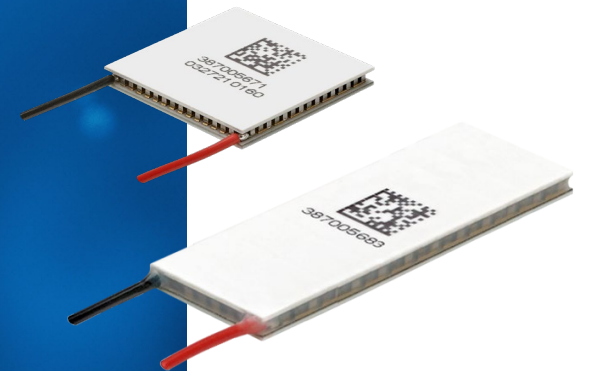




Next-Generation
Thermoelectrics Designed
for **Real-Time PCR**

Introduction

PCR requires a high number of **thermal cycles** to create millions of strands of DNA sequences for analysis.



PowerCycling PCX Thermoelectric Coolers provide rapid temperature changes for PCR applications with minimal degradation in performance

Application Overview



Traditional PCR

Provides result **after test**



Real-Time PCR

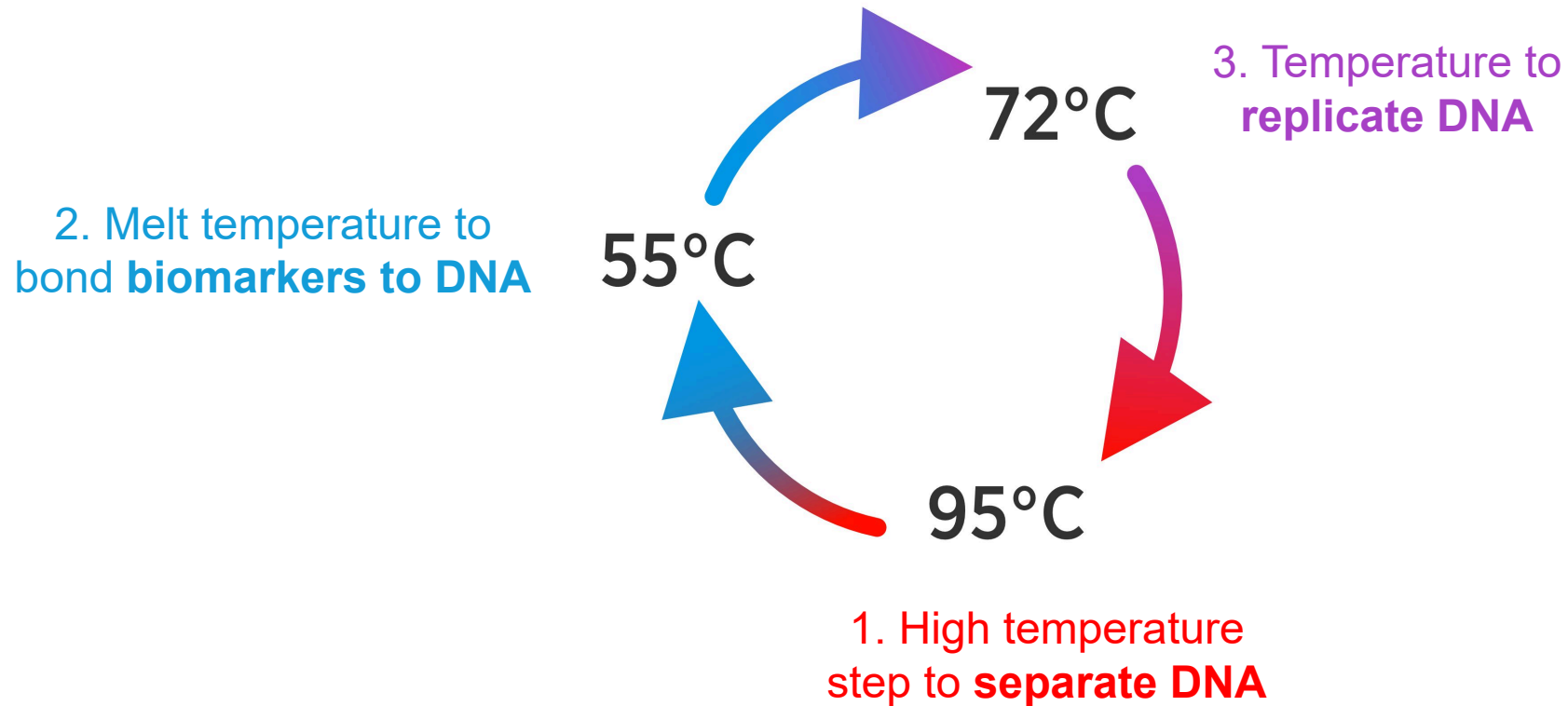
View results **during tests**



Quantitative or Digital PCR

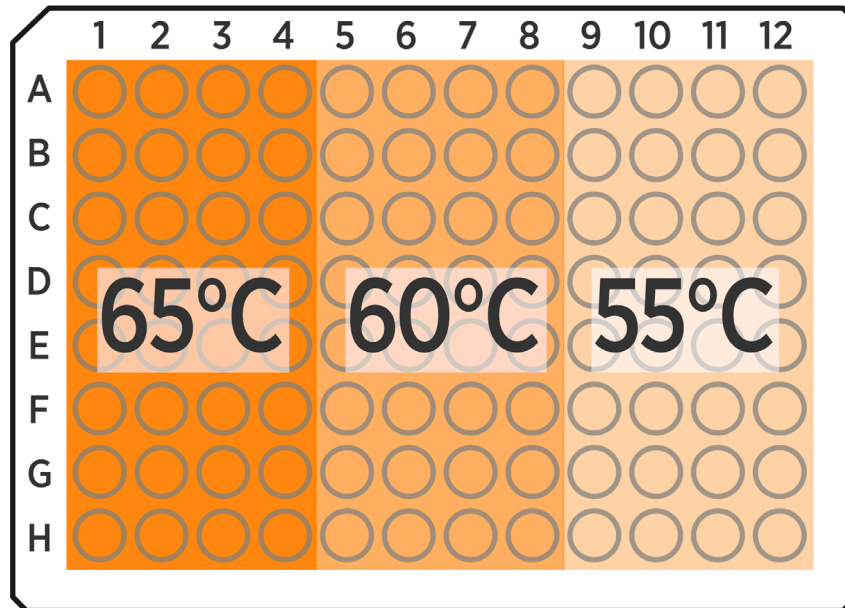
Provides **deeper analysis**

Polymerase Chain Reaction (PCR)



The PCR process typically consists of 30-40 repeated temperature cycles to produce up to ~1 billion DNA strands

