

Cold aisle containment system for computer room

Article Overview

Cold aisle containment is an effective method to improve cooling efficiency, reduce energy costs, and maintain optimal server performance in computer rooms.

Overview of Cold Aisle Containment

Cold aisle containment involves enclosing the cold aisles--the rows where server intakes face--using doors at the ends and partitions or a roof over the aisle. This prevents the mixing of cold supply air with hot exhaust air, ensuring that servers receive consistent, cool airflow from CRAC (Computer Room Air Conditioning) or CRAH (Computer Room Air Handler) units . Unlike hot aisle containment, cold aisle containment is generally easier to retrofit in existing data centers, especially where overhead obstructions like ducts, lighting, or cabling exist .

Benefits

- o **Energy Efficiency:** Cold aisle containment can reduce cooling-related energy costs by up to 30%, and studies have shown that electricity used to move cold supply air can be reduced by 75% .
- o **Improved Temperature Control:** By separating hot and cold air, it minimizes hot spots and maintains a stable environment for IT equipment .
- o **Quick Payback:** Retrofits can be implemented quickly, with payback periods ranging from weeks to a few months, depending on energy rebates and utility incentives .
- o **Flexibility:** Cold aisle containment works with or without raised floors and can integrate with high-density cooling systems or extreme density setups .

Implementation Considerations

- o **Physical Setup:** Doors, roof panels, and side partitions create a "contained" cold aisle. Panels can be made from materials like twin-wall polycarbonate for insulation and durability .
- o **Fire Safety:** Full containment creates a separate volume, so fire suppression systems must be adapted to cover both the overall data center and the contained aisle .
- o **Airflow Management:** Ensure that conditioned air is delivered efficiently to the contained space. Leaks from raised floors or under equipment like PDUs can reduce efficiency .
- o **Security and Access:** Sliding doors with locks and clear panels allow monitoring while maintaining controlled access .

Comparison with Hot Aisle Containment

Cold aisle containment system for computer room

While both hot and cold aisle containment improve cooling efficiency, cold aisle containment is generally less expensive, easier to retrofit, and does not require additional ducting or ceiling plenums . Hot aisle containment may achieve higher supply temperatures but can create extremely hot exhaust areas, which may not be suitable for all equipment.

Practical Tips

- o Use self-closing doors to prevent air leakage.
- o Consider panel gaskets to improve the seal and maintain temperature control.
- o Evaluate the layout of racks and airflow paths to maximize cooling efficiency.
- o Integrate with existing CRAC/CRAH units for optimal performance without major structural changes . Cold aisle containment is a cost-effective, flexible, and energy-efficient solution for modern computer rooms, particularly in high-density or retrofitted data centers. It ensures reliable cooling, reduces operational costs, and supports the longevity and performance of IT equipment.

Explore 30 hot aisle, cold aisle, structural, door, roof, flexible containment and airflow-control products for data centers. Engineering

Physical Containment Systems Selection Guide Aisle Containment Systems by Vertiv™ Aisle Containment is the logical extension

With hot aisle cold aisle isolation you can depend on easy-to-deploy data center partitions with superior safety features and high

Enhance airflow control and energy efficiency in data centers, laboratories, and cleanroom environments with

Cool Shield(TM) containment offers state-of-the-art hot and cold aisle containment solutions designed to

Cold aisle containment can be used with or without conventional raised floor cooling. It is easily retrofitted into existing raised floor

Superior Cooling Efficiency: By sealing the cold aisle so that only cool supply air reaches server inlets, cold aisle containment

While either hot aisle or cold aisle containment systems can be installed and are both capable of increasing efficiency and cooling

Hot and cold aisle containment is one of the most effective strategies for improving cooling performance in

Cold aisle containment system for computer room

modern server rooms. By

Hot aisle containment systems isolate the hot aisle using a similar enclosure system to that of a cold aisle with a sealed

Aisle containment is a layout design for server racks and other

How aisle containment works Aisle containment is a physical means of separating hot (exhaust) and cold (supply) air.

Tate's Cold Aisle Containment (CAC) system efficiently channels cold air from the CRAH or CRAC unit to

By maintaining consistent, predictable temperatures, cold aisle containment minimizes thermal stress and reduces the risk of

Traditional open aisle data centers use perimeter PAC (precision air conditioning) or CRAC (computer room air conditioning) units to

Are you interested in cold aisle containment for your data center? C&C explains how these containment systems can

Web: <https://www.supremeacademicresearch.co.za>

