eppendorf

The Next Stage

The new Mastercycler® X50

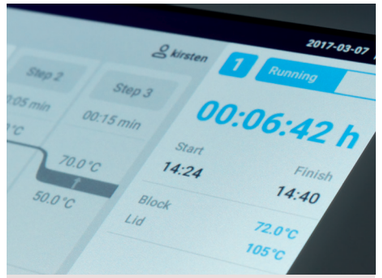
»We cannot solve our problems with the same thinking we used when we created them.«

Albert Einstein, Physicist

The new Mastercycler X50 is the elegant synthesis of flexibility for research applications and standardization for routine applications such as food testing etc. A new highly intuitive touch screen concept puts all of those benefits always at your fingertips.

Optimization
Eppendorf once again pioneers in the field of PCR optimization. Our innovative 2D-Gradient allows you to optimize two temperatures (e.g. denaturation and annealing) in one run while using Eppendorf's trusted SteadySlope® technology.

> More information: page 6–7



Speed
Take your PCR to the next level. 10 °C/s heating on an open block format gives you unexpected speed. Your run times will never be the same. How fast do you dare to go?

> More information: page 8–9

Standardization
Temperature verification to international standards, block temperatures you can trust from well to well and run to run. These are among the many benefits we can offer, allowing your PCR assays to contribute to a trusted or even validated workflow.

> More information: page 9

The Next Stage of Engineering

Speed and enhanced optimization functions like the 2D-Gradient make the Mastercycler X50 the ideal tool for advanced research in molecular biology. The excellent block temperature control and regulation give rise to the next stage of optimization, whereas the adaptable user management and profound documentation capabilities give peace of mind to laboratories working or conforming to set standards.

A highly intuitive touch display, low noise levels, low power consumption, and the versatile flexlid lid concept complete the product to be a powerful yet discrete tool. 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 computer-controlled network.

Product Features:
> Innovative 2D-Gradient for advanced PCR optimization
> Heating rate: up to 10 °C/s
> Wide selection of blocks from a fast silver block to 384
> Intuitive touch display
> Connect up to 10 units to a network
> flexlid® concept: automatic height adjustment of the lid allows you to use all types of consumables
> Small footprint
> 2 year warranty

Applications:
> Fast PCR
> PCR optimization
> Standard PCR
> Incubation
> Cycle sequencing

Network like a pro
Control up to 10 cyclers without a PC or additional hardware and up to 50 cyclers using a PC.

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

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.

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

Dynamic homogeneity
Individual control of all six peltier elements allows dynamic homogeneity regulation in real-time.

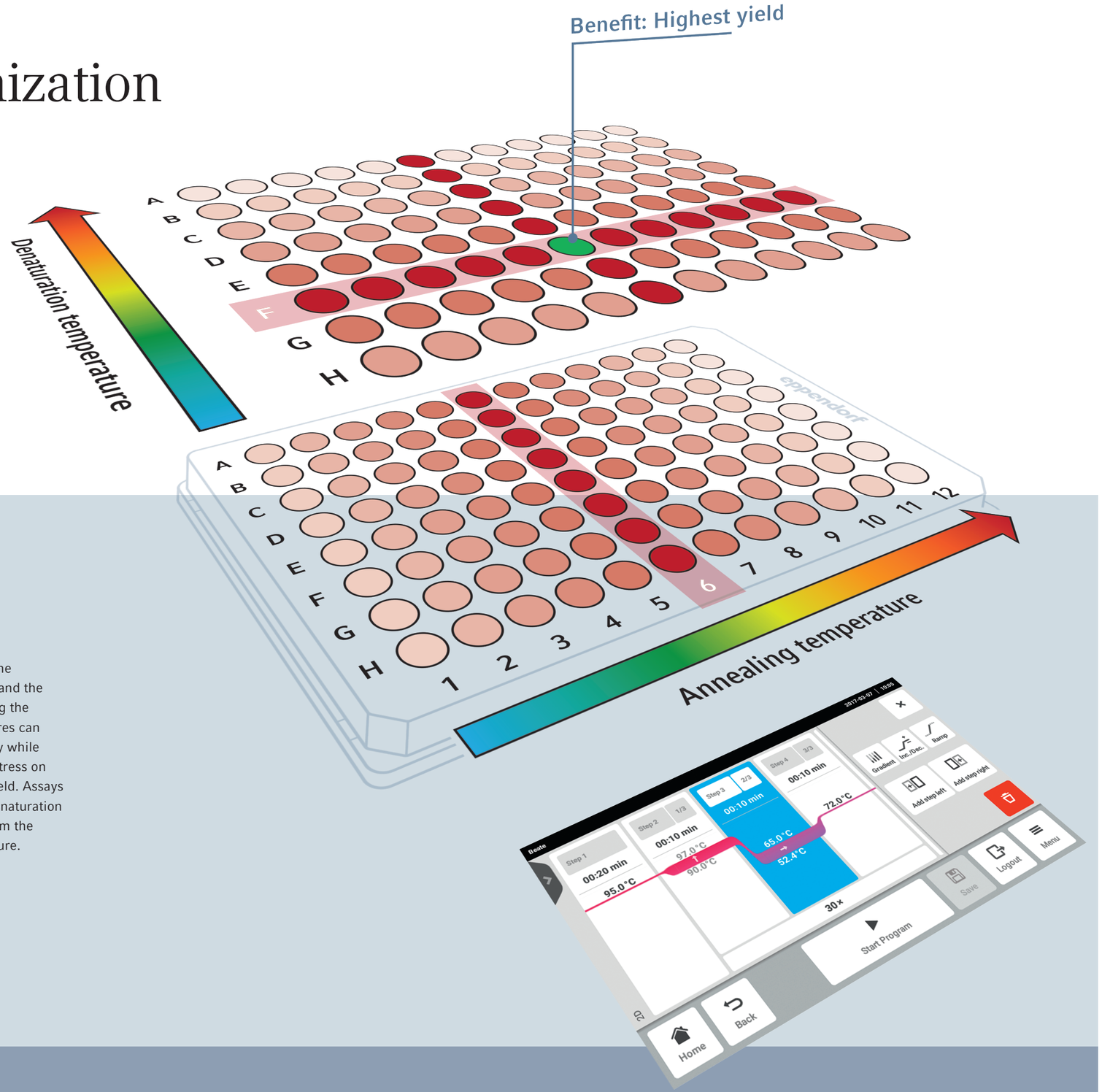
Small footprint
Ventilation from front to back contributes to the small footprint of the Mastercycler X50. No extra space is needed for ventilation on either side of the cycler.