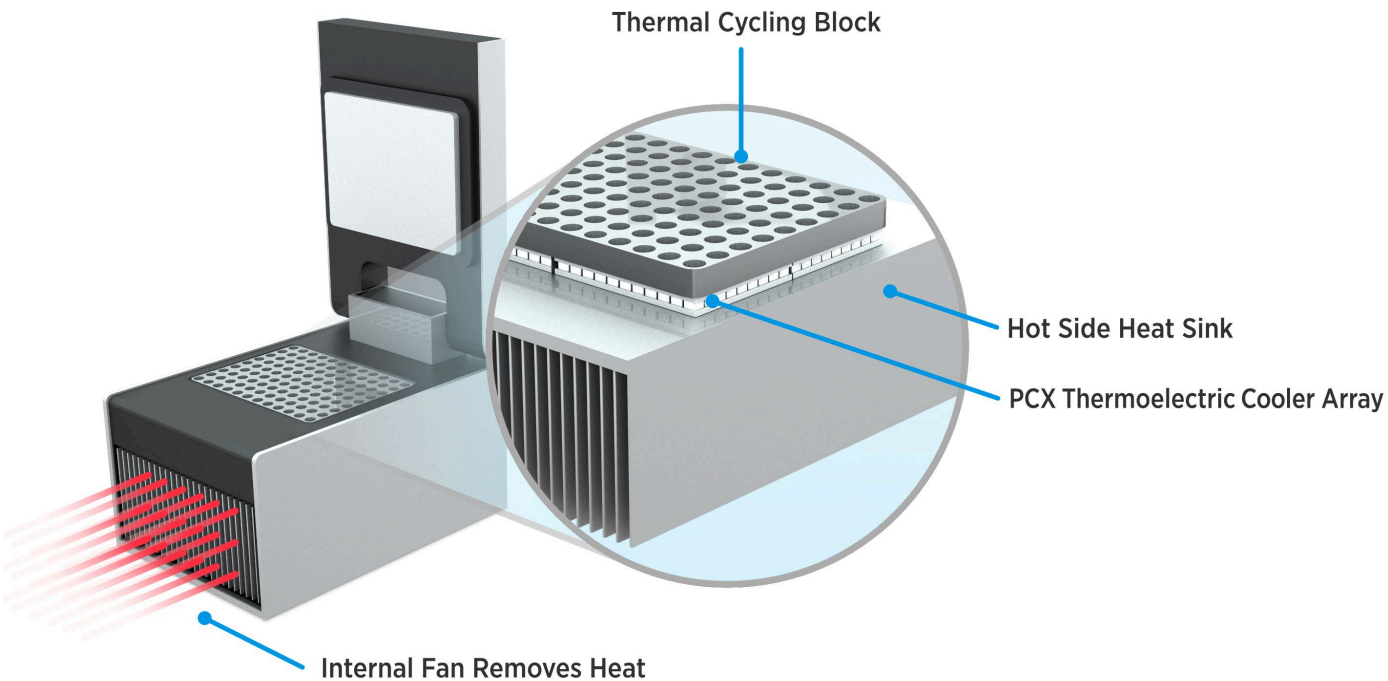
Optimal Melt Temperature



Advanced PCR machines utilize temperature zones to determine optimal **melt temperature** **biomarkers bond to DNA.**

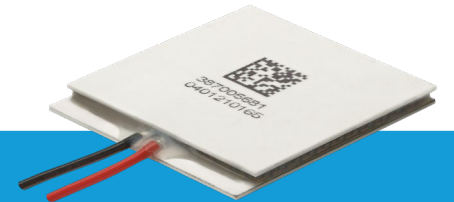
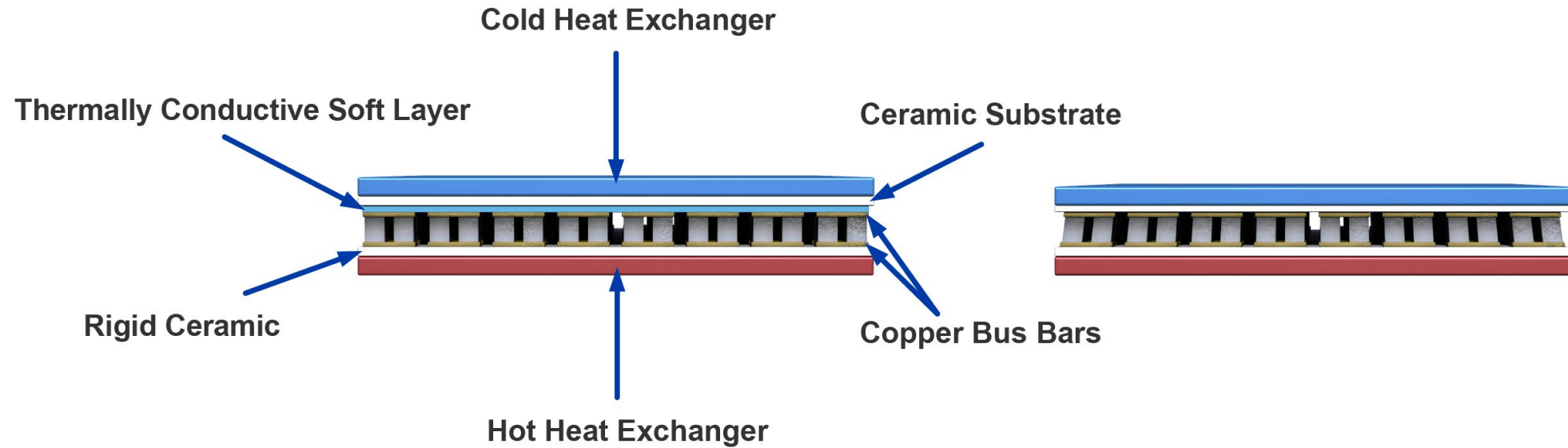
Thermoelectrics in PCR Devices

Real-time thermocyclers use thermoelectric coolers for **precise temperature control**



