VERTIV™

Liebert®

DCW™ CATALOGUE

Chilled Water-Based High Density
Cooling For The Data Center

Flexible Approaches For Energy Efficient Cooling

Save up to 70% in cooling energy usage

Data center managers are constantly faced with the challenge of reducing energy consumption and increasing processing capacity, without compromising business activities. The Liebert® DCW™ chilled water-based high density cooling family provides energy savings of up to 70% over traditional cooling. The modular approach allows additional cooling to be added as compute capacity grows, without disruption of the data center.

Adding targeted cooling is more cost-efficient than trying to lower the temperature of the entire data center by increasing the overall room air conditioning capacity. Liebert DCW mission-critical cooling systems are specifically designed to address the higher heat loads generated by tightly packed electronic rack enclosures.

Liebert DCW Water-Based Systems

Liebert DCW is a family of water-cooled systems that offers a cost-efficient cooling alternative. They are designed to work in any size space from a small computer room to a large data center with loads from 5 to 35 kW per rack. Business continuity professionals are demanding an integrated high heat density cooling solution — one that considers both room-level and rack-level needs.

Effective Solutions need to be flexible

Added as heat loads increase, Liebert DCW cooling capacity allows your facility to adapt as heat loads rise — allowing cooling solutions to be added to react to the changes in your environment.

Benefits of the Liebert DCW approach include:

Lowest Total Cost of Ownership

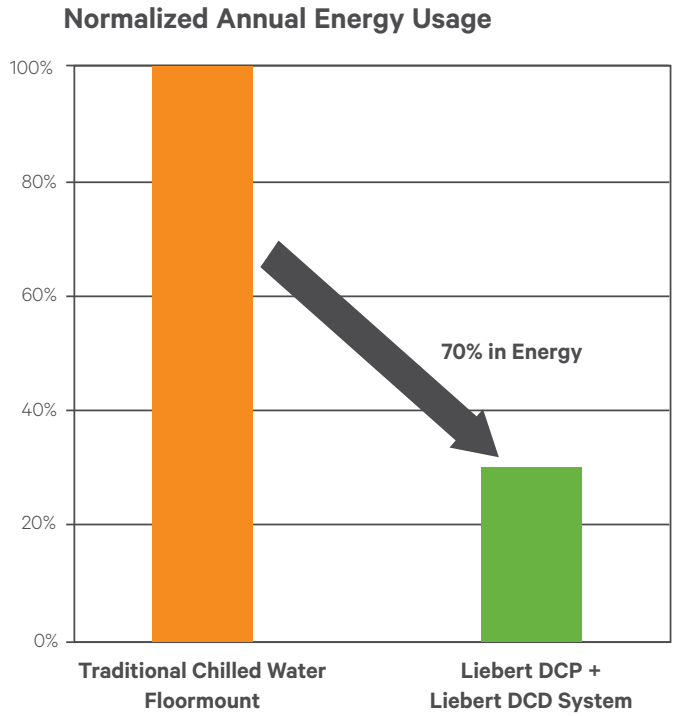
- Total energy savings potential of up to 70%
- More cost-effective than increasing the overall room air conditioning capacity using floor-mounted cooling units only
- Minimal floor space requirements

Flexibility

- Can cool more than 35 kW per rack
- Designed to work with or without the hot aisle/cold aisle
- Works with or without raised floor

Higher Availability

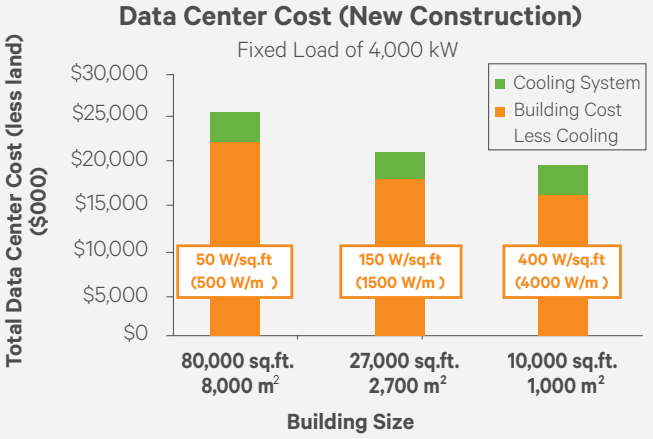
- Ensures continuous operation of critical IT systems under extreme heat conditions
- Local service and support experts, and 24 hour support call center



