eppendorf

Master of Class

Mastercycler® – tradition leads the way into the future

»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 a pioneer 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 and 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 12

PCR Accessories
Ensure optimized 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, 13

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 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
> 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)

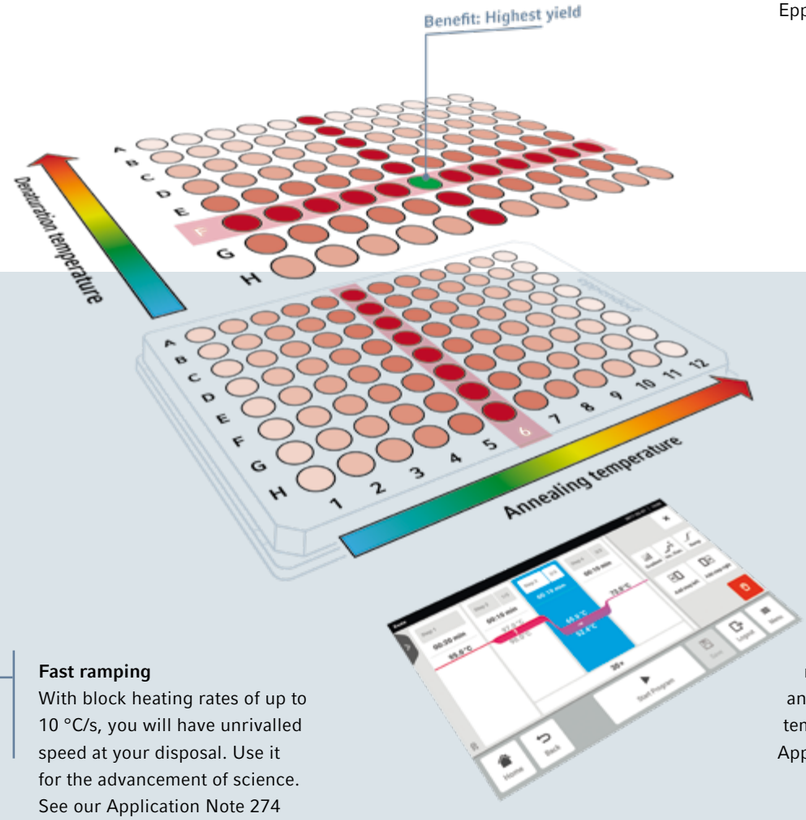
Applications:
> Fast PCR applications
> Efficient PCR set-up in mid to high throughput
> PCR optimization (s. Application Note 387)

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.

Touch screen interface
Intuitive and quick programming from the beginning.

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



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.

Speed Up Your PCR

Manufacturer	Thermal cycler	Total run time [hh:mm:ss] (rounded to the nearest 10 seconds)	(Maximum heating) ramp rate according to technical data [°C/s]
Eppendorf	Mastercycler® X50s	00:39:00	10
Eppendorf	Mastercycler® X50a	00:45:10	5.0
VWR™	PeqSTAR 96X	00:47:20	5.0
HiMedia®	Prima-96™	00:48:00	5.0
Bio-Rad®	C1000 Touch™	00:48:20	5.0
Bio-Rad®	PTC Tempo 96	00:48:20	5.0
Applied Biosystems	Proflex™ (96-well)*	00:48:20	6.0
Eppendorf	Mastercycler® X40	00:48:40	3.3
Bioneer	AllInOneCycler™#*	00:51:40	9.5
Applied Biosystems	Veriti™ Dx Fast	00:53:40	5.0
Applied Biosystems	SimpliAmp™*	00:54:30	4.0
VWR™	XT⁹⁶	00:55:30	4.0
Bio-Rad®	T100*	01:02:50	4.0

#96 well Fast PCR system.
*Performed in high profile twin.tec plate because the cyclers cannot accommodate low profile plates.

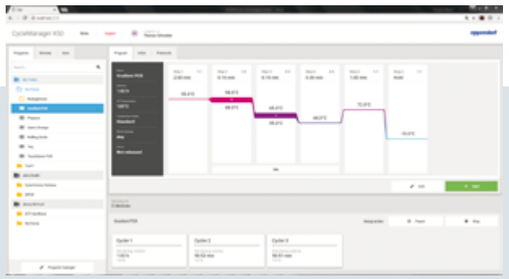
See our Application Note 274 for details.

