Case Study:

Avtron LC35 Liquid Cooled Load Banks for a Leading Blue-Chip Technology Company

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Client: Leading Blue-Chip Technology Company

Location: Northern Netherlands

Background & Challenge

A leading blue-chip technology company required support testing at a 45 MW data center in the Northern Netherlands. Avtron LC35 liquid-cooled load banks were used to simulate server rack thermal loads, enabling verification of the 1.5 MW liquid cooling loops, CDUs and facility-side chilled water system, while also supporting electrical infrastructure testing ahead of operation. With years of commissioning expertise, King Environmental Services (KES) selected the LC35 units for this testing phase and applied proven methodologies to ensure the correct procedures were followed throughout the process.

Key Challenges:

- **Consistent Load Delivery for Accurate System Testing:** Client needed consistent delivery of a stable load to the liquid cooling system under both normal operating conditions and a failure scenario.
- **Full-Capacity Thermal Loading and Failure Testing:** Client required a stepped, heat-load ramp-up from baseline up to the full 1.5 MW capacity per loop, followed by a sudden secondary loop pump-failure simulation to observe the facility's transient response time.
- **High-Density Liquid-Cooled Load Simulation:** Client sought a high-density, compact design that rejects heat directly into the liquid loop rather than pushing hot air into the room. This mirrored the internal thermal load of AI server architecture without needing massive temporary airflow management.

Technical Overview

To meet the required 1.5 MW thermal load per loop, the client manifolded six Avtron LC35 units in parallel, with each unit operating at 250 kW. The LC35 units were piped directly to the Technical Water System (TWS) side of the Coolant Distribution Units (CDUs). Each unit utilized a dedicated manifold that distributed flow through five 50 mm hoses, which were connected to the TWS pipework via the permanent rack connections. Flow rates and thermal input were carefully controlled to replicate the hydraulic characteristics and thermal load of the production racks, ensuring an accurate simulation of real-world operating conditions.

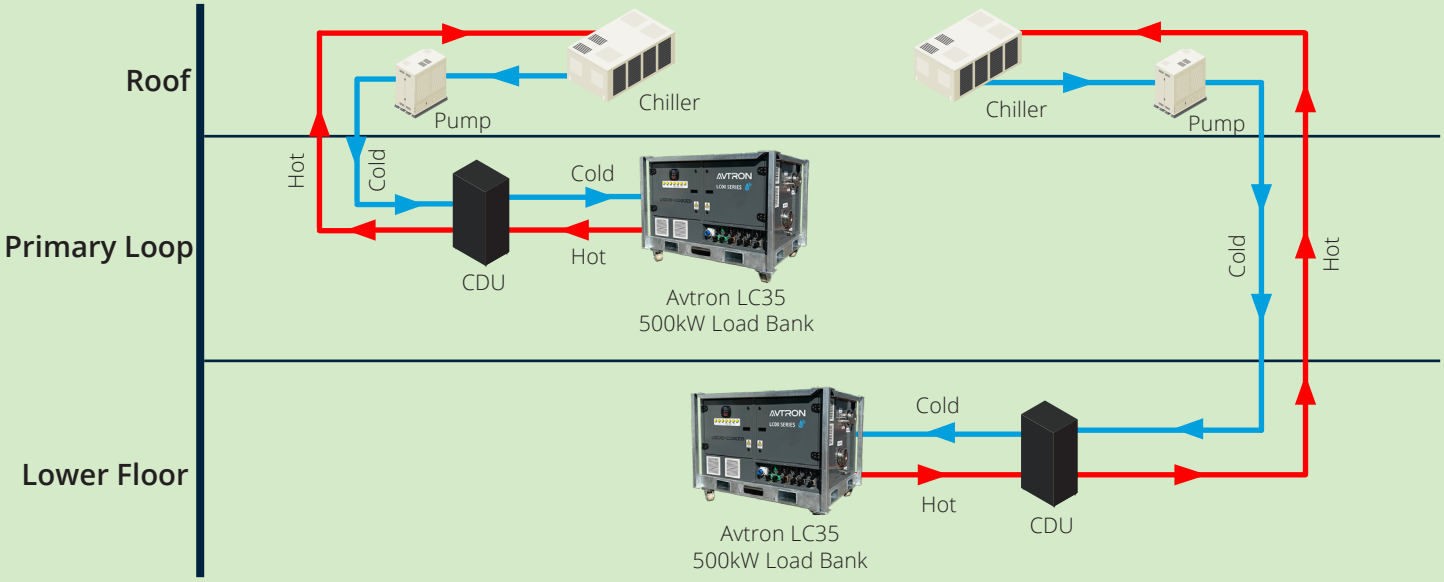
COOLANT DISTRIBUTION UNITS (CDU) EXPLAINED

A coolant distribution unit (CDU) is the central system that manages and circulates liquid coolant between high-density IT racks and a data centre's facility cooling plant. It keeps the two loops separate for safety, using a heat exchanger to transfer heat from the server coolant to the building's chilled water system, while precisely controlling temperature, pressure, and flow.

