eppendorf

Master of Class

Mastercycler® – tradition leads the way into the future


eppendorf
Mastercycler X50h

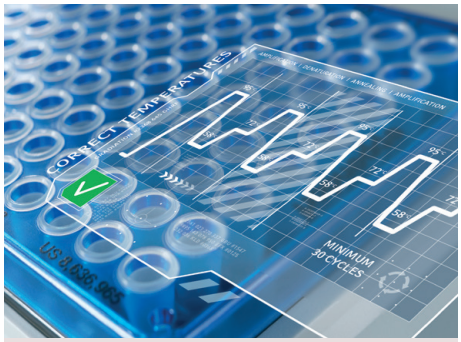
»Science consistently produces a new crop of miraculous truths and dazzling devices every year.«

Kary Mullis, Biochemist

From the first days of PCR until now, many big and small innovations have improved this technology and made it to one of the most common techniques in molecular biology. Since the introduction of our first thermal cycler in 1990, Eppendorf continues to develop instruments, consumables and accessories that help to improve reliability, yield and PCR run-times. As the innovator of the gradient technology for easy PCR optimization, Eppendorf is your Expert Partner to offer solutions that fit to even the highest demands.

PCR Instruments
Choose from a variety of PCR cyclers the version that fits best to your application. Eppendorf offers options for fast PCR, PCR optimization

> More information: page 04



PCR Consumables
Depending on your throughput you have the choice between tubes, tube strips, 96-well or 384-plates or specially optimized consumables for fast PCR runs. A variety of sealing options completes the consumable portfolio.

> More information: page 10

PCR Accessories
Ensure optimal performance for your cyclers with the Temperature Verification System. Obtain reliable and effective sealing with Eppendorf HeatSealers. Connect up to fifty cyclers to a central software application with CycleManager X50.

> More information: pages 06, 11

Speed Up and Save Time

The Mastercycler X50 is the optimal instrument to save time with higher PCR throughput, using standard formats whenever speed or lab efficiency are of paramount importance. Up to 10 units can be combined – ideal for high throughput applications or labs with a high number of users running different assays. Should you feel you need more flexibility or throughput, up to 50 units can be combined in a network, operated by the CycleManager X50 software application.

The excellent block temperature control and extremely fast temperature ramp rates allow you to save time with optimized protocols. The 2D-Gradient option results in 96 different reaction parameters to optimize two steps of the PCR protocol in a single run and supports a fast optimization of your PCR protocols.

Product Features:

