description	Order no.	
Standard Systems		
FibraStage Disposable Bottles, Pack of 4	M1327-9980	
FibraStage Adapter (required for Europe)	P0620-6460	
FibraStage Bottle Opener (To open bottle for harvesting disks)	P0640-0518	
Glucose Monitoring Kit (Includes 50 test strips)	P0440-0500	
Glucose Test Strips (Includes 50 test strips)	P0440-0508	
9-Pin Signal Cable	P0620-6470	
Crystal Violet dye (100 mL for cell counting – Nucleus counting kit)	P0640-0610	
Cell Dissociation Tool (to compress the bottom of the bottle)	P0640-0600	
FibraStage Bottle Cap	P0640-0620	
Continuous Systems		
Continuous System Disposable Bottles, Pack of 4	M1327-9981	
FibraStage 3-Head Pump (3 individually controlled motor units) tubing & pump head not included.	P0620-3040	
Tubing Set & Pump Head (Includes 1 set of tubing, tubing connectors and pump head)	P0740-2730	
Tubing Only (Includes 5 sets of tubing)	P0740-2740	
2 L Media Addition Bottle	M1362-9902	

CelliGen® BLU bioreactor with single-use vessels



Description

CelliGen BLU is a benchtop bioreactor that combines all the convenience of single-use technology with the trusted performance, advanced process management and scalability of a stirred-tank design. Ideal for research or production.

Product features

- **Applications:** Mammalian and animal cell lines in batch, fed-batch and continuous culture
- **Single-use vessel*:** Interchangeable, single-use, rigid-wall vessels, offered in 5.0 and 14.0 liter (total volume) capacities. All components are pre-validated, pre-sterilized and constructed from USP Class VI materials, making them acceptable for GMP environments. Pre-sterilization eliminates the need for autoclaving, and facilitates rapid turn-around between runs. Includes pitched-blade or packed-bed impeller, tubing, filters, and headplate penetrations for RTD temperature sensor, pH and DO probes, addition (three), sample, harvest, overlay, and sparge
- **Sophisticated control station:** Compact benchtop design with powerful RPC (Reactor Process Controller) provides integrated control of up to 32 process parameters, trends up to 8 parameters simultaneously, stores up to 10 recipes, and provides built-in security features. See page 370. Includes industrial touchscreen interface with adjustable-position, 38.1 cm (15 in) color display; 3 integrated pumps; magnetic-drive motor; temperature control; pH, DO, and 3- or 4-gas mixing; 2 USB ports; and 7 analog inputs and 7 outputs to add ancillary devices
- **Gas flow control:** Thermal Mass Flow Controller (TMFC) options for sparge line and gas overlay
- **Additional options:** Scale for measuring additions and level; validation package, and more. Related accessories, including BioCommand® SCADA Software, gas analyzers and more are described beginning on page 396

(*) Patent pending. Other vessel sizes and configurations are available. Contact your sales representative for details.



Single-use vessels are pre-sterilized, ready for immediate use. Just add media and inoculate. Includes impeller, sparge, tubing and filters.

CelliGen® BLU – ordering information

Ordering information – vessel kits

Description	Vessel Volume	Order no.	
Vessel Kit – includes heat blanket, RTD temperature sensor, pH and DO probes with cables, and needle-free syringes (vessel not included)	Kit for 5.0 L vessels	M1363-0105	
	Kit for 14.0 L vessels	M1363-0114	

Ordering information – single-use vessels

Description	Vessel Volume	Quantity	Order no.	
Single-Use Vessel(s) – includes Microsparge and Pitched Blade Impeller (items in Vessel Kits not included)	5.0 L	1 vessel	M1363-0125	
		4 vessels	M1363-0127	
	14.0 L	1 vessel	M1363-0126	
		4 vessels	M1363-0128	
Single-Use Vessel(s) – includes Macrosparge and Pitched Blade Impeller (items in Vessel Kits not included)	5.0 L	1 vessel	M1363-0121	
		4 vessels	M1363-0123	
	14.0 L	1 vessel	M1363-0122	
		4 vessels	M1363-0124	

Ordering information – accessories and replacement parts

Description	Order no.	
Media/Supplement Addition Kits		
500 mL Media/Supplement Addition Kit	P0640-8860	
1.0 L Media/Supplement Addition Kit	P0640-8861	
5.0 L Media/Supplement Addition Kit	P0640-8862	
10.0 L Media/Supplement Addition Kit	P0640-8863	
"Y" Connector for custom manifolds	P0620-0947	
Validation		
CelliGen BLU Controller Validation Package	M1363-0101	
CelliGen BLU Vessel Validation Package	M1363-0061	

Ordering information – accessories and replacement parts

Description	Order no.	
Additional Accessories		
Connection Kit	M1363-0112	
Pressure Regulator Kit	M1363-5002	
Needle-Free Syringe, pack of 10	M1363-9910	
Polysulfone Quick Connect (male) 0.635 cm	P0240-2670	
Replacement Parts		
pH Probe, 5.0 L, includes cable	P0300-2371	
pH Probe, 14.0 L, includes cable	P0300-2370	
DO Probe, 5.0 L	P0720-6524	
DO Probe, 14.0 L	P0720-6523	
DO Cable, 5.0 L & 14.0 L	P0720-2338	
Heat Blanket, 5.0 L	M1363-8012	
Heat Blanket, 14.0 L	M1363-8013	

Additional related accessories, including BioCommand® SCADA Software, chillers, gas analyzers and more are described on pages 396 - 407.

A guide to impeller selection in fermentors and bioreactors

When growing Eukaryotes or Prokaryotes in a stirred-tank reactor, it's critical to choose the impeller type best suited to your process. This article provides a brief overview of our impellers and how they work, to guide you in selecting the best impeller for your application. For a table of cell lines commonly used in fermentation and cell culture processes, matched with the impeller(s) best suited for their growth, see our website at www.nbsc.com/papers or contact us for assistance.

Cell Lift impellers for microcarrier culture

The Cell Lift impeller, designed by New Brunswick Scientific, provides uniform circulation for microcarrier cultures. This is an ultra-low-shear impeller, in which the flow is caused by three discharge ports located on the impeller shaft. The rotation of the ports creates a low differential pressure at the base of the impeller tube, lifting the microcarriers up through the tube and expelling them out through the ports. This continuous recirculation loop keeps the cells uniformly dispersed throughout the vessel.



Cell Lift Impeller

Gases are introduced through a ring sparger, which generates bubbles which pass along the impeller between the exterior of the inner tube and an outer membrane known as the aeration cage. A mesh lining, on the outer membrane of the cage, has 85 μm penetrations small enough to ensure that cells growing on the microcarriers cannot pass through. Gas exchange occurs at the membrane-media interface, ensuring that the cells remain in a bubble-free environment and are not subjected to shear due to bubble breakage. The bubbles are then expelled out the ports, located at the top of the impeller, into a second screened-in cage. A foam breaker directs air, supplied by a gas overlay, into the cage to break up any foam that has developed.

The Cell Lift impeller can be used in batch and fed-batch processes of shear-sensitive animal cells. It can also be used for continuous perfusion processes with the addition of a decanting column(s) and a media feed in/broth pump out setup.

Packed-bed basket impellers for secreted products

Another unique New Brunswick Scientific design, the packed-bed basket impeller is used primarily for manufacturing high yields of secreted products from anchorage-dependent or suspension cultures in perfusion. The basket is comprised of two horizontally-positioned, perforated metal screens that extend to the vessel walls. Enclosed between the screens, a bed of Fibra-Cel disks serves as a solid support matrix for cell growth. Cells growing in the disk bed become immobilized on or between the disks, where they remain throughout the culture run, protected from external shear forces. Media is circulated by way of a hollow impeller tube with discharge ports positioned above the basket. Like the Cell Lift impeller, rotation of these discharge ports creates a low differential pressure at the base of the impeller tube, which circulates the media throughout the system. The media receives gases through a sparger located at the bottom of the inner tube, protecting the cells from being exposed to the gas liquid interface. This results in low turbulence and low shear stress on the culture. Exceptionally high cell densities are achievable due to the high surface-to-volume ratio provided by the disk bed, coupled with the ability to use perfusion.

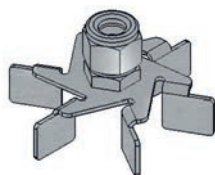


Basket with Fibra-Cel

Impeller selection guide (continued)

Rushton-type impellers ideal for fermentation

The blades of Rushton and Rushton-type impellers are flat and set vertically along the agitation shaft, producing a unidirectional radial flow. These impellers are commonly used in fermentations of cell lines that require high oxygen rates, such as yeast, bacteria, and some fungi.



Rushton-type Impeller

Marine blade impellers for shear-sensitive microorganisms

The leading face of the blades on this impeller can be flat or concave, while the back side is convex, producing an axial flow. Marine Blade impellers are used for applications requiring gentle mixing without causing cell damage. Due to their unidirectional flow, however, the $K_L a$ of Marine Blade impellers tend to be slightly lower than that of impellers which employ both axial and radial mixing.



Marine blade Impeller

Pitched blade impellers for shear-sensitive microorganisms

The blades on this impeller are flat, and set at approximately 45° angles, producing both an axial and radial flow. The combination provides better overall mixing, and creates a higher oxygen mass transfer rate ($K_L a$) than that of unidirectional (axial or radial) flow impellers. Pitched Blade impellers are low shear impellers, designed to gently mix the contents of the culture without causing cell damage. They are most commonly used with mammalian, insect, or other shear-sensitive cell lines, growing either in suspension or with the aid of microcarriers. They are also widely used in fermentation processes dealing with highly viscous cultures, such as filamentous bacteria and fungi, as well as some biofuels processes.



Pitched Blade Impeller

Spin filter retention device for all cell lines

Spin filters are used to keep cells inside the vessel during continuous or perfusion culture. In New Brunswick bioreactors, spin filters with a low-shear Marine Blade impeller are offered for suspension and microcarrier applications. The Spin Filter Kit consists of a screened cage surrounding the impeller shaft, with very small filter pore openings that keep cells isolated outside the cage. Inside the rotating cage, a dip-tube is provided for continuous withdrawal of culture broth. A media feed tube is used outside the cage to provide a steady supply of fresh nutrients. Offered with 10 μm openings for suspension cultures and 75 μm openings for microcarrier cultures. Due to its gentle mixing nature, the spin filter is typically used with cell lines that are microcarrier-dependent or highly sensitive to shear. They are ideal for production of secreted proteins, as they keep the harvested media cell-free and thereby simplify purification.



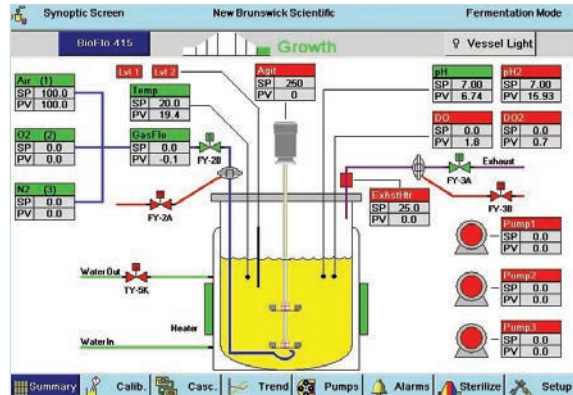
Spin Filter with
Marine Blade

Reactor Process Controller – BioFlo® and CelliGen® BLU, 115, 310, 415, 510 and 610

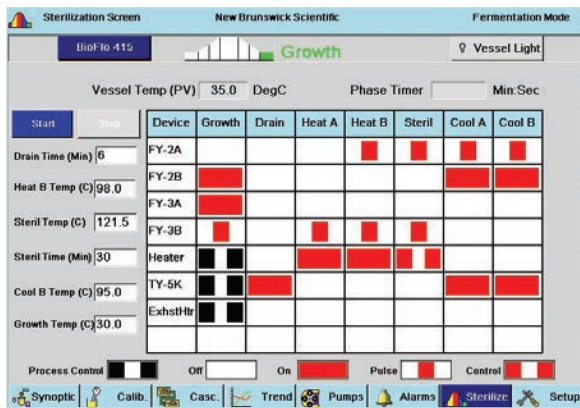
Reactor Process Controller (RPC) is an advanced controller used in most New Brunswick benchtop and pilot-plant fermentors and bioreactors. The advantages of a common control platform are easier scale-up, reduced learning curve, and uniformity among products. The RPC system uses a touchscreen interface to simplify setup, calibration and monitoring, and is capable of controlling up to 32 process loops per fermentor or bioreactor. When used in our BioFlo and CelliGen 310 systems, it enables simultaneous control of up to 4 vessels – and over 120 process loops – from a single controller. In the 115, it can simultaneously control up to 3 vessels – over 90 process loops.

Sample screens

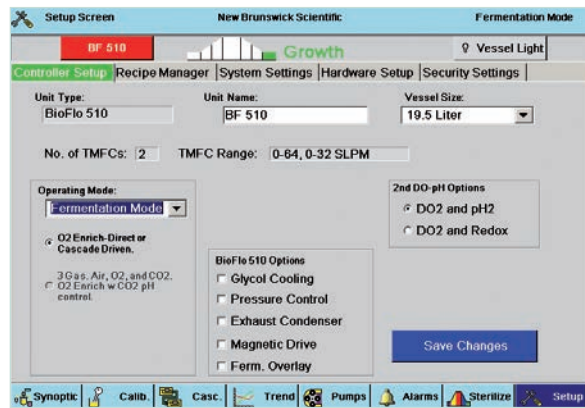
A variety of other screens are also provided for setting up and controlling pumps, alarms, cascade control strategies, and much more.



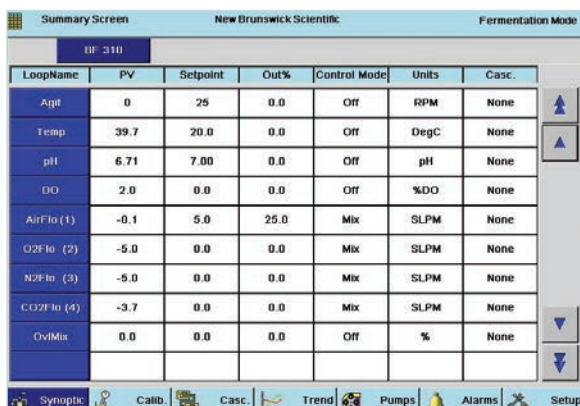
Synoptic View provides a pictorial alternative to the summary screen for viewing and editing process values.



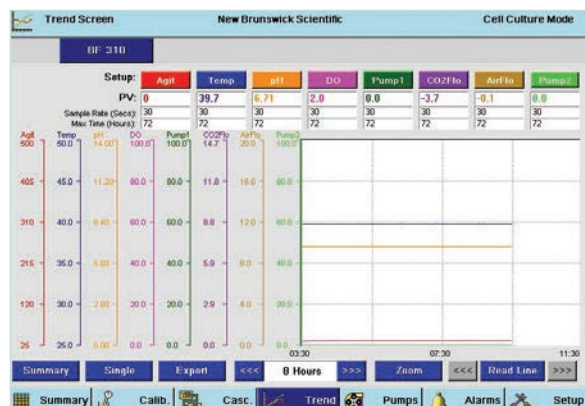
Enter and view sterilization parameters and valve sequences from the Sterilization Screen (available only on sterilizable-in-place 415, 510 and 610 models).



The Setup Screen lets you easily configure your settings – Adjust gas flow options, change vessel size for more accurate PI values, save up to 10 recipes, add additional fermentors, and more.



Summary Screen lets you conveniently view setpoints, current values, cascade loops and more – for up to 10 parameters simultaneously. All 32 parameters can be viewed simply by scrolling up or down.



Trend graphing makes it simple to track and export data on up to eight process variables per reactor over a six day span. Customize the view by selecting the parameters, colors and interval between sample measurements.

BioFlo®/CelliGen® 115 fermentor/bioreactor, 1.3 - 14.0 liters

**System controllers and components**

1. **Control Station** (and optional utility stations for second and third vessel) include an integrated water manifold to save space. Footprint measures just 39.6 x 40.6 cm, W x D.
2. **Rotameters/TMFC** – each Control or Utility Station can accommodate up to four Rotameters – available in a variety of flow rates – or a Thermal Mass Flow Controller. (Two Rotameters shown).
3. **Color Touchscreen Interface**, 21.3 cm, is standard on Control Stations. (Not provided on supplemental utility stations.)
4. **Sample Assembly** – a syringe-activated device for removing media samples without contaminating the culture. The sampler installs in a headplate port. Samplers are sized to vessels.
5. **Heat-Blanketed Vessels** are available in four sizes. Shown with direct-drive motor.
6. **Three Fixed-Speed (12 RPM) Peristaltic Pumps** can be linked directly to acid, base, foam, level.
7. **Quick Connects for Water In/Out** allow utilities to be attached and detached in seconds.
8. **Connections for pH/DO, Sparge, Motor, Heater, Temperature Probe and Foam/Level** are easily accessed from the side.
9. **Optional Addition Bottle Holder** saves valuable lab space.
10. **Double-Wall Water-Jacketed Vessels** are available in four sizes. Shown with Magnetic Drive motor.
11. **Exhaust Condenser** – essential in most applications for keeping exhaust filters dry and vessel contents from evaporating during culture.

Description

The BioFlo/CelliGen 115 is an easy-to-use system, with built-in controls for operation as a microbial fermentor as well as mammalian/animal cell culture bioreactor. This versatility, coupled with its ability to control up to three independent reactors from a single control station, makes it ideally suited to use in R&D labs, universities, teaching facilities, testing labs, and more.

Product features

- **Applications:** Microbes, yeast, insect, plant or mammalian cells, in batch, fed-batch and continuous culture
- **Pre-configured kits:** Simplify ordering by choosing a pre-configured kit for basic or advanced fermentation or advanced cell culture. Kits include everything you need to get started, from vessel and control station to cable ties and tubing. See chart on page 372 for details, or custom-configure a system to your specifications by selecting from our wide range of options
- **Vessel:** Eight interchangeable, autoclavable, glass vessels are offered in 1.3, 3.0, 7.5 & 14.0 liter (total volume) capacities. Choose double-wall water-jacketed vessel with magnetic-drive motor, or heat-blanketed vessel with direct-drive motor
- **Impellers:** Rushton-type, pitched-blade and marine-blade impellers and spin-filter retention devices are offered. Basic and Advanced Fermentation Kits include 2 Rushton-type Impellers as standard; Cell Culture Kits include a pitched-blade impeller as standard. See page 368
- **Sophisticated control station:** Compact unit with powerful RPC (Reactor Process Controller) provides integrated control of process parameters, for up to 3 independent vessels. One control station or cost-saving utility station is required for operation of each vessel. Includes 3 integrated pumps; integrated water manifold; and 2 USB ports
- **Industrial touchscreen control interface:** Bright, easy-to-read, color display is built into the Control Station for system management and monitoring
- **Gas flow control:** Manual gas-flow control via one or two Rotameters is standard with pre-configured kits and automatic gas mixing comes standard with cell culture systems. Systems can be customized with up to 4 Rotameters, TMFC for automatic gas-flow control and automatic gas mixing via solenoids
- **Additional options:** pH & DO probes, addition bottle kit, start-up kit and much more. Related accessories, including BioCommand® SCADA Software, gas analyzers and more are described beginning on page 396

continued on next page

BioFlo®/CelliGen® 115 pre-configured kits contain everything you need to get started

Basic and Advanced Fermentation Kits, as well as Advanced Cell Culture Kits simplify ordering. If a pre-configured system doesn't meet your process requirements, a fully configurable system can be designed by selecting from our available options:

- pH/DO
- Automatic gas mixing
- Thermal Mass Flow Control (TMFC)
- Rotameters
- Pumps
- Foam/Level.

Need a second or third system? Budget-saving utility stations and "Add-A-Vessel Kits" take the cost and work out of ordering added units.

Do you already own a New Brunswick BioFlo 110 vessel? Save money by re-using your existing vessel. Retro Kits are also offered to convert your existing cable connections to fit the new system.

We've thought of everything, including offering "start-up kits" containing essential tubing connectors, cable ties, clamps and more – catalog number M1369-0300 – see page 376.

Contents of pre-configured kits

Kit Contents	Advanced Fermentation Kit	Advanced Cell Culture Kit	Basic Fermentation Kit
Vessel Kit – Basic*			●
Vessel Kit – Advanced*	●	●	
Master Control Station with Touchscreen	●	●	●
Temperature Control	●	●	●
Agitation Control	●	●	●
pH/DO Control	●	●	
Foam/Level Control	●	●	
3 Fixed-Speed Pumps	●	●	
Manual Gas Mix	●		●
Automatic Gas Mix via 4 Solenoids		●	
Manual Gas Flow via Rotameters (Qty. Rotameters shown)	2	1	1
Automatic Gas Flow (0-20 SLPM TMFC)**			

(*) For details of vessel kit components, see the Add-A-Vessel table on next page.

(**) Available in configured systems only.

Standard flow rates

Vessel Size (L)	Fermentation Kits SLPM	Cell Culture Kits SLPM
1.3	0.25 - 2.5	0.05 - 0.5
3.0	0.2 - 5.0	0.12 - 1.2
7.5	0.1 - 11.4	0.25 - 2.5
14.0	2.0 - 20.0	0.5 - 5.0



BioFlo/CelliGen 115 Controller with two Utility Stations

BioFlo®/CelliGen® 115 pre-configured kits (continued)

Contents of Add-A-Vessel kits

Vessel Kits contain most ancillary components required for independent operation as a second or third vessel.

Contents	Adv. Fermentation Vessel Kit		Adv. Cell Culture Vessel Kit		Basic Fermentation Vessel Kit	
	Heat Blanket	Water Jacket	Heat Blanket	Water Jacket	Heat Blanket	Water Jacket
Dish-Bottom Vessel with stainless steel headplate	●	●	●	●	●	●
Vessel Stand	●		●		●	
Agitation Motor, 50 - 1200 rpm (ferm. direct drive)	●	●			●	●
Agitation Motor, 25 - 200 rpm (cell cult. magnetic drive)			○	○		
Agitation Motor, 25 - 400 rpm (cell cult. direct drive)			○	○		
Heater Blanket	●		●		●	
Jacket Water Heater		●		●		●
Immersion Cooling Coil	●		●		●	
Thermowell & RTD Probe	●	●	●	●	●	●
pH/DO Probe Kit	●	●	●	●	○	○
Foam/Level Probe	●	●	●	●	○	○
Baffle Assembly	●	●			●	●
Rushton Impellers (two blades)	●	●	○	○	●	●
Pitched Blade Impeller (one blade)	○	○	●	●	○	○
Ring Sparger	●	●	●	●	●	●
Microsparge	○	○	○	○	○	○
Exhaust Condenser	●	●	●	●	○	○
Sampling Assembly	●	●	●	●	○	○
Tri-Port Adapter	●	●	●	●	○	○
Septum Kit	●	●	●	●	○	○
Liquid Addition Tube and Headplate Adapter	●	●	●	●	○	○
Two Addition Bottles and Tubing	●	●	●	●	○	○

● Standard ○ Optional

BioFlo 115 Advanced Fermentation kits – ordering information

Advanced Fermentation Kits are available with choice of voltage and heat-blanketed vessel (**HB**) or water-jacketed vessel (**WJ**).

Total Volume (L)	Working Volume (L)	Electrical Service	HB Kit		WJ Kit	
			Order no.		Order no.	
1.3	0.4 - 1.0	200 - 240 V	M1369-1151		M1369-1161	
3.0	0.8 - 2.2	200 - 240 V	M1369-1152		M1369-1162	
7.5	2.0 - 5.6	200 - 240 V	M1369-1155		M1369-1165	
14.0	4.0 - 10.5	200 - 240 V	M1369-1150		M1369-1160	
Add-A-Vessel Advanced Fermentation Kits*						
Available with choice of heat-blanketed vessel (HB) or water-jacketed vessel (WJ).						
1.3	0.4 - 1.0	—	M1369-1601		M1369-1611	
3.0	0.8 - 2.2	—	M1369-1602		M1369-1612	
7.5	2.0 - 5.6	—	M1369-1605		M1369-1615	
14.0	4.0 - 10.5	—	M1369-1610		M1369-1620	

(*) When ordering Add-a-Vessel Kits, a control station or utility station is required.

continued on next page

BioFlo® / CelliGen® 115 pre-configured kits (continued)

BioFlo 115 Basic Fermentation kits – ordering information

Advanced Fermentation Kits are available with choice of voltage and heat-blanketed vessel (**HB**) or water-jacketed vessel (**WJ**).

Total Volume (L)	Working Volume (L)	Electrical Service	HB Kit		WJ Kit	
			Order no.		Order no.	
1.3	0.4 - 1.0	200 - 240 V	M1369-1141		M1369-1631	
3.0	0.8 - 2.2	200 - 240 V	M1369-1142		M1369-1632	
7.5	2.0 - 5.6	200 - 240 V	M1369-1145		M1369-1635	
14.0	4.0 - 10.5	200 - 240 V	M1369-1140		M1369-1640	
Add-A-Vessel Basic Fermentation Kits* (BioFlo® 115)						
Available with choice of heat-blanketed vessel (HB) or water-jacketed vessel (WJ).						
1.3	0.4 - 1.0	—	M1369-1001		M1369-1011	
3.0	0.8 - 2.2	—	M1369-1002		M1369-1012	
7.5	2.0 - 5.6	—	M1369-1005		M1369-1015	
14.0	4.0 - 10.5	—	M1369-1010		M1369-1020	

(*) When ordering Add-a-Vessel Kits, a control station or utility station is required.

CelliGen 115 Advanced Cell Culture kits – ordering information

Advanced Cell Culture Kits are available with choice of voltage and heat-blanketed vessel (**HB**) or water-jacketed vessel (**WJ**) and choice of magnetic (**M**) or direct-drive (**D**) agitation systems.

Total Volume (L)	Working Volume (L)	Electrical Service	Agitation System	HB Kit		WJ Kit	
				Order no.		Order no.	
1.3	0.4 - 1.0	200 - 240 V	M D	M1369-1401		M1369-1171	
				M1369-1501		M1369-1371	
3.0	0.8 - 2.2	200 - 240 V	M D	M1369-1402		M1369-1172	
				M1369-1502		M1369-1372	
7.5	2.0 - 5.6	200 - 240 V	M D	M1369-1405		M1369-1175	
				M1369-1505		M1369-1375	
14.0	4.0 - 10.5	200 - 240 V	M D	M1369-1410		M1369-1170	
				M1369-1510		M1369-1370	
Add-A-Vessel Advanced Cell Culture Kits**							
Available with choice of heat-blanketed vessel (HB) or water-jacketed vessel (WJ).							
1.3	0.4 - 1.0	—	D	M1369-1041		M1369-1021	
3.0	0.8 - 2.2			M1369-1042		M1369-1022	
7.5	2.0 - 5.6			M1369-1045		M1369-1025	
14.0	4.0 - 10.5			M1369-1050		M1369-1030	
1.3	0.4 - 1.0	—	M	M1369-1051		M1369-1031	
3.0	0.8 - 2.2			M1369-1052		M1369-1032	
7.5	2.0 - 5.6			M1369-1055		M1369-1035	
14.0	4.0 - 10.5			M1369-1060		M1369-1040	

(**) When ordering Add-a-Vessel Kits, a control station or utility station is required.

