COOLIT SYSTEMS TECH BRIEF:

15kW COLDPLATE

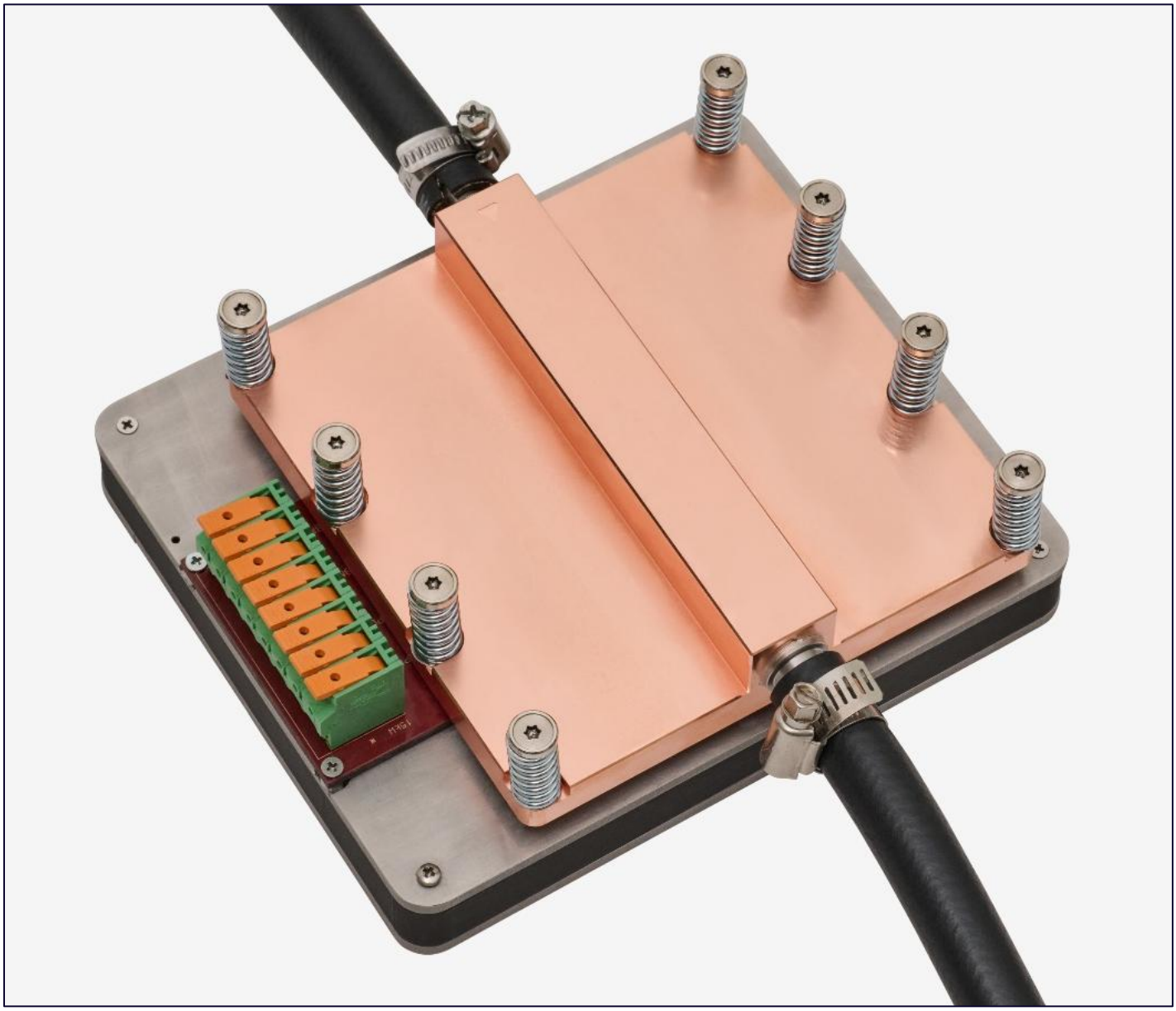


Image: High-Resolution Photo of CoolIT Systems 15kW coldplate mounted to thermal test vehicle

Summary

CoolIT's 15kW coldplate demonstration shows that single-phase direct liquid cooling (DLC) can scale far beyond today's AI cooling requirements and will remain the leading cooling architecture as AI compute continues to grow in power and density.

