CompuDynamics™
UPTIME IN NO TIME

Liquid Cooling for 13.5MW Data Center

30,000 sq. ft. electrical fit-out and advanced liquid cooling in Texas to support HPC and AI.

As high-performance computing (HPC) and artificial intelligence (AI) reshape IT infrastructure, cooling technology has become critical for optimal data center performance. With rising computing demands, traditional air-cooled solutions often fall short, paving the way for advanced liquid cooling methods. Since 2002, Compu Dynamics has built a comprehensive data center solutions portfolio, offering services like white space integration, liquid cooling, and specialized installations for electrical, mechanical, and low-voltage systems. Compu Dynamics' expertise in data center innovation positions it at the forefront of implementing cutting-edge liquid cooling solutions for clients' specific needs.

Real Expertise, Real Stories.

Compu Dynamics partnered with one of the world's largest **enterprise cloud providers** to deliver a high-efficiency, **30,000 sq. ft. 13.5 megawatt data center fit-out with liquid cooling solutions** at a hyperscale facility in Texas.

Meticulously executed by Compu Dynamics' design, engineering, and integration teams, this project created a state-of-the-art data center optimized for high-performance computing and AI, with enhanced safety, efficiency, and reliability.

To support high-density computing, the deployment included setting up a robust liquid cooling infrastructure with nearly 300 rear door heat exchangers (RDHx) enabling 50kW+ server racks. Additional components included motorized control valves and flow meters to enhance cooling efficiency. Compu Dynamics also installed 400A Remote Power Panels (RPPs), 400A Parallel Feeders, and three-tiered overhead trays for power and low-voltage cables. Rigorous hydro testing and actuator control simulation ensured system reliability and a leak-free environment, delivering optimal performance.

Project Scope:

- Electrical and mechanical infrastructure design/build
- Installation of 400A RPPs, 400A Parallel Feeders, and 1,000+ 60A overhead power whips
- Three-tiered trays for power and network cabling
- Integration of motorized control valves, flow meters, and hoses for approx. 300 rear door heat exchangers
- RDHx hose connections, balancing, and testing
- Pre-production testing with Belimo PS100 actuator control simulator
- Hydro-testing for a leak-free environment across doors, hoses, and valves
- Developed step-by-step process for testing and installation
- Created risk mitigation plan

Things to consider before beginning liquid cooling deployments

Here is a starting point for the many new design considerations that one must address when planning a high-density liquid cooling installation:

Power and Density:

- Rack power densities (day one and future)
- Total POD power density (day one and future)
- CDU selection (matching capacity and POD density)
- CDU redundancy (N+1 or N+?)
- Spare CDU loop taps for future expansion

Infrastructure and Materials:

- Piping material selection
- Drip pans and leak detection
- Building supports: Will the ceiling grid support new overhead piping? Will the raised floor support rack weight and/or CDU?

Fluid Flow and Cooling:

- At the chip level: target fluid flow rate and operating temperatures
- In-rack manifolds: port-quantity / size / fitting type and flow control devices
- Secondary POD piping location (overhead or bottom)
- Secondary loop redundancy (isolation and bypass)
- Primary and secondary loop filtration.

System Integration and Maintenance:

- BMS integration and auxiliary sensors (temperature, flow, pressure, leak detection)
- System validation, commissioning, operation, maintenance, and repair

Benefits of working with Compu Dynamics:

Compu Dynamics encompasses all the skills and expertise needed to deliver end-to-end solutions for data center tenants and operators. As our customers' needs evolve throughout the life cycle, we tailor our solutions to match each phase.

- We meet with customers to evaluate specific needs, identify the best solutions, and develop a detailed scope of work.
- Provide comprehensive design schematics, permit documents, and product specifications.
- Deploy state-of-the-art liquid cooling systems that meet current and future standards.
- Installation of complete heat rejection systems, if not already present.
- Complete start-up, validation and commissioning, training, and provide essential O&M documents.
- 24/7 support is available for emergency response, backed by a full one-year warranty.

It is essential when embarking on a high performance fluid-to-the-rack project for AI or any high density deployments that data center owners proceed with the best available knowledge and resources at hand to ensure a smooth implementation process. A successful liquid cooling strategy needs the right partner who is vendor agnostic, and can design, build, and support the infrastructure throughout its life cycle.

LEARN MORE

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For full solutions details, visit compu-dynamics.com.