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

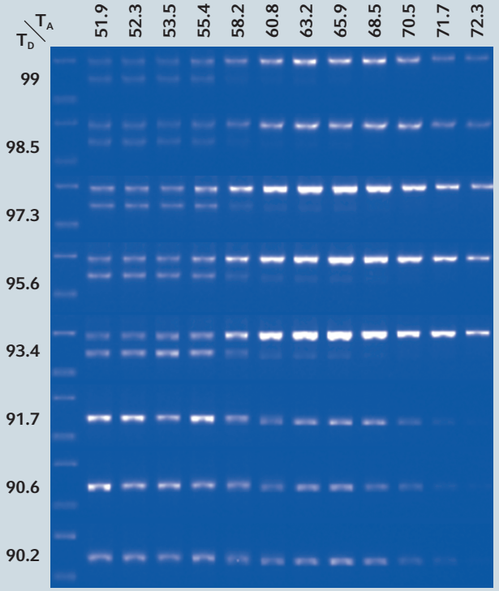
The Next Stage of PCR Optimization

Optimizing the annealing temperature to improve PCR results is a routine task, so why not optimize as far as you can? More and more findings indicate that optimization of the denaturation temperature is worthwhile as well. A high denaturation temperature will harm the enzyme and other biomolecules in your assay. A low denaturation temperature may result in inefficient splitting of the complimentary DNA strands, as is often found with GC-rich templates or templates prone to form »hairpin structures«.

Eppendorf's new 2D-Gradient allows optimization of the annealing and the denaturation temperature in a single run – taking less time than ever before. This gives you the ideal set of temperatures for your PCR assay – quickly, conveniently, reliably.



Cross-Examination



PCR optimization of β-actin Gene with 2D-Gradient technique.
2D-Gradient allows you to optimize both the denaturation temperature (bottom to top) and the annealing temperature (left to right) during the same run. Higher denaturation temperatures can have the advantage of increased specificity while lower denaturation temperatures reduce stress on biomolecules and can lead to increased yield. Assays that struggle to work reliably at a 95 °C denaturation temperature could benefit significantly from the optimization of the denaturation temperature.

> For technical details, please see our Application Note 387.

The Next Stage of Speed

PCR should be faster. That gives you quicker results, throughout the day, and a faster transition to optimal temperatures. The Mastercycler X50 heats with max. 10 °C/s and cools with max. 5 °C/s. Make the speed of the Mastercycler X50 your research advantage.