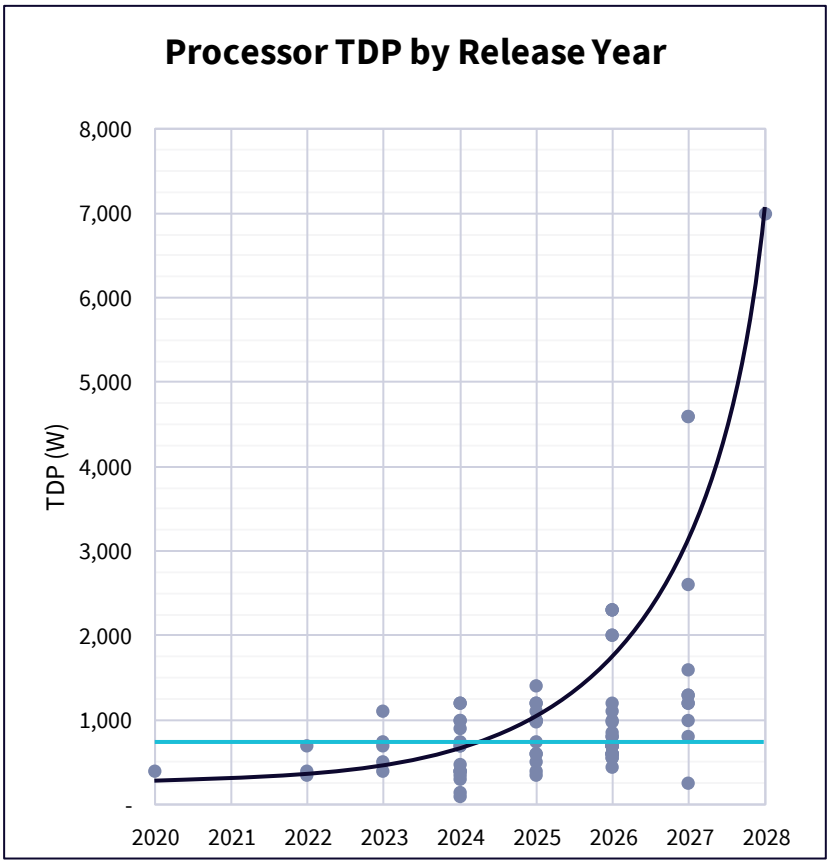
Announced in June 2026, CoolIT's 15kW coldplate delivers more than 10x the cooling capacity of today's top-end AI GPUs and nearly 4 times the 4kW coldplate the company introduced in March 2025.

This technical brief explains why this milestone matters, details CoolIT's 15kW design and testing, and touches on what is next.

The Challenge: Increasing Thermal Density

AI computing platforms are pushing power densities ever higher. Starting in 2023, new generations of processors – specifically GPUs (Graphics Processing Units) and AI ASICs (Application-Specific Integrated Circuits) – began exceeding 750W, which is considered the limit of forced-air cooling.

The chart on the right shows the upward trajectory in chip thermal design power (TDP). TDP defines the amount of heat generated – and conversely, what the cooling system must remove – for a chip to operate.



In the chart, each dot represents the TDP of a successive processor generation, with the teal line representing the 750W TDP air-liquid cooling threshold.

In 2024, mainstream GPUs and ASICs began exceeding the 750W limit, prompting widespread adoption of single-phase direct liquid cooling (DLC).

Today, DLC is the de facto standard for high-density AI cooling because of its inherent modularity, scalability, technical maturity and operational compatibility.

According to CoolIT's own liquid-cooling industry market sizing, in 2025, hyperscale and other AI cloud service providers (CSPs) invested more than US$5 billion in DLC technology cooling system (TCS) infrastructure. TCS equipment includes server cold plates, coolant distribution units (CDUs) and connecting piping and manifold systems. In 2026, worldwide TCS spending is expected to exceed US$11 billion. Add to this the billions of dollars more that CSPs are spending on new AI data centers and facility water system (FWS) infrastructure to understand the full extent of the investment going into DLC infrastructure.

Will rising thermal densities cause the industry to investigate atypical designs, or will single-phase DLC continue its market growth?

Put another way: Will today's substantial DLC investments scale with tomorrow's compute demands?