- Precise Temperature Control $\pm 0.5^{\circ}\text{C}$
- Secondary Control Loop on Hot Side
- Tight Lapping Tolerances
- Group Thermoelectric Coolers by ACR Value

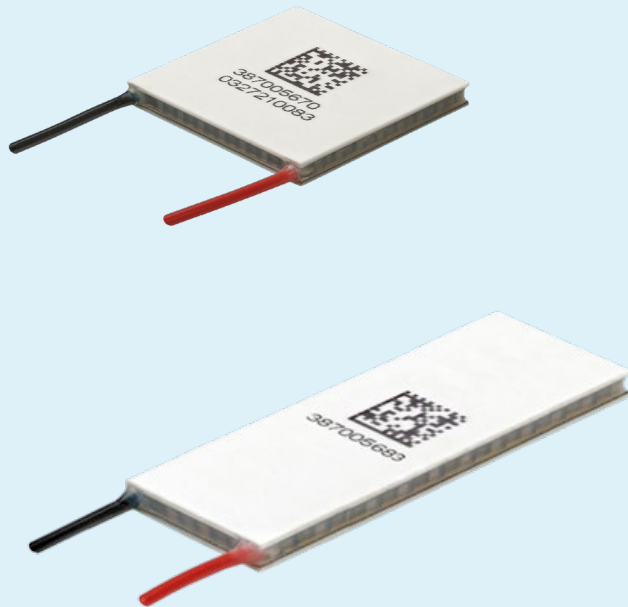
Standard vs PCX Thermoelectric Coolers



PowerCycling PCX Thermoelectric Coolers features unique module construction that absorbs mechanical stresses and **extends the operating life** in thermal cycling applications

PowerCycling PCX Series

High-Performance Thermoelectric Coolers



Next-Gen
Material

Fast Ramp
Rates

Tested to
withstand
rigorous cycle
testing

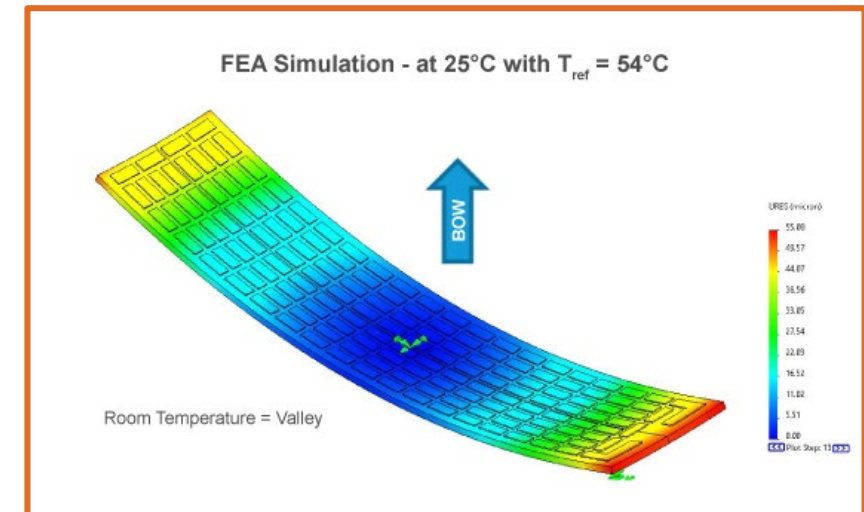
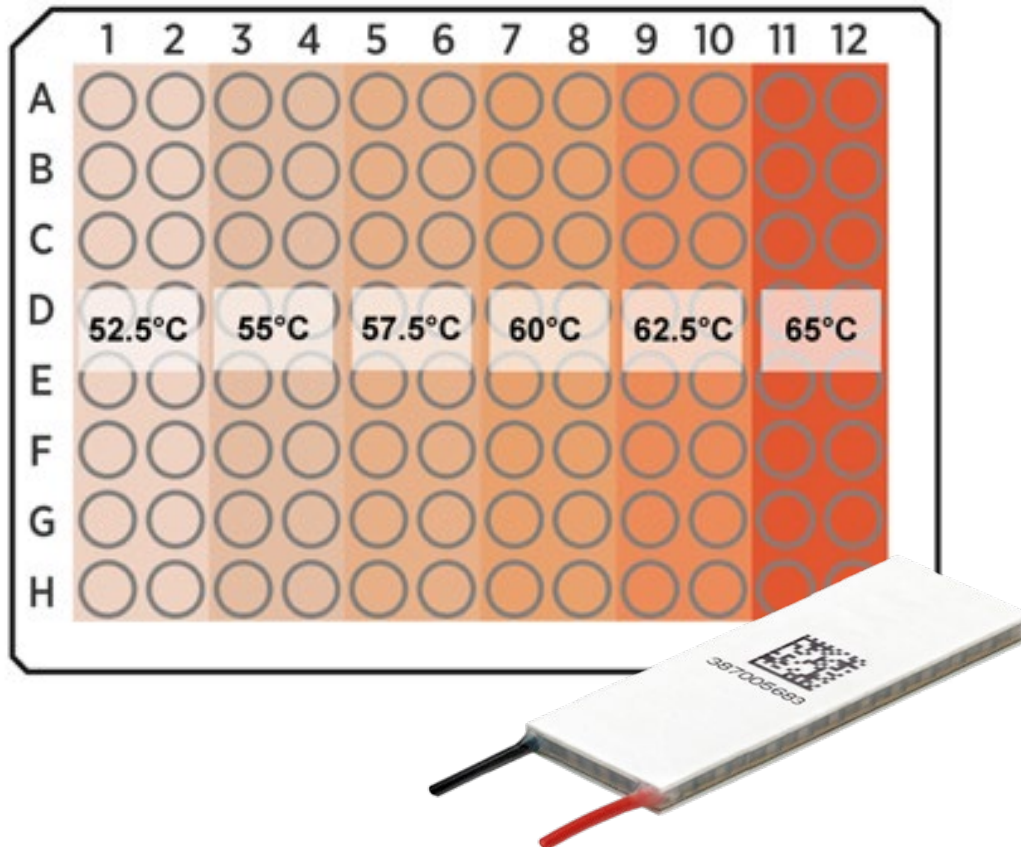
Long-life
Operation