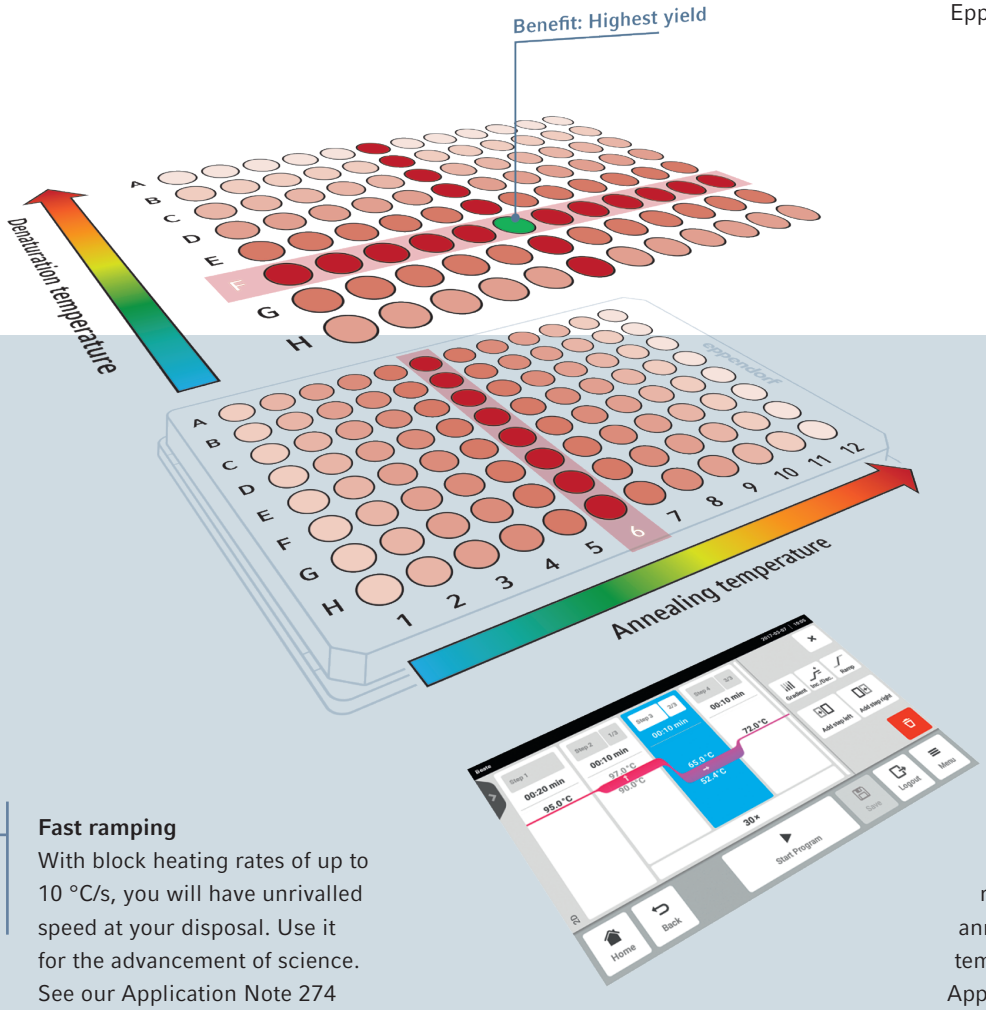
> Fast ramp rate of up to 10 °C/s to realize fast PCR runs (see Application Note 274)
> Wide selection of blocks from a fast silver block to 384 well format offers flexibility
> Connect up to 10 units to a network or up to 50 cyclers with the CycleManager X50 software to save time for PCR programming
> Innovative 2D-Gradient for advanced PCR optimization
> TSP: Thermal Sample Protection actively maintained a constant block temperature (at 20 °C) when the heated lid function has been switched on
> Super fast transfer of your optimized protocols by keeping your desired runtime (ideally used with Mastercycler X50s)

Applications:

> Fast PCR applications
> Efficient PCR set-up in mid to high throughput
> PCR optimization (s. Application Note 387)

Quiet like a whisper

The Mastercycler X50 is designed to be impressively quiet – even during extensive cooling steps.



Fast ramping
With block heating rates of up to 10 °C/s, you will have unrivalled speed at your disposal. Use it for the advancement of science. See our Application Note 274 for details.

2D-Gradient
Two gradients in the same run allow you to optimize the annealing and the denaturation temperature in parallel. See our Application Note 387 for details.

Touch screen interface
Intuitive and quick programming from the beginning.

Small footprint
Ventilation from front to back contributes to the small footprint of the Mastercycler X50. No extra space is needed for ventilation on either side of the cycler.

Speed Up Your PCR

Thermal cycler	Total run time [hh:mm:ss]
Mastercycler X50s	00:39:29
Mastercycler X50l	00:45:02
TAdvanced 96S	00:47:05
PeqSTAR® 96X	00:47:10
TAdvanced 96	00:47:37
Biorad® C1000	00:49:18
Agilent SureCycler® 8800	00:50:33
Proflex® (96-well)*	00:50:54
Mastercycler® nexus gradient	00:51:15
Applied Biosystems® Veriti™ Fast	00:56:13
SimpliAmp®*	00:56:44
Biorad T100*	01:03:52

* Performed in high profile twin.tec plates because the cyclers cannot accommodate low profile plates.