Liebert® DCW™ Solutions Cut Capital Costs

Investing in a facility that utilizes a higher rack density design — along with a cooling system designed especially for this type of installation — offers a significant cost savings advantage in terms of building size and energy usage.

The flexible configuration of the Liebert DCW system modules also allows scalability for future growth and significantly improves floor space utilization compared to an installation using only floor-mounted cooling units. Installing more Liebert DCW capacity uses little or no additional floor area.



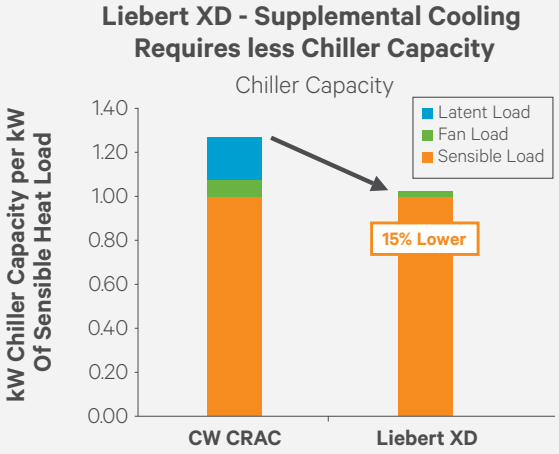
The capital costs of a data center are significantly reduced as higher densities of IT equipment are housed in smaller sized areas.

Study — Data Center Cost (New Construction) 400 racks with an average heat load of 10 kW each. Cost for building, power, cooling, lighting, fire protection, security, etc. included. Cost of land not included.

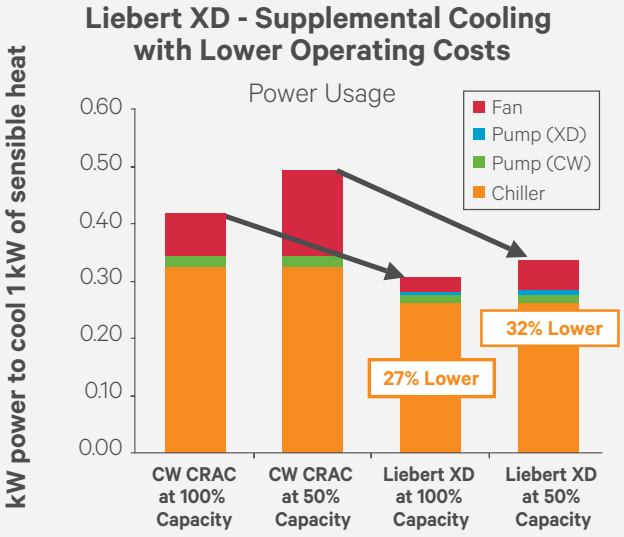
Building 1: 80,000 sq.ft. (8000m2), 18" (450mm) Raised Floor, Designed for 50 W/sq.ft (500W/m2), Raised-floor Precision Air Conditioning units for cooling.

Building 2: 27,000 sq.ft. (2700m2), 36" (900mm) Raised Floor. Designed for 150 W/sq.ft (1500W/m2), Raised-floor Precision Air Conditioning units for cooling.

Building 3: 10,000 sq.ft. (1000m2), 18" (450mm) Raised Floor. Designed for 400 W/sq.ft (4000W/m2), Raised-floor Precision Air Conditioning units (for basic cooling and humidity control) and Liebert XD.



One of the major areas of savings identified with the use of Liebert DCW equipment is the ability to reduce chiller plant size. This is because the chiller typically is sized for the total gross capacity of the raised-floor cooling units. The 65% lower fan load of the Liebert DCW System modules and the fact they are 100% sensible results in a capital chiller size savings of 15% or more.