High Temperature
Operation

Cooling capacity
range from
14 to 215 Watts

PCX Elongated Thermoelectric Coolers

High precision temperature control for faster test results



Our PCX Elongated Series eliminate the bowing effect that occurs with longer parts.

Conclusion



Real-Time PCR requires a **high number thermal cycles** to replicate DNA

PCR Thermocyclers utilize thermoelectric coolers to achieve **precise temperature control**

Mechanical stresses that occur during heating and cooling cycles quickly degrades standard thermoelectric coolers.

The PowerCycling PCX Series features a unique module construction and uses next generation materials to **provide faster ramp rates** and **long-life operation** for PCR applications.

For More Information



PCX Thermoelectric Coolers
speed up PCR cycling



More information on the **PowerCycling PCX Series** can be found by visiting

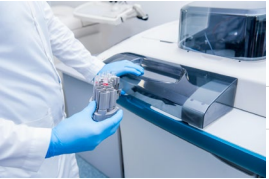
<https://www.lairdthermal.com/products/thermoelectric-cooler-modules/peltier-thermal-cycling-pcx-series>

Read more about thermoelectrics for Real-time PCR in our **application note**

<https://www.lairdthermal.com/thermal-technical-library/application-notes/next-generation-thermoelectrics-designed-for-real-time-pcr>

About Laird Thermal Systems

Laird Thermal Systems develops thermal management solutions for demanding applications



Medical



Analytical



Industrial



Transportation



Telecom

- **DIVERSE PRODUCT PORTFOLIO**
Thermoelectric Coolers, Thermoelectric Cooler Assemblies, Temperature controllers and Liquid Cooling Systems

- **SOLVING COMPLEX ISSUES**
Our engineers use advanced thermal modeling and management techniques to solve complex heat and temperature control problems

- **ACCELERATING TIME-TO-MARKET**
We partner closely with our customers across the entire product development lifecycle.

- **MAXIMIZING PERFORMANCE**
Our global manufacturing and support resources help customers maximize productivity, uptime, performance and product quality

Laird Thermal Systems is the optimum choice for standard or custom thermal solutions

Learn more by visiting
www.lairdthermal.com





Have a question or need more information about
Laird Thermal Systems? Please contact us via the website at www.lairdthermal.com



Next-generation-thermoelectrics-designed-for-Real-Time-PCR-Presentation-013122

Trademarks

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