BioFlo®/CelliGen® 115 – approximate vessel dimensions, as prepared for autoclave

Heat-blanketed vessels

Vessel Total Volume (L)	With Exhaust Condenser			Without Exhaust Condenser	
	Length	Width	Height	Diameter	Height
	cm	cm	cm	cm	cm
1.3 & 3.0	24	22	56	22	42
7.5	37	29	65	29	49.5
14.0	29	29	74	29	61
On Optional Slant Rack					
7.5	71	29	46	—	—
14.0	80	29	51	—	—

Water-jacketed vessels

Vessel Total Volume (L)	With Exhaust Condenser			Without Exhaust Condenser	
	Length	Width	Height	Diameter	Height
	cm	cm	cm	cm	cm
1.3	29	29	52	23.5	41
3.0	29	29	56.5	24	45
7.5	29	29	68	29	52
14.0	29	29	80	29	67
On Optional Slant Rack					
7.5	66	29	47	—	—
14.0	72	29	52	—	—

BioFlo®/CelliGen® 115 – accessories for fermentation and cell culture

Ordering information – accessories and replacement parts

Description	Order no.	
pH Probe Kits (Probe, Cable, Adapter)		
For 1.3 L Vessels	M1369-9970	
For 3.0 L Vessels	M1369-9977	
For 7.5 L Vessels	M1369-9982	
For 14.0 L Vessels	M1369-9985	
Replacement pH and DO Probe Cable/Adapter		
pH cable (all vessels)	P0720-2276	
DO cable (all vessels)	P0720-2336	
pH/DO probe adapter (12 mm compression)	M1273-5040	
DO Probe Kits (Probe, Cable, Adapter)		
For 1.3 L Vessels	M1369-9974	
For 3.0 L Vessels	M1369-9979	
For 7.5 L Vessels	M1369-9986	
For 14.0 L Vessels	M1369-9988	
Replacement Foam/Level Kits (Foam probe, Level probe, Cable, Adapters)		
For 1.3 L Vessels	M1369-9947	
For 3.0 L Vessels	M1369-9951	
For 7.5 L & 14.0 L Vessels	M1369-9960	

Ordering information – accessories and replacement parts

Description	Order no.	
Replacement Foam/Level Cable/Adapter		
Foam/Level cable (all vessels)	M1361-8014	
Foam/Level probe adapter (12 mm compression)	M1273-5042	
Replacement Motors		
Direct Drive, For 1.3 & 3.0 L Fermentors	M1369-3120	
Direct Drive, For 7.5 & 14.0 L Fermentors	M1369-3125	
Direct Drive, For All vessel sizes, Cell Culture	M1369-3135	
Magnetic Drive, For All vessel sizes	M1369-3130	
Replacement Heater Blankets		
For 1.3 L Vessels	M1369-8021	
For 3.0 L Vessels	M1369-8022	
For 7.5 L Vessels	M1369-8020	
For 14.0 L Vessels	M1369-8023	
Replacement Water Jacket Heaters		
For 1.3 & 3.0 L Vessels	M1369-3107	
For 7.5 & 14.0 L Vessels	M1369-3108	

continued on next page

BioFlo® / CelliGen® 115 – accessories for fermentation and cell culture (continued)

Ordering information – accessories and replacement parts

Description	Order no.	
Replacement Glass Vessels		
1.3 L Heat Blanket Vessel	M1273-9907	
3.0 L Heat Blanket Vessel	M1273-9909	
7.5 L Heat Blanket Vessel	M1273-9916	
14.0 L Heat Blanket Vessel	M1273-9918	
1.3 L Water Jacket Vessel	M1273-9908	
3.0 L Water Jacket Vessel	M1273-9915	
7.5 L Water Jacket Vessel	M1273-9917	
14.0 L Water Jacket Vessel	M1273-9919	
Replacement exhaust condensers		
For 1.3, 3.0 and 7.5 L Vessels	M1273-9945	
For 14.0 L Vessels	M1273-9957	
Headplate adapters & plugs		
Tri-port Adapter	M1273-9961	
pH/DO Probe Adapter (12 mm compression)	M1273-5040	
Foam/Level Probe Adapter (12 mm compression)	M1273-5042	
Septum Kit	M1273-3031	
6 mm Adapter kit, (6 mm port for 6 mm tube)	M1273-5054	
6 mm Single Addition Tube for 6 mm adapter	M1273-9575	
Adapter Kit, 12 mm port to 6 mm tube	M1273-5056	
Adapter Kit, 12 mm port to 12 mm tube	M1273-5058	
6.35 mm Port Plug	M1273-9405	
12 mm Port Plug	M1273-9406	
19 mm Port Plug	M1273-9407	
Replacement and spare parts kits		
Headplate Port Washers/O-Rings	M1273-9900	
Spare Parts Kit, 1.3 & 3.0 L HB Vessel	M1273-9991	
Spare Parts Kit, 7.5 & 14.0 L HB Vessel	M1273-9992	
Spare Parts Kit, 1.3 & 3.0 L WJ Vessel	M1273-9998	
Spare Parts Kit, 7.5 & 14.0 L WJ Vessel	M1273-9999	
Impellers		
Rushton Impeller, 1.3 & 3.0 L	M1273-9291	
Rushton Impeller, 7.5 L	M1273-9292	
Rushton Impeller, 14.0 L	M1273-9293	

Ordering information – accessories and replacement parts

Description	Order no.	
Pitched Blade, 1.3 & 3.0 L, Upflow	M1273-9206	
Pitched Blade, 7.5 & 14.0 L, Upflow	M1273-9207	
Pitched Blade, 1.3 & 3.0 L, Downflow	M1273-9290	
Pitched Blade, 7.5 & 14.0 L, Downflow	M1230-9212	
Marine Blade, 1.3, 3.0 L	M1273-9901	
Marine Blade, 7.5 & 14.0 L	M1273-9902	
Spin Filter Suspension Cells, 1.3 L	M1273-3201	
Spin Filter Suspension Cells, 3.0 L	M1273-3202	
Spin Filter Suspension Cells, 7.5 L	M1273-3205	
Spin Filter Suspension Cells, 14.0 L	M1273-3210	
Spin Filter Microcarriers, 1.3 L	M1273-3211	
Spin Filter Microcarriers, 3.0 L	M1273-3212	
Spin Filter Microcarriers, 7.5 L	M1273-3215	
Spin Filter Microcarriers, 14.0 L	M1273-3220	
Microspargers		
Sintered/Porous Microsparger, 1.3 L HB Vessel	M1273-5007	
Sintered/Porous Microsparger, 1.3 L WJ Vessel	M1273-5003	
Sintered/Porous Microsparger, 3.0 L	M1273-5004	
Sintered/Porous Microsparger, 7.5 L	M1273-5005	
Sintered/Porous Microsparger, 14.0 L	M1273-5006	
Sampling assemblies		
Sampling Assembly, 1.3 L	M1273-9946	
Sampling Assembly, 3.0 L	M1273-9949	
Sampling Assembly, 7.5 L	M1273-9953	
Sampling Assembly, 14.0 L	M1273-9956	
Rotameter kits		
0-20 SLPM Rotameter with stand & tubing	M1287-3520	
0-5 SLPM Rotameter with stand & tubing	M1287-3510	
Miscellaneous		
"Start-Up Kits" with tubing connectors, cable ties, clamps and more	M1369-0300	
Autoclave Rack for 7.5 and 14.0 L Vessels	M1273-9266	
Water Regulator Kit (4 manifolds)	M1273-5001	

BioFlo® / CelliGen® 115 – accessories for fermentation and cell culture (continued)

Ordering information – accessories and replacement parts

Description	Order no.	
Air Regulator Kit (4 manifolds)	M1273-5002	
Water Regulator/Filter Kit (for single system)	M1117-2040	
Air Regulator/Filter Kit (for single system)	M1230-3030	
Bearing Housing Cap (10 pack)	M1273-9936	
Addition Bottle Kit (250 mL)	M1273-9989	
Addition Bottle Kit (500 mL)	M1273-9990	
Addition Bottle Holder Kit	M1273-9940	
Silicone Grease for Seals/O-rings	P0860-1050	
Silicone Tubing Clamp	P0160-4460	
Polysulfone Quick-Connect (Female) 0.635 cm	P0240-2680	
Polysulfone Quick-Connect (Male) 0.635 cm	P0240-2670	

Vessel headplate ports

Vessel Size (L)	6 mm	12 mm	19 mm	Total Ports
1.3	1	9	0	10
3.0	6	7	0	13
7.5	7	8	1	16
14.0	7	8	1	16

BioFlo® 110 – replacement parts

Ordering information – accessories and replacement parts

Description	Order no.	
Jacket water heaters		
Jacket Water Heater, 1.3-3.0 L Vessels	M1273-3107	
Heater blankets		
For 1.3 L Vessels	M1273-9931	
For 3.0 L Vessels	M1273-9932	
For 7.5 L Vessels	M1273-9930	
For 14.0 L Vessels	M1273-9933	
Motors		
Direct Drive, Ferm., 1.3-3.0 L	M1273-3120	
Direct Drive, Ferm., 7.5-14.0 L	M1273-3125	
Direct Drive, Cell Culture, all vessels	M1273-3135	
Magnetic Drive, all vessels	M1273-3130	

Ordering information – accessories and replacement parts

Description	Order no.	
pH Probes		
1.3 L pH Probe	P0720-5582	
3.0 L pH Probe	P0720-5584	
7.5 L pH Probe	P0720-5580	
14.0 L pH Probe	P0720-5583	
pH Probe cable		
BioFlo® 110 pH Probe Cable (all sizes)	P0720-2095	
DO Probes		
1.3 L Direct or Magnetic Drive	P0720-6580	
3.0 L Direct or Magnetic Drive	P0720-6282	
7.5 L Direct or Magnetic Drive	P0720-6283	
14.0 L Direct or Magnetic Drive	P0720-6284	
DO Probe cable		
BioFlo® 110 DO Probe Cable (all sizes)	P0720-2331	

BioFlo® 310 compact autoclavable benchtop fermentor, 2.5 - 14.0 liters



Trend up to 144 hours of process data. Monitor and control it all on a large, 38.1 cm touchscreen interface

Description

BioFlo 310 is a validatable, benchtop, autoclavable fermentor with advanced controller and touchscreen interface capable of operating up to four reactors simultaneously.

Product features

- **Applications:** Bacteria, yeast or fungi, and with optional accessories can be adapted for mammalian, animal, insect or plant cells. For batch, fed-batch and continuous culture
- **Sophisticated control station:** Compact unit with powerful RPC (Reactor Process Controller) provides integrated control of up to 32 process parameters, trends up to 8 parameters, and stores 10 recipes, in each reactor, and includes built-in security features. See page 370. Includes large industrial touchscreen interface with adjustable-position, 38.1 cm (15 in) color display; 3 integrated pumps; control of agitation, temperature, pH, DO, foam/level, and 2-, 3- or 4-gas mixing; 2 USB ports; and 7 analog inputs and 7 outputs to add ancillary devices. Cost-saving utility stations are offered for operation of 2nd, 3rd and 4th vessel
- **Vessel:** Interchangeable, autoclavable vessels with unique heat exchanger enables rapid temperature removal after autoclaving and from exothermic cultures, and rapid rises for temperature inductions. Offered in 2.5, 5.0, 7.5 & 14.0 L (total volume) capacities.
- **Impellers:** 2 Rushton-type impellers standard. Pitched-blade and marine-blade, optional. See page 368
- **Gas flow control:** Sparge gas with 1 TMFC and 4 solenoid valves is standard. Or custom configure up to 4 TMFCs with choice of various flow rates, or Rotameter. Gas overlay available
- **Additional options:** pH & DO probe kits, 2nd DO - pH / Redox sensor, scales, validation packages, and more shown on next page. Related accessories, including BioCommand® SCADA Software, gas analyzers, and more are described beginning on page 396

Ordering information – pre-configured kits

System Includes	Electrical Service	Total Volume (L)	Working Volume (L)	Order no.	
Master Control Station with Touchscreen Display, 1 TMFC (0.4-20 SLPM) Automatic Gas Mixing, Vessel Assembly* with Direct Drive Motor, pH/DO Probe Kit, and Sample Assembly	200 - 240V, 50/60 Hz	2.5	0.75 - 1.75	M1287-1174	⚡
		5.0	1.25 - 3.75	M1287-1175	⚡
		7.5	2.0 - 5.5	M1287-1176	⚡
		14.0	3.0 - 10.5	M1287-1177	⚡

(* Vessel assembly includes glass vessel with stainless-steel headplate and dished-jacketed bottom, exhaust condenser, sampling assembly, two 6-blade Rushton-type impellers, foam/level sensor, direct drive motor, and more.

⚡ **Ordering information for other voltage options begins on page 471.**

BioFlo® 310 – ordering custom configurations

To order a BioFlo® 310 with multiple Thermal Mass Flow Controllers (TMFCs) with various ranges, and/or 2nd, 3rd and 4th Utility Station, and/or 2nd DO - pH/Redox sensors:

1. Choose voltage:

- 200 - 240 V _____ M1287-1020

2. Choose cabinet:

(One Control Station or Utility Station is required for operation of each vessel.)

- Master Control Station _____ M1287-2110
- Utility Station with no display _____ M1287-2112

3. Choose gases:

- 0 TMFC* (requires a Rotameter)*** _____ M1287-2010
- 1 Rotameter (0-20 SLPM**) _____ M1287-3510
- 1 Rotameter (0-5 SLPM) _____ M1287-3520
- 1 TMFC (0.4 - 20 SLPM)*** _____ M1287-2012
- 1 TMFC (0.1 - 5 SLPM)*** _____ M1287-2011
- 2 TMFC (0.1 - 5 SLPM) _____ M1287-2013
- 2 TMFC (0.4 - 20 SLPM) _____ M1287-2014
- 3 TMFC (0.4 - 20 SLPM) _____ M1287-2016
- 4 TMFC (0.1 - 5 SLPM) _____ M1287-2017
- 4 TMFC (0.4 - 20 SLPM) _____ M1287-2018

3a. When should you select multiple TMFCs?

When you require each gas to be individually controlled, monitored and displayed in SLPM.

3b. Which TMFC is right for your process?

For fermentation we recommend 0.4-20 SLPM and 0.1-5 SLPM for smaller size vessels or multiple TMFCs.

(*) TMFC = Thermal Mass Flow Controller

(**) SLPM = Standard Liters Per Minute

(***) 0 and 1 TMFCs are built with 4-gas manifold for 4 gas mixing

4. Add vessel kits:

Vessel Total Volume (L)	With Motor	Without Motor
	Order no.	Order no.
2.5	M1287-0300	M1287-0320
5.0	M1287-0301	M1287-0321
7.5	M1287-0302	M1287-0322
14.0	M1287-0303	M1287-0323

5. Add 2nd DO - pH/Redox board, optional:

- Factory installed _____ M1287-3540

6. Add probe kits which include probe and cable:

pH/DO Probe Kits

- 2.5 L _____ M1287-0400
- 5.0 L _____ M1287-0401
- 7.5 L _____ M1287-0402
- 14.0 L _____ M1287-0403

Redox Probe Kits

- 2.5 L _____ M1287-0410
- 5.0 L _____ M1287-0411
- 7.5 L _____ M1287-0412
- 14.0 L _____ M1287-0413

7. Add options and accessories:

see page 380 and related accessories beginning on page 396.

Upgrade your existing BioFlo 3000 vessel or existing cabinet to a BioFlo 310. You can gain the power of the advanced BioFlo 310 controller while saving money by re-using your existing vessels/controller.

How to order:

To use your existing BioFlo 3000 vessel with a BioFlo 310 cabinet:

- 1. Choose Cabinet:** (Includes Master Control Station with 1 TMFC, 0.4-20 SLPM – complete Fermentation cabinet)
 - 230 V Master Control Station _____ M1287-1005
- 2. Choose Motor Conversion Kits:** (Includes new motor, cables and tubing)
 - For BioFlo 3000 Vessels, 1 & 3 L _____ M1287-1200
 - For BioFlo 3000 Vessels, 6 L _____ M1287-1201
 - For BioFlo 3000 Vessels, 14 L _____ M1287-1202

To use your existing BioFlo 3000 cabinet with a BioFlo 310 vessel:

- 1. BioFlo 310 Retro Kit** (Includes vessel assembly, vessel kit, tubing kit and motor)
 - For BioFlo 310 Vessels, 2.5 L _____ M1287-1205
 - For BioFlo 310 Vessels, 5.0 L _____ M1287-1206
 - For BioFlo 310 Vessels, 7.5 L _____ M1287-1207
 - For BioFlo 310 Vessels, 14.0 L _____ M1287-1208

BioFlo® 310 – options and accessories

Ordering information

Description	Order no.	
Cell culture conversion kit/gas overlay		
Microbial to Cell Culture Conversion Kit adapts the BioFlo 310 fermentor to enable high performance growth of mammalian, insect or plant cells using a CelliGen Plus or CelliGen 310 vessel. Includes a TMFC with 4 gas mix which plugs into your BioFlo 310 cabinet, reducing the flow rate from 0-20 SLPM to 0-5 SLPM. Enables dual control for sparge and gas overlay. For Information on Cell Culture Vessels see pages 381–386.	M1287-3501	
2nd DO-pH/Redox options		
2nd DO-pH/Redox Controller (Field Installed)	M1287-3530	
Replacement glass vessels		
Replacement Vessel, 2.5 L	M1287-9930	
Replacement Vessel, 5.0 L	M1287-9931	
Replacement Vessel, 7.5 L	M1287-9932	
Replacement Vessel, 14.0 L	M1287-9933	
Validation kits		
Basic Validation	M1287-0101	
Basic Plus Validation	M1287-0102	
Optional autoclave rack		
Angled Autoclave Rack	XMF-8624	
Angled Autoclave Rack, low profile for 14 L vessels	M1227-9231	
Additional options		
RS-232 8-Port (Serial) Controller (required when connecting scales)	M1287-0020	
Mettler Toledo Scale Display (required with each of the following scales)	P0440-4489	

Ordering information

Description	Order no.	
Mettler Toledo Scale, 15 kg	P0440-4325	
Mettler Toledo Scale, 32 kg	P0440-4321	
Mettler Toledo Scale, 60 kg	P0440-4326	
Mettler Toledo Scale, 150 kg	P0440-4327	
Barnant Variable Speed Pump, 230 V (connects via Analog I/O) 0-100 rpm	M1287-9967	
Water Regulator/Filter Kit (4 Manifolds)	M1273-5001	
Air Regulator/Filter Kit (4 Manifolds)	M1273-5002	
Sampling Assembly (included in fermentation vessel kits)	M1287-5042	
Optional Sampling Assembly adapter (used with Corning 15 ml or BD Falcon 50 ml disposable vials)	M1287-9964	
Septum Adapter Kit (Includes 10 Septa)	M1287-5031	
Probe Adapter Kit (12 mm compression)	M1287-5030	
6 mm Adapter Kit (Holds 0.635 cm Tube)	M1287-5034	
User's Kit for 2.5, 5.0 and 7.5 L – Includes tubing, clamps, filters, connectors, addition vessels and other commonly required items	M1287-9914	
User's Kit for 14 L, same as above	M1287-9915	
Addition Bottle Kit, 250 mL	M1273-9989	
Addition Bottle Kit, 500 mL	M1273-9990	
Tri-Port Addition Kit	M1287-9212	
Single Addition Kit	M1287-5043	
Spare Parts Kit, 2.5 L	M1287-6020	
Spare Parts Kit, 5.0 L	M1287-6021	
Spare Parts Kit, 7.5 L	M1287-6022	
Spare Parts Kit, 14.0 L	M1287-6023	

BioFlo®/CelliGen® 310 – vessel dimensions and ports



Up to four reactors can be controlled with a single Control Station

Vessel dimensions – BioFlo / CelliGen 310

Vessel Dimensions With Exhaust Condenser					
Vessel Total Volume (L)	BioFlo 310		CelliGen 310		
	Length & Width cm	Height cm	Length cm	Width cm	Height cm
2.5	20.3	53.3	20.3	21.6	55.9
5.0	24.1	61.0	24.1	24.1	63.5
7.5	26.7	63.5	27.9	27.9	66.0
14.0	29.9	71.1	32.4	32.4	73.7

Autoclave Dimensions – BioFlo / CelliGen 310

Recommended Autoclave Dimensions – BioFlo/CelliGen 310				
Order no.	Vessel Size (L)	Max Length Rack Mounted	Max Width Rack Mounted	Max Height Rack Mounted
XMF-8624 Autoclave Rack	2.5	66 cm	27.4 cm	45.7 cm
	5.0	66 cm	27.4 cm	52 cm
	7.5	66 cm	27.4 cm	55.3 cm
	14.0	68.5 cm	35.5 cm	57 cm
M1227-9231 Autoclave Rack, Low Profile	For CelliGen 310			
	14.0	76.2 cm	33 cm	45.7 cm
	For BioFlo 310			
	14.0	73.6 cm	35.5 cm	50.8 cm

Vessel headplate ports – BioFlo / CelliGen 310

Vessel Size (L)	6 mm	PG 13.5	19 mm	Total Ports
2.5	1	9	0	10
5.0	3	10	1	14
7.5	3	12	1	16
14.0	3	12	1	16

CelliGen® 310 autoclavable stirred-tank/packed-bed bioreactor, 2.5 – 14 liters



Trends 8 loops and up to 144 hours of process data.

Description

CelliGen 310 is a validatable, benchtop, autoclavable bioreactor with advanced controller and touchscreen interface capable of operating up to four reactors simultaneously.

Product features

- **Applications:** Mammalian, animal, insect or plant cells, in batch, fed-batch and continuous culture.
- **Sophisticated control station:** Compact unit with powerful RPC (Reactor Process Controller) provides integrated control of up to 32 process parameters, trends up to 8 parameters, and stores 10 recipes, in each reactor, and includes built-in security features. (See page 370.) Includes large industrial touchscreen interface with adjustable-position, 38.1 cm (15 in) color display; 3 integrated pumps; control of agitation, temperature, pH, DO, foam/level, and 2-, 3-, or 4-gas mixing; 2 USB ports; and 7 analog inputs and 7 outputs to add ancillary devices. Cost-saving utility stations are offered for operation of 2nd, 3rd and 4th vessel
- **Vessel:** Interchangeable, double-walled glass, water-jacketed, autoclavable vessels, offered in 2.5, 5.0, 7.5 & 14.0 L (total volume) capacities
- **Impellers:** Choice of 5 types, including low-shear Cell Lift impeller for microcarriers, packed-bed basket for high yields of secreted products, pitched blade, marine blade, and spin-filter. See page 368
- **Gas flow control:** Sparge gas with 1 TMFC* (0.1 - 5 SLPM**) and 4 solenoid valves is standard. Or custom-configure up to 4 TMFCs with choice of various flow rates, or Rotameter. Gas overlay with TMFC or Rotameter, optional
- **Additional options:** pH & DO probe kits, 2nd DO - pH / Redox sensor, scales, validation packages, and more listed on next page. Related accessories, including BioCommand® SCADA Software, gas analyzers, and more are described beginning on page 396

Ordering information – pre-configured kits

Impeller and probe kits must be ordered separately.

System Includes***	Electrical Service	Total Volume (L)	Working Volume (L)	Order no.	
Master Control Station, 1 TMFC (0.1 - 5 SLPM) with 4-Gas Mixing, Touchscreen Display, Magnetic-Drive Motor & Vessel Kit ◊	200 - 240 V, 50/60 Hz	2.5	0.6 - 1.4	M1287-1264	⚡
		5.0	1.2 - 3.5	M1287-1265	⚡
		7.5	1.5 - 5.0	M1287-1266	⚡
		14.0	3.5 - 10.0	M1287-1267	⚡

(*) TMFC = Thermal Mass Flow Controller (**) SLPM = Standard Liters Per Minute (***) Impeller Kit and Probe Kit selections must additionally be specified. See Probe Kits on next page and Impeller Kits on page 384. Note: CelliGen 310 & CelliGen BLU Control Stations are not interchangeable. (◊) Vessel Kit includes water-jacketed glass vessel with stainless-steel headplate, exhaust condenser, foam/level sensor and more.

⚡ **Ordering information for other voltage options begins on page 471.**

CelliGen® 310 – ordering custom configurations

To order a CelliGen 310 with multiple Thermal Mass Flow Controllers (TMFCs) with various ranges, and/or 2nd, 3rd and 4th Utility Station, and/or 2nd DO - pH/Redox sensors:

1. Choose voltage:

- 200 - 240 V _____ M1287-1020

2. Choose cabinet: (see description on page 382)

(One Control Station or Utility Station is required for operation of each vessel.)

- Control Station _____ M1287-2110
- Utility Station with no display _____ M1287-2112

3. Choose gases:

- 0 TMFC* (requires a Rotameter)*** _____ M1287-2010
- 1 Rotameter (0-20 SLPM**) _____ M1287-3510
- 1 Rotameter (0-5 SLPM) _____ M1287-3520
- 1 TMFC (0.4 - 20 SLPM)*** _____ M1287-2012
- 1 TMFC (0-1 SLPM)*** _____ M1287-2019
- 1 TMFC (0.1 - 5 SLPM)*** _____ M1287-2011
- 2 TMFC (0.1 - 5 SLPM) _____ M1287-2013
- 2 TMFC (0.4 - 20 SLPM) _____ M1287-2014
- 3 TMFC (0.1 - 5 SLPM) _____ M1287-2015
- 3 TMFC (0.4 - 20 SLPM) _____ M1287-2016
- 4 TMFC (0-0.5 SLPM) _____ M1287-2021
- 4 TMFC (0-1 SLPM) _____ M1287-2020
- 4 TMFC (0.1 - 5 SLPM) _____ M1287-2017
- 4 TMFC (0.4 - 20 SLPM) _____ M1287-2018

(*) TMFC = Thermal Mass Flow Controller

(**) SLPM = Standard Liters per Minute

(***) 0 and 1 TMFCs are built with 4-gas manifold for 4 gas mixing

3a. What gas flow rate is right for your impeller?

In Cell Culture Process – Refer to chart below. Gas flow values may vary depending on your requirement. All gases combined should add up to the total gas range desired.

4. Add vessel kits¹:

Vessel Total Volume (L)	With Motor	Without Motor
	Order no.	Order no.
2.5	M1287-0310	M1287-0330
5.0	M1287-0311	M1287-0331
7.5	M1287-0312	M1287-0332
14.0	M1287-0313	M1287-0333

(¹) For Vessel Dimensions see page 381.

5. Select impeller kit (see page 368).

6. Add 2nd DO - pH/Redox board, optional:

- Factory installed _____ M1287-3540

7. Select pH/DO probe kit which include probe and cable:

For all Impellers except Packed-Bed Basket:

- M1287-0400 _____ 2.5 L
- M1287-0401 _____ 5.0 L
- M1287-0402 _____ 7.5 L
- M1287-0403 _____ 14.0 L

For Packed-Bed Basket Impellers Only:

- M1287-0674 _____ 2.5/5.0 L
- M1287-0675 _____ 7.5 L
- M1287-0676 _____ 14.0 L

8. Add Fibra-Cel® disks, if using packed-bed basket impeller:

- M1292-9984 _____ 50 grams
- M1292-9988 _____ 250 grams

Typical Quantity of Fibra-Cel Used:

2.5 L Vessel	50 Grams
5.0 L Vessel	150 Grams
7.5 L Vessel	250 Grams
14.0 L Vessel	500 Grams



Up to four reactors can be controlled with a single Control Station.

Gas Flow recommendations [SLPM] when using different impellers and vessel sizes in CelliGen 310

Impellers	Total Volume: 2.5 L	Total Volume: 5.0 L	Total Volume: 7.5 L	Total Volume: 14.0 L
Packed-Bed Basket ²	0 - 0.1	0 - 0.15	0 - 0.2	0 - 0.3
Pitched / Marine Blade	0 - 0.3	0 - 0.5	0 - 0.5	0 - 0.7
Spin Filter	0 - 0.5	0 - 0.5	0 - 0.5	0 - 1.0
Cell Lift ²	0 - 1.0	0 - 1.5	0 - 2.5	0 - 5.0

(²) When using a Cell Lift or Basket impeller, the minimum and maximum working volume is always the maximum volume shown for that vessel size.

CelliGen® 310 – ordering (continued)







Upgrade your existing CelliGen Plus vessel or existing cabinet to a CelliGen 310. You can gain the power of the advanced CelliGen 310 controller while saving money by re-using your existing vessels/controller.

How to Order:

To use a CelliGen 310 cabinet with a your existing CelliGen Plus vessel:	To use your existing CelliGen Plus cabinet with a new CelliGen 310 vessel:
<p>1. Choose cabinet: (Includes Master Control Station with 1 TMFC, 0.1 -5 SLPM – complete Cell Culture cabinet)</p> <ul style="list-style-type: none"> ● 230 V Master Control Station ————— M1287-1004 <p>2. Choose motor conversion kits: (Includes new motor, cables and tubing)</p> <ul style="list-style-type: none"> ● For CelliGen Plus Vessels, 2.2 & 5 L ————— M1287-1203 ● For CelliGen Plus Vessels, 7 & 14 L ————— M1287-1204 	<p>1. CelliGen 310 Retro Kit (Includes vessel assembly, vessel kit, tubing and motor)</p> <ul style="list-style-type: none"> ● For CelliGen 310 Vessels, 2.5 L ————— M1287-1210 ● For CelliGen 310 Vessels, 5.0 L ————— M1287-1211 ● For CelliGen 310 Vessels, 7.5 L ————— M1287-1212 ● For CelliGen 310 Vessels, 14.0 L ————— M1287-1213

Impellers

See article on page 368 for more information.

<p>Basket Impeller with Fibra-Cel® Disks</p> 	<p>Basket Impeller</p> 	<p>Low-shear Cell Lift</p> 	<p>Marine Blade</p> 	<p>Spin Filter with Marine Blade</p> 	<p>Pitched Blade</p> 
<p>For high yields of secreted products from suspension or anchorage-dependent cells. Perfusion only.</p> <p>Also for processes using viral infections, BEVS and gene therapy. Cells are immobilized on Fibra-Cel disks and no special cell retention devices are required.</p>	<p>For traditional vaccines as well as gene therapy processes using microcarriers, batch or perfusion. Perfusion requires a cell retention device such as a decanting column.</p> <p>Also for processes using viral infections. High $K_L a$.</p>	<p>For suspension cells in batch, fed-batch, or perfusion. In perfusion a cell retention device is required.</p> <p>Also for processes using viral infections.</p>	<p>For suspension (10 μ screen) and for microcarriers (75 μ screen). Dip tube inside Spin Filter harvests cell-free medium. Perfusion only.</p>	<p>For insect and other suspension cells as well as microcarriers in batch, fed-batch or perfusion. A cell retention device is required in perfusion.</p> <p>Also for processes using viral infections.</p>	

CelliGen® 310 – options and accessories

Ordering information

Description	Order no.	
Gas Overlay		
Gas Overlay with TMFC (0.1 - 5 SLPM)	M1287-3500	
Gas Overlay without TMFC (requires Rotameter)	M1287-3550	
Gas Overlay Vessel Kit (includes stainless steel tube & adapter, filter and silicone tubing)	M1287-3505*	
Scales		
RS-232 8-Port (Serial) Controller (required when connecting 1-8 scales to CelliGen® 310)	M1287-0020	
Mettler Toledo Scale Display (required with each of the scales below)	P0440-4489	
Mettler Toledo Scale, 15 kg	P0440-4325	
Mettler Toledo Scale, 32 kg	P0440-4321	
Mettler Toledo Scale, 60 kg	P0440-4326	
Mettler Toledo Scale, 150 kg	P0440-4327	
Replacement glass vessels		
2.5 L Glass Vessel	M1287-9920	
5.0 L Glass Vessel	M1287-9921	
7.5 L Glass Vessel	M1287-9922	
14.0 L Glass Vessel	M1287-9923	
Additional options		
Barnant Variable Speed Pump, 230 V (connects via Analog I/O) 0-100 rpm	M1287-9967	
Water Regulator/Filter Kit (4 Manifolds)	M1273-5001	
Air Regulator/Filter Kit (4 Manifolds)	M1273-5002	
Sampling Assembly, used with cell lift impeller	M1287-5042	
2.5 L Decanter Assembly, used with cell lift impeller	M1287-1190	
5.0 L Decanter Assembly, used with cell lift impeller	M1287-1191	
7.5 L Decanter Assembly, used with cell lift impeller	M1287-1192	
14.0 L Decanter Assembly, used with cell lift impeller	M1287-1193	
Validation kits		
Basic Validation	M1287-0111	
Basic Plus Validation	M1287-0114	

(*) Recommended when purchasing overlay.

(**) Includes dip tube.

