



Innovative direct-to-chip data center cooling system with Alfa Laval brazed heat exchangers

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Data center densities are rising exponentially, driving demand for innovative cooling solutions. SEGUENTE, Inc., a global leader in high-performance computing (HPC) and infrastructure, has developed a two-phase, direct-to-chip liquid cooling solution and collaborated with Alfa Laval to optimize the brazed heat exchangers as condensers inside the unit. Scalable, highly efficient and cutting-edge, the SEGUENTE COLDWARE™ system is groundbreaking in delivering enhanced data center performance, cost savings and sustainability.



Digital infrastructure performance advisory organization, Uptime Institute, reports that data center owners and operators consider liquid cooling with dielectric-cooled cold plates a viable solution to manage heat loads effectively. The SEQUENTE COLDWARE direct-to-chip liquid cooling technology provides a scalable, fully integrated solution supporting densities exceeding 200 kW per rack.

Long-standing collaboration for optimized liquid cooling performance

Engaging in a strategic design process, SEQUENTE and Alfa Laval tested and refined designs, continuously sharing insights and feedback to validate the condenser selection for the overall optimal system performance. The team engaged in meaningful collaboration based on mutual trust and a shared vision of achieving unparalleled results.

“Incorporating the proper condensers into coolant distribution units for passive thermal management of high-performance servers and racks is a challenge,” says Dr. Raffaele Luca Amalfi, Chief Executive Officer and Co-Founder, SEQUENTE, Inc. “Our collaboration resulted in solutions that integrate highly performant condensers capable of cooling from edge to hyperscale facilities.”

“Based on experience, we trust Alfa Laval brazed heat exchangers as reliable, highly efficient condensers for active or passive coolant distribution units.”

Dr. Raffaele Luca Amalfi, CEO and Co-Founder, SEQUENTE, Inc.

Alfa Laval’s heat transfer and manufacturing expertise positively impacted the design. Experts from both companies worked together to minimize pressure drop and ensure uniform fluid distribution across the heat exchanger, which is critical in implementing cost-effective passive liquid cooling. As a result, the liquid cooling technology maximizes energy efficiency and thermal performance while minimizing costs. Through this collaborative effort, the liquid cooling solution achieves peak performance while meeting the ever-changing demands of modern data centers.

Cost-effective and scalable, the COLDWARE cooling system supports current and emerging HPC applications. Here’s why:

- *Fully integrated rack solutions*
Scalable > 200 kW compute
- *Water-free pumpless liquid loop*
Uses heat from chips to move fluid through the system
- *Near zero maintenance*
Long-life dielectric fluid with ultra-low greenhouse warming potential (GWP) and zero ozone depletion potential (ODP)
- *Higher reliability*
Passive cooling with no moving parts for long-term stability
- *Easy deployment*
Plug-and-play for fast rollout in legacy and new installations
- *Cost-effective return on investment*
Low CAPEX and OPEX

Maximum cooling efficiency, minimal environmental impact



60% reduction in total cost of ownership



98% savings in cooling energy



95% heat capture efficiency



12x increase chip power



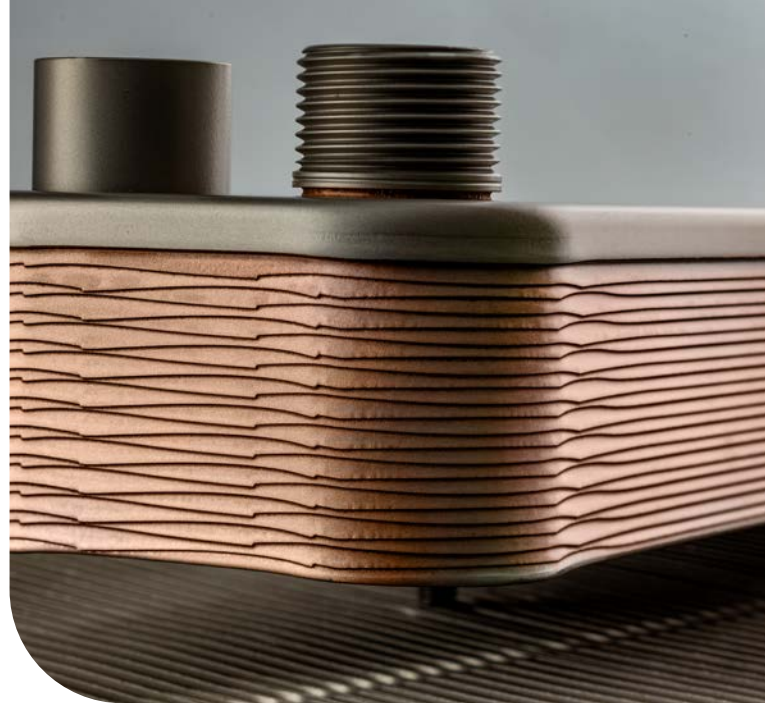
10x increase rack density

Ultra-efficient cooling for ultra-high-density racks

Increasingly powerful processors require ultra-effective thermal management. Data center owners and operators can rely on the SEGUENTE COLDWARE two-phase, direct-to-chip liquid cooling solution for higher heat transfer efficiency, sustainability benefits, and reduced energy consumption, infrastructure, and emissions. COLDWARE enables data center owners and operators to manage a twelvefold increase in chip power or tenfold increase in rack density¹ effectively without taking up additional floor space.