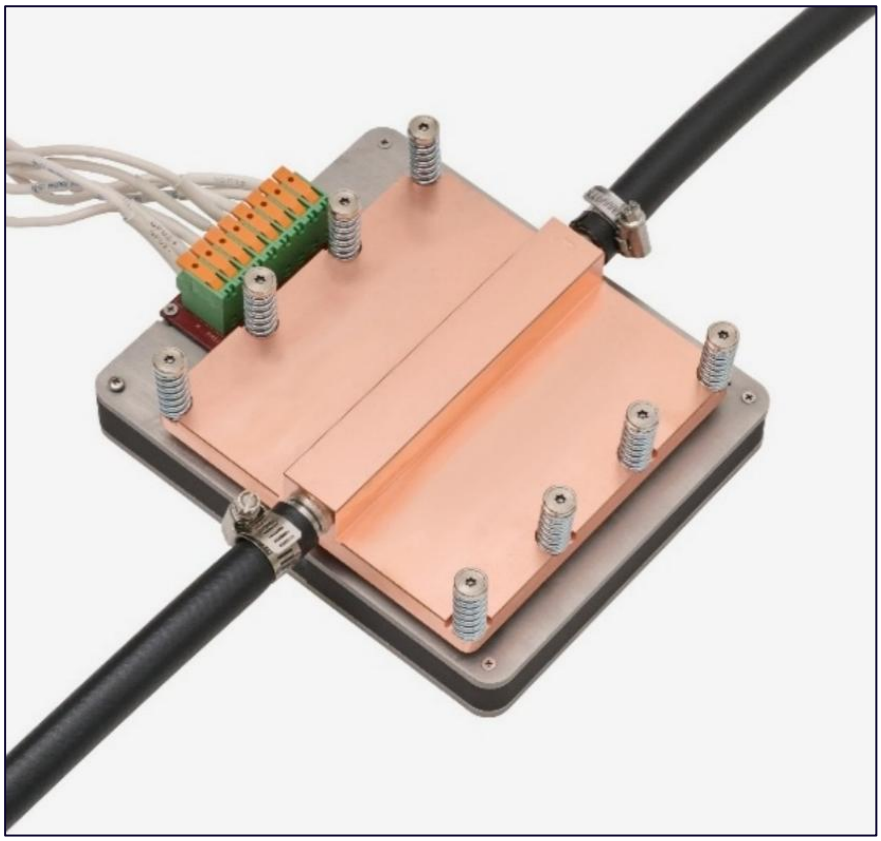
CoolIT's 15kW coldplate demonstration shows that single-phase DLC has significant performance runway. It is clear that DLC's limits have not yet been reached, giving the industry confidence that today's DLC investments can support future generations of AI infrastructure.

15kW Coldplate Design and Test Set-Up

In late 2025, CoolIT's Liquid Lab™ team designed a coldplate to push DLC's boundaries, including building a thermal test vehicle (TTV) to accurately simulate extreme heat and test coldplate performance.

CoolIT hypotheses were:

- DLC has much greater headroom performance increases and optimizations, and
- DLC technology could far exceed the widely claimed limits of 2 to 2.5 kW.



The goal of the experiment was to show that both standard coldplate designs and standard system operation could produce superior results.

After a design phase and CFD analysis, CoolIT settled on a coldplate design targeting 15kW of thermal capacity. The coldplate incorporated CoolIT's patented Split-Flow™ architecture optimized to minimize pressure drop and thermal resistance, as well as used industry-leading internal geometries, proven mass-manufacturing techniques and standard thermal interface materials, in this case, thermal paste.

CoolIT validated the design using a purpose-built TTV, which accurately represents thermal conditions. Four ceramic heaters simulated GPU and HBM zones, delivering a total of 15kW TDP.

Three separate coldplates were tested with eight thermocouples placed directly at the heater surface, measuring case temperatures across the device footprint.

The coldplate was validated with a standard water-glycol coolant, delivered at 1.2 LPM/kW, with system-level thermal performance suitable for 45°C inlet temperature warm-water cooling environments.