Ordering information

Description	Order no.	
2nd DO-pH/Redox options		
2nd DO-pH/Redox Controller (Field Installed)	M1287-3530	
Impeller kits (includes shaft, impeller & sparger)		
2.5 L Cell Lift Impeller Kit for microcarriers (80 µm)	M1287-1110	
5.0 L Cell Lift Impeller Kit for microcarriers (80 µm)	M1287-1111	
7.5 L Cell Lift Impeller Kit for microcarriers (80 µm)	M1287-1112	
14.0 L Cell Lift Impeller Kit for microcarriers (80 µm)	M1287-1113	
Air Wash Kit for increasing oxygen transfer rate (used with Cell Lift only)	M1287-1150	
2.5 L Marine Blade Impeller Kit for suspension cells	M1287-5072	
5.0 L Marine Blade Impeller Kit	M1287-5073	
7.5 L Marine Blade Impeller Kit	M1287-5074	
14.0 L Marine Blade Impeller Kit	M1287-5075	
2.5 L Pitched Blade Impeller Kit for suspension cells	M1287-5068	
5.0 L Pitched Blade Impeller Kit	M1287-5069	
7.5 L Pitched Blade Impeller Kit	M1287-5070	
14.0 L Pitched Blade Impeller Kit	M1287-5071	
2.5 L Basket Impeller Kit for secreted proteins – need to order Fibra-Cel® separately	M1287-1140	
5.0 L Basket Impeller Kit	M1287-1141	
7.5 L Basket Impeller Kit	M1287-1142	
14.0 L Basket Impeller Kit	M1287-1143	
2.5 L Spin Filter Impeller Kit – for suspension cells (10 µm)	M1287-1125**	
5.0 L Spin Filter Impeller Kit (10 µm)	M1287-1126**	
7.5 L Spin Filter Impeller Kit (10 µm)	M1287-1127**	
14.0 L Spin Filter Impeller Kit (10 µm)	M1287-1128**	
2.5 L Spin Filter Impeller Kit – for microcarriers (75 µm)	M1287-1135**	
5.0 L Spin Filter Impeller Kit (75 µm)	M1287-1136**	
7.5 L Spin Filter Impeller Kit (75 µm)	M1287-1137**	

continued on next page

CelliGen® 310 – options and accessories (continued)

Ordering information

Description	Order no.	
Impeller only		
14.0 L Spin Filter Impeller Kit (75 µm)	M1287-1138**	
2.5 L Pitched Blade Impeller only, Right-hand	M1287-9227	
5.0 L Pitched Blade impeller only, Right-hand	M1287-9228	
7.5 L Pitched Blade impeller only, Right-hand	M1287-9229	
14.0 L Pitched Blade impeller only, Right-hand	M1287-9230	
2.5 L Pitched Blade impeller only, Left-hand	M1287-9287	
5.0 L Pitched Blade impeller only, Left-hand	M1287-9288	
7.5 L Pitched Blade impeller only, Left-hand	M1287-9289	
14.0 L Pitched Blade impeller only, Left-hand	M1287-9290	
2.5 & 5.0 L Marine Blade Impeller only, Right-hand pitch (directs flow up).	M1287-9950	
7.5 L Marine Blade Impeller only, Right-hand pitch (directs flow up).	M1287-9952	
14.0 L Marine Blade Impeller only, Right-hand pitch (directs flow up).	M1287-9954	
2.5 & 5.0 L Marine Blade Impeller only, Left-hand pitch (directs flow down).	M1287-9951	
7.5 L Marine Blade Impeller only, Left-hand pitch (directs flow down).	M1287-9953	
14.0 L Marine Blade Impeller only, Left-hand pitch (directs flow down).	M1287-9955	

(**) Includes dip tube.

Ordering information

Description	Order no.	
Microspargers, 5 micron		
2.5 L Microsparger	M1287-5010	
5.0 L Microsparger	M1287-5011	
7.5 L Microsparger	M1287-5012	
14.0 L Microsparger	M1287-5013	
Replacement screen & O-ring kit for cell lift impeller		
For 2.5 L vessel	M1287-9985	
For 5 L vessel	M1287-9986	
For 7.5 L vessel	M1287-9987	
For 14.0 L vessel	M1287-9988	
Perfusion kits		
2.5 L Perfusion Kit	M1287-1185	
5.0 L Perfusion Kit	M1287-1186	
7.5 L Perfusion Kit	M1287-1187	
14.0 L Perfusion Kit	M1287-1188	
Spare parts kits		
For 2.5 L Vessels	M1287-6030	
For 5.0 L Vessels	M1287-6031	
For 7.5 L Vessels	M1287-6032	
For 14.0 L Vessels	M1287-6033	

BioFlo® 415 sterilizable-in-place benchtop fermentor for R&D, 7 - 19.5 liters



No autoclave or steam generator needed to autoclave vessels

Description

BioFlo 415 is a compact, validatable lab fermentor which uniquely uses a built-in electric heater and utilizes your water supply to automatically achieve sterilization on your lab bench without the need for an external steam source.

Product features

- **Applications:** Bacteria, yeast or fungi, in batch, fed-batch or continuous culture.
- **Sophisticated control station:** Compact unit with powerful RPC (Reactor Process Controller) provides integrated control of up to 32 process parameters, trends up to 8 parameters simultaneously, stores up to 10 recipes, and includes built-in security features. (See page 370.) Includes large industrial touchscreen interface with adjustable-position, 38.1 cm (15 in) color display; 3 integrated pumps; control of agitation, temperature, pH, DO, foam/level, and up to 4-gas mixing; 2 USB ports; and 7 analog inputs and 7 outputs to add ancillary devices
- **Vessel:** Interchangeable, stainless-steel, sterilizable-in-place vessels offered in 7.0 & 14.0 liter capacities with 2:1 aspect ratio, and 19.5 liter capacity with 3:1 ratio. Vessel assembly includes top magnetic-drive motor, exhaust condenser and sparger assembly with SIP filters, foam/level probe kits, drain valve and more
- **Impellers:** 7.0 and 14.0 L vessel include 2 Rushton-type impellers. 19.5 L vessel includes 3 Rushton-type impellers. Pitched-blade and marine-blade, optional
- **Gas flow control:** Thermal Mass Flow Controller (0.5 - 25 SLPM)* with 4 solenoid valves for gas mixing is standard. Replace the TMFC with a low-cost Rotameter, or upgrade by adding up to 4 TMFCs
- **Additional options:** Single or redundant pH, DO & Redox Kits; sampling assembly; scales; validation packages, and more listed on next page. Related accessories, including BioCommand® SCADA Software, gas analyzers, and more are described beginning on page 396

Pre-configured systems

System Includes	Electrical Service	Total Volume (L)	Working Volume (L)	Order no.	
BioFlo 415 Control Station, 1 TMFC (0.5 – 25 SLPM) with 4-Gas Mixing, Touchscreen Display and Vessel Assembly Kit. Call for Detailed Quotation	100 - 240 V, 50/60 Hz	7.0	2.0 - 5.0	M1360-1120	⚡
		14.0	4.0 - 10.0	M1360-1121	⚡
		19.5	5.0 - 15.5	M1360-1123	⚡

(*) SLPM = Standard Liters Per Minute.

⚡ **Ordering information for other voltage options begins on page 471.**

BioFlo® 415 – ordering information

1. Specify pre-configured kit from chart on the previous page dependent on your vessel size.

2. Select any of the highly recommended options from the list below. (Not included in the pre-configured kits.)

- Probe kits (pH, DO, Redox kits include probes and cables)
- Baffle Plug Kit and Pitched or Marine Blade (required for cell culture process)
- Needles and QMI 7-port Septum Kit
- Sample Assembly

3. For a different configuration than listed above, including multiple TMFCs with various ranges and/or 2nd DO- pH/ Redox sensor:

Select Gases from list below:

- 0 TMFC** (requires a Rotameter)*** ————— M1360-2030
- 3 TMFC (0.5- 25 SLPM*) ————— M1360-2036
- 1 TMFC (0.1 - 5 SLPM)*** ————— M1360-2031
- 4 TMFC (0 - 0.5 SLPM) ————— M1360-2041
- 1 TMFC (0.5 - 25 SLPM)*** ————— M1360-2032
- 4 TMFC (0 - 1.0 SLPM) ————— M1360-2040
- 2 TMFC (0.1 - 5 SLPM) ————— M1360-2033
- 4 TMFC (0.1 - 5 SLPM) ————— M1360-2037
- 2 TMFC (0.5 - 25 SLPM) ————— M1360-2034
- 4 TMFC (0.5 - 25 SLPM) ————— M1360-2038
- 3 TMFC (0.1 - 5 SLPM) ————— M1360-2035

4. To upgrade your existing BioFlo 410 to a BioFlo 415:

Choose cabinet M1360-1005.

Bioflo 415 options & accessories*1

Description	Order no.	
Spare vessel assembly kits (include components listed in "Vessel Assembly" description on page 387.)		
7.0 L System with Magnetic Drive	M1360-2020	
14.0 L System with Magnetic Drive	M1360-2021	
19.5 L System with Magnetic Drive	M1360-2023	
Fluidine Tank Bottom Drain/ Harvest Valve	M1360-2050	
Probe kits: 7.0 liter systems		
pH probe, Mettler Ingold Gel Filled	M1294-9820	
DO probe, Mettler Ingold	M1294-9822	
Redox probe, Hamilton Gel Filled	M1360-9832	
Probe kits: 14.0 liter systems		
pH probe, Mettler Ingold Gel Filled	M1294-9824	
DO probe, Mettler Ingold	M1294-9826	
Redox probe, Hamilton Gel Filled	M1360-9834	
Probe kits: 19.5 liter systems		
pH probe, Hamilton Gel Filled	M1294-9828	
D.O. probe, Hamilton	M1294-9830	
Redox probe, Hamilton Gel Filled	M1360-9836	
Impellers		
Pitched Blade Impeller (up flow), 7.0 L	M1273-9206	
Pitched Blade Impeller (up flow), 14.0 L	M1294-9940	
Pitched Blade Impeller (up flow), 19.5 L	M1294-9942	
Pitched Blade Impeller (down flow), 7.0 L	M1273-9290	

Bioflo 415 options & accessories*1

Description	Order no.	
Impellers (continued)		
Pitched Blade Impeller (down flow), 14.0 L	M1294-9941	
Pitched Blade Impeller (down flow), 19.5 L	M1294-9943	
Marine Blade Impeller, 7.0 L	M1294-9948	
Marine Blade Impeller, 14.0 L	M1294-9944	
Marine Blade Impeller, 19.5 L	M1294-9945	
Additional options		
QMI 7-Port Septum Kit (19 mm port)	M1294-5023	
DO Probe Membrane Replacement Kit	P0720-6570	
PG 13.5 Probe-Adapter for 19 mm port	M1294-9544	
19 mm Probe-Adapter for 19 mm port	M1294-9542	
Water Regulator/Filter Kit (4 Manifolds)	M1273-5001	
Air Regulator/Filter Kit (4 Manifolds)	M1273-5002	
Needle (Pack of 100) 18 Gauge 3.8 cm Length (used for multiple septum ports)	P0440-0064	
Baffle Plug Kit (New vessel headplate)	M1294-9954	
Basic Validation	M1360-0101	
Basic Plus Validation	M1360-0102	
Enhanced Validation	M1360-0103	
Sampling Assembly	M1294-5013	
Spare Parts Kit	M1360-9969	

(*1) SLPM = Standard Liters per Minute (**1) TMFC = Thermal Mass Flow Controller (***) 0 and 1 TMFC are built with 4-gas manifold for 4 gas mixing
 (*) If product received in 2006 or before, please contact your New Brunswick sales representative for correct part numbers.

BioFlo® 510 and CelliGen® 510 sterilizable-in-place culture systems, 19.5 and 40.0 liters



Bench or mobile system

Standard features

- RPC (Reactor Process Control) Software
- Top-Mounted Drive with Double-Mechanical Seal
- ASME/CE Electropolished Vessel
- Baffles (Standard on BioFlo 510 Fermentation System)
- Load Cell
- Bright, 38.1 cm Industrial Color Touchscreen Controller
- 3-Fixed Speed Pumps
- User-Definable, Sterilization Sequence Program
- Control System Security
- Temperature Control
- Resterilizable Harvest Port
- Ring Sparger
- Inlet/Exhaust Filters
- 7 Analog Inputs and 7 Analog Outputs

Description

BioFlo 510 Fermentors and CelliGen 510 Bioreactors are intermediate systems ideal for pilot through production applications. Compact systems fit on the bench or on optional mobile skid. A modular design and wide variety of standard and optional components provide the flexibility to customize these systems to meet your process requirements.

Product features

- **Applications:** Bacteria, yeast, insect, plant or mammalian cells, in batch, fed-batch or continuous culture
- **Sophisticated control station:** Powerful RPC (Reactor Process Controller) provides integrated control of up to 32 process parameters, trends up to 8 parameters simultaneously, stores up to 10 recipes, and includes built-in security features. (See page 370.) Includes large industrial touchscreen interface with adjustable-position, 38.1 cm (15 in) color display; 3 integrated pumps; 2 USB ports; 7 analog inputs and 7 outputs to add ancillary devices; integrated load cell and more
- **Vessel:** Electropolished 316L stainless-steel, sterilizable-in-place vessels offered in 19.5 & 40.0 liter capacities with 2:1 aspect ratio
- **Impellers:** Fermentor includes (2) Rushton-type impellers, with pitched-blade and marine-blade, option. Bioreactor offers choice of pitched-blade, marine-blade, spin filter, Cell-Lift* or packed-bed basket* impellers (* 40 L only. See page 368)
- **Gas flow control:** Fermentor comes standard with 1 TMFC and a single gas or upgrade to 2 gases with solenoid valves or 2 individual TMFCs. Bioreactor comes standard with 1 TMFC and 4 solenoid valves or upgrade to 4 individual TMFCs. Additional flow and mixing combinations, such as replacing the TMFC with a low-cost Rotameter for manual gas flow control are available. Gas overlay and air-wash systems with choice of flow rates
- **Additional options:** See list below for wide range of options. Related accessories, including BioCommand SCADA Software, gas analyzers, and more are described beginning on page 396

continued on next page

BioFlo® 510 and CeliGen® 510 – ordering information

1. Specify base system vessel size.
2. Select options from the list below.
3. Consult an application specialist for your specific needs.

BioFlo 510 & CeliGen 510 options

Gas flow

- Rotameter:
 - 0-3 SLPM
 - 0-64 SLPM
 - 0-32 SLPM
- Various combinations of 2, 3, or 4 TMFCs:
 - 0.06-3 SLPM
 - 0.6-32 SLPM
 - 0.3-15 SLPM
 - 1-64 SLPM
- Overlay with TMFC (0-15 or 0-32 SLPM)
- Air Wash System with TMFC (0-15 or 0-32 SLPM)
- Overlay Valve only

Exhaust line

- Exhaust Condenser
- Automatic Pressure Control

Impellers

- Rushton Type – Used commonly for robust cell lines such as bacteria, yeast and algae, where maximum OTR is desired. Provided as standard on BioFlo 510 fermentors
- Pitched Blade – Commonly used with mammalian, insect or other shear sensitive cell lines for batch, fed-batch, or continuous cultures. Produces axial and radial mixing
- Pitched Blade with Magnetic Drive – For critical cell culture applications
- Marine Blade – Commonly used with mammalian, insect or other shear sensitive cell lines for batch, fed-batch, or continuous cultures. Produces axial mixing
- Spin Filter – For Suspension or Microcarrier cultures where a dip tube inside the filter withdraws cell media as harvest or waste
- Cell Lift – Specially designed to provide uniform circulation for both Suspension and Microcarrier cultures. Can be used with optional decanting columns for perfusion cultures (40 L only)
- Packed-Bed Basket Impeller – For secreted products from anchorage dependent and suspension cells, this impeller immobilizes cells in a bed of Fibracel® disks to provide extremely high cell densities (40 L only)

Probes

- Single or Redundant pH/DO Control Systems
- Redox Control System
- Foam/Level Detection System

Addition and sampling

- Resterilizable Sample Valve
- Resterilizable Addition Valves (4 max.)
- Resterilizable Addition/Harvest Valve with Dip Tube (2 max.)
- 3.8 cm Sanitary Fitting 7-Port Septum
- Addition Vessels (Glass / Stainless Steel)
- Decanters
- Sterile Sampling Assembly (Kit of 3)

SCADA software (see page 400)

- BioCommand® Track and Trend
- BioCommand Batch Control
- BioCommand Batch Control Plus

Validation

- Basic Package
- Basic Plus Package
- Enhanced Package

Utility regulator & pre-filter kits

- Process Air Pre-Filter/Regulator Kit
- Instrument Air Pre-Filter/Regulator Kit
- Water Pre-Filter/Regulator Kit
- Process Steam Pre-Filter/Regulator Kit
- Utility Steam Pre-Filter/Regulator Kit
- Utility Connection Kit

Additional options

- Allen Bradley™ CompactLogix™ PLC Control System
- Sprayballs for clean-in-place of Vessel
- External Variable Speed Pumps
- External Scales
- 8-Port Serial Controller (RS-232)
- Spare Parts Kits
- Preventative Maintenance Kits
- Mobile Skid
- System Passivation

BioFlo® 610 mobile pilot-plant fermentor, 65 - 125 liters



Standard features

- RPC (Reactor Process Control) Software
- Bottom-Mounted Drive with Double-Mechanical Seal
- ASME/CE Vessel
- Baffles (Removable)
- Load Cells
- Bright, 38.1 cm Industrial Color Touchscreen Controller
- 3-Fixed Speed Pumps
- User-Definable, Pressure Hold Sequence Program
- User-Definable, Sterilization Sequence Program
- Control System Security
- Temperature Control
- Resterilizable Harvest Port
- Ring Sparger
- Inlet/Exhaust Filters
- 7 Analog Inputs and 7 Analog Outputs

Description

The BioFlo 610 is a compact, mobile, pilot-plant fermentor for process development and small-scale production. A modular design and wide variety of standard and optional components provide the flexibility to customize the system to meet your process requirements.

Product features

- **Applications:** Bacteria, yeast, plant, or insect cells, in batch, fed-batch or continuous culture
- **Sophisticated control station:** Powerful RPC (Reactor Process Controller) provides integrated control of up to 32 process parameters, trends up to 8 parameters simultaneously, stores up to 10 recipes, and includes built-in security features. (See page 370.) Includes large industrial touchscreen interface with adjustable-position, 38.1 cm (15 in) color display; 3 integrated pumps; 2 USB ports; 7 analog inputs and 7 outputs to add ancillary devices; integrated load cell and more.
- **Vessel:** 316L stainless-steel, sterilizable-in-place vessels offered in 65 & 125 liter capacities with 3:1 aspect ratio
- **Impellers:** Rushton-style impellers, standard. Pitched-blade and marine-blade, optional
- **Gas flow control:** Single-gas system with Thermal Mass Flow Controller (TMFC) is standard. Replace the TMFC with a low-cost Rotameter, or upgrade by adding a second TMFC for two-gas mixing. Gas overlay valve available
- **Additional options:** See list below for wide range of options. Related accessories, including BioCommand® SCADA Software, gas analyzers and more are described beginning on page 396

continued on next page

BioFlo® 610 – ordering information

1. Specify base system vessel size.
2. Select options from the list below.
3. Consult an application specialist for your specific needs.

BioFlo 610 options

Gas flow control:

- Single Gas
- Two Gas
- Overlay Valve

Gas Flow:

- **Rotameter, 65 L Vessels (Shown in SLPM)**
9.5-95
- **Rotameter, 125 L Vessels (Shown in SLPM)**
15.0-150
- **1 TMFC, 65 L Vessels (Shown in SLPM)**
1.5-75
- **1 TMFC, 125 L Vessels (Shown in SLPM)**
3.0-150
- **2 TMFC, 65 L Vessels (Shown in SLPM)**
1.5-75/ 0.6-32
- **2 TMFC, 125 L Vessels (Shown in SLPM)**
3.0-150/ 1.0-64

Exhaust line:

- Exhaust Condenser
- Automatic Pressure Control

Impellers:

- Rushton-Type, Standard
- Pitched Blade, Optional
- Marine Blade, Optional

Probes:

- Single or Redundant pH/DO Control Systems
- Redox Control System
- Foam/Level Detection System

Addition and sampling:

- Resterilizable Sample Valve
- Resterilizable Addition Valves (4 Maximum)

- 3.8 cm Sanitary Fitting 7-Port Septum
- Addition Vessels (Glass / Stainless Steel)
- Sterile Sampling Assembly (Kit of 3)

SCADA software (see page 400)

- BioCommand® Track and Trend
- BioCommand Batch Control
- BioCommand Batch Control Plus

Validation

- Basic Package
- Basic Plus Package
- Enhanced Package

Utility regulator & pre-filter kit

- Process Air Pre-Filter/Regulator Kit
- Instrument Air Pre-Filter/Regulator Kit
- Water Pre-Filter/Regulator Kit
- Process Steam Pre-Filter/Regulator Kit
- Utility Steam Pre-Filter/Regulator Kit
- Utility Connection Kit

Additional options

- Sprayballs for clean-in-place of Vessel
- External Variable-Speed Pumps
- External Scales
- 8-Port Serial Controller (RS-232)
- Spare Parts Kits
- Preventive Maintenance Kits
- System Passivation
- Vessel Electropolish
- Low seal pressure switch for double mechanical seal

BioFlo® Pro fermentors and CelliGen® Pro bioreactors, 75 - 3000 liters



BioFlo Pro Fermentor

The new standard in large-scale customizable bioprocess equipment adheres to cGMP and GMP guidelines

Description

BioFlo Pro fermentors and CelliGen Pro bioreactors are modular systems designed for quick delivery, dependable operation and system flexibility, all at an affordable price. Pro systems utilize industry-standard components for dependable operation, and an Allen Bradley™ CompactLogix™ programmable-logic controller (PLC) for easy integration into any production facility. The modular design enables multiple options to be added, removed, or changed at any time to meet your various process requirements. Fermentors available in 75, 150, 300, 500, 1000, 1500 & 3000 liter sizes. Bioreactors available in 75, 150, 300 & 650 liter sizes.

Standard features

Fermentors, all sizes:

- 3:1 ratio
- Bottom-Drive, Double-Mechanical Seal

Bioreactors:

- 75 - 150 liter, 1.9:1 ratio, Top-Drive, Double-Mechanical Seal
- 300 liter, 1.6:1 ratio, Top-Drive, Double-Mechanical Seal
- 650 liter, 2:1 ratio, Bottom-Drive, Double-Mechanical Seal

- Allen Bradley CompactLogix Controller
- 316L ASME code/CE Stainless-Steel Vessel
- Automatic Sterilization Program
- Large, Color, Operator-Interface Terminal
- Open-Frame Piping Skid
- Manual Air-Flow Control
- Safety Features: Headplate Open Interlock, Emergency Stop, Rupture Disk, Jacket Relief Valve
- Automatic Temperature Control
- SIP / CIP Drain Valve
- SIP Inlet / Exhaust Filters
- Automatic Agitation Control
- Resterilizable Harvest Port
- NEMA-4 Rated Electrical Cabinet

(*) 2 maximum for fermentation; 4 maximum for cell culture

Options

Exhaust line:

- Exhaust Condenser
- Automatic Backpressure Control
- Dual Exhaust Filters (in parallel)
- Single or Dual Exhaust Filters with test integrity ports

Pumps:

- 4 Built-In Fixed-Speed Addition Pumps
- External Variable-Speed Pumps*

Housings/probes:

- pH / DO Probes and Transmitters
- Redox Probe and Transmitter
- Retractable Probe Housings
- Redundant Probe Kits

Foam kits:

- Foam Kit
- High-Foam Kit
- High-High Foam Kit

Filter/regulator kits:

- Process Steam
- Utility Steam
- Water
- Instrument Air
- Utility Connection Kit

continued on next page

BioFlo® / CeliGen® Pro options (continued)

Sampling

- Sampling Valve (Resterilizable)
- Novaseptum® Sampling System
- Sterile Sampling Assembly (Kit of 3)

Vessel volume/weight

- Vessel Volume via differential pressure
- Load Cells
- Level Probe

Additional accessories

- Clean-In-Place Option (transfer panel/spray balls)
- Cooling by dedicated heat exchanger for chiller
- Low-Seal Pressure Switch for Double-Mechanical Seal
- Thermometer (Digital)
- Electropolish
- Passivation
- Transfer Lines (Resterilizable)
- Utility Connection Kit

Data recording

- BioCommand® SCADA Software (see page 400)
- (7) Inputs (4-20 mA) for Ancillary Devices
- Delta V™ connectivity

Validation packages

- Basic Validation
- Basic Plus Validation
- Enhanced Validation

Parts kits

- Spare Parts Kits
- Preventative Maintenance Kit

Additional options for BioFlo Pro fermentors only

Air inlet line

- Thermal Mass-Flow Controller
- Dual-Inlet Air Filters (in series)
- Dual-Inlet Air Filters with test integrity ports
- Gas Overlay
- 2-Gas Mix (O₂ supplementation)

Impellers

- Rushton-Type, Standard
- Pitched Blade, Optional
- Marine Blade, Optional

Addition or inoculation

- Addition Valve (up to 5)
- 7-Port or 12-Port Septums
- Stainless-Steel Addition Vessels – 4 L, 7.5 L, 11 L & 19 L
- Addition-Vessel Scales
- Glass Bottles for Addition/Harvest, 0.25 - 10 L

Additional options for CelliGen® Pro bioreactors only



CelliGen Pro Bioreactor

Air inlet line

- 4-Gas Mix (CO₂, O₂, N₂ and Air)
- Single Mass-Flow Controller
- 4 Thermal Mass Flow Controllers (CO₂, O₂, N₂ and Air)
- Dual-Inlet Air Filters (in series)
- Dual-Inlet Filters with test integrity ports
- Gas Overlay with TMFC
- Air Wash

Impellers

- Pitched Blade, Standard (Suspension)
- Marine Blade, Optional (Suspension)
- Spin Filter, Optional (Suspension or Microcarrier)
- Cell Lift, Optional (Microcarrier)
- Packed-Bed Basket, Optional (Fibra-Cel® Disks)

Addition or inoculation

- 1.3 cm Addition Valve (up to 3)
- 2.5 cm Addition Valve
- 7-Port or 12-Port Septums
- Stainless-Steel Addition Vessels – 4 L, 7.5 L, 11 L & 19 L
- Glass Bottles for Addition/Harvest, 0.25 - 10 L
- Addition-Vessel Scales

Accessories for New Brunswick fermentors and bioreactors


In addition to the accessories listed here, we can supply a variety of ancillary equipment which can interface with New Brunswick fermentors and bioreactors. Please allow our process engineers to suggest reliable equipment to utilize in your

process development, on-line analysis, up- and down- stream processing. The following section presents only a selected list of the most commonly requested items.

Ordering information

Description	Order no.	
Pumps and Accessories		
Watson-Marlow 520 U/R, large capacity 1-220 rpm variable speed pump with front panel auto/manual control. Accepts external signals up to 60 V or 32 mA for automatic start/stop operation and reversible pumping by remote control, 220-240 V, 50/60 Hz, 100 W	P0620-0921	
Masterflex Easy-Load Pumps, 1-100 rpm variable speed pumps. 1.82 m cable with 2 open wires to directly connect to BioFlo/CelliGen 310 or BioFlo 415 Analog I/O. 220-230 V, 50/60 Hz	M1287-9967	
Autoclavable connectors		
Resterilizable Quick Connect, 19 mm for SIP units	M1153-9633	
Resterilizable Quick Connect, 25 mm for SIP units	M1153-9639	
Luer-lock Syringe Connector	P0240-5000	
107.95 mm long Hypodermic Needle, 3.26 mm diameter, (12 needles)	P0440-0061A	
Sample vials		
Case of (72) 25 mL Autoclavable Sample Vials, with caps	M1227-9935	
Case of (72) 40 mL Autoclavable Sample Vials, with caps	P0640-0500	
4 L Addition Vessel Kit Assembly includes stainless-steel vessel with dip tube, stainless-steel process valve, silicone tubing and 0.2 µm vent filter	M1290-0550	
Addition vessels (stainless steel)		
7.5 L Additional Vessel Kit	M1290-0551	
11 L Addition Vessel Kit	M1290-0552	
19 L Addition Vessel Kit	M1290-0553	

Variable speed pumps may be remotely controlled using the BioFlo 310, CelliGen 310, BioFlo 510, CelliGen 510, BioFlo Pro, General Purpose Controller or 4-20 mA Interface Box. Call New Brunswick for additional pump information.

 **Ordering information for other voltage options begins on page 471.**

Ordering information

Description	Order no.	
Addition / harvest bottle (glass) for aerobic cell culture		
 0.25 L Addition / Harvest Bottle Kit Assembly includes a clear Pyrex glass bottle with aseptic reservoir cap including a full length stainless-steel dip tube and 0.2 µm vent filter	M1362-9905	
0.5 L Addition / Harvest Bottle Kit	M1362-9906	
1 L Addition / Harvest Bottle Kit	M1362-9901	
 2 L Addition / Harvest Bottle Kit	M1362-9902	
5 L Addition / Harvest Bottle Kit	M1362-9903	
10 L Addition / Harvest Bottle Kit	M1362-9904	
Addition / harvest bottle (glass) for anaerobic cell culture		
0.25 L Addition / Harvest Bottle Kit Assembly includes a clear Pyrex glass bottle with aseptic reservoir cap including (2) full length stainless steel dip tubes and (2) 0.2 µm vent filters – perfect for anaerobic processes	M1362-9913	
0.5 L Addition / Harvest Bottle Kit	M1362-9914	
1 L Addition / Harvest Bottle Kit	M1362-9915	
2 L Addition / Harvest Bottle Kit	M1362-9916	
5 L Addition / Harvest Bottle Kit	M1362-9917	
10 L Addition / Harvest Bottle Kit	M1362-9918	

It is recommended that a 4.76 mm ID silicone tubing (P0740-2505) be ordered to attach the Addition / Harvest bottles to the appropriate hose barb on the fermentation / bioreactor system.

Accessories for New Brunswick fermentors and bioreactors (continued)

Other accessories for New Brunswick fermentors/bioreactors

Chillers

We can supply chillers for most fermentors/bioreactors. See also page 398.

Steam generators

We can supply utility and clean steam generators for most fermentors/bioreactors in various electrical services.

Sampling probes (cell free)

Withdraws sterile, cell-free samples from bioreactor/fermentor for either off-line or on-line analysis.

Light sources

We offer special cold light sources in wave lengths from 300-800 nm and with various illumination intensities.

Biochemistry analyzers

We can assist customers in the selection of off-line or on-line process analysis equipment and interfacing to any New Brunswick fermentor/bioreactor for analysis of glucose, lactate, glutamate, ethanol, sucrose, lactose, galactose, choline, hydrogen peroxide and methanol. Call for detailed information.

Replacement silicone tubing

The numbers in the top half of the chart identify tubing by fermentor/bioreactor model. The lower portion of the chart identifies corresponding part number, I.D. and O.D.

