

## Heat Exchangers for Today's **Immersion Cooling Systems**

# Introduction



Heat generated in data centers must be removed to ensure high computer speed and performance



Immersion Cooling utilizes heat exchangers for bulk heat removal and precise temperature control





# Application Overview



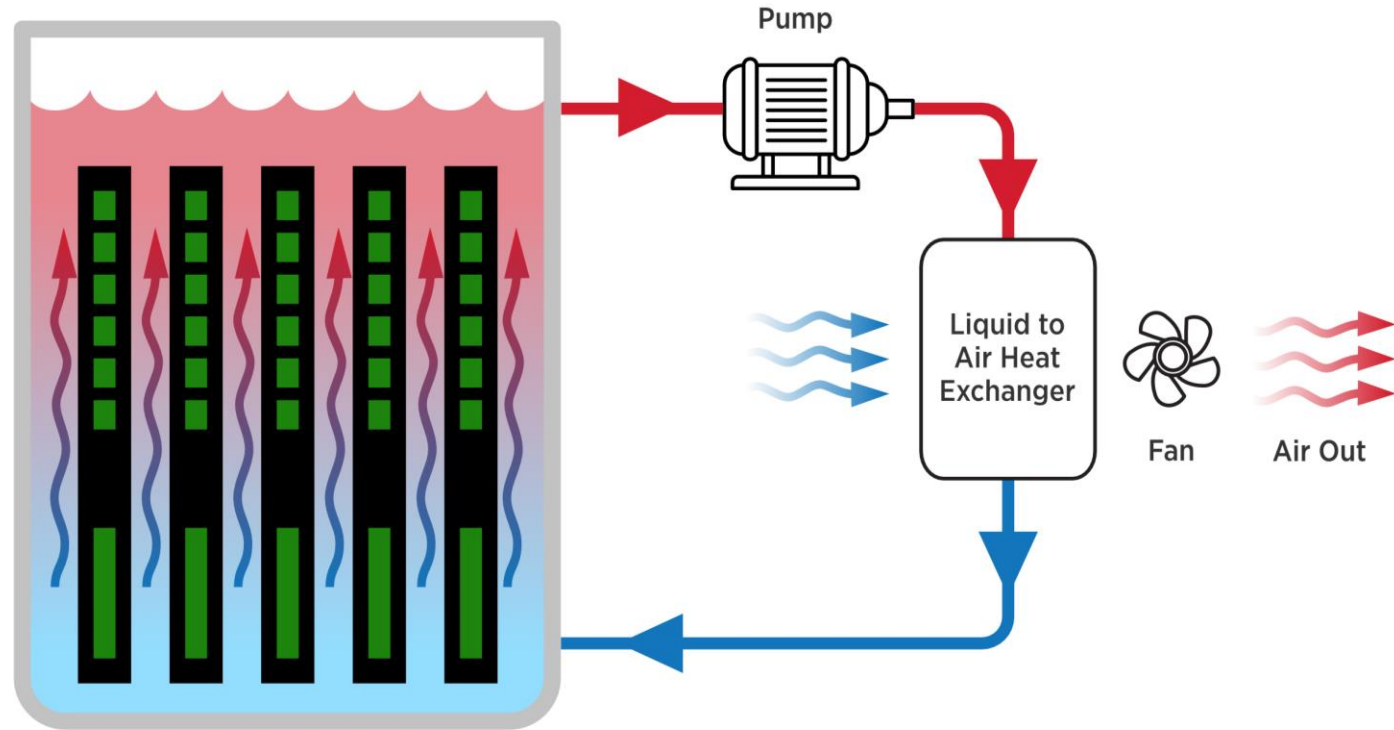
Immersion cooling systems remove heat by submerging the computer hardware in a thermally conductive dielectric liquid