Performance Results

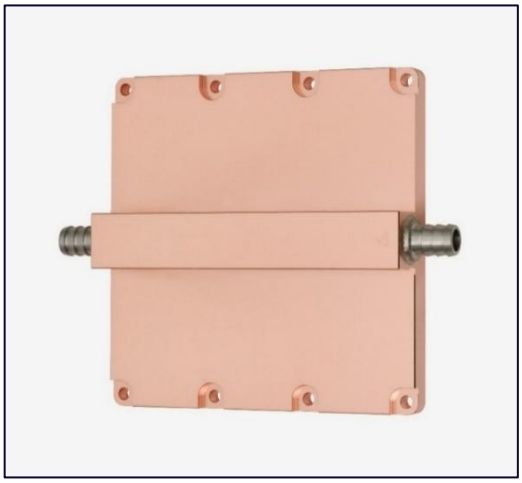
The coldplate maintained consistent thermal performance, using the industry standard flow rate for AI systems of 1.2 LPM/kW and with overall system thermal resistance suitable for warm-water cooling conditions.

The table below shows the test results across the three different coldplates, with values detailed for each of the eight thermocouples. The temperature difference (ΔT) between the case and the fluid inlet temperature is averaged across the columns and rows.

The setup used 45°C warm water as the inlet temperature and operated with an average temperature delta (DeltaT) just below 35°C. This results in an average case temperature (Tcase) of 80°C, appropriate for processors today.

Table of Results at 1.2LPM/kW				
	Coldplate 1	**Coldplate 2**	**Coldplate 3**	**Average**
ΔT1	26.8	34.7	32.3	31.3
ΔT2	29.9	33.5	34.7	32.7
ΔT3	31.5	37.6	39.0	36.0
ΔT4	34.6	39.3	39.0	37.6
ΔT5	41.5	44.2	44.0	43.2
ΔT6	29.0	33.6	35.2	32.6
ΔT7	29.0	30.8	32.6	30.8
ΔT8	37.7	27.6	27.7	31.0
Average	32.5	35.2	35.6	34.4

What This Means for the Industry



The test results supported the hypotheses that the 15kW coldplate could deliver significant headroom and exceed stated DLC limits. CoolIT's validated 15kW coldplate represents nearly a 4x increase in supported TDP from its previous design in 2025, while using the same architectural foundation.

This progression proves that scaling performance does not require a departure from established cooling approaches. Instead, precise coldplate design and flow optimization enable single-phase DLC to outpace rapidly increasing TDP.

CoolIT validated performance at 15kW using AI flow rates, showing that future GPU, CPU and ASIC platforms fall well within the capabilities of existing direct-to-chip architectures.

What this means is:

- **Silicon companies** can aggressively pursue high-density performance roadmaps, knowing today's cooling architectures already support future generation devices.
- **Server manufacturers** (OEMs & ODM) can look to DLC for future AI and other high-density server liquid cooled server designs including 100% heat capture, fanless designs.
- **Cloud service providers** (CSPs) can continue to invest in single-phase DLC equipment, infrastructure and operational systems knowing this is a technology here to stay.
- **Data center operators** can continue to invest in AI-ready facilities, including 45°C inlet facility water systems (FWS), with the assurance that single-phase DLC is the de facto cooling technology and will be for years to come.

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The Next Chapter of Single-Phase DLC

While CoolIT's 15kW coldplate represents an important milestone, it is not the limit. Significant opportunities remain.

CoolIT continues to invest in:

- Further coldplate optimization to reduce thermal resistance and pressure drop.
- New coldplate architecture, including direct-to-die and micro-channel lids.
- Expanded cooling of peripheral components to maintain 100% total heat capture.
- Server architecture innovations that support ultra-high-density compute.
- System-level designs that enable future >1MW rack power.

Each of these efforts builds on the same proven foundation demonstrated in this work. Single-phase DLC is a mainstream solution widely deployed. It will continue to evolve, extending its role as the cornerstone of high-performance AI cooling.

Why CoolIT

CoolIT brings decades of experience in direct liquid cooling, with a track record of delivering proven solutions for the world's most demanding platforms. The company combines deep system-level expertise and global manufacturing with in-house design, prototyping and validation capabilities.

CoolIT's partners are able to reduce risk, accelerate development and deploy cooling solutions that perform reliably across large-scale deployments. With validated performance at 15kW TDP, CoolIT continues to lead the industry toward the next era of high-density computing.

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