> Further information available at:
www.eppendorf.com/mastercycler

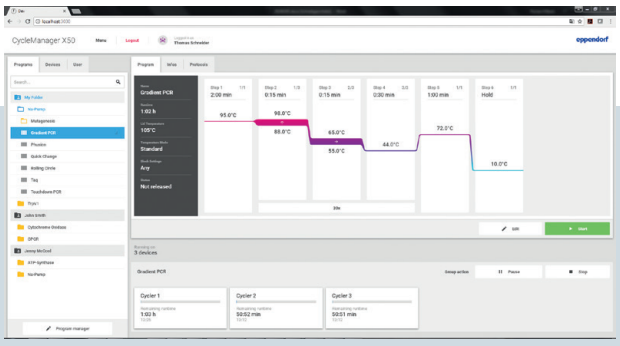
Enhance PCR Efficiency

Up to 10 cyclers can be operated by one Mastercycler X50, that serves as a master instrument. Connect all cyclers to the central software application CycleManager X50 and you can operate up to fifty Mastercycler X50 eco modules from your office. Password protected user access and different access rights, allowing greater documentation capabilities than ever before.
The Mastercycler X50 eco modules offer a status display at the front to identify the cycler and the current status.

Product Features

> Individual, simultaneous or grouped control of up to fifty Mastercycler X50 eco modules
> Maintenance date reminders to ensure unverified cyclers are not used
> Central management of protocols, log files, user rights and booking schedules

The new CycleManager X50 offers a comprehensive solution to support the entire PCR workflow with features like a booking schedule and maintenance management combined with an intuitive, versatile and state-of-the-art software operation. Arrange instruments in groups to run them in parallel and get notified by email when your PCR is completed!



> For further information visit:
www.eppendorf.com/cyclemanager

Mastercycler® Performance Plans

epServices
for premium performance

Is your lab ISO-accredited? Do you have to work in accordance to ISO 17025 or ISO 15189?
Our Mastercycler Performance Plans offer a choice of preventive maintenance services for consistent instrument performance and confidence in safety. This service plan also includes an offering for IQ/OQ and verification acc. to ISO 9001/ISO 17025.

Certification Services
Installation Qualification (IQ) and Operational Qualification (OQ) certification services support your Quality Management requirements, providing you with qualified assurance that your Mastercycler is functioning correctly, in accordance with manufacturers specifications.

Temperature verification
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.

> For further information visit:
www.eppendorf.com/mastercycler-service

The Mastercycler® nexus X2

The Mastercycler nexus X2 gives you the ability to run two totally independent protocols at the same time. Smaller assays fit nicely on the 32-well-block—larger assays can exceed 48 samples and run on the 64-well-block. The larger block is available with a gradient function.

As every member of the Mastercycler nexus family, the Mastercycler nexus X2 can be combined with all other family members in a network of up to 3 units. That allows you to install the best solution for your needs and benefit from the same intuitive software on all your PCR devices.

In combination with Eppendorf PCR Tubes, PCR Strips or divisible plates, the Mastercycler nexus X2 will give you consistent and publishable results—every day!

Product features

> Large block for large assays—small block for small assays.
> Universal block for strips, 0.2 mL and 0.5 mL PCR tubes
> Intuitive graphic programming (optional mouse use)
> Optional gradient for PCR optimization
> E-mail notification
> Combine up to 3 units for maximum throughput!

Benefits at your fingertips:

Two independent blocks of different sizes provide a lot of flexibility.
Combine up to 3 units for higher throughput.
Low noise, low power consumption, intuitive software.