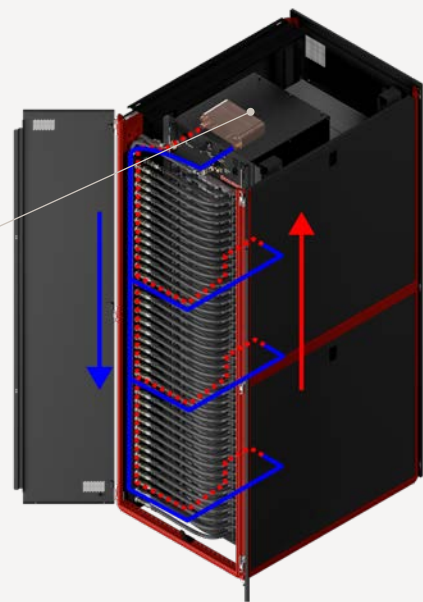
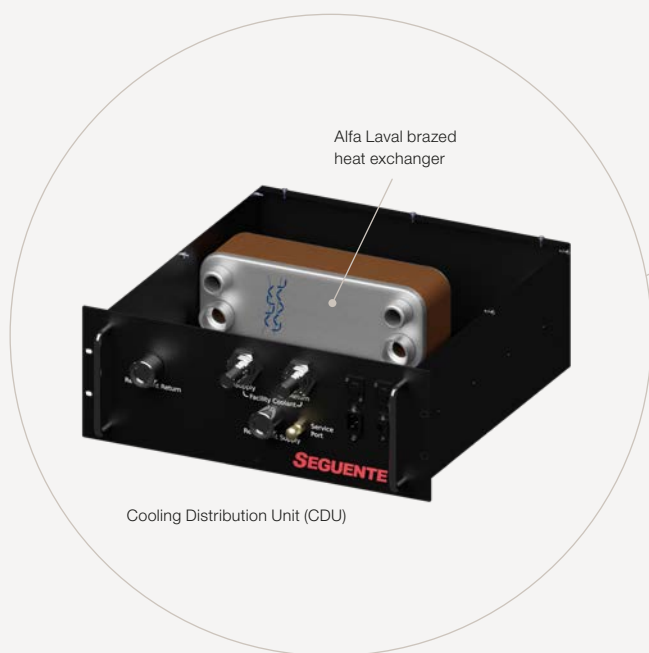
Peak performance with minimal environmental impact

The liquid cooling solution circulates a dielectric fluid with ultra-low GWP and ODP through cutting-edge cold plates positioned directly on computing processors, such as central processing units (CPUs) and graphic processing units (GPUs). As the coolant passes over the processors, it absorbs heat, dissipating the heat load and partially vapourizing the fluid. The liquid-vapour mixture then passes through a coolant distribution unit (CDU) where it condenses back into liquid form before re-entering the coolant loop.



“The CDU is the brain of our advanced AI software,” notes Dr. Amalfi. “Our smart CDU integrates the optimized Alfa Laval condenser. Our COLDWARE AI software enables data center owners and operators to make informed, strategic decisions and optimize performance based on data analytics in real time.”

¹ Key metrics based on SEGUENTE COLDWARE performance compared to air-cooling systems.



SEGUENTE COLDWARE two-phase direct-to-chip liquid cooling system

SEGUENTE COLDWARE coolant distribution unit with the Alfa Laval brazed heat exchanger inside effectively rejects heat from the high-density rack to the data center facility-level cooling loop.

Towards a more environmentally conscious future

Transitioning to more sustainable, high-efficiency cooling solutions for data centers is crucial for maintaining more stable, energy-efficient HPC infrastructure. Breaking new ground to accelerate the adoption of liquid cooling technology in data centers hinges on ongoing collaboration between SEGUENTE and Alfa Laval.

“Collaboration is underway to expand our liquid cooling portfolio with scalable modules that will handle capacities well beyond current demand,” says Dr. Amalfi. “We will continue to work with Alfa Laval to bring data center owners and operators more energy-wise solutions that help accelerate the transition to liquid cooling solutions.”

COLDWARE improves energy efficiency and total power usage effectiveness, securing stable operations while reducing carbon emissions.

“Our collaboration with Segunte exemplifies the power of combined expertise to innovate solutions,” says Tommaso Ferrarese, Business Development Manager, Brazed & Fusion Bonded Heat Exchangers at Alfa Laval.



Compact and maintenance-free, Alfa Laval brazed heat exchangers ensure superior thermal efficiency, maximum reliability and optimal performance.

“Together, we optimized the condenser direct-to-chip cooling, ensuring optimal performance.”

Tommaso Ferrarese, Business Development Manager, Brazed & Fusion Bonded Heat Exchangers at Alfa Laval

Securing uninterrupted data center operations helps our customers gain competitive advantage, notes Dr. Amalfi. He envisages collaborating with Alfa Laval far into the future. Optimizing SEGUENTE liquid cooling technology for maximum heat capture and enhanced sustainability by reducing carbon footprint. Ensuring stable operations of more energy-efficient data centers worldwide is essential to the global economy.

“Segunte shares Alfa Laval’s commitment to people, planet and profitability,” Dr. Amalfi notes. “To us, it’s important to make sure our mission reflects our unwavering commitment to providing sustainable solutions while driving business success.”

SEGUENTE is a global provider of end-to-end AI and HPC solutions for data centers, integrated with COLDWARE liquid-cooled IT hardware, AI software management and heat rejection options. Its products and services are ideal for legacy, new and modular deployments. The company’s AI and HPC solutions support the digital infrastructure evolution, enabling efficiency and sustainability.



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Up-to-date Alfa Laval contact details for all countries are always available on our website at www.alfalaval.com

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