LIQUID COOLING — GUIDE

Questions to Ask a Liquid Cooling Vendor Before You Buy

A practical checklist for data center operators and MEP engineers evaluating liquid cooling vendors: technical specs, warranties, fluid qualification, integration, and commercial terms.

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Evaluating liquid cooling vendors requires technical depth and commercial rigor. This checklist covers the questions operators and MEP engineers should ask before committing.

Technical capability

Cooling architecture

- [ ] What cooling technologies do you offer (direct-to-chip, single-phase immersion, two-phase immersion, RDHx)?
- [ ] What is your maximum demonstrated rack density in production? At what supply temperature (W-class)?
- [ ] Can you support mixed cooling in one facility (e.g., direct-to-chip for AI, RDHx for legacy)?
- [ ] What is your typical CDU deployment model (rack, row, facility)? Why for my use case?

Server/OEM integration

- [ ] Which server OEMs have you qualified with? At what densities?
- [ ] Do you offer cold plates for our specific GPU/CPU models (NVIDIA B200/GB200, AMD MI300/MI350, Intel Gaudi)?
- [ ] What is the cold-plate pressure drop at design flow? How does it vary across a 72-GPU rack?
- [ ] Do you provide quick-disconnects (QDs) rated for our pressure/temperature? Dripless? Hot-swappable?

Fluid and materials

- [ ] What coolant(s) do you support in the IT loop? Facility loop?
- [ ] For direct-to-chip: Is the fluid qualified by the server OEM for warranty coverage?
- [ ] For immersion: Does the fluid have Intel Data Center Certification for Immersion Cooling or equivalent OEM validation?
- [ ] What materials are wetted in the IT loop? Compatibility with cold-plate alloys, seals, hose, QDs?
- [ ] What is the fluid life expectancy? Recommended replacement interval? Testing protocol?

Thermal performance

- [ ] What supply temperature and 9EB FöW2 •our design target? Which ASHRAE W-class?
- [ ] What is the CDU approach temperature (IT supply vs. facility return)?
- [ ] How does the system respond to rapid load transients (GPU power spikes)?
- [ ] What instrumentation is included (flow, temp, pressure, conductivity, leak detection)?

Reliability and operations

Redundancy and resilience

- [ ] What redundancy model do you recommend (N+1, 2N, cold standby)? For CDU? Pumps? Heat exchangers? Controls?
- [ ] What is the switchover time on pump or CDU failure? Is it automatic?
- [ ] How does the system behave during facility loop temperature excursions?
- [ ] What is the single largest fault domain in your proposed architecture?

Maintenance and serviceability

- [ ] What preventive maintenance is required? Frequency? Duration? Downtime needed?
- [ ] Can components be serviced without draining the IT loop? Without shutting down adjacent racks?
- [ ] What spare parts do you recommend holding on-site? Lead times for critical spares?
- [ ] Do you offer remote monitoring and predictive analytics? Integration with our BMS/DCIM?

Fluid management

- [ ] How is fluid quality monitored? Online sensors or manual sampling?
- [ ] What is the filtration strategy? Filter change interval? Bypass capability?
- [ ] How is fluid topped up or replaced? Closed-system procedures?
- [ ] What is the process for fluid contamination event (biological, corrosion, particulate)?

Commercial and contractual

Warranties and guarantees

- [ ] What warranties cover the CDU, cold plates, manifolds, QDs, and fluid?
- [ ] Does the server OEM honor warranty with your cooling solution installed? Written confirmation?
- [ ] Are there performance guarantees (supply temp stability, 9E@, uptime)?
- [ ] What are the exclusions? Fluid degradation, improper maintenance, facility loop deviations?

Fluid supply continuity

- [ ] Who manufactures the fluid? What is the supply chain depth?
- [ ] Are there qualified alternative fluids? Approval process and timeline?
- [ ] Price escalation mechanism for fluid? Cap?
- [ ] For two-phase fluids: Regulatory risk (EU F-gas, US AIM Act)? Phase-down schedule?

Pricing model

- [ ] Capital vs. operational cost breakdown (equipment, installation, fluid, maintenance, monitoring)?
- [ ] Pricing per kW, per rack, per CDU, or per project?
- [ ] Volume discounts for multi-rack/multi-site deployments?
- [ ] Payment milestones tied to commissioning gates?

Intellectual property and data

- [ ] Who owns the operational data (temps, flows, alerts)? Data export rights?
- [ ] Are controls proprietary? Can we integrate with our DCIM/BMS without vendor lock-in?
- [ ] Source code escrow for control software?

Project execution

Delivery and installation

- [ ] What is the typical lead time for CDU, cold plates, manifolds, QDs?
- [ ] Do you provide installation supervision or turnkey installation?
- [ ] What site preparation is required (power, water, drainage, structural, network)?
- [ ] Commissioning sequence and duration? Load bank test or live server?

Team and experience

- [ ] How many production deployments at "e50 kW/rack? At "e100 kW/rack?
- [ ] References: Can we speak to 2-3 customers with similar density and server OEM?
- [ ] Field service coverage in our geography? Response time SLA?
- [ ] Training for our operations team? Duration and format?

Regulatory and sustainability

Compliance

- [ ] Does the system comply with ASHRAE 90.1 / 90.4 for our jurisdiction?
- [ ] Pressure vessel codes (ASME, PED, CRN) for CDU heat exchangers and piping?
- [ ] Electrical codes for CDU pumps, controls, leak detection?
- [ ] Seismic certification for our site category?

Environmental

- [ ] Fluid GWP (global warming potential) and ODP (ozone depletion potential)?
- [ ] End-of-life fluid disposal process and cost?
- [ ] Water usage effectiveness (WUE) impact? Closed-loop vs. evaporative?
- [ ] Waste heat recovery capability (temperature, volume, heat exchanger option)?

Decision matrix template

Criterion	Weight (1-5)	Vendor A	Vendor B	Vendor C
Max qualified density	5			
OEM warranty coverage	5			
Fluid qualification	5			
Redundancy architecture	4			
Lead time	4			
Total cost of ownership (3 yr)	4			
Service/SLA in region	3			
Controls openness	3			
Fluid supply security	3			
Reference quality	3			
Weighted score				

Sources

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Frequently asked questions

Should I ask for a reference installation at my target density?

Yes. Ask for a live site running at "e80% of your target rack density with the same server OEM and cold-plate design. Request a site visit or detailed case study with performance data (supply temp, 9E@, PUE, uptime).

What fluid qualifications should I require?

For direct-to-chip: OEM server warranty with the specified fluid. For immersion: Intel Data Center Certification for Immersion Cooling (the first certified solution used a Shell fluid, 2025) or OEM-specific validation. Never use unqualified fluids (Mordor Intelligence, 2026).

How do I verify a vendor's CDU redundancy claims?

Request factory acceptance test (FAT) procedures for switchover time, failure detection, and graceful degradation. Ask for MTBF/MTTR data for pumps, heat exchangers, and controls. Define the resilience model in the contract (CoolIT Systems, 2025).

What commercial terms protect me from fluid supply risk?

Include fluid supply continuity clauses, qualified alternate fluid approvals, and price escalation caps. Two-phase fluorocarbon supply (Chemours Opteon) depends on the Navin Fluorine manufacturing ramp (capacity from 2026) (Chemours, 2025).