Silicone Tubing (Replacement)								
Fermentor/ Bioreactor	Vessel Size	Gas Connectors	Acid, Base Antifoam, Addition Port	Harvest Tube	Cooling Coil	Single Addition Port	Triple Addition Port	Side Addition Port
BioFlo 115	All	1	8	5	5	5	8	—
BioFlo 310 & CelliGen 310	All	10	8	5	—	5	8	—
Item	I.D.	O.D.	Length	Order no.				
1	2.0 mm	6.4 mm	15.2 m	M0740-3110				
2	3.2 mm	6.4 mm	15.2 m	M0740-3111C3				
3	6.4 mm	9.8 mm	7.6 m	M0740-2542				
4	3.2 mm	6.4 mm	7.6 m	M0740-2445				
5	4.8 mm	8.0 mm	7.6 m	M0740-2505				
6	8.0 mm	11.1 mm	15.2 m	M0740-2590				
7	2.4 mm	6.4 mm	15.2 m	M0740-2430				
8	1.6 mm	4.8 mm	15.2 m	M0740-2396				
9	9.5 mm	16.6 mm	7.6 m	M0740-2721C3				
10	4.1 mm	6.4 mm	7.6 m	M0740-3113C3				

ThermoFlex™ recirculating CFC-Free, mobile chiller



Technical specifications

Overall Dimensions H x W x D	69.6 x 36.1 x 62.7 cm
Net Weight	57.2 kg

Ordering information

Model	Description	Electrical Service	Order no.
Thermo Scientific Neslab ThermoFlex™ Recirculating Chiller	ThermoFlex 1400 PD 2, IPR plus PRV	230 V, 50 Hz	P0620-2798
	Accessories		
	Plumbing Package		P0620-0959
	Pressure Regulator (0-20 psi)		P0620-2799
	Pressure Gauge (0-30 psi)		M1287-9918

Description

Recirculating chiller for use with low-to-high density cultures to maintain sub-ambient temperatures.

New Brunswick can also supply chillers for SIP fermentors/ bioreactors. Call for details.

Product features

- **Applications:** for use with most New Brunswick benchtop fermentors & bioreactors. Call for details
- **Cooling capacity:** 1170 Watt heat removal capacity for the 230 V, 50 Hz unit, at 20 °C
- **Features:** positive-displacement pump, 7.6 liter reservoir, digital controller display, level indicator, integrated funnel and air filter

Analog Input/Output Module



Technical specifications

Input/Output Types and Quantities	
User-Definable	3 inputs
0-5 V or 4-20 mA	3 outputs
0-5 V	4 inputs
	4 outputs

⚡ Ordering information for other voltage options begins on page 471.

Description

New Brunswick's new Analog Input/Output Module allows you to easily incorporate process values from auxiliary pumps, transmitters and other 0-5 V or 4-20 mA devices.

Product features

- OPC server interface
- Communicates with OPC-compatible BioCommand® packages for total process control (requires a computer with USB connection)

Ordering information

Model	Electrical	Order no.
Analog Input/ Output Module	100-240 V, 50/60 Hz	M1372-1001

Interface kit for RS-232 device

Description

The RS-232 Device Interface Kit provides the ability to integrate up to eight (8) simple RS-232 devices into your fermentation process to obtain weight measurements, flow rates or other data. This information can be integrated directly into OPC-compatible BioCommand packages for the development of powerful feed strategies based on weights or pump flow rates. The kit includes one USB cable to connect to your PC, one eight-port RS-232 serial box, and OPC server software designed specifically to communicate with BioCommand. This kit is designed to

communicate with Mettler scales which use SICS level 0 communication protocol. Contact your local sales representative for details on connecting to other simple RS-232 devices.

Ordering information

Model	Order no.	
RS-232 OPC Server Kit	M1295-0002	

EX-2000 off-gas oxygen / carbon dioxide monitor



May be wall-mounted, or used on the benchtop. Shown with optional stand.

Technical specifications

Overall Dimensions W x H x D	33 x 41.1 x 20.5 cm
Net Weight	4.1 kg

Description

The EX-2000 gas analyzer provides continuous and unattended monitoring of exhaust carbon dioxide (CO₂) and oxygen (O₂) gasses in benchtop fermentors & bioreactors.

Contact your New Brunswick sales representative for system recommendations.

Product features

- **Applications:** suitable for use with any size fermentor/ bioreactor*
- **Features:** infrared (IR) sensor determines carbon dioxide concentration. Electrochemical sensor monitors the oxygen concentration. Factory calibrated
- **Signal output:** provides 4-20 mA output. Requires interfacing into ML-6100 or General Purpose Controller or 4-20 mA Multi-Loop Controller with BioCommand® software to allow for visualization and archiving of carbon dioxide and oxygen levels. BioCommand also allows for supervisory control and calculations
- **Construction:** Enclosure material is corrosion-resistant fiberglass (NEMA 12); all external interface-plumbing components are 316 stainless steel. All necessary fittings for tubing and connection are included for out-of-the-box installation

Ordering information

Model	Description	Electrical Service	Order no.	
EX-2000 Off-Gas Oxygen / Carbon Dioxide Monitor	EX-2000 Monitor	100-240 V, 50/60 Hz	M1276-0000	
	Accessories			
	Stand for bench mounting		M1276-5000	

(*) For temperature maintenance or for rapid cooling applications in larger fermentors and bioreactors, ask your New Brunswick sales representative for assistance.

We can also recommend and supply a variety of other systems for measurement of exhaust CO₂, O₂ and other gases as well as systems for sample pre-treatment. Call for details on these analyzers and how they can be interfaced with your fermentor/bioreactor and BioCommand bioprocess software.

BioCommand® bioprocessing software – Track and Trend, Batch Control and Batch Control Plus



Description

New Brunswick has developed three next-generation BioCommand® software packages to enhance your ability to monitor, control and log data from your fermentation and cell culture processes through your personal computer (PC). These Supervisory Control and Data Acquisition (SCADA) packages provide the tools needed for research, optimization, and if needed, the security and audit trails to meet your regulatory requirements. All are OPC compatible to enable your fermentor or bioreactor to "talk" to any other OPC-compatible device in your lab or production facility.

Ordering information

Model	Order no.
BioCommand Track and Trend	M1326-0000*
BioCommand Batch Control	M1326-0010*
BioCommand Batch Control Plus	M1326-0020*
OPC Server	M1291-0011*

BioCommand Accessories

Description	Order no.
Connection Kit: Contains one 16 meter RS-422 Serial Cable, one RS-232/RS-422 Converter and one BioCommand Cable. Kit contains M1171-8010, M1286-8010 & P0460-7550 or may also be ordered individually as listed below.	M1286-0100
16 meter RS-422 Serial Cable. One cable is included with each BioCommand package. Purchase one additional cable for each additional process controller. Multiple cables may be connected for longer lengths. Length each: 16 meters	M1171-8010
RS-232/RS-422 Converter: Used to convert RS-232 serial pin-out to RS-422 cable connection	P0460-7550
BioCommand Cable: Converts RS-232 signal to RS-422 to facilitate BioCommand communication with controller.	M1286-8010
Interface Box: Converts up to eight RS-232 COM ports into USB for customers whose computers lack an RS-232 connection.	M1287-0020

(* Includes one M1286-0100 Kit. Order one additional M1171-8010 cable for each additional controller.

BioCommand Track and Trend

This entry-level package has been designed specifically for researchers and scientists requiring basic data management and monitoring capabilities. It provides the ability to trend and control parameter setpoints, establish alarm settings, and produce batch records; and is ideal for basic process management.

BioCommand Batch Control

This intermediate package includes all the capabilities of BioCommand Track and Trend, plus additional enhanced control features including a sophisticated programming module, custom synoptic display window, and equipment lock-out feature. The added control features of this software package make it ideal for optimizing your process.

BioCommand Batch Control Plus

Our premium package includes all of the features of the previous two packages, as well as includes three levels of security, event logs, and audit-trail capabilities to be compatible with the FDA 21 CFR Part 11 electronic signature and electronic batch record requirements. BioCommand Batch Control Plus allows the power of BioCommand software to be utilized in an FDA validated process.

OPC Server

Used to interface and connect OPC-compliant 3rd party equipment to New Brunswick Bioreactors and Fermentors. Included with all BioCommand software packages listed above. Additionally, can be used without BioCommand packages to provide connectivity to 3rd party SCADA such as MATLAB®, LavVIEW® and other OPC-compatible packages.

Contract laboratory services



Description

As an equipment manufacturer with in-house fermentation and cell culture laboratories, New Brunswick offers contract fermentation and cell culture services. Unlike larger contract research organizations, New Brunswick offers low overhead and highly trained and qualified staff with expertise in fermentation and cell culture processes.

New Brunswick has over 50 years of experience in successful scale-up and optimization of non-cGMP cell culture and fermentation processes. We maintain stirred-tank and packed-bed bioreactors and fermentors for research through to production. Whether you require biomass, partial clarification of intracellular or extracellular products in raw or fractionated forms, New Brunswick can help meet your needs.

Services include consultation for new processes, process development, biomass production, secreted protein recovery, as well as batch, fed-batch and continuous fermentation and cell culture processing. If preferred, customers are welcome to work side-by-side with our team. Please call for a free consultation.

New Brunswick Scientific's wide range of services include:

- Media formulation
- Computer-control strategies
- Process development
- Process optimization
- Scale-up
- Downstream clarification
- Benchtop to pilot-scale contract production

Expertise extends to a range of cell types including, but not limited to:

- | | |
|----------------------------|---|
| ● Recombinant animal cells | ● Insect cells |
| ● NSO cells | ● Recombinant <i>E. coli</i> |
| ● BHK cells | ● Yeast with expertise in <i>Pichia</i> |
| ● CHO cells | ● <i>Bacillus</i> |
| ● VERO cells | ● <i>Streptomyces</i> |
| ● 293 cells | ● Rat liver cells |
| ● HEK cells | ● <i>Baculovirus</i> |

Training



Description

Training is available on any New Brunswick fermentors and bioreactors. Training sessions can be set up at your site or can be held at New Brunswick headquarters laboratories in Enfield, CT USA.

Training is designed to assist new and existing users by familiarizing them with the components and operation of their fermentor or bioreactor. Guidance is provided to users on their application. Client-site training is performed only after delivery and setup of the equipment and after utility services have been connected and a New Brunswick service representative has checked the system. For further information, contact your local New Brunswick representative.

Probes for fermentation and cell culture

Description

We can supply spare probes and accessories from among the broad line of Mettler Ingold and Hamilton products. For spare probes, see below and pages 403 - 407. Directions for using these charts are shown at right.

- pH probes begin on page 404. DO probes begin on page 406.
- Locate your vessel in the left column of the appropriate chart.
- Slide your finger across to the right until you come to a box with a number in it, then look at the top of the column above the number to find the catalog number for that probe. NOTE: Vessels can accommodate more than one type of probe.
- Each time you see a number for a particular vessel, it indicates that probe can be used with that vessel.
- The number inside the box refers to the associated reference charts for cables, adapter, and housings, which follow below.

Redox probes

		Mettler Ingold			Hamilton		
Order no.		P0720-5780	P0720-5781	P0720-5782	P0720-6532	P0720-6531	P0720-6530
Immersion Depth		120 mm	200 mm	325 mm	325 mm	425 mm	625 mm
Vessel Connector		PG 13.5	PG 13.5	PG 13.5	PG 13.5	PG 13.5	PG 13.5
Cable end		K8	K8	K8	K8	K8	K8
Type		Gel	Gel	Gel	Gel	Gel	Gel
BioFlo 110/115	1.3 L & 3 L		1				
BioFlo 110/115	7.5 L			1			
BioFlo 110/115	14.0 L					1	
BioFlo 310	2.5 L		2		2		
BioFlo 310	5.0 L & 7.5 L			2	2		
BioFlo 310	14.0 L			2	2		
BioFlo 410/415	7 L			2	2		
BioFlo 410/415	14 L					2	
BioFlo 410/415	19 L						2
BioFlo 510	all vessels	3, 7 & 9					
BioFlo 610	all vessels	3, 7 & 9					
BioFlo Pro	all vessels	4 & 6		4, 5 & 8	4, 5 & 8		

Probes for fermentation and cell culture (continued)

Redox cables and housings

Ref.	Description	Order no.	
Cables referenced in table above			
1	Redox Cable, 110/115	P0720-2763	
2	Redox Cable, BioFlo 310, 410 and 415	P0720-2275	
3	Redox Cable, BioFlo 510	P0720-2277	
4	pH/Redox Cable for BioFlo and CelliGen Pro	M1290-0610	
5	pH/Redox Ground Wire Extension for Retractable Probe Housings (325 mm)	M1290-8012	
Housings referenced in table above			
6	25 mm Ingold Port 12 mm Housing with Material Certificate (BioFlo/CelliGen Pro Only)	P0720-6450C1	
7	25 mm Ingold Port 12 mm Housing with Material Certificate	P0720-6240C3	
8	InTrac [®] 797, Stainless Steel Retractable Probe Housing, 25 mm Ingold Port, 325 mm Probe Length w/ Material Certificate	P0720-5570C	
9	510 Port Adapter – Converts 1.5" Sanitary to 25 mm Ingold Port	M1361-9208	

Redox transmitters

Description	Order no.	
Transmitter, Panel Mount, (required with BioFlo 110/115 Redox probes)	P0620-5974	
Transmitter, Wall Mount, (required with BioFlo 110/115 Redox probes)	P0620-5975	

Probes for fermentation and cell culture (continued)

Optical density (turbidity) and CO₂ probes

Description	Order no.
Turbidity Probes	
Turbidity Probe, Autoclavable 12 mm/297 mm Length InPro 8100 (Cable not included)	P0720-5950*
Turbidity Probe, Autoclavable 12 mm/120 mm Length InPro 8100 (Cable not included)	P0720-5951*
Turbidity Probe, SIP 12 mm/120 mm Length InPro 8200 with Cable	P0720-5961
Turbidity Probe, SIP 12 mm/205 mm Length InPro 8200 with Cable	P0720-5962
Turbidity Probe, SIP 12 mm/297 mm Length InPro 8200 with Cable	P0720-5963
Turbidity Probe, SIP 12 mm/407 mm Length InPro 8200 with Cable	P0720-5960
Turbidity Accessories	
5M Turbidity Cable	P0720-2430
Turbidity Transmitter, TRB 8300	P0620-5551
CO₂ Probes (VP Connector)	
CO ₂ Probe, 12 mm/120 mm length	P0720-6480
CO ₂ Probe, 12 mm/220 mm length	P0720-6481
CO ₂ Probe, 12 mm/320 mm length	P0720-6482
CO₂ Accessories	
CO ₂ Cable	P0720-9660

(*) Cable not included. Must be ordered separately.

pH probes

Order no.	Mettler Ingold				Hamilton	
	P0720-5581	P0720-5582	P0720-5584	P0720-5580	P0720-5583	P0720-6540
Immersion Depth	120 mm	200 mm	225 mm	325 mm	425 mm	625 mm
Vessel Connector	25 mm	PG 13.5	PG 13.5	PG 13.5	PG 13.5	PG 13.5
Cable end	K9	K9	K9	K9	K9	K9
Type	Gel	Gel	Gel	Gel	Gel	Gel
BioFlo 110 ^a /115 ^b /3000 ^a	1.3 L / 1.6 L	2 ^a /4 ^b				
BioFlo 110 ^a /115 ^b /3000 ^a	3 L		2 ^a /4 ^b			
BioFlo 110 ^a /115 ^b /3000 ^a	7.5 L / 6.6 L			2 ^a /4 ^b		
BioFlo 110 ^a /115 ^b /3000 ^a	14.0 L				2 ^a /4 ^b	
BioFlo 310	2.5 L	3				
BioFlo 310	5.0 L & 7.0 L		3			
BioFlo 310	14.0 L			3		
CelliGen 310	2.5L	3				
CelliGen 310	5.0 L & 7.5 L		3			
CelliGen 310	14.0 L			3		
CelliGen 310 Basket	2.5 L to 7.5 L	3				
CelliGen 310 Basket	14.0 L**		3			
CelliGen Plus	2.2 L	2				
CelliGen Plus	5.0 L & 7.5 L			2		
CelliGen Plus	14.0 L				2	

(**) For CelliGen Plus Probe Adapters, ask your local New Brunswick sales representative.

Probes for fermentation and cell culture (continued)

pH probes (continued)

Order no.		Mettler Ingold				Hamilton	
		P0720-5581	P0720-5582	P0720-5584	P0720-5580	P0720-5583	P0720-6540
Immersion Depth		120 mm	200 mm	225 mm	325 mm	425 mm	625 mm
Vessel Connector		25 mm	PG 13.5	PG 13.5	PG 13.5	PG 13.5	PG 13.5
Cable end		K9	K9	K9	K9	K9	K9
Type		Gel	Gel	Gel	Gel	Gel	Gel
CelliGen Plus Basket	2.2 L**		2				
CelliGen Plus Basket	5.0 L** & 7.5 L**		2				
CelliGen Plus Basket	14.0 L**			2			
BioFlo 410/415	7.0 L				3		
BioFlo 410/415	14.0 L					3	
BioFlo 410/415	19.5 L						3
BioFlo 4500	all vessels	2 & 8			2 & 9		
BioFlo 5000	all vessels	1 & 8			1 & 9		
BioFlo/CelliGen 510	all vessels	4, 8 & 10					
BioFlo 610	all vessels	4, 8 & 10					
BioFlo/CelliGen Pro	all vessels	5 & 7			5, 6 & 9		

(**) For CelliGen Plus Probe Adapters, ask your local New Brunswick sales representative.

pH probe cables & housings

Ref.	Description	Order no.	
Cables referenced in table above			
1	AK9 Cable for BioFlo 5000	P0720-2093	
2	AK9 cable, 3ft, BioFlo IIC, 2000, III, 110, 3000, IV, 4000, 4500, CelliGen and CelliGen Plus	P0720-2095	
3	pH Cable for BioFlo 310, 410, 415 and CelliGen 310	P0720-2273	
4	pH Cable for BioFlo 115, 510 and CelliGen 115, 510	P0720-2276	
5	pH/Redox Cable for BioFlo and CelliGen Pro	M1290-0610	
6	pH/Redox Ground Wire Extension for Retractable Probe Housings (325 mm)	M1290-8012	
Cables for older New Brunswick equipment, not referenced in table above			
	AK9 Cable, 2.4 m. For Micros, MPP, MicroGen (ML-4100), MicroLift, and ML4100	M1131-8010	
	AK9 Cable, Analog For MultiGen, BioFlo I, MicroFerm and MicroGen	P0720-2090	
	pH Cable for BioFlo 6000 (Ingold Probes Only)	M1238-8001	
Housings referenced in table above			
7	25 mm Ingold Port 12 mm Probe Housing with Material Certificate (BioFlo/CelliGen Pro Only)	P0720-6450C1	
8	25 mm Ingold Port 12 mm Probe Housing with Material Certificate	P0720-6240C3	
9	InTrac® 797, Stainless Steel Retractable Probe Housing, 25 mm Ingold Port, 325 mm Probe Length w/ Material Certificate	P0720-5570C	
10	510 Port Adapter – Converts 1.5" Sanitary to 25 mm Ingold Port	M1361-9208	

Probes for fermentation and cell culture (continued)

DO probes

		Mettler Ingold (InPro 6800)							Hamilton
Order no.		P0720-6270	P0720-6280	P0720-6281*	P0720-6580	P0720-6282	P0720-6283	P0720-6284	P0720-6520
Immersion Depth		80 mm	120 mm	160 mm	160 mm	220 mm	320 mm	420 mm	625 mm
Vessel Connector		25 mm	PG 13.5	PG 13.5	PG 13.5	PG 13.5	PG 13.5	PG 13.5	PG 13.5
Cable end		T82	T82	VP	T82	T82	T82	T82	T82
BioFlo 110 ^a / 3000 ^b	1.3 L / 1.6 L			3 ^{a+b} /1 ^b					
BioFlo 110 ^a /3000 ^b	3.0 L / 3.3 L					1 ^{a+b} /11 & 14 ^b			
BioFlo 110 ^a /3000 ^b	7.5 L / 6.6 L						1 ^{a+b} /12 & 14 ^b		
BioFlo 110 ^a /3000 ^b	14.0 L							1 ^{a+b} /13 ^b	
BioFlo 115	1.3 L				6				
BioFlo 115	3.0 L					6			
BioFlo 115	7.5 L						6		
BioFlo 115	14.0 L							6	
BioFlo 310	2.5 L / 5.0 L					5			
BioFlo 310	7.5 L / 14.0 L						5		
CelliGen 310	2.5 L / 5.0 L					5			
CelliGen 310	7.5 L / 14.0 L						5		
CelliGen Plus**	2.2 L					1 & 13			
CelliGen Plus**	5.0 L					1			
CelliGen Plus**	7.5 L						1		
CelliGen Plus**	14.0 L							1 & 13	
CelliGen Plus ^a /310 ^b (Basket Only)	2.2 L / 2.5 L		1 & 13 ^a /5 ^b						
CelliGen Plus ^a /310 ^b (Basket Only)	5.0 L		1 ^a /5 ^b						
CelliGen Plus ^a /310 ^b (Basket Only)	7.5 L					1 ^a /5 ^b			
CelliGen Plus ^a /310 ^b (Basket Only)	14.0 L					1 ^a /5 ^b			
BioFlo 410/415	7.0 L						5		
BioFlo 410/415	14.0 L							5	
BioFlo 410/415	19.5 L								5
BioFlo 4500	all vessels	1 & 8	1 & 8				1 & 9		
BioFlo 5000	all vessels	2 & 8	2 & 8				2 & 9		
BioFlo/ CelliGen 510	all vessels		6, 8 & 10						
BioFlo 610	all vessels		6, 8 & 10						
BioFlo/ CelliGen Pro	all vessels		4 & 7				4 & 9		

(*) 1L BioFlo 110 probes require a VP connector cable, P0720-2332, or probe adapter P0720-6470.

(**) For CelliGen Plus Probe Adapters, ask your local New Brunswick sales representative.

Probes for fermentation and cell culture (continued)

DO cables, housings and accessories (plus pH general accessories)

Ref.	Description	Order no.	
Cables referenced in table on previous page			
1	DO Cable, BioFlo IIC, III, 3000, 4000, IV, 4500, 110 (except 1.6 L) and CelliGen Plus	P0720-2331	
2	DO Cable, BioFlo 5000, Micros, MicroLift, MPP and ML-4100	M1131-8009	
3	DO Cable, BioFlo 110 (1.3 L) & BioFlo III/3000 (1.6 L)	P0720-2332*	
4	DO Cable, BioFlo and CelliGen Pro	P0720-2342	
5	DO Cable, BioFlo 310, 410, 415 and CelliGen 310	P0720-2333	
6	DO Cable, BioFlo 115 and 510	P0720-2336	
Housings referenced in table on previous page			
7	25 mm Ingold Port 12 mm Probe Housing with Material Certificate (BioFlo®/CelliGen® Pro Only)	P0720-6450C1	
8	25 mm Ingold Port 12 mm Probe Housing with Material Certificate	P0720-6240C3	
9	InTrac® 797, Stainless Steel Retractable Probe Housing, 25 mm Ingold Port, 325 mm Probe Length w/ Material Certificate	P0720-5570C	
10	510 Port Adapter – Converts 1.5" Sanitary to 25 mm Ingold Port	M1361-9208	
Adapters referenced in table on previous page			
11	PG13.5 Thread Adapter for 3/8" NPT port	M1016-0900	
12	PG13.5 Thread Adapter for 3/8"NPT port, 92.07 mm	M1226-9446	
13	DO Port Length Extender (same threads), 42.86 mm	M1176-9540	
Adapters not referenced in table on previous page			
	DO Port Length Extender (same threads), 76.99 mm	M1176-9575	
	DO Port Length Extender (same threads), 82.55 mm	M1176-9579	
Gasket referenced in table on previous page			
14	Gasket for probe adapters M1016-0900 & M1226-9446	M1016-0890	
DO Accessories, Mettler Ingold not referenced in table on previous page			
	DO Cable, 3 meters for Mettler Model 4500	P0720-2560	
	DO Cable, 5 meters for Mettler Model 4500	P0720-2561	
	DO probe cap	P0720-5567	
	DO Membrane Kit for Inpro 6000. Includes four membranes, O-rings, & 25 mL electrolyte	P0720-6268	
	DO Membrane Kit for Inpro 6000. Includes one membrane, O-rings, & 25 mL electrolyte	P0720-6339	
	Probe Adapter, converts T-82 to VP connector	P0720-6470*	
pH & DO General Accessories, not referenced in table on previous page			
	pH & DO Simulator/Calibrator. For checking integrity of pH & DO electronics & cables	P0720-5631	

(*) 1L BioFlo 110 probes require a VP connector cable, P0720-2332, or probe adapter P0720-6470.

CEPA High-speed centrifuges – for liquid separation and solids removal

**NOT SOLD IN EUROPE
(EXCEPT UK)**

Description

The CEPA centrifuges described in this catalog are designed for rapid cell removal and clarification of fermentation broth and similar liquid-solid mixtures in "clarifying" configurations; or for the separation of two liquids in "separating" configurations. Models range from a small lab unit, through large production-scale systems capable of processing up to 3,000 L/hr. All use bottom feed, retain solids in the bowl and expel supernatant from upper tray(s). All wetted surfaces are stainless steel (except optional silicone bottom valve). All floor models feature 3-phase electric motors for rapid acceleration. Basic configurations include one bowl, ancillary equipment¹, and tools. Virtually all combinations of options are available on all models in all voltages.²

LE benchtop model laboratory centrifuge

All model LEs feature variable speed and digital tachometer. Recommended for separating 2 - 15 liters. Maximum throughput rate is 30 L/hr.

Z41 floor model centrifuge

Recommended for laboratory or pilot-scale volumes of 20 - 75 L. Maximum throughput rate is 500 L/hr.

Z61 floor model centrifuge






Recommended for pilot-scale volumes of 30 - 200 L. Maximum throughput rate is 1,500 L/hr.

Z81 production floor model centrifuge

Recommended for pilot and production process volumes of 100 - 500 L. Maximum throughput rate is 2,000 L/hr.

Z101 production floor model centrifuge

As powerful as the Z81, and with a 25% larger cylinder capacity, Z101 is typically used with 150 - 600 L process volumes. Maximum throughput rate is 3000 L/hr.

Model	Specifications	Recommended accessories	
LE	Power: 330 Watts ³ Bowl Volume: 0.25 L Rotational Speed: 15,000 - 45,000 rpm Max Acceleration: 50,000 G Height: 68.3 cm	Spare Parts Kit: XLE-SP1 Extra clarifying cylinders Adjustable separating cylinders Cooling Coils	
Z41	Power: 0.9 kW ³ Bowl Volume: 2 L Rotational Speed: 20,000 rpm Max Acceleration: 17,000 G Height: 117 cm	Spare Parts Kit: X41-SP1 Extra clarifying cylinders Extra separating cylinders Cooling Coils	
Z61	Power: 1.5 kW ³ Bowl Volume: 6 L Rotational Speed: 17,000 rpm Max Acceleration: 18,000 G Height: 155 cm	Spare Parts Kit: X61-SP1 Extra clarifying cylinders Extra separating cylinders Cooling Coils	
Z81	Power: 2.2 kW ³ Bowl Volume: 8 L Rotational Speed: 16,000 rpm Max Acceleration: 18,000 G Height: 155 cm	Spare Parts Kit: X81-SP1 Extra clarifying cylinders Extra separating cylinders Cooling Coils	
Z101	Power: 2.2 kW ³ Bowl Volume: 10 L Rotational Speed: 14,000 rpm Max Acceleration: 15,500 G Height: 160 cm	Spare Parts Kit: X81-SP1 Extra clarifying cylinders Extra separating cylinders Cooling Coils	

(1) Ancillary equipment, which varies with the model, includes various cleaning tools such as special brushes and other implements.
(2) Maximum throughput shown was obtained with water. Throughput will decrease with thicker or more viscous cultures.
(3) Various voltages available.

continued on next page

CEPA High-speed centrifuges – optional features

Clarifying bowl

Retains solids such as biomass and discharges liquid through single-level upper discharge ports.

Separating bowl

Separates liquids of different densities, retains solids and discharges liquids through bi-level upper discharge ports.

Closed bowl (non-continuous)

For precise sediment determination of measured charges. Contains no feed or discharge lines.

Emulsifying bowl

For emulsification of two liquids.

Adjustable separating bowl

A separating cylinder with interchangeable separating rings for optimizing performance with different liquid combinations.

Bottom valve

Centrifugally actuated silicone rubber valve prevents centrifuge contents from emptying when cylinder rotation is stopped. The valve prevents feed input when rotational speeds are less than 80 % of maximum.

Cooling coil

Stainless steel. Allows circulation of cold water or other coolants to lower the temperature of the cylinder's contents during centrifugation.

Enclosed models

CEPA centrifuges are available mounted in cast-metal chambers with stainless steel-clad interiors. Sealed by a sturdy door the enclosure facilitates quieter operation, control of gaseous environment at atmospheric pressure.

HEMA configuration

CEPA centrifuges can be supplied with serum-clarifying cylinders and full length cooling coils for blood fractionation.

Explosion proof

For use where risk of explosion exists.

NOT SOLD IN EUROPE
(EXCEPT UK)





The name Eppendorf stands for the highest quality and reliability. Well-known companies trust in our expertise in the design and production of plastics when it comes to meeting the high standards of individual market segments such as diagnostics or quality control. Eppendorf keeps developing the existing product range of, e.g., tips and plates, in cooperation with its customers to meet their specific demands and supports them with modifications of form, fit and function for a better fit on devices or with plastic adjustments that are especially designed for specific applications.