The smaller chiller plant and lower fan load result in significant energy savings as well. A 27% energy savings is very conservative.

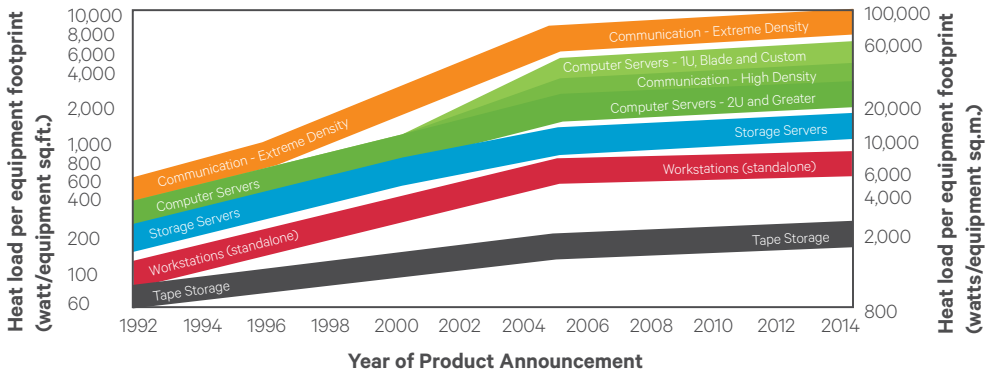
The Liebert DCW cooling solution can provide 200 kW of sensible cooling, with modules capable of providing localized cooling up to 35 kW per rack.

High Heat Density. High Temperatures.

With constant introduction of new technology, the computing capacity that once filled an entire room can now be contained within a single rack. Blade servers, communication switches and other electronics are packed into racks — creating increased heat densities that cannot be effectively cooled by traditional cooling solutions.

This compacted capacity means higher heat densities. What was once a 1 kW rack or 10 kW rack may now exceed 30 kW. This requires a shift in focus from a traditional room-based view of cooling to a rack-based view. IT decision makers must consider both "watt per square foot" and "kW per rack" when evaluating cooling solutions.

No Relief in Sight: Heat Loads Rising



ASHRAE, Datacom Equipment Power Trends and Cooling Applications, 2005. © American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., www.ashrae.org

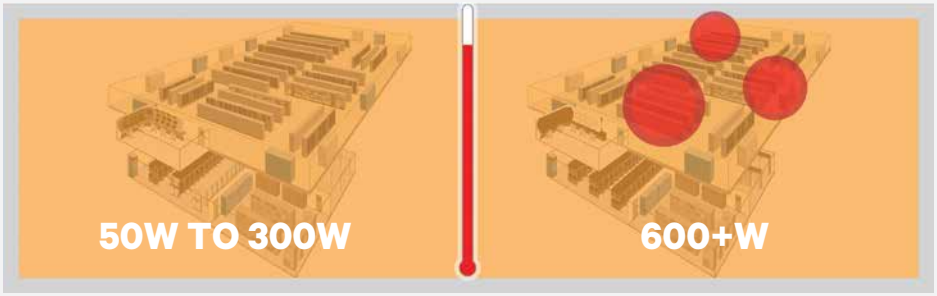
And, They Attack Your Facility in Two Ways

Hotter Facilities

As processor capabilities increase, so do computer room power densities—from 50 Watt per square foot (540W/m2) to over 300 Watt per square foot (320W/m2). Your whole data center just keeps getting hotter.

Hot Spots

Compounding the problem, this higher heat load is not evenly distributed throughout the room. Sometimes, power densities can grow into hundreds of Watt per square foot, creating localized "hot spots" of extreme heat.