Technical Specifications	
Block homogeneity:	
20 °C – 72 °C	≤ ±0.3 °C
95 °C	≤ ±0.4 °C
Heating rate*	ca. 3 °C/s
Cooling rate*	ca. 2 °C/s
Max. power consumption	700 W
Block temperature accuracy	±0.2 °C
Sound power levels	< 40 dB[A]
Temperature control range of the block	4 – 99 °C
Temperature control mode	Fast, Standard, Safe
Gradient range	12 °C
Gradient temperature range	30 – 99 °C
Lid temperature range	37 – 110 °C
Dimensions (W × D × H)	25 × 41.2 × 33 cm
Weight	11 kg (24.2 lbs)

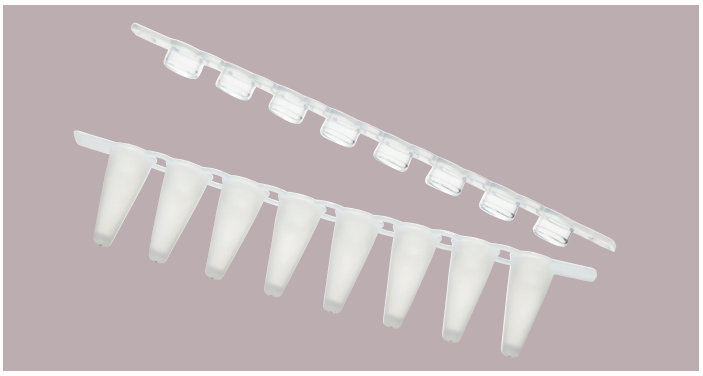
* Heating and cooling rates measured at block

PCR Consumables

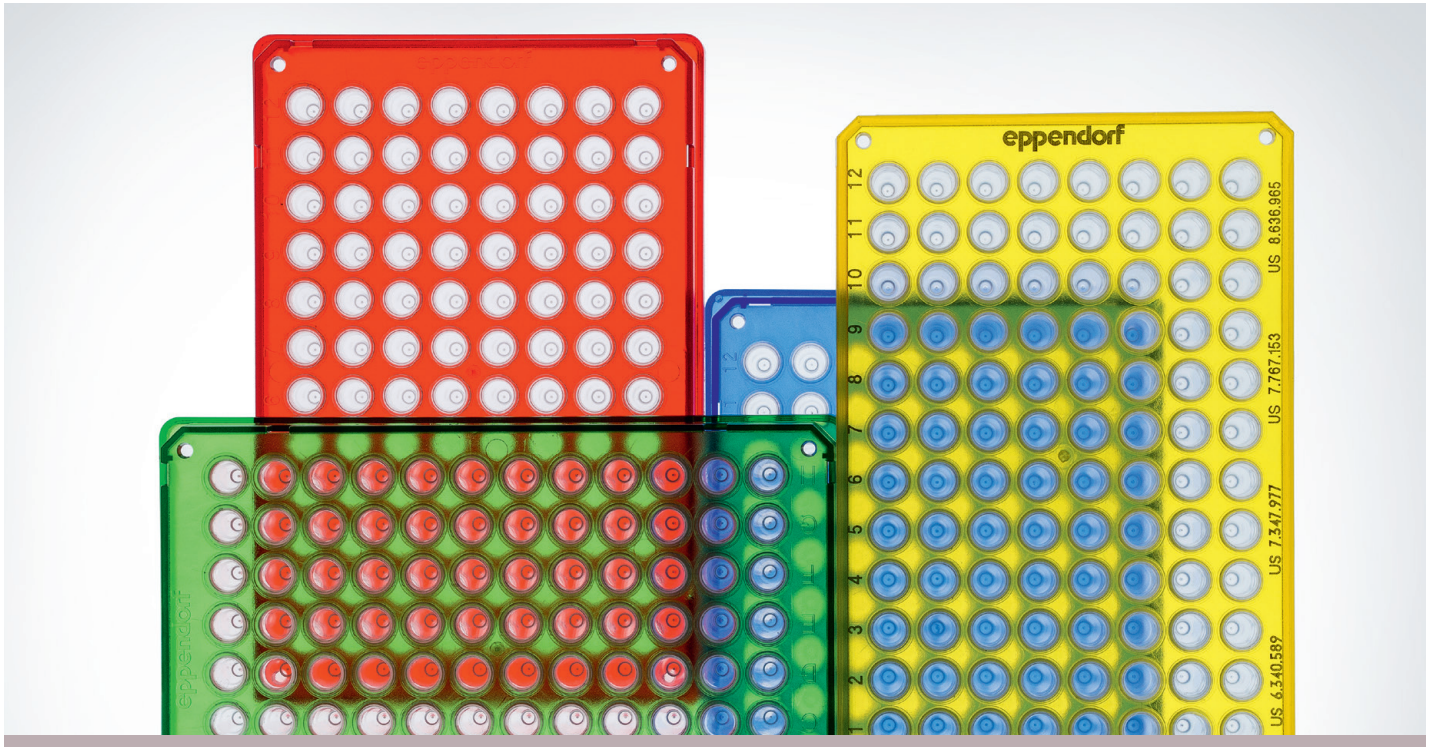
In good company – high quality consumables
Every researcher doing PCR always wonders about the best instrument, the best master mix, the best polymerase. Also when it comes to choosing the plastic consumables that build the connection between PCR instruments and your precious sample, the same rationality and prudence should be applied.