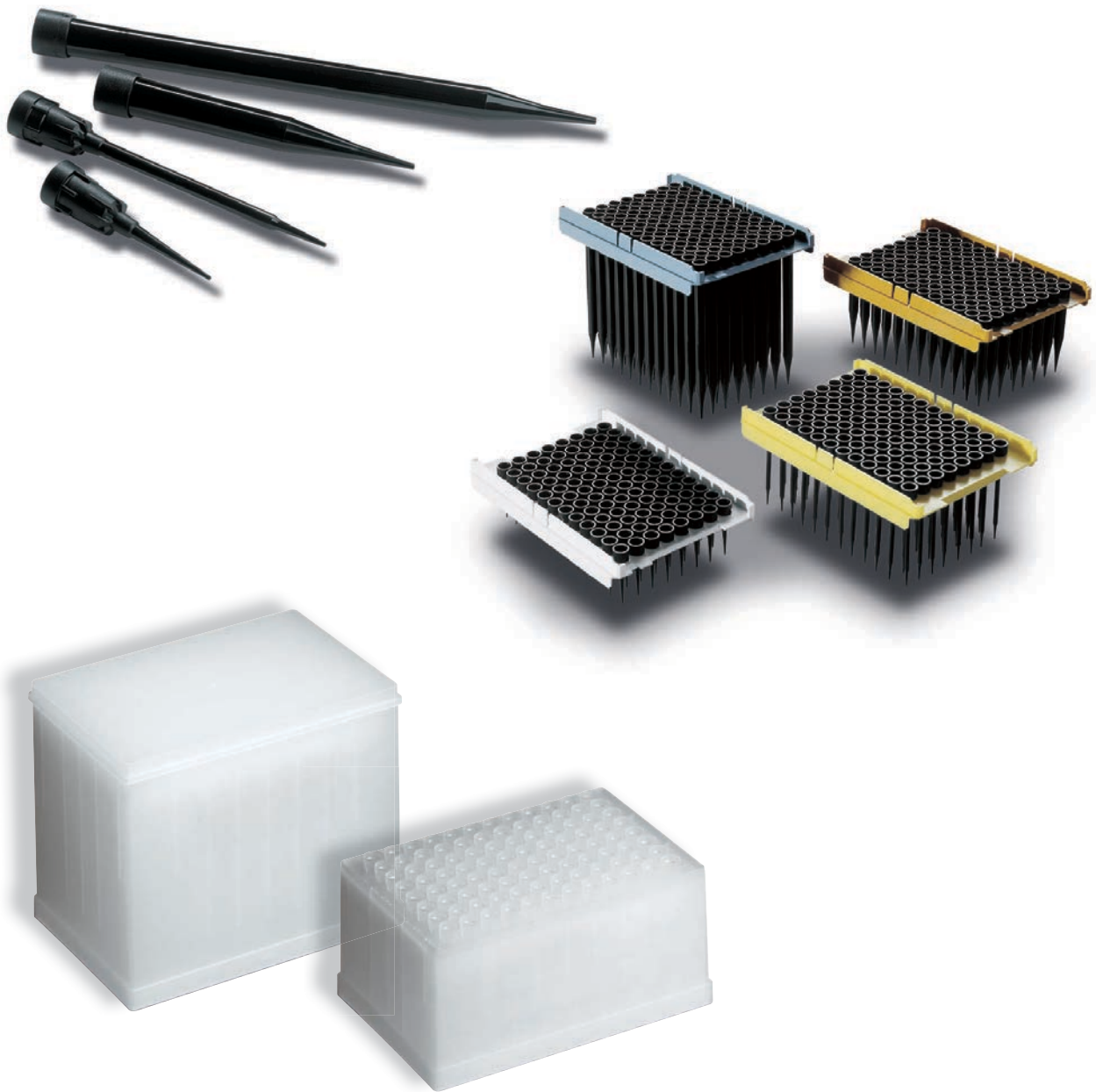
4. OEM

**OEM-Solutions
Plates and Tips**

Tips - Foundation for Customized Solutions

Customized Solutions are Eppendorf products that have been tailored to the individual requirements of major customers. If customers further market these solutions to third parties under their own brand name, in connection with their own products or as a component of their kits, these solutions are referred to as OEM products.

A line of Customized Solutions is already available for the Eppendorf tips: conductive and nonconductive automatic tips, special colors, volumes and dimensions of tips. All versions can be repeatedly found in countless products.



i Further informations at www.eppendorf.com/oem

Tips - Foundation for Customized Solutions

Customer-specific solutions for users

Nearly every detail of the tips can be customized:

- Surface coating
- Filter positioning
- Optimization for automatic application

What are your requirements of a device tip?

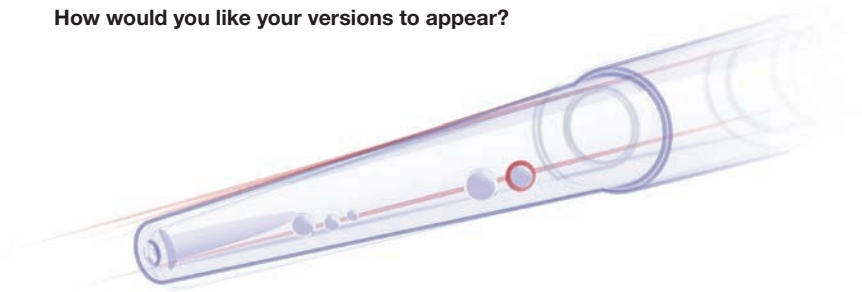
Perhaps:

- Stackability
- SBS box
- Low retention automatic tips

Nearly every version is possible. Let us discuss your automatic tips, specifications, unit sales, packaging versions and much more.

We are your partner for CS solutions – powered by Eppendorf.

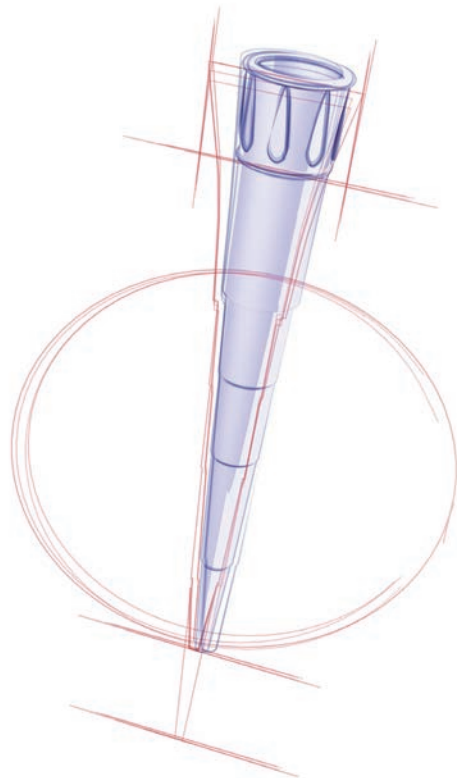
How would you like your versions to appear?



Special surface treatment



Stackability

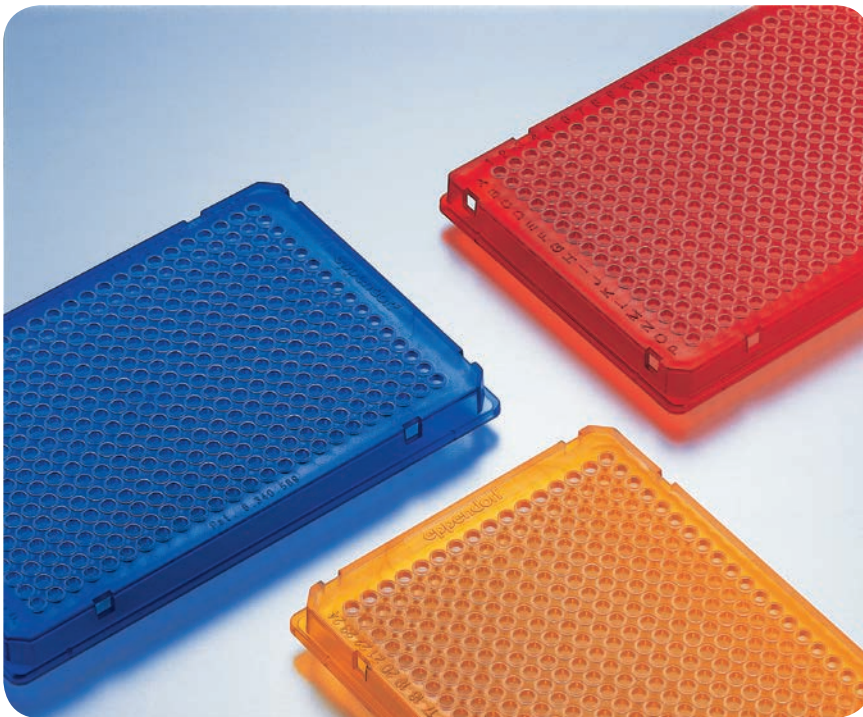


Modified specifications

Plates - Foundation for Customized Solutions

Description

Colors, forms, functions – we have already changed many features on our plates for Customized Solutions or OEM versions. Our expertise enables us to respond to requirements from various market segments with the right technology. Our response to your individual requirements is quick and uncomplicated.



i Further informations at www.eppendorf.com/oem

Plates - Foundation for Customized Solutions

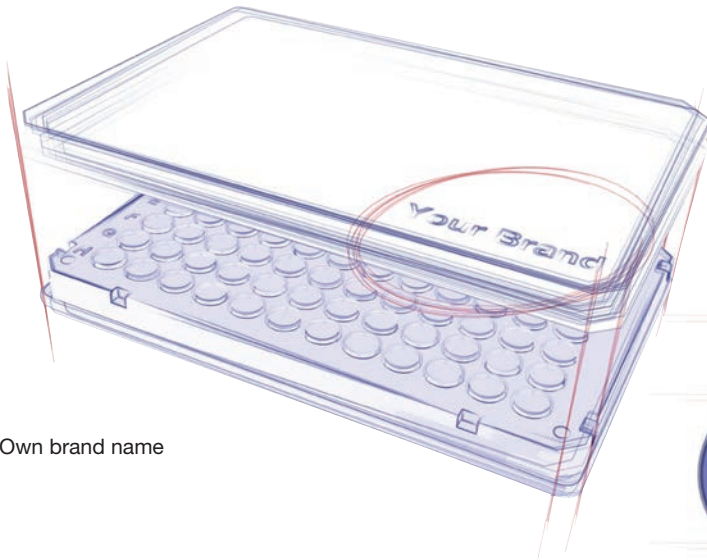
Possible additional modifications

This seal is found on many CS product versions

It indicates that these products fulfill all Eppendorf quality requirements. This seal can also be located on your own plate. Your CS product is developed and manufactured with the same care as our brand – you are powered by Eppendorf.



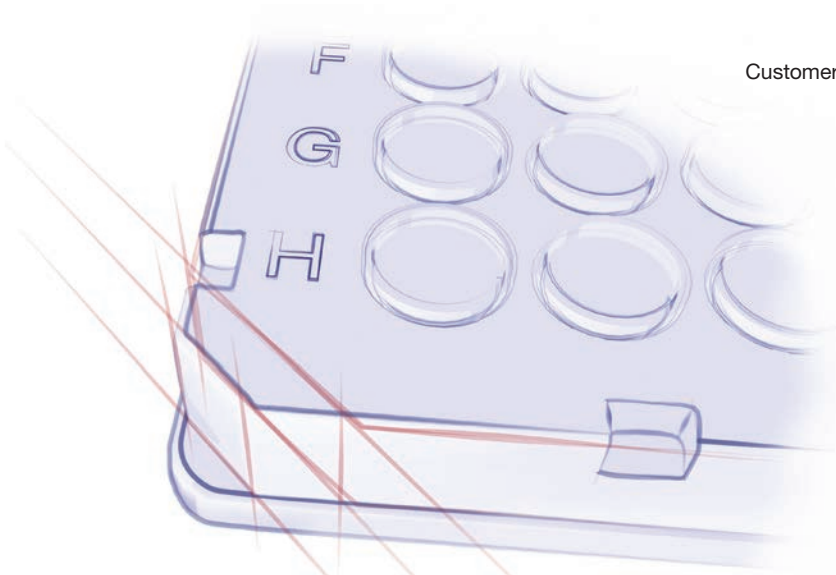
How would you like your versions to appear?



Own brand name



Customer-specific degree of purity



Customization to systems of other manufacturers

OEM-components/products are sold exclusively to companies who sell these goods on to third parties in conjunction with their own products or as a component of their kits. · Technical specifications subject to change.



The appendix is a compact collection of important tips and tricks for our team that has been constantly updated over many years. It answers questions on modern applications for your daily laboratory work and offers interesting facts.



5. Appendix

**Useful information,
tips and tricks
for the laboratory**

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Index – 1. Abbreviations, symbols, conversion factors and data

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1.1. Conversions and foreign units**1.1.1. Volume and weight** (Density = 1 g/mL)

Volume:	Weight:
1 nL	1 µg
1 µL	1 mg
1 mL	1 g
1 L	1,000 g (1 kg)

1.1.2. Time units**Conversion factors:**

1 day	= 1.44 x 10 ³ min	= 8.64 x 10 ⁴ s
1 year	= 5.26 x 10 ⁵ min	= 3.16 x 10 ⁷ s

1.1.3. Foreign units**Lengths:**

1 inch (in)	= 2.54 cm
1 foot (ft)	= 12 inches = 30.48 cm

Volumes (GB):

1 pint (pt)	= 0.5679 L
1 quart (qt)	= 2 pints = 1.1359 L
1 gallon (gal)	= 4 quarts = 4.5435 L

Volumes (US):

1 pint (pt)	= 0.4729 L
1 quart (qt)	= 2 pints = 0.9458 L
1 gallon (gal)	= 4 quarts = 3.7832 L

Temperature:

1° Kelvin (K)	= °C + 273.151°
1° Fahrenheit (F)	= [(°C - 32) x 10] ÷ 18

1.2. Conversion factors, old units to actual units

Size:	Old unit resp. commonly used unit:	Actual unit:
Pressure	1 at	0.980665 10 ⁴ Pa
	1 Atm (=760 Torr)	1.01325 10 ⁵ Pa
	1 Torr	1.3332 10 ² Pa
	1 bar	1 10 ⁵ Pa
	1 mbar	1 hPa
Energy	1 mkp	9.80665 J
	1 kcal	4.1868 kJ
	1 erg	10 ⁻⁷ J
Radioactive decay	1 dpm	60 Bq
	1 Ci = 2.22 x 10 ¹² dpm	3.7 x 10 ¹⁰ Bq
	1 mCi = 2.22 x 10 ⁹ dpm	3.7 x 10 ⁷ Bq
	1 µCi = 2.22 x 10 ⁶ dpm	4.7 x 10 ⁴ Bq

1.3. Metric prefixes

E	=	exa	=	10 ¹⁸
P	=	peta	=	10 ¹⁵
T	=	tera	=	10 ¹²
G	=	giga	=	10 ⁹
M	=	mega	=	10 ⁶
k	=	kilo	=	10 ³
h	=	hecto	=	10 ²
da	=	deca	=	10 ¹
d	=	deci	=	10 ⁻¹
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

1. Abbreviations, symbols, conversion factors and data

1.4. Greek alphabet

α	A	Alpha
β	B	Beta
γ	Γ	Gamma
δ	Δ	Delta
ϵ	E	Epsilon
ζ	Z	Zêta
η	H	Êta
θ	Θ	Thêta
ι	I	Jota
κ	K	Kappa
λ	Λ	Lambda
μ	M	My
ν	N	Ny
ξ	Ξ	Xi
\omicron	O	Omikron
π	Π	Pi
ρ	P	Rho
σ	Σ	Sigma
τ	T	Tau
υ	Y	Ypsilon
ϕ	Φ	Phi
χ	X	Chi
ψ	Ψ	Psi
ω	Ω	Omega

Abbreviations and symbols

bp	base pair
Da	Dalton, the unit of molecular mass; kDa = 1,000 Da, MDa = 1,000,000 Da.
ds	double-stranded (as in dsDNA)
kb	kilobase: 1,000 bases or base pairs, as appropriate
M	Molar or molarity, moles of solute per liter of solution (mol/L)
Mb	megabase: 1,000,000 bp
MW	molecular weight (g/mol)
mol	Mole, absolute amount of a substance (1 mol = 6.023×10^{23} , Avogadro number)
ss	single-stranded (as in ssDNA)
λ	wavelength
λ_{\max}	wavelength at the absorption maximum

1.5. Tris-HCl buffer, pH values

5 °C	7.76	7.89	7.97	8.07	8.18	8.26	8.37	8.48	8.58	8.68	8.78	8.88	8.98	9.09	9.18	9.28
25 °C	7.20	7.30	7.40	7.50	7.60	7.70	7.80	7.90	8.00	8.10	8.20	8.30	8.40	8.50	8.60	8.70
37 °C	6.91	7.02	7.12	7.22	7.30	7.40	7.52	7.62	7.71	7.80	7.91	8.01	8.10	8.22	8.31	8.42

1.6. Nucleic acid conversions

1.6.1. Conversion of weight to absolute quantity (mol)

1 μ g of 1,000 bp DNA	= 1.52 pmol	= 9.1×10^{11} molecules
1 μ g of pUC18/19 DNA (2,686 bp)	= 0.57 pmol	= 3.4×10^{11} molecules
1 μ g of pBR322 DNA (4,361 bp)	= 0.35 pmol	= 2.1×10^{11} molecules
1 μ g of M13mp18/19 DNA (7,250 bp)	= 0.21 pmol	= 1.3×10^{11} molecules
1 μ g of λ -DNA (48,502 bp)	= 0.03 pmol	= 1.8×10^{10} molecules

1.6.2. Conversion of absolute quantity (mol) to weight

1 pmol of 1,000 bp DNA	= 0.66 μ g
1 pmol of pUC18/19 DNA (2,686 bp)	= 1.77 μ g
1 pmol of pBR 322 DNA (4,361 bp)	= 2.88 μ g
1 pmol of M13mp18/19 DNA (7,250 bp)	= 4.78 μ g
1 pmol of λ -DNA (48,502 bp)	= 32.01 μ g

1. Abbreviations, symbols, conversion factors and data

1.6.3. Molecular weight of DNA fragments

500 bp dsDNA	= 325,000 Da
500 nt (nucleotide) ssDNA	= 162,500 Da
1 kb dsDNA	= 660,000 Da
1 kb ssDNA	= 330,000 Da
1 kb ssRNA	= 340,000 Da
1 MDa dsDNA	= 1.52 kb
Average molecular weight of dNMP	= 325 Da
Average molecular weight of DNA base pair	= 650 Da

1.6.4. Molecular weights for nucleotides

Compound	Molecular weight (in Dalton)
ATP	507.2
CTP	483.2
GTP	523.2
UTP	484.2
dATP	491.2
dCTP	467.2
dGTP	507.2
dTTP	482.2
AMP	347.2
CMP	323.2
GMP	363.2
UMP	324.2
dAMP	312.2
dCMP	288.2
dGMP	328.2
dTMP	303.2

1.7. Protein conversions

1.7.1. Conversion of proteins to DNA length

Protein with a molecular weight of 10,000	= 270 bp DNA
Protein with a molecular weight of 30,000	= 810 bp DNA
Protein with a molecular weight of 37,000 (corresponds to 333 amino acids)	= 1,000 bp DNA
Protein with a molecular weight of 50,000	= 1.35 kb DNA
Protein with a molecular weight of 100,000	= 2.7 kb DNA

1.7.2. Conversion of absolute quantity (mol) to weight

100 pmoles of 100,000 Da protein	= 10 µg
100 pmoles of 50,000 Da protein	= 5 µg
100 pmoles of 10,000 Da protein	= 1 µg

1.8. DNA content of various organisms

Organism	DNA content (in bp) (haploid Genome)
<i>Escherichia coli</i>	4.2×10^6
<i>Arabidopsis thaliana</i>	4.7×10^6
<i>Saccharomyces cerevisiae</i>	1.4×10^7
<i>Drosophila melanogaster</i>	1.4×10^8
<i>Homo sapiens</i>	3.3×10^9
<i>Triticum aestivum</i> (hexaploid wheat)	1.7×10^{10}

2. Elements, reagents, chemicals and isotopes

2.1. Atomic numbers and atomic weights of elements			
Element	Symbol	Atomic number	Atomic weight
Actinium	Ac	89	227.03
Aluminum	Al	13	26.98
Americium	Am	95	243.06
Antimony	Sb	51	121.75
Argon	Ar	18	39.95
Arsenic	As	33	74.92
Astatine	At	85	210.99
Barium	Ba	56	137.34
Berkelium	Bk	97	247.07
Beryllium	Be	4	9.01
Bismuth	Bi	83	208.98
Boron	B	5	10.81
Bromine	Br	35	79.9
Cadmium	Cd	48	112.4
Calcium	Ca	20	40.08
Californium	Cf	98	249.07
Carbon	C	6	12.01
Cerium	Ce	58	140.12
Cesium	Cs	55	132.91
Chlorine	Cl	17	35.45
Chromium	Cr	24	52
Cobalt	Co	27	58.93
Copper	Cu	29	63.55
Curium	Cm	96	245.07
Dysprosium	Dy	66	162.5
Einsteinium	Es	99	254.09
Erbium	Er	68	167.26
Europium	Eu	63	151.96
Fermium	Fm	100	252.08
Fluorine	F	9	18.99
Francium	Fr	87	223.02
Gadolinium	Gd	64	157.25
Gallium	Ga	31	69.72
Germanium	Ge	32	72.59
Gold	Au	79	196.97
Hafnium	Hf	72	178.49
Helium	He	2	4
Holmium	Ho	67	164.93
Hydrogen	H	1	1.01
Indium	In	49	114.82
Iodine	I	53	126.9
Iridium	Ir	77	192.22
Iron	Fe	26	55.58
Khurchatovium	Kh	104	260
Krypton	Kr	36	83.8
Lanthanum	La	57	138.91
Lawrencium	Lr	103	256
Lead	Pb	82	207.2
Lithium	Li	3	6.94
Lutetium	Lu	71	174.97
Magnesium	Mg	12	24.31
Manganese	Mn	25	54.94

2.1. Atomic numbers and atomic weights of elements			
Element	Symbol	Atomic number	Atomic weight
Mendelevium	Md	101	255.09
Mercury	Hg	80	200.59
Molybdenum	Mo	42	95.94
Neodymium	Nd	60	20.183
Neon	Ne	10	20.18
Neptunium	Np	93	237.05
Nickel	Ni	28	58.71
Niobium	Nb	41	92.91
Nitrogen	N	7	14.01
Nobelium	No	102	255
Osmium	Os	76	190.2
Oxygen	O	8	16
Palladium	Pd	46	106.4
Phosphorus	P	15	30.97
Platinum	Pt	78	195.09
Plutonium	Pu	94	242.06
Polonium	Po	84	208.98
Potassium	K	19	39.1
Praseodymium	Pr	59	140.91
Promethium	Pm	61	145
Protactinium	Pa	91	231.04
Radium	Ra	88	226.03
Radon	Rn	86	222.02
Rhenium	Re	75	186.2
Rhodium	Rh	45	102.91
Rubidium	Rb	37	85.47
Ruthenium	Ru	44	101.07
Samarium	Sm	62	150.4
Scandium	Sc	21	44.96
Selenium	Se	34	78.96
Silicon	Si	14	28.09
Silver	Ag	47	107.87
Sodium	Na	11	22.99
Strontium	Sr	38	87.62
Sulfur	S	16	32.06
Tantalum	Ta	73	180.95
Technetium	Tc	43	98.91
Tellurium	Te	52	127.6
Terbium	Tb	65	158.93
Thallium	Tl	81	204.37
Thorium	Th	90	232.04
Thulium	Tm	69	168.93
Tin	Sn	50	118.69
Titanium	Ti	22	47.9
Tungsten	W	74	183.85
Uranium	U	92	238.03
Vanadium	V	23	50.94
Xenon	Xe	54	131.3
Ytterbium	Yb	70	173.04
Yttrium	Y	39	88.91
Zinc	Zn	30	65.37
Zirconium	Zr	40	91.22

2. Elements, reagents, chemicals and isotopes

2.2. Acids and bases

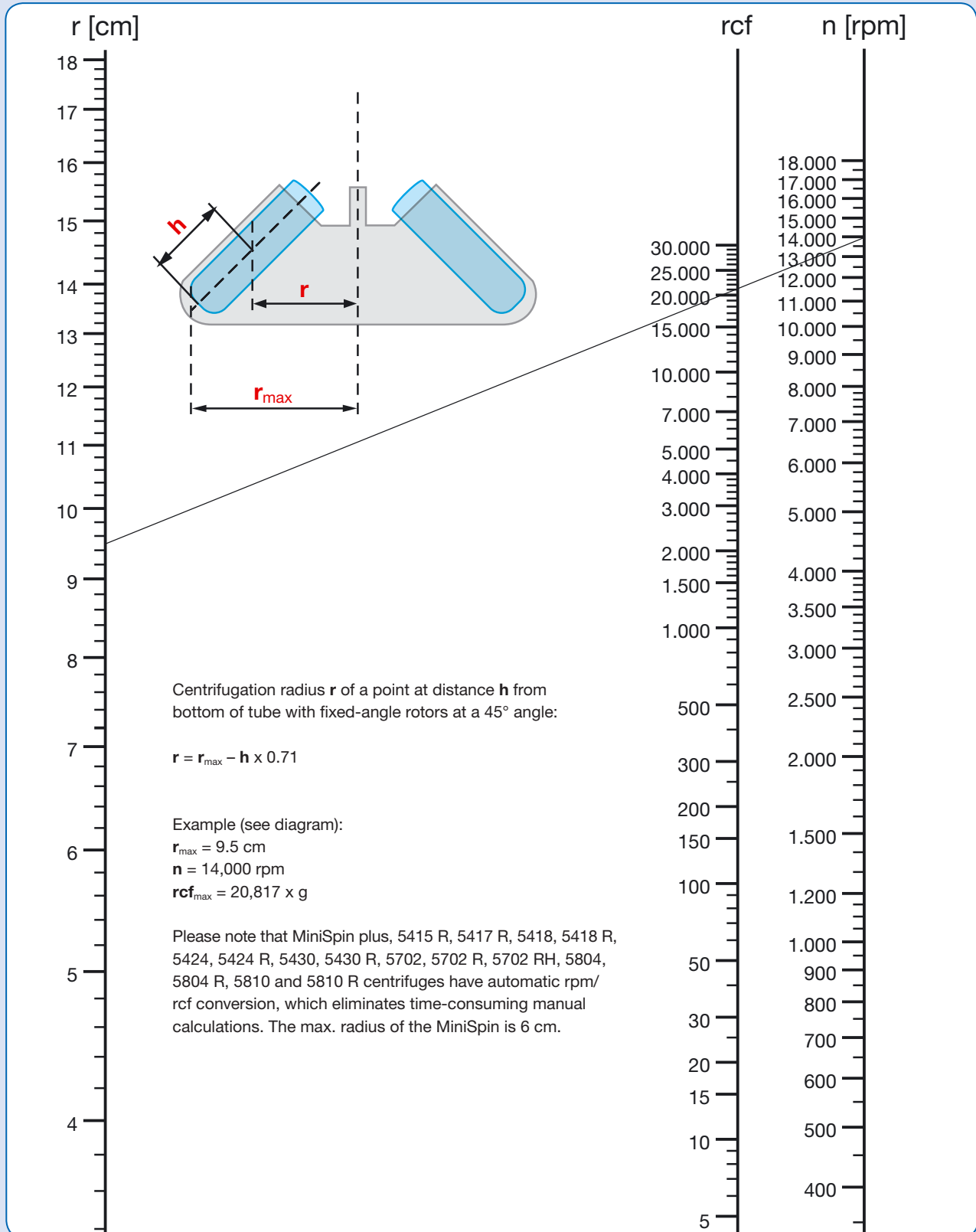
	Molecular weight	% by weight	Molarity (approx.)	1 M solution (mL/L)	Specific gravity
Acids					
Acetic acid (glacial)	60.05	99.6	17.4	57.5	1.05
Formic acid	46.03	90	23.6	42.4	1.205
		98	25.9	38.5	1.22
Hydrochloric acid	36.46	36	11.6	85.9	1.18
Nitric acid	63.01	70	15.7	63.7	1.42
Perchloric acid	100.46	60	9.2	108.8	1.54
		72	12.2	82.1	1.70
Phosphoric acid	98.00	85	14.7	67.8	1.70
Sulfuric acid	98.07	98	18.3	54.5	1.835
Bases					
Ammonium hydroxide	35.0	28	14.8	67.6	0.90
Potassium hydroxide	56.11	45	11.6	82.2	1.447
Sodium hydroxide	40.0	50	19.1	52.4	1.53

2.3. Isotopes – physical properties of commonly used isotopes

Nuclide	Half-life	Emission	Energy, max. (MeV)	Range of emission, max.	Rec. shielding (half value layer)
³ H	12.43 years	β	0.0186	0.42 cm (air)	–
¹⁴ C	5,370 years	β	0.156	21.8 cm (air)	–
³² P	14.3 days	β	1.71	610 cm (air)	Acrylic (1 cm)
				0.8 cm (water)	–
				0.76 cm (acrylic)	–
³³ P	25.4 days	β	0.249	49 cm	Acrylic (1 cm)
³⁵ S	87.4 days	β	0.167	24.4 cm (air)	–
¹²⁵ I	60 days	γ	0.27–0.035	0.2 mm (lead)	Lead (0.02 mm)

3. Application tips for centrifugation

3.1. Conversion table for rpm/rcf (nomogram)



3. Application tips for centrifugation

3.2. k-factors and centrifugation times

The k-factor, a value that is primarily determined by the rotor, affects the sedimentation time necessary during centrifugation. It is a measure for the sedimentation distance in the test tube, i.e., for the difference between the longest and shortest distance between the sample and the rotor axis (see diagram). The duration of separation in the test tube increases in direct proportion to its distance. The k-factor clearly depends on the angle of the tubes in the rotor and on the type of tubes used. A small k-factor means more rapid separation. The k-factor is also affected by the rotational speed; the higher the rotational speed, the quicker the separation.

The formula is

$$k = \frac{\ln\left(\frac{r_{\max}}{r_{\min}}\right)}{n^2} \times 2.533 \times 10^{11}$$

n = rotational speed; r_{\min} and r_{\max} : see diagram

A direct comparison of two rotors is possible by calculating the relative speed of a separation in both centrifuge rotors.

The formula for calculating the relative centrifugation time is

$$t_x = t \times \left(\frac{k_x}{k}\right)$$

t = Centrifugation time in the comparative centrifuge, calculated from experiment

t_x = Centrifugation time required in centrifuge X

k = k-factor of the comparative centrifuge

k_x = k-factor of centrifuge X

Example:

The 30-position fixed-angle rotor in Centrifuges 5430 has a k-factor of 508 at a maximum speed of 14,000 rpm and a maximum rcf of 20,817 x g. With the same rotor angle (45°) and the same maximum speed (14,000 rpm), the 18-position fixed-angle rotor of Centrifuge 5418 attains a maximum rcf of 16,873 x g and a k-factor of 719.

In the case of Models 5430 and 5418: a centrifugation time of only 7 minutes is required in the 5430 to attain the same separation performance for the selected separation example; in contrast, the 5418 requires 10 minutes.

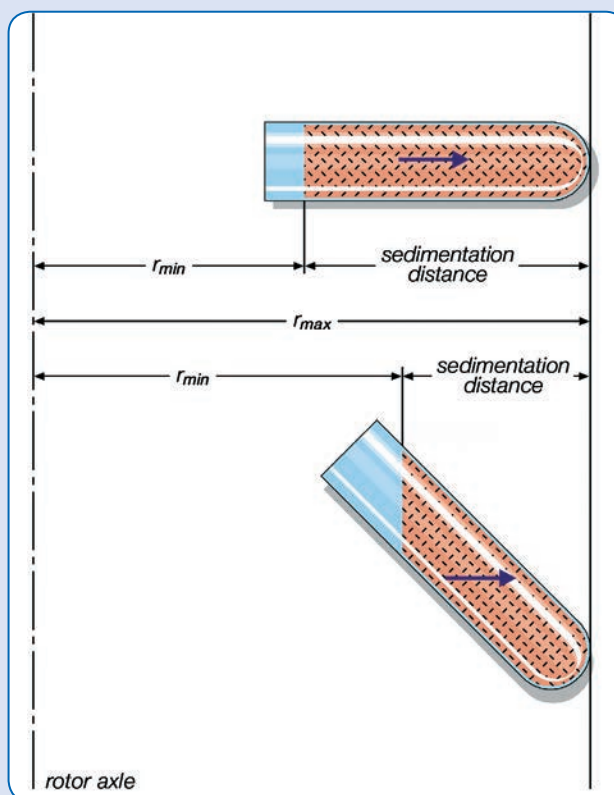
Separation example:

$$t_{5430} = t_{5418} \times \left(\frac{k_{5430}}{k_{5418}}\right)$$

$$t_{5430} = 10 \text{ min} \times \left(\frac{508}{719}\right)$$

$$t_{5430} = 7.07 \text{ min} = 7'04''$$

When determining centrifugation times, it is therefore advisable to take into consideration the physical characteristics of the centrifuge used, particularly when using critical samples and small sample quantities.



