Liquid Cooling Quick Disconnects for AI Data Centers

An Engineer's Selection Guide for Flow, Pressure Drop, Blind-Mate Reliability, Serviceability, Cleanliness, and System Integration

Executive Summary

Artificial intelligence is accelerating the shift toward higher-density data center cooling architectures. As rack power levels increase, liquid cooling is becoming more important in advanced compute environments where air cooling alone may not provide the required thermal performance.

Within these systems, liquid quick disconnects, or QDs, do more than move coolant from one point to another. Their design can affect flow restriction, coolant containment, blind-mate repeatability, service access, cleanliness control, and long-term maintainability across the cooling loop.

This whitepaper outlines key engineering considerations for selecting QDs in AI data center liquid cooling applications. It focuses on where QDs are used, what performance factors engineers should evaluate, and how connector selection should align with the broader cooling architecture, including cold plates, compact tray-level systems, rack manifolds, coolant distribution units, source-line infrastructure, hose assemblies, and custom manifold solutions.

> Key takeaway
> In high-density liquid-cooled systems, QD selection should be evaluated as part of the full coolant path, with attention to flow performance, sealing behavior, blind-mate tolerance, serviceability, cleanliness, and system-level integration.