> Further information available at:
www.eppendorf.link/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.

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!



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

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

Technical specification

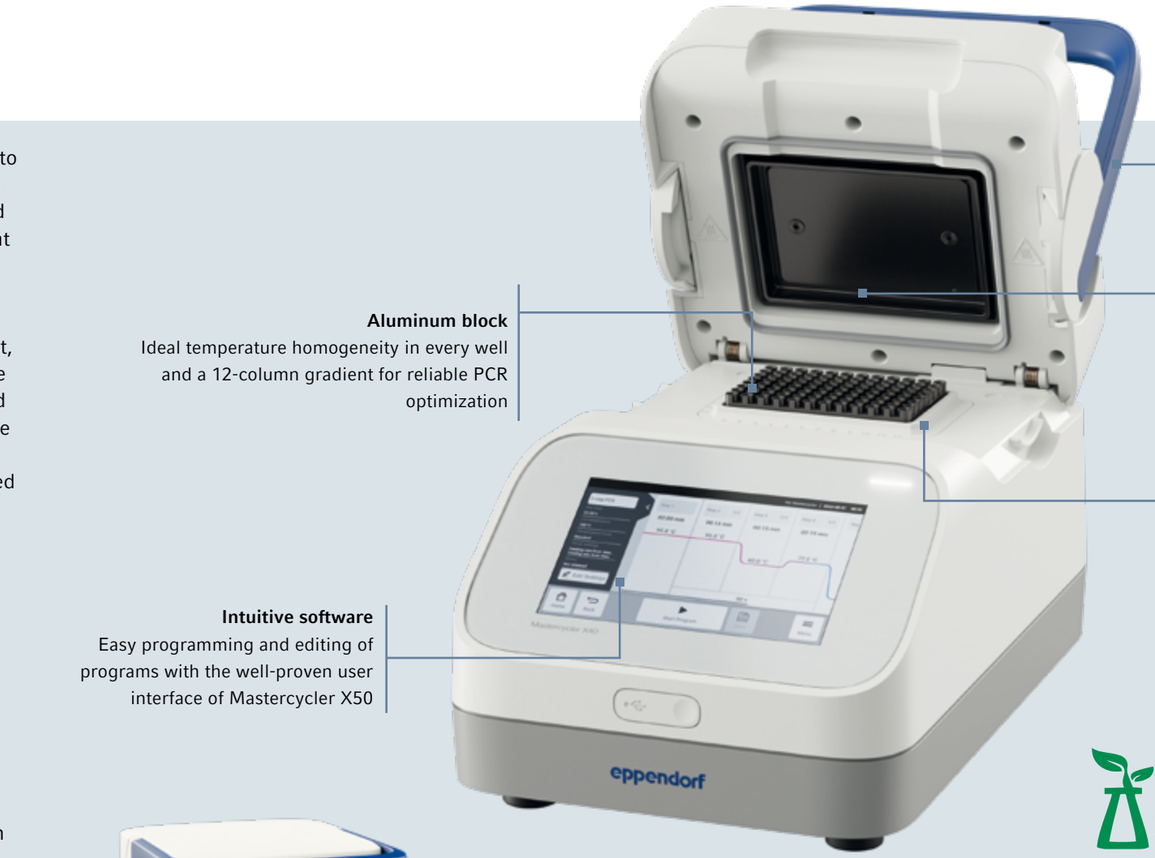
Features	Mastercycler® X50 family	Mastercycler® nexus X2	Mastercycler® X40
No. of connectable instruments (w/o additional software)	Up to 10	Up to 3	Not possible
CycleManager software	Yes, connects up to 50 eco modules	Not available	Not available
Block formats	2 different formats for 96-well and 384-well plates	2 blocks in one instrument (32-wells and 64 wells)	96-well format
Temperature Gradient	Yes, 2D-gradient, X- and Y-axis	Yes, X-axis, on the 64-well block	Yes, X-axis over 12 columns
Regulatory Documentation	Stringent user management, event log	No	Stringent user management, event log
Temperature Verification System	Yes	Yes	Yes
High pressure lid option (optimized for the usage of plates)	Yes (see Application Note 388)	No	No
Lidconcept	flexlid	flexlid	SafeLid
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	Heating rate: up to 3.3 °C/s Cooling rate: up to 1.5 °C/s
VisioNize® compatible	Yes, direct connection	Yes, connection via VisioNize box	Yes, direct connection