Have you ever considered that your chosen consumables can make a huge difference in the quality and reproducibility of your PCR results? Wall thickness, thermal conductivity of the material, mechanical stability and many other technical characteristics will have a direct impact on your experiment and subsequently the results. Ensure you chose the right PCR consumables for your application!

> 96-well and 384-well PCR plates for high and medium throughput
> Divisible plates, PCR tubes and tube strips for lower throughput
> Sealing options, racks and other accessories for an optimized workflow



Especially for advanced applications such as fast PCR, the combination of instrument & consumable with a highly reproducible set-up is significant to achieve reliable results. The new Eppendorf Fast PCR Tube Strips are especially developed to support fast PCR runs. They are optimized for fast transfer of heat from block to reaction. This results in overall run time savings while getting higher yields, resulting from more efficient PCR.



> For further information see Application Note 400 – available for download at: www.eppendorf.com/mastercycler

HeatSealer and Sealing Films

The Eppendorf HeatSealer Family offers you reliable and effective sealing of a variety of plates. When working with plates, only a tight and reproducible seal gives you predictable and reproducible assay performance. Every lab works with different kinds of plates and a heat sealer will work with most common formats – from large deepwell plates to low-profile PCR plates. Our specific set of adaptors gives you the range you need to seal almost any plate. Especially for long term storage, a tight seal is very beneficial to ensure your sample is securely stored until you need it again!

Product features:
> Hermetic sealing of multiwell plates
> Minimizes evaporation in PCR, reducing cross contamination
> Seals 96- and 384-well plates
> Integrated thermostat prevents overheating
> Improved mechanics for easier sealing
> PCR Plate Adapter included

The Eppendorf HeatSealer S100 fits in every lab – it is very small and easy to operate.

The Eppendorf HeatSealer S200 provides the flexibility you need – you can choose from different sealing temperatures and sealing times.

Temperature Verification System

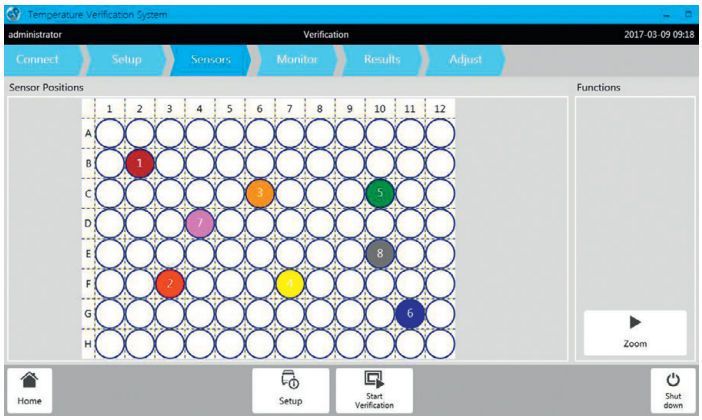
Make your PCR a standardized routine

The better you can control the reproducibility of your PCR, the easier it is to run it consistently and to document the reproducibility of your workflow. Excellent block homogeneity, accuracy and precision as well as regular temperature verification, stringent user management and advanced connectivity are cornerstones of a validated PCR workflow.