Thermal cycler	Total run time [hh:mm:ss]	Ramp rate according to technical data [°C/s]
Mastercycler X50s	00:39:29	10
Mastercycler X50l	00:45:02	5
PeqSTAR 96X	00:47:10	5
Biorad® C1000	00:49:18	5
Agilent SureCycler® 8800	00:50:33	6
Proflex® (96-well)*	00:50:54	6
Mastercycler nexus gradient	00:51:15	3
Applied Biosystems® Veriti Fast	00:56:13	5
SimpliAmp®*	00:56:44	4
Biorad T100*	01:03:52	4

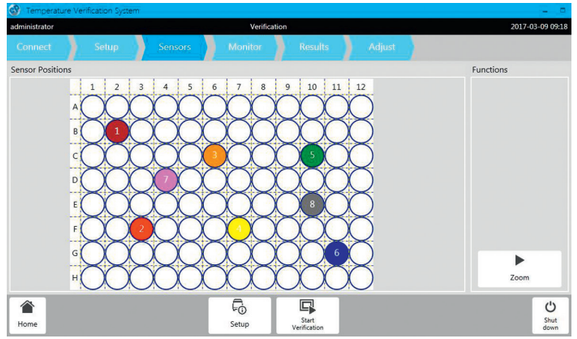
* Performed in high profile twin.tec plates because the cyclers cannot accommodate low profile plates.

There ia a large variety of cyclers available with different ramp rates published.
If you compare the corresponding run times by performing the same protocol using different cyclers, you see that ramp rates do not tell the full story about whether a cycler is fast or not.

> For technical details, please see our Application Note 274:
»Comparative run time evaluations of PCR thermal cyclers«.

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 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
> Advanced documentation capabilities
> Adjustable 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 Specifications

Description	Mastercycler® X50s	Mastercycler® X50a	Mastercycler® X50h	Mastercycler® X50i	Mastercycler® X50l	Mastercycler® X50t
						
Thermoblock	Silver	Aluminum	Aluminum	Silver	Aluminum	Aluminum
High pressure lid			■			■
96-well plate	■	■		■	■	
384-well plate			■			■
0.1/0.2 mL tubes	■	■		■	■	
Temperature control range of the block		4–99 °C			4–99°C	
Temperature control mode	Fast, Intermediate, Standard, Safe			Fast, Intermediate, Standard, Safe		
Heating technology of the block	Six peltier elements			Six peltier elements		
2D-Gradient block	over 12 columns / over 8 rows		over 24 columns / over 16 rows	over 12 columns / over 8 rows		over 24 columns / over 16 rows
Gradient range	1–30 °C			1–30 °C		
Gradient temperature range	30–99 °C			30–99 °C		
Lid temperature range	37–110 °C			37–110 °C		
Lid descent	flexlid			flexlid		
Block homogeneity: **20 °C–72 °C** **95 °C**	≤ ±0.2 °C ≤ ±0.3 °C			≤ ±0.2 °C ≤ ±0.3 °C		
Block temperature accuracy	± 0.15 °C			± 0.15 °C		
Heating rate	max. 10 °C/s	max. 5 °C/s		max. 10 °C/s	max. 5 °C/s	
Cooling rate	max. 5 °C/s	max. 2.3 °C/s		max. 5 °C/s	max. 2.3 °C/s	
Interfaces	Ethernet, USB			Ethernet, USB		
Dimensions (W × D × H)	27.5 × 43 × 33 cm			27.5 × 43 × 33 cm		
Weight	11.5 kg			10.7 kg		
Power supply	110–230 V, 50–60 Hz			110–230 V, 50–60 Hz		
Max. power consumption	850 W			850 W		

Ordering information	International Order no.	North America Order no.
Mastercycler® X50s, silver block, 96-well plate or 0.1/0.2 mL tubes	6311 000.010	6311000010
Mastercycler® X50a, aluminum block, 96-well plate or 0.1/0.2 mL tubes	6313 000.018	6313000018
Mastercycler® X50h, aluminum block, 384-well plate, high pressure lid	6316 000.019	6316000019
Mastercycler® X50i*, silver block, 96-well plate or 0.1/0.2 mL tubes	6301 000.012	6301000012
Mastercycler® X50l*, aluminum block, 96-well plate or 0.1/0.2 mL tubes	6303 000.010	6303000010
Mastercycler® X50t*, aluminum block, 384-well plate, high pressure lid	6306 000.010	6306000010
Accessories		
Ethernet cable, 5 m	6313 070.040	6313070040

* to operate this unit, it needs to be connected to a Mastercycler X50 s,a,p, or h. Up to 9 units can be connected to a Mastercycler X50 s,a,p, or h.

Your local distributor: www.eppendorf.com/contact
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www.eppendorf.com/mastercycler