In modern liquid-cooled data centres—especially those supporting GPU-heavy or AI workloads—a CDU ensures stable, efficient heat removal and rapid response to thermal spikes. In short, it's the key piece of infrastructure that makes reliable, high-density liquid cooling possible.

Steady-state performance testing was conducted at 25%, 50%, 75% and 100% load steps. Each step was maintained for 90 minutes to allow the primary facility-side chilled water loop to stabilize. During these sustained test periods, comprehensive thermal imaging inspections of the electrical distribution network were performed, while current draw across the busbar system were monitored and verified to ensure stable current draw across the busbars at peak capacity.

Testing focused on validating key thermal, hydraulic and electrical performance parameters under full operating conditions. A target fluid temperature differential (Delta T) across the load bank network was verified at full load to confirm effective heat transfer and system performance. Simulated rack flow rates were maintained throughout testing, with loop's response monitored across all six branches using the LC35 units' integrated unit magmeters and clamp-on ultrasonic flow meters to verify flow accuracy and distribution. Electrical performance was also validated by confirming stable 250 kW power draws per unit at 400 V/50 Hz. In addition, busbar integrity was assessed under full-load conditions using infrared thermography, which confirmed the absence of localized hot spots at joints, tap-off boxes and connection splices, demonstrating reliable electrical distribution and connection quality.



Results

The LC35s provided a reliable and straightforward solution for simulating the thermal and hydraulic demands of the production environment. Quick-connect fittings enabled rapid installation and removal, reducing deployment time and simplifying site operations. Although the units were operated independently using local controls rather than as a networked cluster, the control platform provided sufficient flexibility to execute the required test script and manage load levels throughout the commissioning process.

The testing program was successfully completed, demonstrating the capability of both the cooling and electrical infrastructure to support sustained full-load operation. Throughout testing, the CDUs maintained stable supply water temperatures, the electrical distribution system handled the continuous demand without issue and all six LC35 units performed well. The near-silent operation of the liquid-cooled load banks was a significant operational advantage, allowing commissioning personnel to communicate effectively on the data hall floor while the system was operating at full capacity, a notable improvement compared to conventional air-cooled load bank solutions.

Features & Benefits

The Avtron Model LC35 liquid-cooled load bank is designed for seamless integration with existing cooling infrastructure, making it an ideal solution for data center commissioning and testing. Built to CE standards, the LC35 offers a range of advanced features to ensure reliable and efficient performance.

The LC35 features a heavy-duty galvanized crash frame, providing robust protection during transport and operation.

The tank is strategically placed at the bottom of the unit to lower the center of gravity and keep the hose connection points easily accessible near the ground.

Durable, corrosion-resistant stainless steel liquid connection points, available with non-drip quick-connect couplings for easy and secure attachment.

INTERNAL VIEW

The elements are strategically arranged to promote efficient liquid flow through the tank, with multiple supports in place to maintain structural integrity and ensure long-term reliability.

Quick-connect power cable terminals designed to accommodate global standards

The LC35 is equipped with casters and stacking feet, allowing for easy transport and compact storage.

As a first-time deployment, the project also provided valuable operational insights. Future enhancements may include implementing Avtron's networked control architecture to allow clustered operation and centralized load management across multiple units. Logistics and transportation were identified as key areas for optimization.

Conclusion

Avtron LC35 liquid-cooled load banks provided an effective, easy-to-deploy solution for simulating production conditions, with reliable performance, stable CDU operation and uninterrupted electrical support throughout testing.

With the rapid growth of AI-driven computing, liquid-cooled data centers are becoming increasingly common. As a result, liquid-cooled load banks such as the LC35 play a critical role in commissioning and validating these environments, helping ensure cooling and power systems perform as designed before operational workloads are introduced. Overall, the project reinforced the importance of comprehensive load testing and validation as liquid cooling becomes a key enabler of next-generation data center deployments.

The LC35 is available now as a proven, production-ready load bank for operators and manufacturers looking to push their liquid-cooling technology to real-world limits. Visit **avtronpower.com** or **https://www.kesgroup.ie/** for more information.

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