Aisle Containment Systems

Flexible Containment Systems to Increase Efficiency
Offerings Increase Energy Efficiency With Vertiv™ Aisle Containment Systems

Reduce energy consumption while supporting higher density IT and networking equipment — without compromising your requirement for availability.

Aisle Containment Systems from Vertiv are designed to optimize the efficiency, design and operation of your data center infrastructure. A comprehensive selection makes it easy to support both standard and non-uniform hot/cold aisle applications.

Ideally Suited For:

Hot aisle/cold aisle applications
- Raised floor data centers with perimeter cooling
- Non-raised floor data centers using row-based precision cooling systems such as Liebert® CRV™ or Liebert XD™
- Retrofit to existing racks, or DCF™ & DCM™ racks
- Vertiv SmartAisle™ Solutions with Liebert precision cooling and Liebert iCOM™ controls

Configurations to fit any site needs:
- Modular roof and door system for DCF & DCM racks
- Vertical system for non-uniform rows and rack heights
- Retractable roof
- Variable standard components interchangeable to create custom solutions
Problem:
In the thermographic view of a typical data center, the problem with the traditional approach in high density data centers is highlighted by the numerous hot spots and wide variation in inlet temperatures to the IT equipment.

Solution:
Liebert® Precision Cooling systems with Liebert iCOM™ control are enhanced by Aisle Containment from Vertiv™, enabling dynamic optimization of the cooling environment, and lower energy usage.

Aisle Containment Systems Are Designed to:

Optimize Cooling System Efficiency
- 30+% efficiency increase
- Continuous dynamic adaptation to load
- Less fan power per kW cooling

Eliminate Hot/Cold Air Mixing
- Uniform and predictable temperature to all IT equipment
- Integrate the cooling unit air flow delivery with the IT equipment requirements

Increase Space Efficiency
- 30+% increase in IT equipment density
- Up to 12kW/rack with perimeter cooling
- Up to 30kW/rack with localized cooling

Increase Capacity
- 25+% increase in available cooling capacity

- Extend capacity of existing precision cooling system

Allow Easy Retrofit
- In many cases, no requirement to replace existing raised floor cooling infrastructure
- Components fit through standard doorways
- Fits existing DCF™ and DCM™ racks

Leverage Redundancy/ Availability
- Utilize existing cooling redundancy of raised floor air distribution and high availability cooling infrastructure
- Retrofit existing racks with Liebert Aisle Containment

Provide Fast Return on Investment (ROI)
- Payback within a few months to less than 2 years
- Low initial investment
Compare the Costs of a Conventional Data Center Design Versus the SmartAisle™ Solution with Aisle Containment

SmartAisle from Vertiv™ is an intelligent, integrated infrastructure using row-based building blocks. Aisle Containment optimizes efficiency and lowers energy expenses in the SmartAisle solution.

### Conventional

<table>
<thead>
<tr>
<th>Number of Racks:</th>
<th>27</th>
</tr>
</thead>
<tbody>
<tr>
<td>Density:</td>
<td>5.9 per rack</td>
</tr>
<tr>
<td>Total IT Load:</td>
<td>160 kW</td>
</tr>
<tr>
<td>Cooling units:</td>
<td>4 x 20 ton Precision Cooling systems Units</td>
</tr>
<tr>
<td>Power:</td>
<td>2 x 100 kVA room-level UPS systems and power distribution</td>
</tr>
</tbody>
</table>

### Table: Costs Comparison

|                      | Conventional Data Center Design | SmartAisle Design | Cost Savings | % Advantage SmartAisle
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Room Costs</td>
<td>$ 515,000</td>
<td>$ 459,000</td>
<td>$ 56,000</td>
<td>11%</td>
</tr>
<tr>
<td>Infrastructure Costs</td>
<td>$ 415,000</td>
<td>$ 391,000</td>
<td>$ 24,000</td>
<td>6%</td>
</tr>
<tr>
<td>Total Capital Expense</td>
<td>$ 930,000</td>
<td>$ 850,000</td>
<td>$ 80,000</td>
<td>9%</td>
</tr>
<tr>
<td>Energy Consumption</td>
<td>$ 63,500</td>
<td>$ 46,500</td>
<td>$ 17,000</td>
<td>27%</td>
</tr>
<tr>
<td>5 Year OpEx</td>
<td>$ 318,000</td>
<td>$ 233,000</td>
<td>$ 85,000</td>
<td>27%</td>
</tr>
<tr>
<td>5 Year TCO</td>
<td>$ 1,248,000</td>
<td>$ 1,083,000</td>
<td>$ 165,000</td>
<td>13%</td>
</tr>
</tbody>
</table>
**SmartAisle**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Racks</td>
<td>16</td>
</tr>
<tr>
<td>Density</td>
<td>10kW per rack</td>
</tr>
<tr>
<td>Total IT Load</td>
<td>160 kW</td>
</tr>
<tr>
<td>Cooling units</td>
<td>6 row-based precision cooling units</td>
</tr>
<tr>
<td></td>
<td>Cold Aisle Containment</td>
</tr>
<tr>
<td>Power</td>
<td>2 Row-based UPS systems</td>
</tr>
<tr>
<td></td>
<td>Modular Power Busway</td>
</tr>
</tbody>
</table>