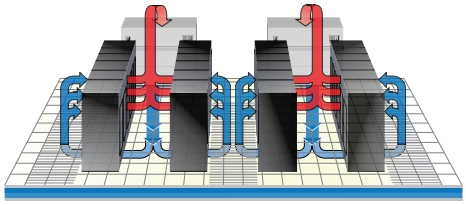


Room-Neutral Cooling

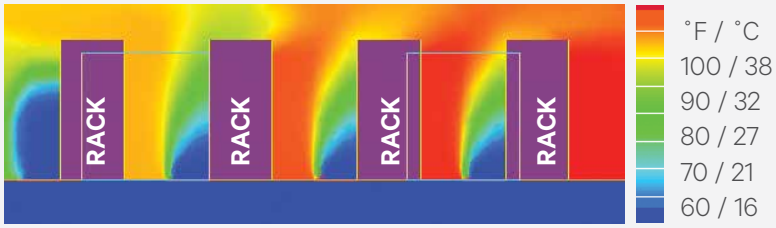
A common way to improve performance of existing raised floor cooling applications has been the “hot aisle/cold aisle” approach. In this configuration, rows of equipment racks are arranged in alternating “hot” and “cold” aisles. Only the cold aisles have perforated floor tiles that allow cool air to come up from under the raised floor. The Liebert® DCW™ solution is compatible with existing hot aisle/cold aisle application.

Some room and equipment designs preclude the hot aisle/cold aisle configuration. These are often well-suited to cooling with the Liebert DCW system.

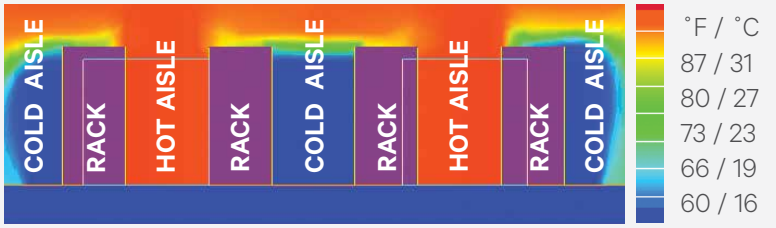
- The Liebert DCD™ door neutralizes the server’s exhaust air before it leaves the rack.
- The Liebert XDK-W enclosed rack contains and cools the hot air within the cabinet.



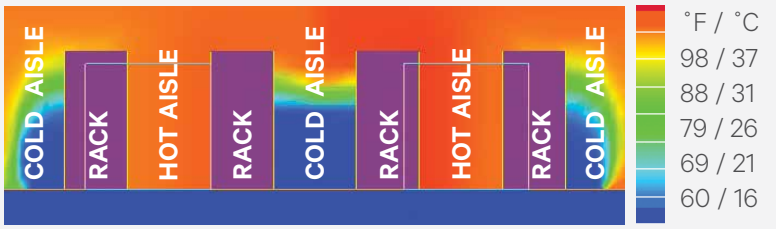
Unfortunately, even when using a hot aisle/cold aisle configuration, the limits of standard underfloor cooling are soon reached as rack heat loads increase.



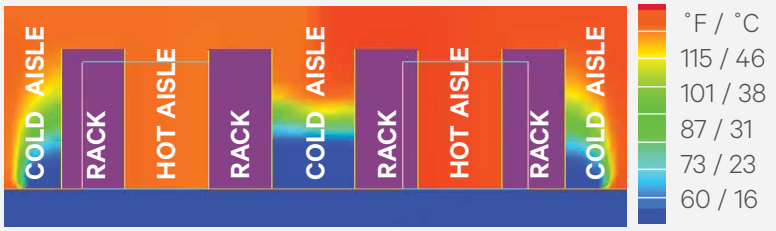
Heat Load = 3 kW Per Rack With Hot Aisle /Cold Aisle Layout