The new Temperature Verification System can verify and adjust the Mastercycler X50 family as well as most other Mastercycler families according to ISO 9001 or 17025. Minimum user input during verification makes it easy and simple to ensure an optimal performance of your PCR cycler.

As an example, the new Mastercycler X50 supports your needs for instrument qualification and method validation with the following features:

> Excellent block homogeneity (±0.2 °C at 20–72 °C)
> Excellent block accuracy and precision (±0.15 °C)
> Fast temperature verification possible
> Adjustable verification settings – according to your audit needs
> Extended documentation capabilities
> Advanced user management – from flexible to strict
> Transparent performance data



Temperature verification with a multi-probe system allows fast and reliable assessment of the cycler's performance. The generated certificates can support instrument qualification for your quality management system.

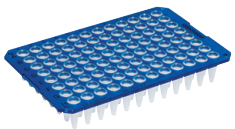
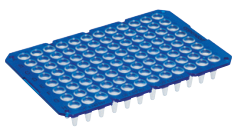
Technical specification

Features	Mastercycler X50 family	Mastercycler nexus X2
No. of connectable instruments (w/o additional software)	Up to 10	Up to 3
CycleManager software	Yes, connects up to 50 eco modules	Not available
***In situ* PCR block**	No	No
Block formats	2 different formats for 96-well and 384-well plates	2 blocks in one instrument (32-wells and 64 wells)
Temperature Gradient	Yes, 2D-gradient, X- and Y-axis	Yes, X-axis, on the 64-well block
Regulatory Documentation	Stringent user management, event log	No
Temperature Verification System	Yes	Yes
High pressure lid option (optimized for the usage of plates)	Yes (see Application Note 388)	No
flexlid concept	Yes	Yes
Speed (heating and cooling rates measured at block)	Heating rate: up to 10°C/s Cooling rate: up to 5°C/s	Heating rate: up to 3°C/s Cooling rate: up to 2°C/s
VisioNize® compatible	Yes, direct connection	Yes, connection via VisioNize box

Technical Specifications	Mastercycler X50s
	
Thermoblock	Silver
Sample Capacity	96 × 0.2 ml PCR vessels, 1 PCR plate (96-wells)
Temperature control range of the block	4–99°C
Temperature control mode	Fast, Intermediate, Standard, Safe
Heating technology of the block	Six peltier elements, individually controlled
Gradient block	over 12 columns / over 8 rows
Gradient range	1–30 °C
Gradient temperature range	30–99 °C
Lid temperature range	37–110 °C
Lid descent and closing pressure	flexlid® technology with Thermal Sample Protection
Block homogeneity: **20 °C–72 °C** **95 °C**	 ≤ ±0.2 °C ≤ ±0.3 °C
Block temperature accuracy	± 0.15 °C
Heating rate*	10 °C/s
Cooling rate*	5 °C/s
Interfaces	Ethernet, USB
Dimensions (W × D × H)	27.5 × 43 × 33 cm
Weight	11.5 kg
Power supply	110–230 V, 50–60 Hz
Max. power consumption	850 W

* Heating and cooling rates measured at block
** Unit can only be operated via a Mastercycler nexus unit (including flat, X1 versions) with control and display panel
Product appearance and/or specifications are subject to change without notice.