4. Genetic code, properties and molecular structure of amino acids

4.1. Genetic code

		2 nd Codon position								
		U		C		A		G		
1 st Codon position	U	UUU	<i>Phe</i>	UCU	<i>Ser</i>	UAU	<i>Try</i>	UGU	<i>Cys</i>	U
		UUC		UCC		UAC		UGC		C
		UUA	<i>Leu</i>	UCA		UAA	<i>Stop</i>	UGA	<i>Stop</i>	A
		UUG		UCG		UAG	<i>Stop</i>	UGG	<i>Trp</i>	G
	C	CUU	<i>Leu</i>	CCU	<i>Pro</i>	CAU	<i>His</i>	CGU	<i>Arg</i>	U
		CUC		CCC		CAC		CGC		C
		CUA		CCA		CAA	<i>Gln</i>	CGA		A
		CUG		CCG		CAG		CGG		G
	A	AUU	<i>Ile</i>	ACU	<i>Thr</i>	AAU	<i>Asn</i>	AGU	<i>Ser</i>	U
		AUC		ACC		AAC		AGC		C
		AUA		ACA		AAA	<i>Lys</i>	AGA	<i>Arg</i>	A
		AUG	<i>Met/Start</i>	ACG		AAG		AGG		G
	G	GUU	<i>Val</i>	GCU	<i>Ala</i>	GAU	<i>Asp</i>	GGU	<i>Gly</i>	U
		GUC		GCC		GAC		GGC		C
		GUA		GCA		GAA	<i>Glu</i>	GGA		A
		GUG		GCG		GAG		GGG		G

In yeast mitochondria, the AUA and UGA codons are used for Met and Trp, not for Ile and Stop as normally.
Start codon:
AUG: Methionine

Termination codons:

UAA:	ochre
UAG:	amber
UGA:	opal

4.2. Nomenclature and properties of amino acids

Amino acid	3-letter symbol	1-letter symbol	Major properties of side chains
Alanine	Ala	A	Aliphatic
Arginine	Arg	R	Basic group
Asparagine	Asn	N	Amide group
Aspartic acid	Asp	D	Acidic group
Cysteine	Cys	C	Sulfur-containing
Glutamic Acid	Glu	E	Acidic group
Glutamine	Gln	Q	Amide group
Glycine	Gly	G	No side chain
Histidine	His	H	Imidazole group
Isoleucine	Ile	I	Aliphatic
Leucine	Leu	L	Aliphatic
Lysine	Lys	K	Basic group
Methionine	Met	M	Sulfur-containing
Phenylalanine	Phe	F	Aromatic group
Proline	Pro	P	Aliphatic
Serine	Ser	S	Hydroxyl group
Threonine	Thr	T	Hydroxyl group
Tryptophan	Trp	W	Aromatic group
Tyrosine	Tyr	Y	Aromatic group
Valine	Val	V	Aliphatic

4. Genetic code, properties and molecular structure of amino acids

4.3. Molecular structure of amino acids

Alanine (Ala)	Arginine (Arg)	Asparagine (Asn)	Aspartic acid (Asp)
Cysteine (Cys)	Glutamine (Gln)	Glutamic acid (Glu)	Glycine (Gly)
Histidine (His)	Isoleucine (Ile)	Leucine (Leu)	Lysine (Lys)
Methionine (Met)	Phenylalanine (Phe)	Proline (Pro)	Serine (Ser)
Threonine (Thr)	Tryptophan (Trp)	Tyrosine (Tyr)	Valine (Val)

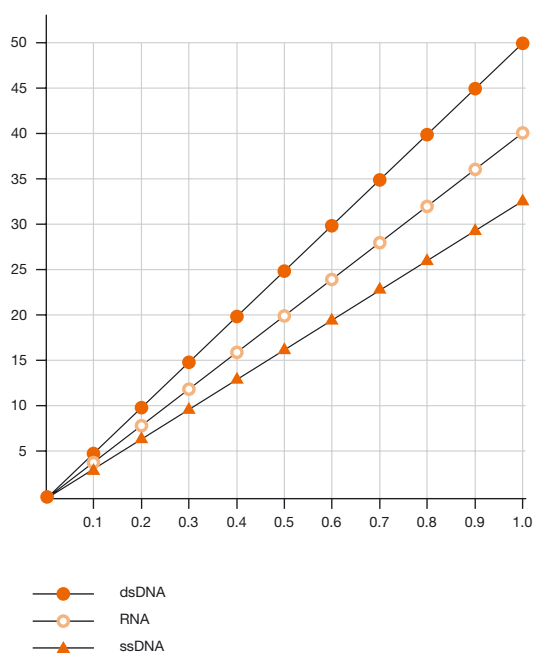
5. Photometric detection of nucleic acids and proteins

5.1. Spectrophotometric conversion of nucleic acids and proteins

5.1.1. Physical properties of nucleotides

Compound	Molecular weight	λ max (pH 7,0)	Absorbance at λ max of a 1 M solution (pH 7.0)
ATP	507.2	259 nm	15,400
CTP	483.2	271 nm	9,000
GTP	523.2	253 nm	13,700
UTP	484.2	260 nm	10,000
dATP	491.2	259 nm	15,200
dCTP	467.2	271 nm	9,300
dGTP	507.2	253 nm	13,700
dTTP	482.2	267 nm	9,600

5.1.2. Conversion to concentration ($\mu\text{g/mL}$)



Double-stranded DNA (dsDNA):

$A_{260} = OD_{260} = 1$ for a 50 $\mu\text{g/mL}$ dsDNA-solution*

Single-stranded RNA:

$A_{260} = OD_{260} = 1$ for a 40 $\mu\text{g/mL}$ RNA-solution*

Single-stranded DNA (ssDNA):

$A_{260} = OD_{260} = 1$ for a 33 $\mu\text{g/mL}$ ssDNA-solution*

Absorbance is calculated as:

Molar extinction coefficient x concentration x path length
(usually cuvette width)

* These values apply when using a neutral-to-light alkaline measuring medium and a cuvette optical path length of 1 cm.

5. Photometric detection of nucleic acids and proteins

5.1.3. Quantification made easy

With the aid of spectroscopy, the quantitative analysis of nucleic acids and proteins has established itself as a routine method in many laboratories. It includes absorption measurements in the ultraviolet and visible ranges. Proteins are measured (directly) at 280 nm and nucleic acids at 260 nm; colorimetric protein determination is performed in the 550 nm to 600 nm range. The Eppendorf® BioPhotometer plus offers the following preinstalled test procedures:

1. Nucleic acid determination

DNA, RNA, oligonucleotides and even mononucleotides can be measured directly in aqueous solutions. Aqueous buffers with low ion concentrations (e.g., TE buffer) are ideal for this method. The concentration is determined by measuring at 260 nm against a blank and then calculating via a factor. Normally, the user has to calculate the concentration of the measured sample using the appropriate factor. The BioPhotometer plus can change these factors easily and will do all necessary calculations.

The absorption of 1 OD at 260 nm is equivalent to approximately 50 µg/mL dsDNA, 37 µg/mL ssDNA, 40 µg/mL RNA or 30 µg/mL for oligonucleotides. Purity determination of DNA interference by contaminants can be recognized by ratio calculations. The ratio A_{260}/A_{280} is used to estimate the purity of nucleic acid since proteins absorb at 280 nm. Pure DNA should have a ratio of approximately 1.8, whereas pure RNA should give a ratio of approximately 2.0. Absorption at 230 nm reflects contamination of the sample by substances such as carbohydrates, peptides, phenols or aromatic compounds. In the case of pure samples, the ratio A_{260}/A_{230} should be > 2.0 .

2. Protein determination

The protein content of a sample can be determined by various analytical procedures using the BioPhotometer plus. Calculations can be performed via factor or via a calibration curve with up to 10 standards.

2.1 Absorption measurement at 280 nm (A_{280})

A_{280} method may be used in concentrations of up to approximately 4 mg/mL (3.0 A). This method is simple and rapid, but it may be disturbed by the parallel absorption of non-proteins (e.g., DNA). Unlike the colorimetric process, this method is less sensitive, requires higher protein concentrations and should thus be used with pure protein solutions. In addition to the direct absorbance display, evaluation is possible with the BioPhotometer plus via the Warburg formula or against a standard.

2.2 Colorimetric determination (dye tests)

Protein samples often consist of a complex mixture of many different proteins. The quantitative detection of the protein content is usually based on the reaction shown by functional groups of the proteins to dye-forming reagents. The intensity of the dye correlates directly with the concentration of the

reacting groups and can be measured exactly. Different methods for dye-quantification are available depending on the type of dye being used:

2.2.1 Lowry assay

Specialist literature contains a multitude of modifications for the Lowry assay. The principal goal is to reduce the high susceptibility to interference. In comparison to the pure Biuret assay, the sensitivity of this assay is greatly increased. However, the Lowry method is adversely affected by a wide range of nonproteins. Additives such as EDTA, ammonia sulfate or Triton® X-100, in particular, are incompatible with the test.

2.2.2 Bicinchoninine acid assay (BCA)

This test represents a highly regarded alternative to the Lowry assay. It is easier to perform, sensitivity can be varied using different temperatures and the dye complex is very stable. In addition, its sensitivity to detergents is similar to that of the Lowry method. This test is also highly susceptible to interference.

2.2.3 Bradford assay

This most rapid and easiest method to use is twice as sensitive as the Lowry or BCA tests and is thus the most sensitive quantitative dye assay. Its additional advantage is that a number of reducing substances (e.g., DTT and mercaptoethanol), which interfere with the Lowry or BCA test, have no adverse effect on results; however, it is sensitive to several detergents. The main disadvantage is that identical amounts of different standard proteins can cause considerable differences in the resulting absorption coefficients.

3. Bacterial cell density

The density of bacterial suspensions may be measured photometrically at OD600 without adding dyes. This applies, for example, to the preparation of competent cells, which must be in a specific phase of growth.

More informations: www.eppendorf.com/60seconds

References:

- (1) Wilfinger W.W., Mackey K. and Chomczynski P. 1997. Effect of pH and ionic strength on the spectrophotometric assessment of nucleic acid purity. *BioTechniques* 22: 474-481.
- (2) Sambrook J. and Russell D.W. 2001. Spectrophotometry of DNA or RNA. *Molecular Cloning*. Third Edition 3: A8.20-A8.21.
- (3) Janke S.A., Fortnagel P. und Bergmann R. 1999. Turbidimetrie in der Mikrobiologie mit Standardphotometern. *Biospektrum* 6: 501-502.

* Triton® is a registered trademark of Union Carbide Chemicals + Plastics Co., Inc.

6. Application tips for PCR

6.1. Procedure and parameters for PCR

This PCR table is intended to provide all PCR newcomers with an overview of the common rules and concentrations that should be observed when developing their experiments.

There are, of course, a number of exceptions and special points that we are unable to accommodate in the table.

Steps	Basic rules		Comments
1 No. of cycles	No. of source molecules	No. of cycles	Do only perform as many cycles as necessary to obtain sufficient PCR product. With too many cycles the formation of unspecific products may occur.
	10 ⁵	25–30	
	10 ⁴	30–35	
	10 ³	35–40	
	50 and less	20–30 followed by a second PCR with “nested” primers, i. e. with a primer pair that binds between the first two primers of the target sequence	
2 Denaturation step	<ul style="list-style-type: none"> ● 95 °C for 30 s or 97 °C for 15 s ● For complex templates (e.g. genomic DNA) begin with an initial denaturation for 2–3 min before the actual cycles ● G/C content greater than 50% increases the denaturation temperature 		Inefficient denaturation is a frequent cause of errors. However: <ul style="list-style-type: none"> ● T_{1/2} <i>Taq</i> at 92.5 °C = 2 h ● T_{1/2} <i>Taq</i> at 95.0 °C = 40 min ● T_{1/2} <i>Taq</i> at 97.5 °C = 5 min (T _{1/2} = half life of <i>Taq</i> at a specific temperature)
3 Annealing step	For standard primers (approx. 20 nucleotides [nt]; 1 μM; 100% match) <ul style="list-style-type: none"> ● Approx. 20 s, T_m should be approx. 55–72 °C 		<ul style="list-style-type: none"> ● Low concentrations and long primers extend necessary annealing times. The optimal annealing temperature is normally 5–10 °C lower than the primer melting temperature (T_m). The T_m value can be calculated using the following formulas: ● T_m = (A+T) × 2 + (C+G) × 4 [Wallace], up to approx. 20 nt ● T_m = 81.5 °C + 16.6 (log[Na⁺]) + 0.41 (%G+C) – (500/n) – 0.61 (%FA) [Meinkoth and Wahl]; FA = Formamide
4 Elongation step	<ul style="list-style-type: none"> ● 1 kb require approx. 1 min 		<ul style="list-style-type: none"> ● The shorter the fragment, the easier it is to control the reaction ● 200–500 bp fragments are sufficient for most detection reactions
5 Basic thermo cycling protocol	Initial denaturation: 2 min 94 °C Denaturation: 0.5 min 94 °C Annealing: 0.5 min 50–68 °C Elongation: 1 min/kb 72 °C Final elongation: 10 min 72 °C	} 25–35 cycles	

We invite you to send us any comments or tips of general interest on this topic.

References: Sambrook, J., Fritsch EF., Maniatis T. *Molecular cloning*, 2nd ed. New York; Cold Spring Harbor Laboratory Press: 1989

6. Application tips for PCR

Reagents	Basic rules	Comments
Buffers	<p>The most common components (as 10x buffers):</p> <ul style="list-style-type: none"> ● 500 mM KCl ● 100 mM Tris-HCl, pH 8.3 (at 25 °C) or 150–200 mM (NH₄)₂SO₄ with 500–750 mM Tris-HCl, pH 9 (at 25 °C) ● 1–2% Triton® X-100 or 0.1% Tween® ● 10–15 mM Mg²⁺ (usually available separately) 	<ul style="list-style-type: none"> ● The buffers delivered with the polymerase are specially tailored to this variety, and it is often not possible to use them with enzymes from other manufacturers ● NaCl concentrations greater than 50 mM inhibit the <i>Taq</i> polymerase ● Mg²⁺ must be added (if not present in buffer) as Mg²⁺ is essential as a cofactor for the DNA polymerase
Mg²⁺	<ul style="list-style-type: none"> ● 0.5–3.5 mM in the assay ● Essential as a cofactor of the DNA polymerase 	<ul style="list-style-type: none"> ● If dUTP is used instead of dTTP, the Mg²⁺ concentration usually must be increased (max. 5 mM). ● Concentration too high: promotes the amplification of nonspecific fragments (smears appear); increases the melting temperature ● Concentration too low: reduces annealing efficiency and the synthesis rate of the polymerase
<i>Taq</i> Polymerase	<ul style="list-style-type: none"> ● 0.5–2.5 units per PCR reaction 	<ul style="list-style-type: none"> ● Concentration too high: reduced specificity ● Concentration too low: reduced efficiency ● Please see step 2, “Denaturation step”
dNTP	<ul style="list-style-type: none"> ● Storage in 10 mM, pH 7.0 aliquots ● 20–200 μM in the assay 	<ul style="list-style-type: none"> ● Concentration too high: leads to mispriming and the misincorporation of nucleotides ● Following a successful PCR, theoretically the major part of the dNTPs are left over ● All nucleotides must have the same concentration ● Modified nucleotides must have a higher concentration
Primer	<ul style="list-style-type: none"> ● 0.1–1 μM in the assay ● Length: approx. 15–30 nt 	<ul style="list-style-type: none"> ● Secondary structures should not be able to form (Stemloop, Hairpin) ● Primer must not be complementary at the 3' ends, as this will lead to the formation of primer-dimers ● Both primers should have the same T_m ● No stretches of individual nucleotides ● G or C at the 3' end improves binding

Triton® is a registered trademark of Union Carbide Chemicals and Plastics Co., Inc.
 Tween® is a registered trademark of ICI Americas, Inc.

6. Application tips for PCR

6.2. Calculating primer quantity

6.2.1. Conversion to absolute quantity (in pmole)

$$\text{Primer in pmole} = \frac{\text{Weight in } \mu\text{g} \times 1,000,000}{\text{Length} \times 327}$$

Example: 0.1 μg of 20 oligomer:

$$\frac{0.1 \times 1,000,000}{20 \times 327} = 15.3 \text{ pmole primer}$$

6.2.2. Conversion to weight (in μg)

$$\text{Weight in } \mu\text{g} = \frac{\text{pmol} \times \text{Length} \times 327}{1,000,000}$$

Example: 10 pmol of 25 oligomer:

$$\frac{10 \times 25 \times 327}{1,000,000} = 0.081 \text{ } \mu\text{g primer}$$

6.2.3. Calculation of the molar concentration of the primer

Micromolar concentration of primer = pmol/ μL

Example 1

20 pmol of primer
in 100 μL PCR mixture = 0.20 micromolar (μM)

Example 2

Primer is 24 nucleotides in length and
is dissolved in 0.1 mL of water

A 10 μL aliquot is diluted to 1.0 mL for A_{260} measurement: $A_{260} = 0.76$.
The stock solution has an absorbance at 260 nm (A_{260}) of 76.
The stock solution (0.1 mL) contains 2.6 A_{260} units.

The base composition of the primer is:

A = 6
C = 6
G = 6
T = 6

The Molar Extinction Coefficient at 260 nm for the primer = **k** (15,200) + **l** (12,010) + **m** (7,050) + **n** (8,400) where:

k = number of A's
m = number of G's
l = number of C's
n = number of T's

The Molar Extinction of the PCR primer = **6** (15,200) + **6** (12,010) + **6** (7,050) + **6** (8,400) = 255,960a

The Molar concentration of the PCR primer stock solution is $\frac{76}{255,960} = 297 \text{ micromolar}$

6.3. Optimization of the Primer concentration (Primer-Matrix)

A Primer-Matrix that spans a range of common concentrations of the forward and reverse primer is recommended to find the optimal combination of concentrations for both primers. Normally a range between 50 nM–900 nM will be tested. A commonly used

Primer-Matrix is featured in Table 1. To achieve the most reliable results, each combination should be performed with 3 replicates and additional negative controls.

Typical used forward and reverse primer combinations for a Primer-Matrix

		Forward				
		50 nM	100 nM	300 nM	600 nM	900 nM
Reverse	50 nM	50/50	100/50	300/50	600/50	900/50
	100 nM	50/100	100/100	300/100	600/100	900/100
	300 nM	50/300	100/300	300/300	600/300	900/300
	600 nM	50/600	100/600	300/600	600/600	900/600
	900 nM	50/900	100/900	300/900	600/900	900/900

6. Application tips for PCR

6.4. Using gradient PCR to optimize different reaction parameters

Gradient PCR is a technique that allows the empirical determination of optimal PCR conditions using the least number of steps. This optimization can often be achieved in just one experiment. Many Eppendorf thermal cyclers feature a temperature gradient function to evaluate 12 to 24 different annealing, elongation and/or denaturation temperatures during a single run. During the same run, a number of other possible reaction variables can also be tested row by row.

Problems with the amplification of a specific DNA fragment are an everyday occurrence in the lab. In many cases, nonspecific bands form during the PCR reaction, which hinder, or even prevent, downstream analyses or an unequivocal assessment of the PCR result. In such cases, PCR conditions must be optimized.

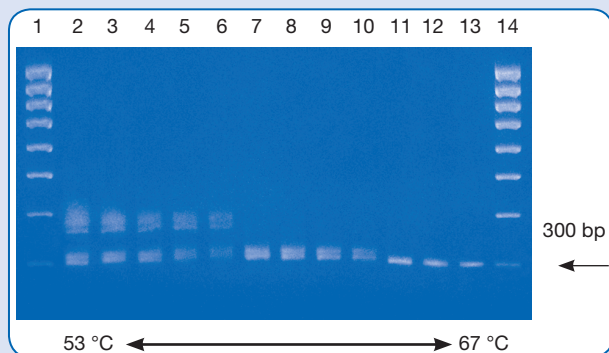


Fig. 1: Determination of the ideal annealing temperature

Annealing temperature

The selection of the annealing temperature is possibly the most critical component for optimizing the specificity of a PCR reaction. In most cases, this temperature must be empirically tested. The formation of nonspecific bands shows that the optimum temperature is often much higher than the calculated temperature (up to 12 °C). Eppendorf® gradient cyclers enable rapid testing of the optimum temperature conditions on one block and in one experiment.

During the annealing step, a temperature gradient is built up consisting of 12 or 24 continuously increasing temperatures across the block. At the same time, each row with 8 or 16 wells shows perfect temperature homogeneity, allowing the possibility to simultaneously test additional reaction components, such as enzyme, primer and template DNA quantities.

Denaturing temperature

As a rule, the denaturation temperature for most DNA samples is between 94 °C and 96 °C. Depending upon its GC content, complexity and structure, the melting point of a DNA fragment can lie considerably above or below this range. However, to ensure minimum reduction of the polymerase activity, the temperature and the dwell time must be kept as low as possible. In these cases, determining the optimal denaturing temperature is greatly facilitated by the Eppendorf gradient cyclers. A gradient between 90 and 99 °C is set to empirically determine the optimal balance between efficient DNA denaturation and reaction conditions that are gentle to enzymes.

Elongation temperature

For most standard applications with *Taq* polymerase, optimization is seldom required. This is not the case for complex protocols, for example, the amplification of long fragments with a mixture of different polymerases. In this case, the optimization of the elongation temperature can play an important role because the ideal temperature for *Taq* polymerases and proofreading enzymes can vary considerably.

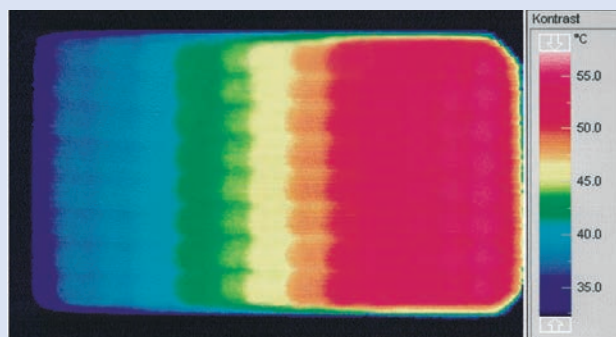


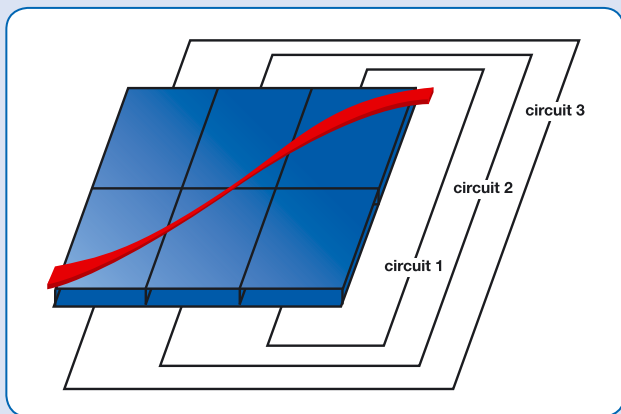
Fig. 2: Thermograph recording of the thermoblock of the Mastercycler® gradient

6. Application tips for PCR and PCR disclaimers

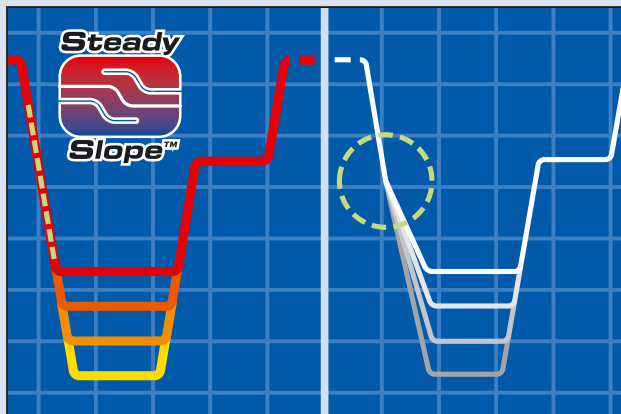
6.5. Eppendorf® thermal cycler: Temperature control means quality

Row homogeneity in the gradient mode

Triple Circuit Technology (TCT) provides an additional heating and cooling zone, thereby ensuring precise control of the temperature for all gradient profiles.



Additional temperature control via TCT



SteadySlope® technology

Constant temperature characteristics in the gradient mode

Comparison device with “dynamic” temperature control characteristic

Changing temperature control characteristic (various cooling speeds) in gradient operation mode

Mastercycler nexus, Mastercycler nexus gradient, Mastercycler nexus eco

Purchase of this instrument conveys a limited non-transferable immunity from suit for the purchaser’s own use under certain non real-time thermal cycler patents licensed from Applied Biosystems, LLC.

Temperature control characteristics

Temperature control characteristics, i.e., the temperature profile and the speed at which temperature control of the samples changes (heating and cooling between the individual PCR steps) plays a key role in PCR. The best known PCR application, which highlights the significance of a reproducible temperature control speed, is random-amplified polymorphic DNA analysis (RAPD) for detecting polymorphisms during DNA fingerprint tests. Variations on the temperature control speed alter the resulting band pattern, as do thermal inaccuracies, making it much more difficult to interpret the results.

A prerequisite for gradient cyclers to successfully transfer PCR protocols from gradient operation to routine operation is to have the temperature curves in both operating modes as similar as possible. With SteadySlope® technology gradient temperatures are always attained with the same temperature characteristics, i.e., each temperature with the optimal speed. For standard PCR applications this is always the highest possible speed, which is clearly defined and is, therefore, reproduced identically in the normal mode. This ensures reliable and uncomplicated transfer of reaction conditions between the two operating modes and rules out any reduction in the yield or specificity caused by changes to the temperature characteristics.

Block Control and Tube Control

Block Control is the preferred operating mode for long, static incubation. However, for short incubation times—such as those that occur during the PCR—the programmed holding time may deviate greatly from the actual holding time for the selected temperature in the reaction mix. Tube Control ensures automatic compensation of this time and that the reaction mix is held at the temperature you have selected for as long as you have programmed it to do so. This is applied identically for all tube types across all Mastercyclers®, allowing you to use the entire block for your samples.

Mastercycler ep realplex

This is a Licensed Real-Time Thermal Cycler or Licensed Real-Time Temperature Cycling Instrument under Applera’s United States Patent No. 6,814,934 and corresponding claims in non-U.S. counterparts thereof, for use in research and for all other applied fields except human in vitro diagnostics. No right is conveyed expressly, by implication or by estoppel under any other patent claim.

7. Eppendorf purity levels for tips, tubes, plates and Combitips®

				 	
Continuous quality control for the following relevant criteria:					
Function, tightness, precision	●	●	●	●	●
Low wetting	●	●	●	●	●
High chemical resistance	●	●	●	●	●
High thermal resistance	●	●	●	●	●
High resistance to centrifugation forces*1	●	●	●	●	●
High transparency	●	●	●	●	●
Precisely shaped	●	●	●	●	●
Lot testing*2 (certified) for the following purity criteria:					
Human DNA-free			●	●	●
DNA-free (Human- + bacterial DNA)					●
DNase-free			●	●	● NEW!
RNase-free			●	●	●
PCR-inhibitor-free			●	●	● NEW!
ATP-free					●
Pyrogen-free (endotoxin-free)		● NEW!		●	●
Sterile (Ph.Eur./USP)		●		●	●
Eppendorf products					
Tips					
epT.I.P.S.® Standard + Box + Set	●				
epT.I.P.S.® Reloads	●		●		
epT.I.P.S.® Racks					●
epT.I.P.S.® Singles					●*3
ep Dualfilter T.I.P.S.®				●	
Combitips plus®	●				●*3
epT.I.P.S.® LoRetention	●		●	●	
epT.I.P.S.® Motion	●	●			
epT.I.P.S.® Motion filtertips		●	●		
Tubes					
Safe-Lock Tubes	●		●		●*3
3810X	●		●		
DNA + Protein LoBind Tubes			●		
PCR Tubes (PCR + real-time PCR)			●		
Cap Strips (PCR + real-time PCR)			●		
Plates and accessories					
Deepwell Plates® + Microplates®		●	●		
Protein LoBind Deepwell Plates®			●		
DNA LoBind Deepwell Plates			●		
twin.tec® PCR Plates (PCR and real-time PCR)			●		
twin.tec® microbiology PCR Plates					●
Heat Sealing Film and Foil			●		
PCR, Storage Films + Foils			●		
Plate Lid		●	●		
UVette®	●		●*4		

*1 For accurate details regarding resistance to centrifugation, please refer to the respective product pages.