Heat Load = 3 kW Per Rack With Hot Aisle /Cold Aisle Layout



Heat Load = 6 kW Per Rack With Hot Aisle /Cold Aisle Layout



Heat Load = 10 kW Per Rack With Hot Aisle /Cold Aisle Layout

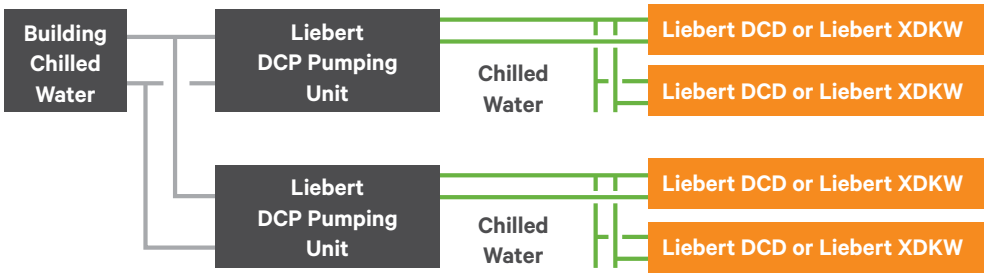
Side views of Computational Fluid Dynamics (CFD) by Fluent showing limitations of hot aisle/cold aisle approach as heat load increases.

Liebert® DCW™ Cooling Solutions

200 kW of Sensible Cooling

The Liebert DCP Coolant Pumping Unit is the key to the performance, efficiency and space saving design of the Liebert DCD passive chilled water door and Liebert XDK-W water- cooled rack enclosure. The unit houses the isolating heat exchanger between the Liebert DCD/XDK-W circuit fluid and building chilled water, the control valve, the dual redundant pumps and the system controls. It controls the fluid temperature above the actual room dewpoint. The Liebert DCP can also be used with other brands of rack cooling equipment.

Building Chilled Water



The Liebert DCP isolates the building's chilled water circuit from the chilled water circuit within the data center. Separating the data center from the building chiller also minimizes the impact of a leak within the data center. Should a leak occur, the volume of water is limited to the amount within the secondary piping system instead of the entire building chiller system. The separation from the building chiller system also ensures proper water quality to the cooling modules in the data center by creating a closed loop system. The Liebert DCP circulates the chilled water to cooling modules (Liebert DCD or Liebert XDK-W) while preventing condensation by maintaining the water temperature above the room dew point.

Intelligent System Control

The Liebert iCOM™ control system on the Liebert DCP features maintenance history, spare parts list, Liebert IntelliSlot® for up to two cards (web compatibility and BMS), and comprehensive monitoring. The enhanced Liebert iCOM with its IT-focused user interface allows real-time monitoring and data capture. Status may be reported back to the BMS via Liebert IntelliSlot communications cards.

Room-neutral Cooling Over 35 kW Per Rack

High density cooling that won't add heat to your room.

Liebert® DCW™ Cooling Modules

Open Architecture

Liebert DCD Rack Door Cooling Module

Replaces the back door of a server enclosure, providing cooling without increasing the rack footprint. The module uses the server fans within the protected rack to provide airflow, providing the most energy efficient design.

- Can cool over 35 kW per Rack
- No electrical components
- No noise
- Stationary connections
- Full access to rear of rack
- Adapts to Vertiv™ DCM racks or racks by other manufacturers

Closed Architecture

Liebert XDK-W High Density Cooling Enclosure

Utilizes closed air circulation, the racks are completely sealed from room air. The server heat load is dissipated into the process chilled water system through an air-to-water heat exchanger in the bottom of the rack. Redundant high-performance fans drive closed loop air circulation in the rack's interior, while servers are supplied with cold air at the front of the rack.

- Can cool over 35 kW per Rack
- Completely sealed rack
- N+1 redundant variable speed fans
- Quiet operations
- Automatic emergency door opening

Open and Closed Architecture Systems as defined by ASHRAE

- Open architecture systems utilizes cooling coils near the heat load either inside or outside the open server rack and use the room air volume as a thermal storage to ride through short power outages.
- Closed architecture fully encloses the rack with the cooling coils inside. Other provisions are required for power loss ride through.

For refrigerant-based systems, the Liebert XD system is designed to maximize cooling efficiency while avoiding the electrical hazards that may be present in a water-based system. The Liebert XD system can cool rack loads from 8 to 40 kW per rack in rooms 1200 sq ft or larger. (See Liebert XD Brochure SL-11265 for more details.)

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