

# High Density Liquid Cooling (HDLC) for HPC and Data Centers



## EXPERTS IN CUSTOMIZED HDLC SOLUTIONS

### EXPERIENCE AND CAPABILITIES

- 10+ Years Liquid Cooling Experience
- Specialized in Custom CDU Design
- Hydraulic and Thermal Testing
- Thermal Analysis
- System Design & Manufacturing
- Leak Testing & Quality Control

### HDLC FEATURES

- In-Rack, Rear Door and In-Row Solutions
- Up to 1.2 MW Cooling Capacity
- Direct-to-Chip & Manifold Connectivity
- Smart Monitoring & Control Interface
- Integrated Leak Detection

### HDLC COOLANT DISTRIBUTION NETWORK

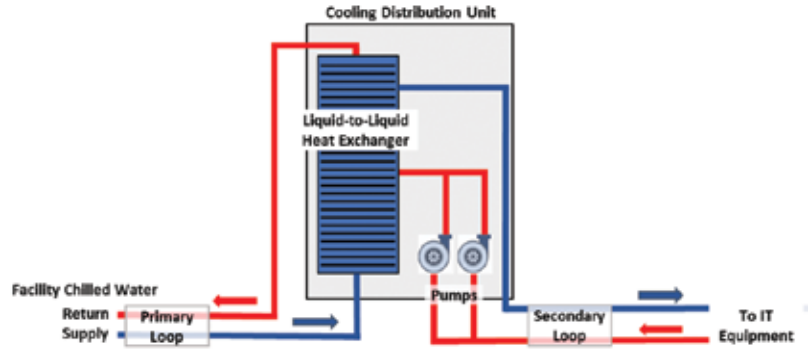
- Wall, floor or ceiling manifolds
- Rack-mounted manifolds and hose kits
- Material - copper and stainless steel
- Joints - brazing, welding, mechanical coupled
- Dripless quick connectors



Integrated Rack Cooling Distribution Units (CDUs)

## IMPORTANT DESIGN PARAMETERS

- Heat Load
- Secondary return water temperature  
OR Secondary flow rate
- Primary (facility) water supply temperature
- Secondary pressure drop
- Approach temperature
- Allowable max power consumption
- Form factor / dimensional constraints
- Voltage
- Controls/communication
- Agency approvals



## LIQUID COOLING APPROACH TEMPERATURE

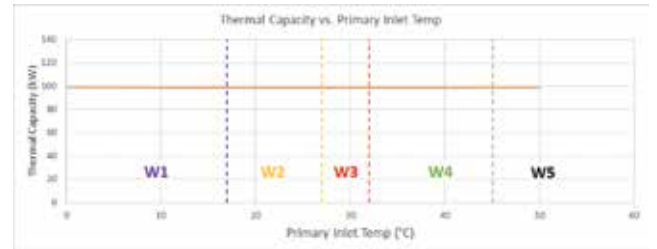
For liquid-to-liquid systems, the approach temperature is the difference between the output temperature between the supply temperatures of each side.

CDU C is defined as 100kW, but with a 25°C approach, while CDU A is defined as 100kW, but with a 3°C approach. At 25°C approach, CDU A would be rated for more than 800kW!



## LIQUID COOLING CLASSES

Liquid Cooling Class	Facility Water Supply Temp.
W1	2°C - 17°C
W2	2°C - 27°C
W3	2°C - 32°C
W4	2°C - 45°C
W5	> 45°C



CDU thermal capacity remains the same across the DC facility water temperature range.

### North America

All locations  
Tel: +1.763.422.2661

### Europe

**Straubenhardt, Germany**  
Tel: +49.7082.794.0  
**Betschdorf, France**  
Tel: +33.3.88.90.64.90  
**Warsaw, Poland**  
Tel: +48.22.209.98.35  
**Assago, Italy**  
Tel: +39.02.5776151.224

### Middle East & India

**Dubai, United Arabian Emirates**  
Tel: +971.4.37.81.700  
**Bangalore, India**  
Tel: +91.80.6715.2001  
**Istanbul, Turkey**  
Tel: +90.216.250.7374

### Asia

**Shanghai, P.R. China**  
Tel: +86.21.2412.6943  
**Singapore**  
Tel: +65.6768.5800  
**Shin-Yokohama, Japan**  
Tel: +81.45.476.0271



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