*2 Batch-specific certificate can be downloaded from www.eppendorf.com/certificates. *3 Individually packaged. *4 Additionally free of protein (protein-free).

i For more information go to www.eppendorf.com/purity and on pages 47 and 139

7. Pure quality: Eppendorf consumables

Eppendorf consumables for the highest quality and purity:

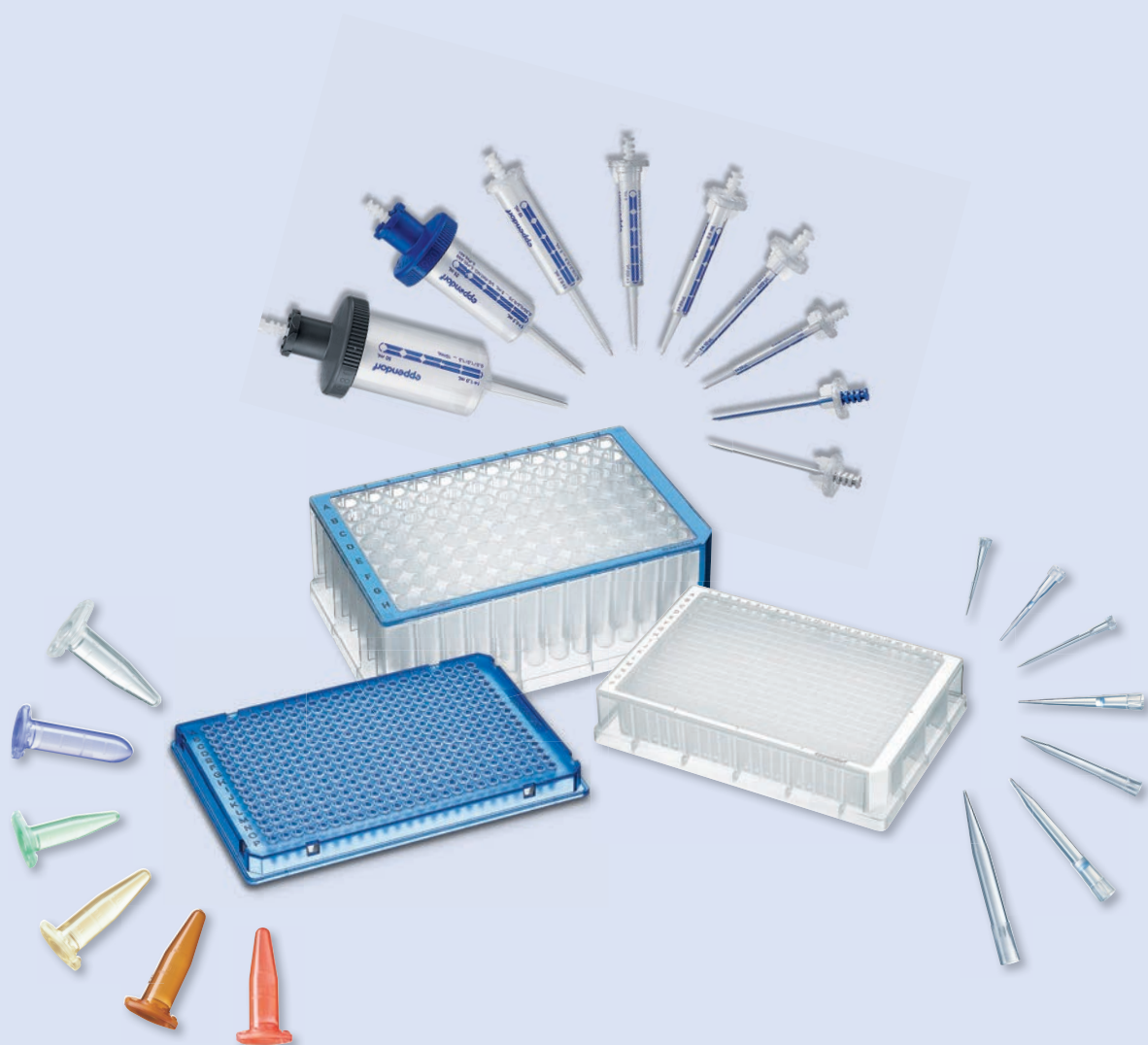
- Manufactured from the purest raw materials
- Fully automatic production in clean room conditions
- Regular quality and functional checks
- Continuous quality assurance throughout the entire production process – from the initial material to the finished product

With the strictest control criteria, internally and externally monitored, we guarantee the consistently high quality of our products – from lot to lot.


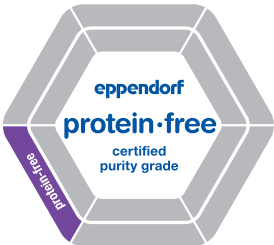

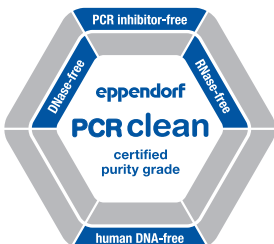
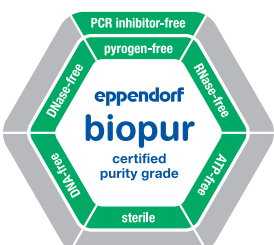
Our consumables are available in a variety of purity qualities:

Eppendorf Quality as well as more advanced purity levels: **Sterile, Protein-free, PCR clean** and **Biopur**.

In addition to our internal process controls, the sterile, protein-free, PCR clean and Biopur purity levels are tested by an external lab lot by lot. This allows us to ensure we consistently meet our customer's high demands when it comes to purity. As a special service, we make the inspection certificate for each delivered lot available online.



7. Pure quality: Eppendorf consumables

	Characteristics	Examples for applications
	<p>Eppendorf Quality</p> <p>Continuous quality controls</p>	All routine lab applications
	<p>Protein-free</p> <p>Continuous, lot-specific quality controls, certified:</p> <ul style="list-style-type: none"> ● Protein-free 	Measurement of protein samples (UVette)
	<p>Sterile</p> <p>Continuous, lot-specific quality controls, certified:</p> <ul style="list-style-type: none"> ● Pyrogen-free (NEW!) ● Sterile 	For use on applications which require sterile work conditions and endotoxin contamination must be prevented, e.g., microbiology and cell cultures
	<p>PCR clean</p> <p>Continuous, lot-specific quality controls, certified:</p> <ul style="list-style-type: none"> ● Human DNA-free ● DNase-free ● RNase-free ● PCR inhibitor-free 	The perfect choice for isolation, storage and analytics (PCR/qPCR, microarrays) of nucleic acids
	<p>Biopur</p> <p>Continuous, lot-specific quality controls, certified:</p> <ul style="list-style-type: none"> ● Human DNA-free ● Bacterial DNA-free ● DNase-free (NEW!) ● RNase-free ● PCR inhibitor-free (NEW!) ● ATP-free ● Pyrogen-free ● Sterile 	This premium purity level offers unmatched flexibility, e.g., in cell culture, nucleic acid analytics, diagnostics or hygiene monitoring

i Lot-specific certificates are can be accessed at www.eppendorf.com.



7. Eppendorf consumables purity levels

7.1. Quality of Eppendorf consumables



Description

Eppendorf products with the Eppendorf Quality purity label fulfill everything expected of reliable, easy-to-handle consumables. With the aid of high quality base material and permanent checks during production, our epT.I.P.S.[®] pipette tips, Eppendorf Tubes[®], Eppendorf Plates[®] and Combitips plus[®] tips are ideal for many lab tasks.

Which requirements does Eppendorf consumables fulfill?

- High precision and accuracy as well as defined flow properties, ensured by precise molding of pipette tips and Combitips plus tips
- Minimal water retention, ensuring reliable volume readings and minimal adhesion
- Excellent running properties of Combitips Plus tips for reduced effort and smooth liquid handling (this is crucial for minute volumes)
- Single-handed opening and closing of microcentrifuge tubes, without sample material being contaminated
- Microcentrifuge tubes are highly stable, even when exposed to extreme thermal or mechanical strain
- Deepwell and Microplates are highly stable during centrifugation
- Good chemical stability of consumables for use in many different applications

Quality control measures

- Tests for vapor tightness, lid-opening force, wall strength, force required to pierce the lid and centrifugal stability performed on microcentrifuge tubes on a daily basis
- Gravimetric measurements are performed on tips and Combitips in order to ensure international specifications
- All production tools are checked throughout the entire production process to ensure consistent quality
- All production steps, from the completion of the goods to packaging, are fully automated; manual intervention has been eliminated, and all subsequent risks caused by contamination have been virtually ruled out. Pipette tips, microcentrifuge tubes, Deepwell plates, Microplates and Combitip cylinders are made of PP (polypropylene), a relatively inert plastic characterized by minimum water retention as well as high dimensional and mechanical stability across a wide temperature range. Other plastics, such as PE (polyethylene), are also used, for example in the Combitips plus pistons; the combination of PP and PE results in ideal running properties between these two parts.

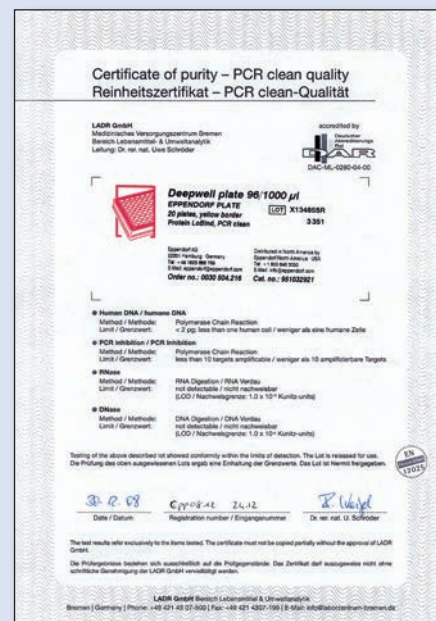
A good basis: Start with top-quality material!

- All plastics used to produce consumables comply with international purity criteria
- The dyes used to color disposables are free of biologically derived substances and substances containing heavy metals
- Plastics are highly resistant to organic and inorganic acids or bases and organic solvents commonly used in laboratories



7. Eppendorf consumables purity levels

7.2. Eppendorf PCR clean



Description

With the advent of PCR (polymerase chain reaction) and many other molecular biology methods in clinical and research labs, new purity criteria for consumables are necessary. Although there are no set directives in this field, we have analyzed the individual criteria and redefined our requirements governing PCR consumables.

All production batches are tested at an independent laboratory for the following:

- Absence of human DNA: This is monitored in a PCR test that can detect quantities smaller than a single human cell (< 2 pg DNA). This is a smaller amount of DNA than what can be found in the material of an individual cell.
- Absence of DNase and RNase: Reaction buffers with one DNA and one RNA conductor are incubated to 37 °C in the consumables (or, following liquid handling, in the consumables for several hours); the intactness of the nucleic acids is then tested via electrophoresis.
- Absence of PCR inhibitors: The consumables are tested in a separate PCR experiment to detect contamination by any substances that may have an adverse effect on the amplification procedure.

Which requirements does “PCR clean” fulfill?

- The miniscule amounts of genetic substance used for experiments must be protected from degradation (e.g., from DNases and RNases), i.e., all tubes, plates and tips must be free of such impurities.

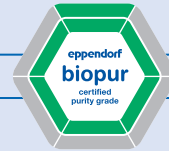
- Consumables that come into contact with PCR reactions must be free of PCR inhibitors, which would interfere with the amplification process.
- These plastic goods must also be free of contaminating nucleic acids, normally human DNA, which could infiltrate the plastic goods during the production process (e.g., via skin particles) and thus may lead to false-positive results.

Clean production, clean packaging

Eppendorf ensures that your lab receives clean, undamaged and fully functional consumables. Production and primary packaging of all products that are available in the PCR clean purity category is conducted under clean room conditions. The protective outer box is secured with a “PCR clean” seal to ensure that the product remains uncontaminated.

Only those consumables that have passed all of the necessary tests are given the “PCR clean” quality seal. The seal assures you that Eppendorf® consumables are suited for direct use in experiments and analysis without the need for further treatment (such as autoclaving).

i Batch related PCR clean certificates are available at www.eppendorf.com/certificates



7. Eppendorf consumables purity levels

7.3. Eppendorf Biopur®



Eppendorf has created the Eppendorf Biopur quality and purity standard in order to meet the highest demands from medical, pharmaceutical and food industries as well as the requirements from the fields of molecular biology, cell technology and forensics.

All disposable products that are available in the highest purity degree; i.e. pipette tips, Combitip plus, Eppendorf tubes and twin.tec microbiology PCR plates; are sterile, pyrogen-free, DNA-free, RNase-free, DNase-free, ATP-free and PCR inhibitor-free.

This is achieved using complex, automated production processes which feature control levels that eliminate contamination from biological substances.

What does Eppendorf Biopur offer?

It meets wetting behavior, tightness, accuracy and chemical resistance requirements as well as specific demands placed on Eppendorf Biopur products:

- Lot-specific, certified sterility according to DAB 10 (German Pharmacopeia), Ph.Eur. (European Pharmacopeia), USP XXV (United States Pharmacopeia), ISO 11135-2:2008 and ISO 11137-1:2006
- Certified free of DNA, RNase, DNase, ATP and PCR inhibitors for each lot
- Certified pyrogen-free according to the kinetic/turbidimetric LAL test (FDA guideline) for each lot

The tested lot receives the Eppendorf Biopur certificate if all test criteria have been met,

providing our customers with the highest level of safety for demanding applications in every area.

Individually packaged – for your safety!

End users demand that Eppendorf Biopur products arrive clean, undamaged and fully functional. All Eppendorf Biopur products, including pipette tips (also available in boxes/racks), Combitips plus, tubes and twin.tec microbiology PCR plates, are individually blister-wrapped – to prevent any possible contamination and guarantee the safety of your applications.

**Certificate of Purity
– Biopur® –**

LADR GmbH
Medizinisches Versorgungszentrum Bremen
Bereich Lebensmittel- & Umweltanalytik
Leitung: Dr. rer. nat. Uwe Schröder

accredited by
Deutscher
Zertifizierungs-
rat
DAR
DAC-ML-0280-04-00

Combitips plus 5 ml
100 Combitips plus
Eppendorf Biopur®
Order no.: 9030 060-655

LOT: 2138189G
2015 -d1
STERILE

Eppendorf AG
82331 Hechingen, Germany
Tel: +49 7321 654 188
www.eppendorf.com

<p>Human DNA / humane DNA Method / Methode: Polymerase Chain Reaction Limit / Grenzwert: < 2 pg, less than one human cell / weniger als eine humane Zelle</p>	<p>Stability / Bestand Method / Methode: <input checked="" type="checkbox"/> ethylene oxide sterilization according DIN EN ISO 11137-2:2007 or <input type="checkbox"/> gamma radiation according DIN EN ISO 11137-2:2007 Please see attached label for the standard method of sterilization for this product. <input checked="" type="checkbox"/> Begleitungs gemäß DIN EN ISO 11137-2:2007 oder <input type="checkbox"/> Einwirkend Sterilisation bei einem SAL von 10⁻⁷ Bitte entnehmen Sie dem Etikett die Standard-Sterilisationsmethode für dieses Produkt. Test method / Prüfverfahren: USP, Ph. Eur.</p>
<p>Bacterial DNA / bakterielle DNA Method / Methode: Polymerase Chain Reaction Limit / Grenzwert: < 50 fg, less than 10 E. coli cells / weniger als 10 E. coli Zellen</p>	<p>Endotoxin Test method / Prüfverfahren: Kinetic-turbidimetric LAL test (FDA Guideline) / Kinetisch-turbidimetrischer LAL-Test Limit / Grenzwert: < 0.200 EU (EU), i.e. 1.12 U/ml</p>
<p>DNase Method / Methode: DNA Digestion / DNA Verdauung Limit / Grenzwert: not detectable / nicht nachweisbar (LOD) / Nachweisgrenze: 1.0 x 10¹⁰ Kunitz-units</p>	<p>ATP Test method / Prüfverfahren: Pre-sterilization test / Biolumineszenz-Test Limit / Grenzwert: < 5.5 x 10⁻¹⁰ ng</p>
<p>RNase Method / Methode: RNA Digestion / RNA Verdauung Limit / Grenzwert: not detectable / nicht nachweisbar (LOD) / Nachweisgrenze: 1.0 x 10¹⁰ Kunitz-units</p>	<p>PCR inhibition / PCR Inhibition Method / Methode: Polymerase Chain Reaction Limit / Grenzwert: less than 10 targets amplifiable / weniger als 10 amplifizierbare Targets</p>

Testing of the above described lot showed conformity within the limits of detection. The Lot is released for use. Die Prüfung des oben ausgewiesenen Lots ergab eine Einhaltung der Grenzwerte. Das Lot ist hiermit freigegeben.

02.04.20 EPP0312 3210 Dr. rer. nat. U. Schröder

Date / Datum Registration number / Eingangsnummer

The test results refer exclusively to the items tested. The certificate must not be copied partially without the approval of LADR GmbH.
Die Prüfergebnisse beziehen sich ausschließlich auf die Prüfgegenstände. Das Zertifikat darf ausgenommen nicht ohne schriftliche Genehmigung der LADR GmbH ververvielfältigt werden.

LADR GmbH Bereich Lebensmittel & Umweltanalytik
Bremen | Germany | Phone: +49 421 43 07-500 | Fax: +49 421 4307-199 | E-Mail: info@labozentrum-bremen.de

① Batch related Eppendorf Biopur certificates are available at www.eppendorf.com/certificates.

7. Eppendorf consumables purity levels

7.4. Importance of purity factors

Sterility	Importance
<p>Per definition, a sterile product does not harbor any living organisms on its surface.</p> <p>The degree of sterilization is described by a residual probability of contamination. This probability is expressed as SAL (Sterility Assurance Level). Thus, a SAL value of 10^{-6} indicates the presence of one non-sterile item among 10^6 (1,000,000) sterilized items.</p>	<p>Sterile products are required whenever the presence of germs may have a negative effect; for example, in the prevention of infection of samples or incorrect test results for microbiological experiments that would be caused by unsterile lab equipment.</p>
Pyrogen-(endotoxin) free	Importance
<p>Thermostable substances (glycoproteins) from the outer membrane of bacteria and other microorganisms can cause fever in humans and impair the growth of cell cultures.</p>	<p>Absence of pyrogen prevents endotoxin-based contamination in drug manufacture, cell culture and medical laboratories.</p>
Bacterial DNA-free (<i>E. coli</i>):	Importance
<p>DNA is found in all cells of living entities, and it is the carrier of all genetic information. The highly sensitive PCR technique enables the detection of individual molecules.</p>	<p>The presence of DNA could lead to false-positive results for different applications involving DNA. Note: Autoclaving does not remove traces of DNA.</p>
Free of human DNA	Importance
<p>To eliminate this potential source of contamination, the consumables are tested for the presence of human DNA. Even a single cell (e.g., skin particles) would be detected in the test. Manufacturing is virtually fully automated and monitored by staff wearing protective clothing.</p>	<p>Tests for human DNA prevent consumables from containing DNA that could lead to false-positive results (e.g., genetic tests in forensics)</p>
DNase-free	Importance
<p>DNases are enzymes which degrade DNA</p>	<p>DNase contaminations can influence DNA analysis</p>
RNase-free	Importance
<p>RNases are enzymes that degrade RNA. These enzymes are extremely resistant, even to autoclaving and irradiation.</p>	<p>RNase-free products are an absolute must in the field of molecular biology because RNA is highly sensitive and can be destroyed very quickly by RNases.</p>
ATP-free	Importance
<p>ATP is a part of all living cells; therefore, its presence can indicate biological contamination.</p>	<p>The test procedure for the quantitative and qualitative detection of ATP is already an integral part of hygiene monitoring, e.g., in the pharmaceutical industry.</p>
Free of PCR inhibitors	Importance
<p>PCR—the replication of DNA—has developed into one of the most important and commonplace molecular biology methods used in medical diagnostics, genetic counseling and all basic biological research. However, there are also substances that impair this reaction, so lab products must be free of these inhibitors.</p>	<p>It is essential that consumables used contain no impurities that could adversely affect PCR. This is particularly crucial for the amplification of minute quantities of genetic substances and for quantitative PCRs.</p>

8. IVD (*In vitro* diagnostic products)



IVD - compliant products meet the requirements of the new European Directive on IVD (98/79/EG).



Pipettes

Pipettes are designed and constructed for contamination-free, precise and correct metering and transferring of liquids, especially of samples

from the human body and reagents within the scope of *In vitro* diagnostic applications, in connection with the respective epT.I.P.S. pipette tips in order to allow the *In vitro* diagnostic medical device to be used as intended. Therefore pipettes, being *In vitro* diagnostic accessories, are in themselves *In vitro* diagnostic medical devices within the meaning of Directive 98/79/EC of the European Parliament and of the Council of 27 October on *In vitro* diagnostic medical devices. Pipettes are intended exclusively for use indoors, and for operation by qualified staff.



Centrifuges

Eppendorf centrifuges serve to separate components of mixtures of different densities, especially for the preparation and processing of samples from the human body within the scope of *In vitro* diagnostic applications, in order to allow the *In vitro* diagnostic medical

device to be used as intended. Therefore centrifuges, being *In vitro* diagnostic accessories, are in themselves *In vitro* diagnostic medical devices within the meaning of Directive 98/79/EC of the European Parliament and of the Council of 27 October on *In vitro* diagnostic medical devices. Eppendorf centrifuges are intended exclusively for use indoors, and for operation by qualified staff.



epT.I.P.S.[®] pipette tips

epT.I.P.S. Eppendorf Biopur[®] pipette tips are designed and constructed for contamination-free, precise and correct metering and transferring of liquids, especially of samples from the human

body and reagents within the scope of *In vitro* diagnostic applications, in connection with Eppendorf pipettes in order to allow the *In vitro* diagnostic medical device to be used as intended. Therefore the epT.I.P.S. Eppendorf Biopur pipette tips, being *In vitro* diagnostic accessories, are in themselves *In vitro* diagnostic medical devices within the meaning of Directive 98/79/EC of the European Parliament and of the Council of 27 October on *In vitro* diagnostic medical devices. epT.I.P.S. Eppendorf Biopur pipette tips are intended exclusively for use by qualified staff, and for one use only.

9. Dispensing acids, alkalis and organic solvents

We have checked a number of acids, alkalis and organic solvents with a variety of viscosities and densities in our laboratories to provide you with practical data in this regard.

Please note that the housing of Multipette does not have an

identical chemical resistance like the combitips. Using the positive displacement system Multipette/Combitips, liquids whose physical properties are greatly different than the physical properties of water can also be precisely dispensed without problems.

Liquid	Conc.	100 μ L [d]	100 μ L [cv]	1,000 μ L [d]	1,000 μ L [cv]	Vapor pressure at 20 °C [hPa]	Density at 20 °C [g/cm ³]	Viscosity at 20 °C [mPa s]
Double-distilled water	100%	±0.6	≤0.6	±0.5	≤0.25	23	1	1
Acetone	100%	0.4	0.5	-0.2	0.3	240	0.79	0.32
Acetonitrile	100%	-0.4	1.1	-0.6	0.2	97	0.79	0.31 [25°C]
Formid acid	98%	-1.7	0.3	-1.9	0.2	42	1.22	1.8
Ammonium hydroxide	32%	1.7	0.5	2.4	0.8	837	0.89	1.3 [26%]
Aniline	100%	-1.8	0.8	-1.3	0.3	0.5	1.03	4.4
Dimethyl formamide (DMF)	100%	0.4	0.6	0.3	0.1	3.77	0.94	0.82
Dimethyl sulfoxide (DMSO)	100%	0.1	0.7	0.1	0.2	0.56	1.1	2.14
Ethyl acetate	100%	-0.4	1.0	-0.4	0.2	97	0.9	0.44
Ethanol	98%	-0.1	0.6	0.1	0.1	58	0.78	1.20
Formaldehyde	37%	0.8	0.3	0.8	0.1	1.3	1.08	2.5 [25°C]
Isopropanol	99%	-0.8	1.4	-0.3	0.2	43	0.78	2.2
Perchloric acid	60%	-2.0	0.5	-1.9	0.1	9	1.53	-
Phosphoric acid	85%	-1.7	0.9	-1.9	0.3	2	1.71	47
Nitric acid	65%	-1.3	0.3	-1.9	0.1	9.4/9	1.41	1.49 [40%]
Hydrochloric acid	37%	-2.1	0.5	-1.7	0.3	213	1.19	2.0
Sulfuric acid	95–97%	-2.6	0.6	-4.4	0.3	0.0016	1.84	26.9
Tetrachloromethane	100%	-0.5	1.0	-0.2	0.2	122	1.59	0.96
Tetrahydrofuran (THF)	100%	-2.7	0.7	-0.3	0.2	173	0.88	0.48
Toluene (methyl benzene)	100%	-0.7	0.9	-1.1	0.1	29	0.87	0.6
Trichloroethylene	100%	-0.4	1.9	-0.1	0.3	77	1.46	0.55
Trichloromethane (chloroform)	100%	-0.1	0.4	0.3	0.2	213	1.47	0.56
Triethylamine	100%	-0.4	0.4	0.1	0.1	69	0.72	0.36
Mean value		1.1	0.7	1.0	0.2			

Table 1: Random [d] and systematic [cv] measurement deviations in percent when dispensing selected liquids

The experiments were performed using a Multipette plus with liquids at room temperature; the results of 10 dispensing operations with a 5 mL Combitips® plus tip are shown.

10. Product and production relevant epGreen measures at Eppendorf

A history of epGreen products

When Dr. Heinrich Netheler and Dr. Hans Hinz founded Eppendorf in 1945, their primary goal was to improve our living conditions. This central theme has been upheld at Eppendorf ever since and has consistently provided the basis for product development. The Eppendorf approach to product development and manufacturing has always been to build the highest quality and most durable products that last for years – even decades. There's nothing greener than a product that continues to perform year after year; this is what our customers have come to expect from us. For Eppendorf, being "green" means that we not only provide you with long-lasting products that set laboratory standards today and in the future – but also products that are environmentally optimized. In this catalog, you will find epGreen features highlighted for many of our products. Following is an overview of the specific areas that we have focused on.

Energy-saving products

One of the greatest contributions to greenhouse gas emission comes from the energy consumption of products over time. We focus on developing new product features that reduce the energy required to operate our products. For example, our latest models of refrigerated microcentrifuges feature an ECO shut-off that automatically deactivates the compressor after a certain period of inactivity. Eppendorf refrigerated centrifuges also feature patented dynamic compressor control for optimized cooling performance, extended compressor life and reduced energy consumption.

Eppendorf environmentally-friendly and safe products

At Eppendorf, we pride ourselves not only on product excellence, high quality assurance and customer satisfaction, but also on cultivating environmental consciousness.

Eppendorf strives to safeguard the environment and to keep its customers safe by restricting the use of environmentally harmful compounds. For example, Eppendorf refrigerated centrifuges feature CFC-free refrigerant with an ozone depletion potential of zero. It is our duty, that Eppendorf products must be compliant with the European Directive on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment, also known as the RoHS Directive. All Eppendorf centrifuges comply with the following directives:

- Waste Electrical and Electronic Equipment Directive (WEEE), which is aimed at reducing the problem of certain hazardous substances in electrical and electronic equipment.
- Electromagnetic Compatibility (EMC) Directive which is aimed at eliminating the unintentional generation, propagation and reception of electromagnetic energy.

Eppendorf is also making a concerted effort to develop eco-friendly product features and packaging. For example, we have eliminated the use of polystyrene at our Logistics Center and now ship products in environmentally friendly and recyclable paper-based materials or bubble wrap. The product packaging of many of our products such as pipettes and mixers has been switched to 100% recyclable materials. All Eppendorf centrifuge rotors are made of aluminium that can be recycled. In addition, we are participating in the German Green Dot System*, a recycling system that is part of the European „Packaging and Packaging Waste Directive - 94/62/EC“.

Our centrifuges are also engineered to reduce noise pollution and integrate brushless induction motors that eliminate carbon-particle emissions and ensure maintenance-free operation.

Eppendorf also looks beyond its own product development to that of its suppliers. We audit our suppliers to ensure that they meet Eppendorf's high standards for quality and are compliant with environmental conservation.

Environmentally-friendly manufacturing and working environment

Eppendorf strives to minimize the use of natural resources at its facilities and during product manufacturing while maintaining the highest standards for product quality. From energy saving solutions in our office building such as the use of light and water sensors to more complex manufacturing process changes, we are making inroads in these areas too:

- Eppendorf consumables are produced with optimized molds using closed water circulation – basically no external water is needed or consumed. The same applies to our centrifuge production. And, excess plastic that accompanies every molding process has been reduced to a minimum.
- Within the last 10 years, our centrifuge facility has been reducing the electrical power consumption per produced centrifuge by more than 50 %.
- Our manufacturing plants utilize the thermal energy that is produced during the production process to heat the facilities. Our consumables production plant in Germany no longer requires any external heat energy.
- We use low energy consumption lighting systems equipped with timers and sensors at Eppendorf facilities, and also recycle metals, paper and plastics.
- All Eppendorf production sites have switched to water soluble varnishes and paints.

The Eppendorf centrifuge production site in Germany is already certified according to ISO/EN 14001, which regulates measures for environmental protection.

10. Product and production relevant epGreen measures at Eppendorf

Eppendorf Environmentally-friendly sales, service and marketing

The Eppendorf epGreen strategy extends beyond manufacturing and products to other areas of our work, including sales, distribution, service and marketing. Following are examples of how we are addressing the environment in these areas:

- When we have the need to deliver vital information to our customers, we use electronic media as much as possible. If print communication is necessary, we use paper derived from sustainable managed forests whenever possible. Our catalogues are certified by PEFC (Program for the Endorsement of Forest Certification schemes), an independent, non-profit, non-governmental organization, which promotes sustainable managed forests through independent third party certification. We strictly pursue carbon-neutral printing, i.e. we compensate all CO₂ emissions that result from printing with voluntary payments to a climate protection project.
- We have started to employ On Demand printing technology for the production of our sales collateral. This approach allows us to print the exact quantity that we need, when we need it – and helps to significantly reduce paper waste.
- Since 2005 we have reduced our aviation carbon footprint by more than 60 %. This was achieved by shifting to sea transport whenever possible.

epGreen®: A long term commitment to our future

epGreen is a long term initiative that lies at our heart: Today and in the future, you can count on Eppendorf to continue implementing novel ways that will help to reduce the environmental impact of our business and to support you with your own green initiatives.

* The German Green Dot is a registered Trademark of Duales System Deutschland AG.

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Eppendorf Patents

Eppendorf is owner of numerous patents worldwide. Please respect our intellectual property. The following are those patents of Eppendorf which protect technology of the products described in this catalog.