Raise Your Standard

with Mastercycler® X40

The Eppendorf Mastercycler X40 leads your standard PCR into a new era. The futuristic design is paired with known quality. The performance of the reliable aluminum block is developed for excellent temperature homogeneity. A 12-column gradient offers fast PCR optimization. Programs from older Mastercycler models can easily be imported. Use the program migration feature to transfer protocols from slower cycler models, so that you can start right away. All programming is done fast, intuitive, and comfortably via chemical resistant glass surface touchscreen and the well-established user interface also used for Mastercycler X50. The SafeLid applies consistent pressure on your samples for evaporation protection.
Sustainability is a must, therefore Mastercycler X40 is shipped in a stable, protective cardboard box. The included short manual is enough to start your PCR immediately and the full manual is available as a digital version, accessible via a QR code on the device.

Product Features:
> The aluminum block of Mastercycler X40 heats up with 3.3 °C/s and cools down with 1.5 °C/s
> 0.1, 0.2 mL PCR tubes and tubestrips and any type of 96-well PCR plate fit the block
> Small footprint and lightweight
> Intuitive programming and colored 7 inch LCD touchscreen
> VisioNize® touch enabled
> More sustainable product (ACT-labeled)



Footprint

No space in your lab? Mastercycler X40 has a small footprint and air vents on its back to fit even in small spaces left over on your lab bench. Its measures are only 24.5 x 38.5 x 23 cm (WxDxH). Additionally it is lightweight of only 7.25 kg.

ACT.
The Environmental Impact Factor Label

Connect Your Cycler to VisioNize® Lab Suite

> Monitor device-related parameters like temperature, status and runtime as well as all device interactions like set-point changes
> Check the current status of your experiment or if a device is available
> Export parameter and event data
> Receive real-time notifications via email and SMS: »Program finished«

VisioNize Lab Suite

> Please visit our website:
www.eppendorf.link/visionize

Ultimate Flexibility

Mastercycler® nexus X2
> Run two independent protocols on the two blocks
> Large block for large assays – small block for small assays

Individual features:

Mastercycler nexus and nexus gradient
> Universal block for plates, 0.1 mL, 0.2 mL and 0.5 mL PCR tubes

Connectivity
> Connect up to 3 units to increase throughput and efficiency

The Mastercycler® nexus X2 is your reliable companion when a maximum of flexibility in formats is needed. The cycler 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. It can accommodate 96-well PCR plates, 0.2 mL and 0.1 mL PCR tubes and strips, as well as 0.5 mL PCR tubes. It is easy to use, does not need much space or energy and sends you an e-mail when it is done.

Product features
> High consumables flexibility
> Optional gradient for PCR optimization
> Connect up to 3 units to a network
> flexlid® concept guarantees an automatic height adjustment of the lid for consistent pressure on all consumable formats

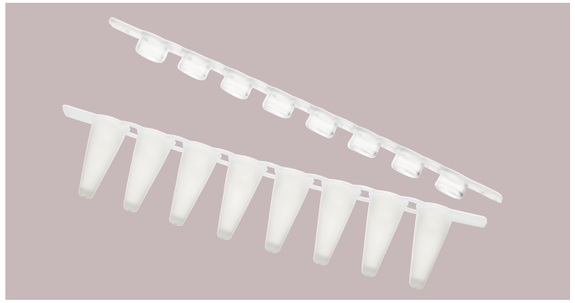
Applications
> Standard PCR in low to mid throughput
> PCR optimization