![SmartAisle Diagram](image_url)
Measurable Energy Efficiency

Traditional Operation

With Cold Aisle Containment

Liebert® Precision Cooling with Liebert iCOM™ control and Aisle Containment

- Requires less fan power per kW of cooling
- Leverages variable fan speed control
- Operates with digital scroll technology for variable capacity control
- Provides continuous dynamic adaptation to cooling load
- Allows you to easily take advantage of free cooling designs
### Savings - Direct Expansion System

<table>
<thead>
<tr>
<th></th>
<th>Traditional Approach</th>
<th>With Cold Aisle Containment</th>
<th>With Liebert ICOM and Containment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compressor</td>
<td>69.7%</td>
<td>50.9%</td>
<td>50.4%</td>
</tr>
<tr>
<td>Condenser</td>
<td>9.3%</td>
<td>9.3%</td>
<td>9.3%</td>
</tr>
<tr>
<td>Evaporator Fan</td>
<td>21.0%</td>
<td>18.5%</td>
<td>7.2%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100%</td>
<td>78.7%</td>
<td>66.9%</td>
</tr>
<tr>
<td><strong>Savings</strong></td>
<td><strong>21%</strong></td>
<td><strong>33%</strong></td>
<td></td>
</tr>
</tbody>
</table>

* Estimated savings based on dedicated data center chiller

### Savings - Chilled Water System

<table>
<thead>
<tr>
<th></th>
<th>Traditional Approach</th>
<th>With Cold Aisle Containment</th>
<th>With Liebert ICOM and Containment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chiller*</td>
<td>71.3%</td>
<td>64.9%</td>
<td>60%</td>
</tr>
<tr>
<td>Pumps*</td>
<td>10.0%</td>
<td>5.4%</td>
<td>5.2%</td>
</tr>
<tr>
<td>Air Handler Fan</td>
<td>18.7%</td>
<td>14.3%</td>
<td>7.2%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100%</td>
<td>84.6%</td>
<td>72.4%</td>
</tr>
<tr>
<td><strong>Savings</strong></td>
<td><strong>15%</strong></td>
<td><strong>28%</strong></td>
<td></td>
</tr>
</tbody>
</table>
Today’s successful businesses depend on adaptable technologies to help them respond quickly to market demands. Your data center must be built on a support infrastructure designed to match the power and cooling needs of rapidly changing IT initiatives such as virtualization and consolidation. Each IT change, move or addition will affect the entire support infrastructure—you need products and support that ensure your IT systems will operate reliably in these environments.

Vertiv™ leads the industry in infrastructure support, with a comprehensive offering that provides efficient operation without compromising availability. These solutions are backed by the industry’s largest service organization, ensuring continued support by factory-trained experts.

**IT RACKS AND ACCESSORIES**

**DCF™ & DCM™ IT Rack**
- Industry leading 83% perforation for high density IT equipment
- Dozens of simple tool-less accessories
- Significant zero-U mounting space
- Roof designed for optional high density cooling

**Liebert® and Knurr Rack PDUs**
- Basic, controlled or adaptive designs
- Local and remote monitoring
- Additional in-rack sensors available
- Available in low and high density
- 2-year no-hassle replacement warranty
Liebert MB™ Modular Busway
- Tool-less mounting to Knurr racks
- Plug-n-play bus plug / rack PDU connections
- Replaces multiple power cables
- Available in dual bus design

Aisle Containment from Vertiv™
- Flexible design independent from rack width
- Sliding or vertical doors
- Modular, vertical or retractable overhead containment
- Integrated adaptive control reduces fan energy cost

POWER AND UPS

Liebert® FDC™/Liebert FPC™
- Rack-size power conditioning and distribution
- Requires only front and back service access
- Offers top or bottom cable entry

Liebert APM™ UPS
- Scalable capacity growth without increasing footprint: 15-90kW
- Operates with up to 94% energy efficiency
- Row-based installation

Liebert NX™ UPS
- Scalable capacity growth without increasing footprint: 40-200kVA
- Parallel configurations for capacity or redundancy
- Operates with up to 97% energy efficiency
- Row-based installation
**PRECISION COOLING**

**Liebert® CRV™ Row-Based Cooling**
- 20kW to 40kW precision cooling with horizontal airflow design for both non-raised and raised floors
- Digital scroll compressor and variable speed fans for highly efficient operation
- Air, water, glycol and chilled water designs
- Liebert iCOM™ for intelligent control, communications and monitoring

**Liebert DS™ Perimeter Cooling**
- Industry standard in floor mount precision cooling.
- Available in single units from 28kW to 105kW
- Flexibility of design with air, water, glycol and GLYCOOL cooling
- Liebert iCOM for intelligent control, communications and monitoring
- Digital scroll technology for variable capacity control
- Widest variety of air supply configurations

**Liebert XD™ Row-based Cooling**
- High heat density cooling system that requires little to no data center footprint
- Additional energy savings with pumped refrigerant technology
- Intelligent fan control in each module and Liebert iCOM for intelligent control, communications and monitoring

**Liebert CW™ Perimeter Cooling**
- Chilled Water cooling
- Available in single units from 26kW to 181kW
- Optional EC Plug Fans maximize energy efficient operation
- Liebert iCOM for intelligent control, communications and monitoring
- Widest variety of air supply configurations
INFRASTRUCTURE MANAGEMENT

Liebert® Nform™
- Software solution providing centralized monitoring of a wide range of data center infrastructure equipment
- Leverages existing network communications
- Triggers event actions or notifications

Liebert SiteScan™ Web
- Software solution providing centralized monitoring of a wide range of data center infrastructure equipment
- Leverages existing network communications
- Triggers event actions or notifications