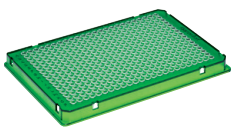


Eppendorf twin.tec® PCR Plates

Model	Eppendorf twin.tec PCR Plate 96 skirted	Eppendorf twin.tec PCR Plate 96 semi-skirted	Eppendorf twin.tec PCR Plate 96 unskirted	Eppendorf twin.tec PCR Plate 96 unskirted, divisible
Number of wells	96 wells	96 wells	96 wells	96 wells
Total volume per well	150 µL	250 µL	150 or 250 µL	150 or 250 µL
OptiTrack® frame color	colorless yellow green blue red	colorless yellow green blue red	colorless blue	colorless blue

Mastercycler X50i	Mastercycler nexus GX2
	
Silver	Aluminum
96 × 0.2 ml PCR vessels, 1 PCR plate (96-wells)	64/32 × 0.2 mL PCR tubes or up to 34 × 0.5 mL PCR tubes
4–99°C	4–99°C
Fast, Intermediate, Standard, Safe	Fast, Standard, Safe
Six peltier elements, individually controlled	4/2 peltier elements
over 12 columns / over 8 rows	over 8 columns
1–30 °C	1–20 °C
30–99 °C	30–99 °C
37–110 °C	37–110 °C
flexlid® technology with Thermal Sample Protection	flexlid® technology with Thermal Sample Protection
≤ ±0.2 °C ≤ ±0.3 °C	≤ ±0.3 °C ≤ ±0.4 °C
± 0.15 °C	± 0.2 °C
10 °C/s	ca. 3 °C/s
5 °C/s	ca. 2 °C/s
Ethernet, USB	Ethernet, USB, CAN in, CAN out
27.5 × 43 × 33 cm	25 × 41.2 × 33 cm
10.7 kg	11 kg (24.2 lbs)
110–230 V, 50–60 Hz	230 V, 50–60 Hz
850 W	700 W

				
	Eppendorf twin.tec PCR Plates LoBind	**Eppendorf twin.tec PCR Plates**		**Eppendorf twin.tec *real-time* PCR Plates**
Eppendorf twin.tec PCR Plate 96 skirted	**Eppendorf twin.tec PCR plate 96 LoBind**	**Eppendorf twin.tec PCR Plates 384 LoBind**	**Eppendorf twin.tec *microbiology* PCR Plate 96**	**Eppendorf twin.tec 96 *real-time* PCR Plates**
384 wells	96 wells	384 wells	96 wells	96 wells
40 µL	150 or 250 µL	40 µL	150 or 250 µL	150 or 250 µL
colorless yellow green blue red	colorless yellow green blue red	colorless	colorless blue	white blue

Ordering information

Description	International Order no.	North America Order no.
Mastercycler® X50s (silver block)	6311 000 010	6311000010
Mastercycler® X50i (silver block, eco module)	6301 000 012	6301000012
CycleManager X50	6349 000 014	6349000014
Mastercycler® nexus GX2	6336 000 015	6336000015
Fast PCR Tube Strips with flat caps	6338 000 012	6338000012
Eppendorf twin.tec® PCR Plate 96, skirted, clear 25 pcs.	0030 128 648	951020401
Eppendorf twin.tec® PCR Plate 96, semi-skirted, clear 25 pcs.	0030 128 575	951020303
Eppendorf twin.tec® PCR Plate 96, unskirted low profile, clear 20 pcs,	0030 133 307	0030133307
Eppendorf twin.tec® PCR Plate 96, unskirted low profile, clear (divisible) 20 pcs,	0030 133 358	0030133358
Temperature Verification System TVS T6	3120 000 900	3120000900

Find more information about additional models of Mastercycler X50 and Mastercycler nexus on www.eppendorf.com/mastercycler

Eppendorf Handling Solutions

Are you interested in tips and tricks for your daily lab work?
The »Eppendorf Handling Solutions« online sphere is the place to go to find information on the most diverse topics from the areas of Liquid Handling, Cell Handling, and Sample Handling.

> Dive into the area of your choice, learn new things, and have fun!
www.eppendorf.com/sample-handling-amplification

Your local distributor: www.eppendorf.com/contact
Eppendorf AG · Barkhausenweg 1 · 22339 Hamburg · Germany
eppendorf@eppendorf.com · www.eppendorf.com

www.eppendorf.com/mastercycler