PCR Consumables

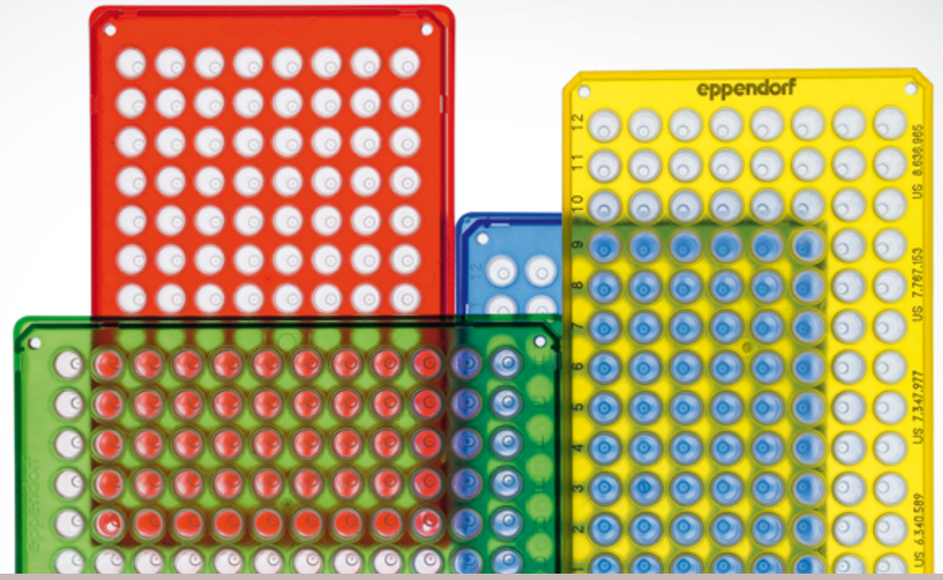
In good company – high quality consumables
Every researcher doing PCR always wonders about the best instrument, the best master mix, the best polymerase. Also when it comes to choosing the plastic consumables that build the connection between PCR instruments and your precious sample, the same rationality 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.link/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 (TVS) verifies and adjusts Mastercycler family members according to your needs. Three sensor types are available (96-well or 384-well or flat) that were calibrated either in a ISO 9001- or ISO IEC 17025 (DAkkS)-certified lab. Minimum user input during verification makes it easy and simple to ensure an optimal performance of your PCR cycler.

As an example, the 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.

> For further information visit:
www.eppendorf.link/mastercycler

Mastercycler® Performance Plans

epServices
for premium performance

Is your lab ISO-accredited? Do you have to work in accordance to ISO/IEC 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 support verification acc. to ISO 9001/ISO/IEC 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 supports to meet documentation and detection requirements in the laboratory.

Be Confident With Every PCR Run

VisioNize Lab Suite

Sign up for free!

Real-Time Monitoring
Monitor your PCR run from anywhere and track the parameters, e.g. runtime or device status

Instant Notifications
Receive alert event notifications, e.g. finished program or error messages to react quickly

Device Connectivity
Connect and monitor all your Eppendorf PCR cyclers*

Easy Data Access
Export parameter, event data and any user interactions

Alert Management
Track all alert acknowledgements with time-stamped data logs

Response-Based Alert Escalation
Define escalation scheme to individual or multiple recipient groups based on lab presence

Task Management
Plan and assign device-related tasks, e.g. clean block or schedule maintenance service. Tasks can be tracked retrospectively via *Task History*

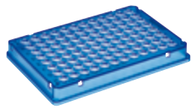
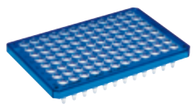
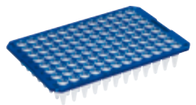
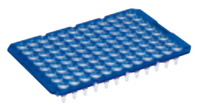
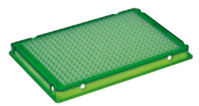
* The VisioNize box is required for Eppendorf Mastercycler nexus models.
** Additional device require extra device licences. Hardware and software upgrades are not included.