**\$243m to \$700m**

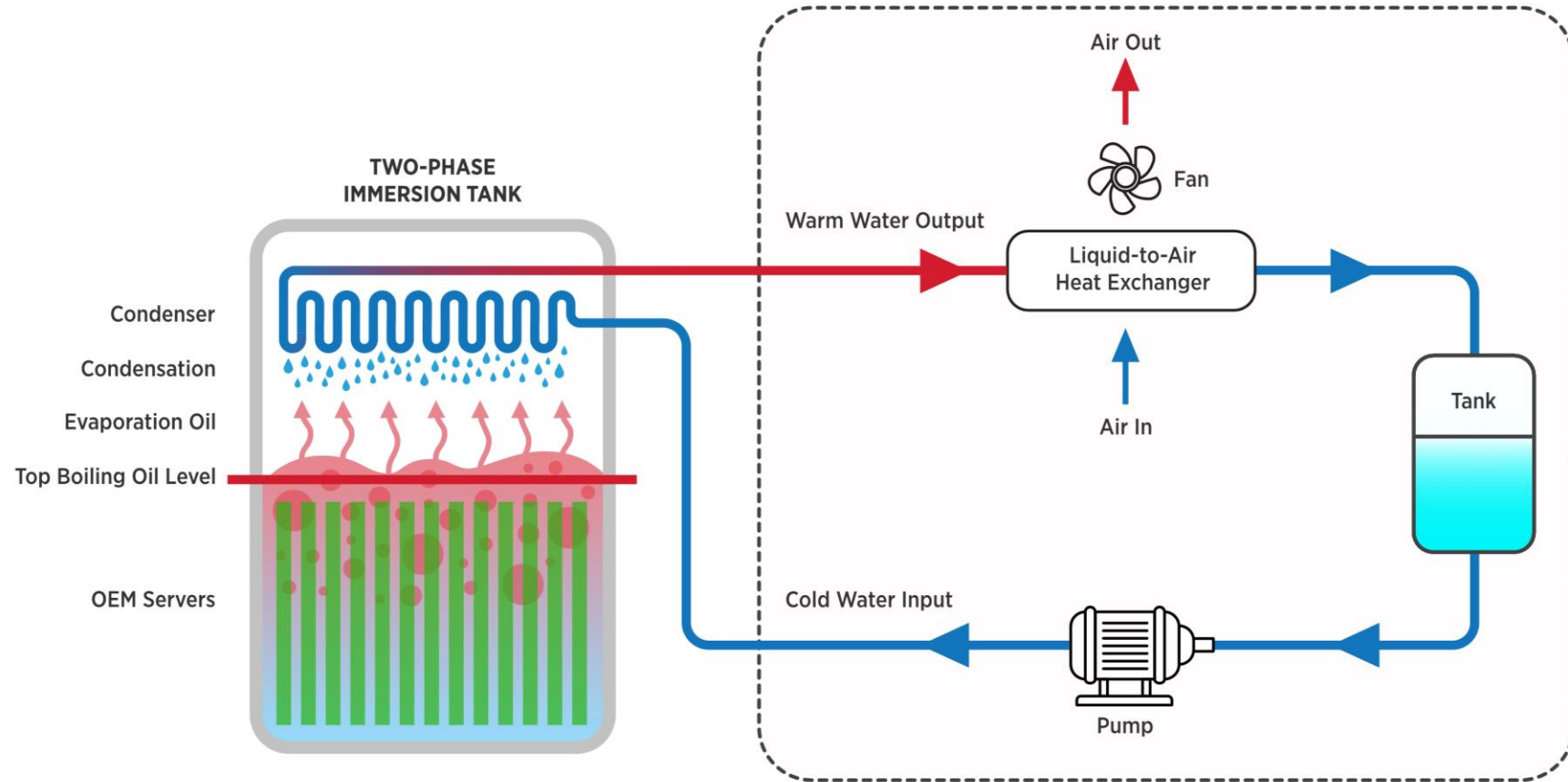
Expected market  
growth for immersion  
cooling by 2026

# Single-Phase Immersion Cooling



Liquid is pumped through heat exchanger that expels heat from system while introducing cooled air to liquid circuit

# Two-Phase Immersion Cooling



Provides faster heat dissipation, lower noise and reduced energy consumption

# LA5000 Liquid-to-Air Heat Exchanger



- **High Reliability**
- **Low Maintenance Features**
- **Low noise operation**
- **Operates above ambient temperatures**
- **Cost-effective cooling solution**
- **Meets laboratory standards**




**5000**  
Watts of  
Cooling Capacity





# Conclusion



Data centers require a thermal management solution to **dissipate the increased amount of heat generated by** modern computer equipment.