Centrifuge 5702 swing-bucket rotor	(U.S. Patent 6,746,391)
Centrifuge Models 58xx	(U.S. Patent 5,496,254)
Centrifuge 5418, 5418 R	(U.S. Patent 6,866,621 B1)
Centrifuge 5424, 5424 R	(U.S. Patent 6,866,621 B1)
Centrifuge 5430, 5430 R	(U.S. Patent 6,866,621 B1)
Centrifuge 5415 R	(U.S. Patent 6,866,621 B1)
Centrifuge 5702, 5702 R, 5702 RH	(U.S. Patent 6,866,621 B1)
CombiTips plus	(U.S. Patent 5,620,660/5,620,661)
Electroporation Buffers	(U.S. Patent 7,157,257)
Electrofusion Buffers	(U.S. Patent 7,157,257)
Electroporator Model 2510	(U.S. Patent 6,103,084)
epMotion 5075 VAC	(U.S. Patent 6,666,978)
Gradient block for Mastercycler family	(U.S. Patent 6,767,512/7,074,367)
MicroDissector	(U.S. Patent 6,673,086)
Multiporator	(U.S. Patent 6,008,038)
Optical sensor epMotion	(U.S. Patent 6,819,437 B2)
PCR tubes 0,2 mL	(U.S. Patent 5,863,791)
PCR tubes strips 0,2 mL	(U.S. Patent 5,863,791)
PCR Cooler	(U.S. Patent 6,616,897)
Reference Series 2000 pipette	(U.S. Patent 5,511,433)
Repeater plus pipette	(U.S. 5,620,660/5,620,661/5,591,408/5,573,729)
Research plus pipette	(U.S. Patent 7,434,484)
Research pro electronic pipette	(U.S. Patent 6,499,365/6,778,917)
Research Series 2100 adjustable-volume pipette	(U.S. Patent 5,531,131)
Research Series 2100 fixed-volume single-channel pipette	(U.S. Patent 6,199,435)
Twin Tip-Holder	(U.S. Patent 6,159,199)
twin.tec PCR Plates	(U.S. Patent 6,340,589)
Universal block, Mastercycler, Mastercycler gradient	(U.S. Patent 6,210,958)
UVette	(U.S. Patent 6,249,345)

Disclaimers

PCR

In the field of PCR, Eppendorf cooperates with QIAGEN® and recommends the use of QIAGEN polymerases. The QIAGEN Multiplex PCR Kit is intended for research use. No claim or representation is intended for its use to provide information for the diagnosis, prevention of treatment of a disease.

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Everything at a glance

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Article numbers for different mains voltage versions



The following products are available in the listed mains voltage versions. For mains voltage versions for which no separate article number is listed

(code number –), the valid article numbers are also those listed in the first column or in the product description. The versions marked n.a. are not available.

Power supply	European	UK/HKG	Australian	China	Japan	ROW
Xplorer						
Single-channel pipette, with charging adapter						
0.5-10 µL	4861 000.015	–	–	–	–	–
5-100 µL	4861 000.023	–	–	–	–	–
15-300 µL	4861 000.031	–	–	–	–	–
50-1,000 µL	4861 000.040	–	–	–	–	–
0.25-5 mL	4861 000.058	–	–	–	–	–
0.5-10 mL	4861 000.066	–	–	–	–	–
Multi-channel pipette (8-channel) with charging adapter						
0.5-10 µL	4861 000.104	–	–	–	–	–
5-100 µL	4861 000.120	–	–	–	–	–
15-300 µL	4861 000.147	–	–	–	–	–
50-1,200 µL	4861 000.163	–	–	–	–	–
Multi-channel pipette (12-channel) with charging adapter						
0.5-10 µL	4861 000.112	–	–	–	–	–
5-100 µL	4861 000.139	–	–	–	–	–
15-300 µL	4861 000.155	–	–	–	–	–
50-1,200 µL	–	–	–	–	–	–
Xplorer charging stand for 1 pipette	4880 000.000	–	–	–	–	–
Xplorer charging stand for 4 pipettes	4880 000.026	–	–	–	–	–
Easypet® with transformer, wall holder, 2 membrane filters 0.45 µm	4421 000.013	4421 000.030	4421 000.048	4421 000.030	4421 000.064	4421 000.056
Multipette stream® , w. charging adapt.	4986 000.017	–	–	–	–	–
Multipette Xstream® , w. charg. adapt.	4986 000.025	–	–	–	–	–
epMotion® 5070	5070 000.000	5070 000.034	5070 000.026	5070 000.069	5070 000.018	5070 000.018
epMotion® 5070 PC	5070 000.140	n. a.	n. a.	n. a.	n. a.	n. a.
epMotion® 5075 LH	5075 000.008	n. a.	n. a.	n. a.	n. a.	n. a.
epMotion® 5075 LH PC	5075 000.750	n. a.	n. a.	n. a.	n. a.	n. a.
epMotion® 5075 VAC	5075 000.016	n. a.	n. a.	n. a.	n. a.	n. a.
epMotion® 5075 VAC PC	5075 000.768	n. a.	n. a.	n. a.	n. a.	n. a.
epMotion® 5075 MC	5075 000.032	n. a.	n. a.	n. a.	n. a.	n. a.
epMotion® 5075 MC PC	5075 000.776	n. a.	n. a.	n. a.	n. a.	n. a.
epMotion® 5075 CB	5070 000.700	n. a.	n. a.	n. a.	n. a.	n. a.
epMotion® 5075 CB PC	5070 000.719	n. a.	n. a.	n. a.	n. a.	n. a.
epMotion® 5075 TMX	5075 000.733	n. a.	n. a.	n. a.	n. a.	n. a.
epMotion® 5075 TMX PC	5075 000.784	n. a.	n. a.	n. a.	n. a.	n. a.
MixMate®	5353 000.014	5353 000.030	5353 000.073	5353 000.081	n. a.	5353 000.022

Article numbers for different mains voltage versions

Power supply	European	UK/HKG	Australian	China	Japan	ROW
Thermomixer® comfort without thermoblock	5355 000.011	5355 000.038	5355 000.070	5355 000.089	5355 000.046	5355 000.046
Thermomixer® compact with thermoblock	5350 000.013	5350 000.030	5350 000.072	5350 000.080	5350 000.048	5350 000.048
ThermoStat plus™ without thermoblock	5352 000.010	5352 000.037	5352 000.070	5352 000.088	5352 000.045	5352 000.045
MiniSpin® with standard rotor	5452 000.018	5452 000.069	5452 000.085	5452 000.093	n. a.	n. a.
MiniSpin® plus with standard rotor	5453 000.011	5453 000.062	5453 000.089	5453 000.097	n. a.	n. a.
Centrifuge 5418 with standard rotor	5418 000.017	5418 000.068	5418 000.084	5418 000.092	5418 000.033	5418 000.025
Centrifuge 5418 R , standard rotor	5401 000.013	5401 000.064	5401 000.080	5401 000.099	5401 000.021	5401 000.056
Centrifuge 5424 with standard rotor (foil version)	5424 000.010	5424 000.061	5424 000.088	5424 000.096	5424 000.037	5424 000.029
Centrifuge 5424 without rotor (foil version)	5424 000.215	5424 000.266	5424 000.282	5424 000.290	5424 000.231	5424 000.223
Centrifuge 5424 with standard rotor (knob version)	5424 000.410	5424 000.460	5424 000.487	5424 000.495	5424 000.436	5424 000.428
Centrifuge 5424 without rotor (knob version)	5424 000.614	5424 000.665	5424 000.681	5424 000.690	5424 000.630	5424 000.622
Centrifuge 5424 R , with standard rotor (foil version)	5404 000.014	5404 000.065	5404 000.081	5404 000.090	5404 000.030	n. d.
Centrifuge 5424 R , without rotor (foil version)	5404 000.219	5404 000.260	5404 000.286	5404 000.294	5404 000.235	n. a.
Centrifuge 5424 R , with standard rotor (knob version)	5404 000.413	5404 000.464	5404 000.480	5404 000.499	5404 000.430	n. a.
Centrifuge 5424 R , without rotor (knob version)	5404 000.618	5404 000.669	5404 000.685	5404 000.693	5404 000.634	n. a.
Centrifuge 5430 with standard rotor (foil version)	5427 000.216	5427 000.267	5427 000.283	5427 000.291	5427 000.232	5427 000.224
Centrifuge 5430 with standard rotor (knob version)	5427 000.410	5427 000.461	5427 000.488	5427 000.496	5427 000.437	5427 000.429
Centrifuge 5430 without rotor (foil version)	5427 000.011	5427 000.062	5427 000.089	5427 000.097	5427 000.038	5427 000.020
Centrifuge 5430 without rotor (knob version)	5427 000.615	5427 000.666	5427 000.682	5427 000.690	5427 000.631	5427 000.623
Centrifuge 5430 R with standard rotor (foil version)	5428 000.015	5428 000.066	5428 000.082	5428 000.090	n.a.	5428 000.023
Centrifuge 5430 R with standard rotor (knob version)	5428 000.414	5428 000.465	5428 000.481	5428 000.490	n.a.	5428 000.422
Centrifuge 5430 R without rotor (foil version)	5428 000.210	5428 000.260	5428 000.287	5428 000.295	n.a.	5428 000.226
Centrifuge 5430 R without rotor (knob version)	5428 000.619	5428 000.660	5428 000.732	5428 000.694	n.a.	5428 000.627
Centrifuge 5417 R* without rotor	5407 000.317	5407 000.368	5407 000.384	5407 000.392	n.a.	n. a.
Centrifuge 5702 without rotor	5702 000.019	5702 000.060	5702 000.086	5702 000.094	5702 000.035	n. a.
Centrifuge 5702 R without rotor	5703 000.012	5703 000.063	5703 000.080	5703 000.098	5703 000.039	n. a.

* Only 50 Hz. 60 Hz available on request.

Article numbers for different mains voltage versions

Power supply	European	UK/HKG	Australian	China	Japan	ROW
Centrifuge 5702 RH without rotor	5704 000.016	5704 000.067	5704 000.083	5704 000.091	5704 000.032	5704 000.024
Centrifuge 5804 without rotor	5804 000.013	5804 000.064	5804 000.080	5804 000.099	n.a.	n.a.
Centrifuge 5804 R without rotor	5805 000.017	5805 000.068	5805 000.084	5805 000.092	n. a.	n. a.
Centrifuge 5810 without Rotor	5810 000.017	5810 000.068	5810 000.084	5810 000.092	n. a.	n. a.
Centrifuge 5810 R without Rotor	5811 000.010	5811 000.061	5811 000.088	5811 000.096	n. a.	n. a.
Centrifuge 5804 Bundle A-4-44+Ad	5804 000.323	5804 000.366	5804 000.382	5804 000.390	n. a.	n. a.
Centrifuge 5810 Bundle A-4-62+Ad	5810 000.327	5810 000.360	5810 000.386	5810 000.394	n. a.	n. a.
Centrifuge 5804R Bundle A-4-44+Ad	5805 000.327	5805 000.360	5805 000.386	5805 000.394	n. a.	n. a.
Centrifuge 5810R Bundle A-4-62+Ad	5811 000.320	5811 000.363	5811 000.380	5811 000.398	n. a.	n. a.
Centrifuge 5810 Bundle A-4-81+Ad	5810 000.424	5810 000.467	5810 000.483	5810 000.491	n. a.	n. a.
Centrifuge 5810R Bundle A-4-81+Ad	5811 000.428	5811 000.460	5811 000.487	5811 000.495	n. a.	n. a.
Centrifuge 5702 Bundle A-4-38+Ad	5702 000.329	5702 000.361	5702 000.388	5702 000.396	n. a.	n. a.
Centrifuge 5702 R Bundle A-4-38+VT	5703 000.322	5703 000.365	5703 000.381	5703 000.390	n. a.	n. a.
Concentrator plus complete system	5305 000.304	5305 000.363	5305 000.380	5305 000.398	n. a.	n. a.
Concentrator plus complete system (without rotor)	5305 000.509	5305 000.568	5305 000.584	5305 000.592	5305 000.541	n. a.
Concentrator plus complete system with junction (without rotor)	5305 000.703	5305 000.762	5305 000.589	5305 000.797	5305 000.746	n. a.
Concentrator plus basic device	5305 000.100	5305 000.169	5305 000.185	5305 000.193	n. a.	n. a.
Thermal Printer DPU 414 , serial printer, incl. power supply unit	6131 011.006	6131 012.002	n. a.	n. a.	6131 010.000	6131 010.000
Heat Sealer	5390 000.024	n. a.	n. a.	n. a.	n. a.	n. a.
Mastercycler nexus gradient	6331 000.017	6331 000.041	6331 000.068	6331 000.076	6331 000.033	6331 000.084
Mastercycler nexus	6333 000.014	6333 000.049	6333 000.065	6333 000.073	6333 000.030	6333 000.081
Mastercycler nexus eco	6332 000.010	6332 000.045	6332 000.061	6332 000.070	6332 000.037	6332 000.088
Mastercycler® pro , with Control Panel	6321 000.515	6321 000.540	6321 000.566	6321 000.574	6321 000.531	6321 000.523
Mastercycler® pro , manual	6321 000.019	6321 000.043	6321 000.060	6321 000.078	6321 000.035	6321 000.027
Mastercycler® pro S , manual, with Control Panel	6325 000.510	6325 000.544	6325 000.560	6325 000.579	6325 000.536.	6325 000.528
Mastercycler® pro S , manual	6325 000.013	6325 000.048	6325 000.064	6325 000.072	6325 000.030	6325 000.021
Mastercycler® pro 384 , manual, with Control Panel	6324 000.516	6324 000.540	6324 000.567	6324 000.575	6324 000.532	6324 000.524
Mastercycler® pro 384 , manual	6324 000.010	6324 000.044	6324 000.060	6324 000.079	6324 000.036	6324 000.028
Mastercycler® ep realplex2	6300 000.507	n. a.	n. a.	n. a.	6300 000.701	6300 000.701
Mastercycler® ep realplex2 S	6300 000.604	n. a.	n. a.	n. a.	6300 000.809	6300 000.809
Mastercycler® ep realplex4	6302 000.504	n. a.	n. a.	n. a.	6302 000.709	6302 000.709
Mastercycler® ep realplex4 S	6302 000.601	n. a.	n. a.	n. a.	6302 000.806	6302 000.806

Article numbers for different mains voltage versions

Power supply	European	UK/HKG	Australian	China	Japan	ROW
FemtoJet[®] programmable microinjector with integrated pressure supply	5247 000.013	5247 000.030	5247 000.072	5247 000.080	5247 000.048	5247 000.048
FemtoJet[®] express programmable microinjector with external pressure supply	5248 000.017	5248 000.033	5248 000.076	5248 000.084	5248 000.041	5248 000.041
Eppendorf BioPhotometer plus[®]	6132 000.008	6132 000.032	6132 000.024	6132 000.059	6132 000.016	n. a.
Eppendorf BioSpectrometer[®] basic	6135 000.009	6135 000.025	6135 000.033	6135 000.041	6135 000.017	6135 000.050
Eppendorf BioSpectrometer[®] kinetic	6136 000.002	6136 000.029	6136 000.037	6136 000.045	6136 000.010	6136 000.053
TransferMan[®] NK 2	5188 000.012	5188 000.039	5188 000.071	5188 000.039	5188 000.047	5188 000.047
Eppendorf Eporator[®]	4309 000.019	4309 000.035	4309 000.051	4309 000.060	4309 000.027	n.a.
InjectMan[®] NI 2	5181 000.017	5181 000.033	5181 000.076	5181 000.033	5181 000.041	5181 000.041
PatchMan NP 2	5183 000.014	5183 000.030	5183 000.073	5183 000.030	5183 000.049	5183 000.049
Multiporator[®]	4308 000.015	n. a.	n. a.	n. a.	n. a.	n. a.
Eppendorf PiezoXpert[®]	5194 000.016	5194 000.032	5194 000.059	5194 000.067	5194 000.024	n. a.

Power Supply	230 V, 50 Hz	120 V, 60 Hz	208–230 V, 60 Hz	120–220 V, 60 Hz
Freezers				
HEF U410 , Upright Freezer	U9260-0008	U9260-0007	n. a.	n. a.
HEF U570 , Upright Freezer	U9270-0008	U9270-0007	n. a.	n. a.
HEF C660 , Chest Freezer	U9250-0008	n. a.	U9250-0007	n. a.
U725-G , Green Upright Freezer				
Air-Cooled	U9440-0005	n. a.	n. a.	n. a.
Water-Cooled	U9440-0004	n. a.	n. a.	n. a.
Innova U101 , Upright Freezer	U9420-0001	U9420-0000	n. a.	n. a.
Innova U360 , Upright Freezer	U9425-0001	U9425-0000	n. a.	n. a.
Innova U535 , Upright Freezer	U9430-0001	U9430-0000	U9430-0002	n. a.
Innova U725 , Upright Freezer	U9440-0001	n. a.	U9440-0002	n. a.
Innova C585 , Chest Freezer	U9400-0001	U9400-0000	U9400-0002	n. a.
Innova C760 , Chest Freezer	U9410-0001	n. a.	U9410-0002	n. a.
Premium U410 , Upright Freezer	U9260-0001	U9260-0000	U9260-0002	n. a.
Premium U570 , Upright Freezer	U9270-0001	U9270-0000	U9270-0002	n. a.
Premium C340 , Chest Freezer	U9230-0001	U9230-0000	n. a.	n. a.
Premium C660 , Chest Freezer	U9250-0001	n. a.	U9250-0002	n. a.
CO2 Back-up , Innova Freezers	U9043-0004	n. a.	n. a.	U9043-0002
LN2 Back-up , Innova Freezers	U9044-0004	n. a.	n. a.	U9044-0002
CO2 Back-up , Premium Freezers	U9043-0008	n. a.	n. a.	U9043-0006
LN2 Back-up , Premium Freezers	U9044-0008	n. a.	n. a.	U9044-0006

Article numbers for different mains voltage versions

Power Supply	230 V, 50 Hz	120 V, 60 Hz	100 V, 60 Hz	100 V, 50 Hz
Shakers				
Innova 40, Incubator Shaker				
1.9 cm orbit	M1299-0082	M1299-0080	M1299-0081	M1299-0083
2.5 cm orbit	M1299-0092	M1299-0090	M1299-0091	M1299-0093
Innova 40R, Incubated/Refrigerated Shaker				
1.9 cm orbit	M1299-0086	M1299-0084	M1299-0085	M1299-0087
2.5 cm orbit	M1299-0096	M1299-0094	M1299-0095	M1299-0097
Innova 42, Stackable Incubator Shaker				
1.9 cm orbit	M1335-0002	M1335-0000	M1335-0001	M1335-0003
2.5 cm orbit	M1335-0012	M1335-0010	M1335-0011	M1335-0013
Innova 42R, Stackable Incubator/Refrigerated Shaker				
1.9 cm orbit	M1335-0006	M1335-0004	M1335-0005	M1335-0007
2.5 cm orbit	M1335-0016	M1335-0014	M1335-0015	M1335-0017
Innova 43, Stackable Incubator Shaker				
2.5 cm orbit	M1320-0002	M1320-0000	M1320-0001	M1320-0003
5.1 cm orbit	M1320-0012	M1320-0010	M1320-0011	M1320-0013
Innova 43R, Stackable Incubator/Refrigerated Shaker				
2.5 cm orbit	M1320-0006	M1320-0004*	M1320-0005*	M1320-0007
5.1 cm orbit	M1320-0016	M1320-0014*	M1320-0015*	M1320-0017
Innova 44, Stackable Incubator Shaker				
2.5 cm orbit	M1282-0002	M1282-0000	M1282-0001	M1282-0003
5.1 cm orbit	M1282-0012	M1282-0010	M1282-0011	M1282-0013
Innova 44R, Stackable Incubator/Refrigerated Shaker				
2.5 cm orbit	M1282-0006	M1282-0004	M1282-0005	M1282-0007
5.1 cm orbit	M1282-0016	M1282-0014	M1282-0015	M1282-0017
I 26, Stackable Incubator Shaker				
2.5 cm orbit	M1324-0002	M1324-0000	M1324-0001	M1324-0003
I 26R, Stackable Incubator/Refrigerated Shaker				
2.5 cm orbit	M1324-0006	M1324-0004	M1324-0005	M1324-0007
Excella 24, Incubator Shaker				
1.9 cm orbit	M1352-0002	M1352-0000	M1352-0001	M1352-0003
Excella 24R, Incubated/Refrigerated Shaker				
1.9 cm orbit	M1352-0006	M1352-0004	M1352-0005	M1352-0007
Excella 25, Incubator Shaker				
2.5 cm orbit	M1353-0002	M1353-0000	M1353-0001	M1353-0003

* Temperature range: 20 °C below ambient to 80 °C

Article numbers for different mains voltage versions

Power Supply	230 V, 50 Hz	230 V, 50/60 Hz	220/230 V, 50/60 Hz	230/240 V, 50/60 Hz	
Shakers					
Excella 25R, Incubated/Refrigerated Shaker					
2.5 cm orbit	M1353-0006	n. a.	n. a.	n. a.	
Excella E10, Open Air Shaker					
2.5 cm orbit	n. a.	M1351-0001	n. a.	n. a.	
Excella E5, Open Air Shaker					
1.9 cm orbit	n. a.	M1355-0001	n. a.	n. a.	
Excella E2, Open Air Shaker					
1.9 cm orbit	n. a.	M1350-0001	n. a.	n. a.	
Excella E1, Open Air Shaker					
1.9 cm orbit	n. a.	M1354-0001	n. a.	n. a.	
C76, Water Bath Shaker					
1.3 cm orbit	n. a.	n. a.	n. a.	M1248-0003	
Innova 3100, Water Bath Shaker					
1.3 cm orbit	n. a.	n. a.	M1231-0002	n. a.	
Innova 2000, Open Air Shaker					
1.9 cm orbit	n. a.	n. a.	M1190-0002	n. a.	
Innova 2050, Open Air Shaker					
1.9 cm orbit	n. a.	n. a.	M1190-0012	n. a.	
Innova 2100, Open Air Shaker					
1.9 cm orbit	n. a.	n. a.	M1194-0002	n. a.	
Innova 2150, Open Air Shaker					
1.9 cm orbit	n. a.	n. a.	M1194-0012	n. a.	
Innova 2300, Open Air Shaker					
2.5 cm orbit	n. a.	n. a.	M1191-0002	n. a.	
5.1 cm orbit	n. a.	n. a.	M1191-0022	n. a.	
Innova 2350, Open Air Shaker					
2.5 cm orbit	n. a.	n. a.	M1191-0012	n. a.	
5.1 cm orbit	n. a.	n. a.	M1191-0032	n. a.	
Innova 5000, Multi-Tier Shaker					
5.1 cm orbit	n. a.	n. a.	M1196-0002	n. a.	
Innova 5050, Rack System					
	n. a.	n. a.	n. a.	M1232-0101	
Innova 5051, Rack Extension					
	n. a.	n. a.	n. a.	M1232-0111	

Article numbers for different mains voltage versions

240 V, 50/60 Hz	120 V, 60 Hz	120 V, 50/60 Hz	100/120 V, 50/60 Hz	100 V, 60 Hz	100 V, 50 Hz	100 V, 50/60 Hz
n. a.	M1353-0004	n. a.	n. a.	M1353-0005	M1353-0007	n. a.
n. a.	n. a.	n. a.	M1351-0000	n. a.	n. a.	n. a.
n. a.	n. a.	n. a.	M1355-0000	n. a.	n. a.	n. a.
n. a.	n. a.	n. a.	M1350-0000	n. a.	n. a.	n. a.
n. a.	n. a.	M1354-0000	n. a.	n. a.	n. a.	n. a.
n. a.	n. a.	M1248-0002	n. a.	n. a.	n. a.	n. a.
M1231-0003	n. a.	M1231-0000	n. a.	n. a.	n. a.	M1231-0001
M1190-0003	n. a.	M1190-0000	n. a.	n. a.	n. a.	M1190-0001
M1190-0013	n. a.	M1190-0010	n. a.	n. a.	n. a.	M1190-0011
M1194-0003	n. a.	M1194-0000	n. a.	n. a.	n. a.	M1194-0001
M1194-0013	n. a.	M1194-0010	n. a.	n. a.	n. a.	M1194-0011
M1191-0003	n. a.	M1191-0000	n. a.	n. a.	n. a.	M1191-0001
M1191-0023	n. a.	M1191-0020	n. a.	n. a.	n. a.	M1191-0021
M1191-0013	n. a.	M1191-0010	n. a.	n. a.	n. a.	M1191-0011
M1191-0033	n. a.	M1191-0030	n. a.	n. a.	n. a.	M1191-0031
M1196-0003	n. a.	M1196-0000	n. a.	n. a.	n. a.	M1196-0001
n. a.	n. a.	n. a.	M1232-0100	n. a.	n. a.	n. a.
n. a.	n. a.	n. a.	M1232-0110	n. a.	n. a.	n. a.

Article numbers for different mains voltage versions

Power Supply	230 V, 50/60 Hz	120 V, 50/60 Hz
Galaxy CO₂ Incubators		
Galaxy 170R		
CO ₂ Galaxy Incubator	CO170R-230-0000	CO170R-120-0000
CO ₂ Galaxy Incubator, High-Temp Disinfection	CO170R-230-1000	CO170R-120-1000
CO ₂ Galaxy Incubator, with O ₂ Control (1–19 %)	CO170R-230-0200	CO170R-120-0200
CO ₂ Galaxy Incubator, High-Temp & O ₂ Control	CO170R-230-1200	CO170R-120-1200
Galaxy 170S		
CO ₂ Galaxy Incubator	CO170S-230-0000	CO170S-120-0000
CO ₂ Galaxy Incubator, High-Temp Disinfection	CO170S-230-1000	CO170S-120-1000
Galaxy 48R		
CO ₂ Galaxy Incubator	CO48R-230-0000	CO48R-120-0000
CO ₂ Galaxy Incubator, High-Temp Disinfection	CO48R-230-1000	CO48R-120-1000
CO ₂ Galaxy Incubator, with O ₂ Control (1–19 %)	CO48R-230-0200	CO48R-120-0200
CO ₂ Galaxy Incubator, High-Temp & O ₂ Control	CO48R-230-1200	CO48R-120-1200
Galaxy 48S		
CO ₂ Galaxy Incubator	CO48S-230-0000	CO48S-120-0000
Galaxy 14S		
CO ₂ Galaxy Incubator	CO14S-230-0000	CO14S-120-0000
CO ₂ Galaxy Incubator, with O ₂ Control (1–19 %)	CO14S-230-0200	CO14S-120-0200

Power Supply	220/230 V, 50/60 Hz	120 V, 50/60 Hz
Tissue culture roller drums		
TC-7	M1053-4005	M1053-4004
TC-8	M1053-5005	M1053-5004

Article numbers for different mains voltage versions

Power Supply	200–240 V, 50/60 Hz	100–120 V, 50/60 Hz
Fermentors / Bioreactors		
BioFlo 115 Advanced Fermentation Kit*		
1.3 L with HB	M1369-1151	M1369-1121
1.3 L with WJ	M1369-1161	M1369-1111
3.0 L with HB	M1369-1152	M1369-1122
3.0 L with WJ	M1369-1162	M1369-1112
7.5 L with HB	M1369-1155	M1369-1125
7.5 L with WJ	M1369-1165	M1369-1115
14.0 L with HB	M1369-1150	M1369-1130
14.0 L with WJ	M1369-1160	M1369-1120
BioFlo 115 Basic Fermentation Kit*		
1.3 L with HB	M1369-1141	M1369-1101
1.3 L with WJ	M1369-1631	M1369-1621
3.0 L with HB	M1369-1142	M1369-1102
3.0 L with WJ	M1369-1632	M1369-1622
7.5 L with HB	M1369-1145	M1369-1105
7.5 L with WJ	M1369-1635	M1369-1625
14.0 L with HB	M1369-1140	M1369-1110
14.0 L with WJ	M1369-1640	M1369-1630
BioFlo 115 Advanced Cell Culture Kit*		
1.3 L with HB – Magnetic Drive	M1369-1401	M1369-1201
1.3 L with HB – Direct Drive	M1369-1501	M1369-1301
1.3 L with WJ – Magnetic Drive	M1369-1171	M1369-1211
1.3 L with WJ – Direct Drive	M1369-1371	M1369-1311
3.0 L with HB – Magnetic Drive	M1369-1402	M1369-1202
3.0 L with HB – Direct Drive	M1369-1502	M1369-1302
3.0 L with WJ – Magnetic Drive	M1369-1172	M1369-1212
3.0 L with WJ – Direct Drive	M1369-1372	M1369-1312
7.5 L with HB – Magnetic Drive	M1369-1405	M1369-1205
7.5 L with HB – Direct Drive	M1369-1505	M1369-1305
7.5 L with WJ – Magnetic Drive	M1369-1175	M1369-1215
7.5 L with WJ – Direct Drive	M1369-1375	M1369-1315
14.0 L with HB – Magnetic Drive	M1369-1410	M1369-1210
14.0 L with HB – Direct Drive	M1369-1510	M1369-1310
14.0 L with WJ – Magnetic Drive	M1369-1170	M1369-1220
14.0 L with WJ – Direct Drive	M1369-1370	M1369-1320

* Footnotes:

HB = Heat Blanket, WJ = Water Jacket, WM = Watson Marlow
All volumes shown are Total Volume

Article numbers for different mains voltage versions

Power Supply	200-240 V, 50/60 Hz	100-120 V, 50/60 Hz	100-240V, 50/60 Hz	
Fermentors / Bioreactors				
Fermenter BioFlo 310*				
2.5 L Standard Pre-configured System	M1287-1174	M1287-1170	n. a.	
5.0 L Standard Pre-configured System	M1287-1175	M1287-1171	n. a.	
7.5 L Standard Pre-configured System	M1287-1176	M1287-1172	n. a.	
14.0 L Standard Pre-configured System	M1287-1177	M1287-1173	n. a.	
Custom configurations, Voltage	M1287-1020	M1287-1020	n. a.	
310 Cabinet for use with BioFlo 3000 Vessel	M1287-1005	M1287-1003	n. a.	
CelliGen 310 Bioreactor*				
2.5 L Standard Pre-configured System	M1287-1264	M1287-1260	n. a.	
5.0 L Standard Pre-configured System	M1287-1265	M1287-1261	n. a.	
7.5 L Standard Pre-configured System	M1287-1266	M1287-1262	n. a.	
14.0 L Standard Pre-configured System	M1287-1267	M1287-1263	n. a.	
Custom configurations, Voltage	M1287-1010	M1287-1020	n. a.	
310 Cabinet for use with CelliGen Plus Vessel	M1287-1004	M1287-1002	n. a.	
BioFlo 415 Fermentor*				
7.0 L Standard Pre-configured System	M1360-1120	n. a.	n. a.	
14.0 L Standard Pre-configured System	M1360-1121	n. a.	n. a.	
19.5 L Standard Pre-configured System	M1360-1123	n. a.	n. a.	
For BioFlo/CelliGen 510, 610, Pro & BLU	Contact your sales representative			
Pumps				
WM Pump, 520 U/R, Variable Speed	n. a.	n. a.	n. a.	
Masterflex, Variable Speed, Easy-Load Pump	n. a.	n. a.	n. a.	
Ancillary Fermentation Accessories				
ThermoFlex Mobile Chiller	n. a.	n. a.	n. a.	
Analog Input/Output Module	n. a.	n. a.	M1372-1001	
EX-2000 Off-Gas Oxygen/Carbon Dioxide Monitor	n. a.	n. a.	M1276-0000	

* Footnotes:
 HB = Heat Blanket, WJ = Water Jacket, WM = Watson Marlow
 All volumes shown are Total Volume

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