> Connect up to three cyclers for free**!
www.eppendorf.link/visionize

Compare all Mastercycler X50-variants

Technical Specifications	Mastercycler® X50s	Mastercycler® X50i	Mastercycler® X40	Mastercycler® nexus GX2
				
Thermoblock	Silver	Silver	Aluminum	Aluminum
Sample Capacity	96 × 0.2 ml PCR vessels, 1 PCR plate (96-wells)	96 × 0.2 ml PCR vessels, 1 PCR plate (96-wells)	96 x 0.1/0.2 mL PCR tubes/tubestrips 1 x 96-well PCR plate	64/32 × 0.2 mL PCR tubes or up to 34 × 0.5 mL PCR tubes
Temperature control range of the block	4–99 °C	4–99 °C	4–99 °C	4–99 °C
Temperature control mode	Fast, Intermediate, Standard, Safe	Fast, Intermediate, Standard, Safe	Fast, Intermediate, Standard, Safe	Fast, Standard, Safe
Heating technology of the block	Six peltier elements, individually controlled	Six peltier elements, individually controlled	Three peltier elements	4/2 peltier elements
Gradient block	over 12 columns / over 8 rows	over 12 columns / over 8 rows	over 12 columns	over 8 columns
Gradient range	1–30 °C	1–30 °C	1–30 °C	1–20 °C
Gradient temperature range	30–99 °C	30–99 °C	30–99 °C	30–99 °C
Lid temperature range	37–110 °C	37–110 °C	37–110 °C	37–110 °C
Lid descent and closing pressure	flexlid® technology with Thermal Sample Protection	flexlid® technology with Thermal Sample Protection	SafeLid for evaporation protection	flexlid® technology with Thermal Sample Protection
Block homogeneity: **20 °C–72 °C**	≤ ±0.2 °C	≤ ±0.2 °C	≤ ±0.2 °C	≤ ±0.3 °C
95 °C	≤ ±0.3 °C	≤ ±0.3 °C	≤ ±0.3 °C	≤ ±0.4 °C
Control accuracy (with the gradient function switched off)	± 0.15 °C	± 0.15 °C	± 0.15 °C	± 0.2 °C
Heating rate*	max. 10 °C/s	max. 10 °C/s	max. 3.3 °C/s	max. 3 °C/s
Cooling rate*	max. 5 °C/s	max. 5 °C/s	max. 1.5 °C/s	max. 2 °C/s
Interfaces	Ethernet, USB	Ethernet, USB	Ethernet, USB A	Ethernet, USB, CAN in, CAN out
Dimensions (W × D × H)	27.5 × 43 × 33 cm	27.5 × 43 × 33 cm	24.5 x 38.5 x 23 cm	25 × 41.2 × 33 cm
Weight	11.5 kg	10.7 kg	7.25 kg (15.9 lbs)	11 kg (24.2 lbs)
Power supply	110–230 V, 50–60 Hz	110–230 V, 50–60 Hz	100-240 V, 50-60 Hz	230 V, 50–60 Hz
Max. power consumption	850 W	850 W	500 W	700 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					**Eppendorf twin.tec® PCR Plates LoBind®**	**Eppendorf twin.tec® PCR Plates**		**Eppendorf twin.tec® *real-time* 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**	**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**
Number of wells	96 wells	96 wells	96 wells	96 wells	384 wells	96 wells	384 wells	96 wells	96 wells
Total volume per well	150 µL	250 µL	150 or 250 µL	150 or 250 µL	40 µL	150 or 250 µL	40 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	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
Mastercycler® X50a (aluminum block)	6313 000 018	6313000018
Mastercycler® X50h (aluminum block, 384 wells)	6316 000 019	6316000019
Mastercycler® X50l (aluminum block, eco module)	6303 000 010	6303000010
Mastercycler® X50t (aluminum block, 384 wells, eco module)	6306 000 010	6306000010
Mastercycler® X40	6381 000 018	6381000018
CycleManager X50	6349 000 014	6349000014
Mastercycler® nexus GX2	6336 000 015	6336000023
Mastercycler® nexus GX2e	6338 000 012	6338000020
Mastercycler® nexus X2	6337 000 019	6337000027
Mastercycler® nexus X2e	6339 000 016	6339000024
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

Your local distributor: www.eppendorf.com/contact
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eppendorf@eppendorf.com · www.eppendorf.com

www.eppendorf.com/mastercycler