**Air-based cooling** methods are proven **inefficient and expensive** to operate.

Providing **precise temperature control** at a **lower cost, immersion cooling** has become popular

Laird Thermal Systems' LA5000 is a **compact** liquid-to-air heat exchanger that offers **dependable performance** and **high cooling capacity** for immersion cooling applications.

**LA5000**  
MFG Part Number 387005698

**WL Series Liquid Cooling System**  
The LA5000 is a recirculating liquid to air heat exchanger that offers dependable, compact performance by removing large amounts of heat from a liquid circuit. The coolant is recirculated using a high-pressure pump to ensure maximum flow rate. Heat from coolant is absorbed by a radiant heat exchanger and dissipated into the ambient environment using brand name fan. Manual adjustments can be made to correct flow switch. Customized features are available, however, MOQ applies.

**Standard Features** | **Check Book** | **Request a Quote** | **Contact Tech Support**

**Features**

- Cooling to ambient
- High heat pumping capacity
- Compact form factor
- Long life operation

**Applications**

- Cooling Particle Accelerators, Linear Accelerators and Cyclotrons
- Semiconductor Fabrication Equipment Cooling
- X-ray Cooling in Industrial Beamlines

**FLUID OPERATING POINTS**

**100% Water**  
Cooling Power (Qc) = 5000 Watts  
Thermal Conductance = 474.5 W/°C  
 $\Delta T$  (Ambient-Coolant) = 10.5 °C  
 $\Delta T$  (Outlet-Inlet) @ 8.3 L/min = 9.6 °C

**70/30 Water-Glycol**  
Cooling Power (Qc) = 5000 Watts  
Thermal Conductance = 441.5 W/°C  
 $\Delta T$  (Ambient-Coolant) = 11.3 °C  
 $\Delta T$  (Outlet-Inlet) @ 8.3 L/min = 10.1 °C

**50/50 Water-Glycol**  
Cooling Power (Qc) = 5000 Watts  
Thermal Conductance = 400.4 W/°C  
 $\Delta T$  (Ambient-Coolant) = 12.5 °C  
 $\Delta T$  (Outlet-Inlet) @ 8.3 L/min = 10.8 °C

**30/70 Water-Glycol**  
Cooling Power (Qc) = 5000 Watts  
Thermal Conductance = 388.4 W/°C  
 $\Delta T$  (Ambient-Coolant) = 12.8 °C  
 $\Delta T$  (Outlet-Inlet) @ 8.3 L/min = 11.1 °C

**LA5000 Heat Dissipation 5000 Watt Requirement**

## Thermal Wizard Liquid Cooling Calculator

Wizard Home | Device Cooling Calculator | PCR Calculator | Enclosure Cooling Calculator | Air Cooling Calculator | Liquid Cooling Calculator

CHOOSE AN EXAMPLE OR COMPLETE THE REQUIREMENTS...

View video for help using Liquid Cooling Calculator

Contact Tech Support

**LIQUID FLOW RATE**  
Fluid Flow Rate: 9.5 L/min

**FLUID DEFINITION**  
Water  
Density: 997.3 kg/m<sup>3</sup>  
Specific Heat: 4180.3 J/kg·K

**TEMPERATURE**  
Inlet: 25 °C  
Outlet: 21 °C

**LIQUID INLET**

**LA5000 Heat Exchanger for Immersion Cooling Systems**

Heat Exchangers for Today's Immersion Cooling Systems

Laird Thermal Systems Application Note

[Datasheet](#)

[Liquid Cooling Calculator](#)

[Application Note](#)

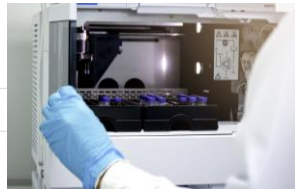


# About Laird Thermal Systems

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](http://www.lairdthermal.com)



# Laird<sup>TM</sup>

The logo features the word "Laird" in a bold, white, sans-serif font with a trademark symbol. A white swoosh underline starts under the 'L' and curves under the 'd'. Below this, the words "THERMAL SYSTEMS" are written in a smaller, bold, white, sans-serif font.

## THERMAL SYSTEMS

Have a question or need more information about  
Laird Thermal Systems? Please contact us via the website at [www.lairdthermal.com](http://www.lairdthermal.com)



Heat-Exchangers-for-todays-immersion-cooling-systems-Presentation-081222

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