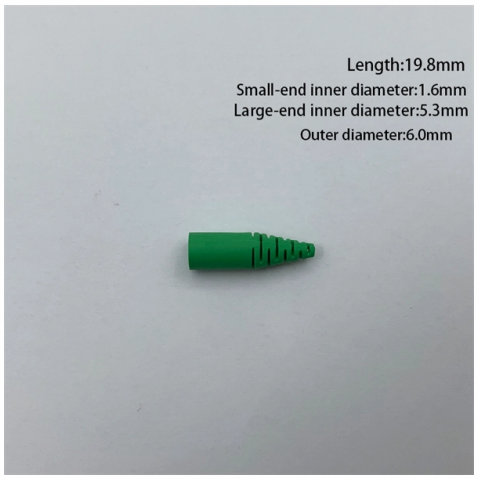
Computer Room Cold Aisle Design Standard



Overview

In its simplest form, hot/cold aisle data center design involves lining up server racks in alternating rows, with cold air intakes facing one way and the hot air exhausts facing the other.

Key Takeaways

Cold aisles should be designed to optimize airflow, maintain equipment temperature, and improve energy efficiency, typically with a minimum width of 1. 2 meters and proper containment strategies.

Cold Aisle Layout and Dimensions

Cold aisles are formed by arranging server racks so that the fronts of opposing rows face each other, creating a corridor where cold air is supplied to the equipment intakes. Key dimensional standards include: Aisle Width: Minimum of 1. 2 meters to allow two full floor tiles between cabinet fronts, ensuring adequate airflow and personnel access.

Wider aisles may be required for ceiling heights above 3. 7 meters to accommodate overhead systems. Aisle Length: Maximum continuous aisle length should not exceed 16 meters.

If one end is closed or lacks an exit, limit the length to 6 meters for safe access and evacuation. Raised Floor Systems: Raised floors (18–24 inches) with perforated tiles are recommended to distribute cold air efficiently to the front of racks.

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Containment Strategies

Cold aisle containment (CAC) involves enclosing the cold aisle with physical barriers to prevent mixing of cold and hot air, which improves cooling efficiency and reduces energy consumption. Key points include: Enclosures: Can be retrofitted into existing data centers and work with or without raised floor cooling. Energy Savings: CAC can reduce chiller operating costs by up to 20% and lower the energy required to move cold air by up to 75%.

Implementation: Ensure proper sealing, blanking panels, and airflow management to maintain cold air integrity and prevent hot air recirculation.

Airflow and Environmental Considerations

Air Supply: Cold air should be delivered directly to the front of equipment racks, while hot air is exhausted into adjacent hot aisles.

CRA

C Placement: Computer Room Air Conditioning (CRAC) units should be positioned at the end of hot aisles to minimize hot air re-entry into cold aisles. Monitoring: Temperature and humidity sensors should be installed to continuously monitor environmental conditions and ensure compliance with equipment specifications.

Best Practices

Maintain clear access for personnel and serviceability. Use blanking panels to prevent bypass airflow. Conduct a total heat load assessment to balance cooling supply and demand.

Consider future growth and high-density equipment when planning aisle width and containment. By following these standards, data centers can achieve optimized cooling performance, improved energy efficiency, and enhanced operational reliability while maintaining safe and accessible cold aisles for IT equipment and personnel.

Article Content

ASHRAE TC9.9 Data Center Power Equipment Thermal Guidelines

rategies orient the IT racks in what is called a hot aisle/cold aisle layout. Cold aisles are ormed by the space between the front faces of two rows of IT equipment rac

Hot Aisle vs Cold Aisle Containment Explained (Data

In this guide, we''ll break down how hot aisle and cold aisle configurations work, what containment systems do, and why airflow

What are hot and cold aisles in the data center?

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In its simplest form, hot/cold aisle data center design involves lining up server racks in alternating rows, with cold air intakes facing one way and the hot air exhausts facing the other. The

Best Practices Guide for Energy-Efficient Data Center Design

A basic hot aisle/cold aisle configuration is created when the equipment racks and the cooling system''s air supply and return are designed to prevent mixing of the hot rack exhaust air and the cool supply

General guidelines for data centers

The cold aisle consists of perforated floor tiles separating two rows of racks. The chilled air from the perforated floor tiles is exhausted from the tiles and is drawn into the fronts of the racks. The inlets of

FOCUSED COOLING USING COLD AISLE CONTAINMENT

As an addition to a conventional precision cooling system, cold aisle containment consistently separates cold and warm areas without requiring structural changes to the data center.

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Aisle Containment Systems Physical Containment Systems ...

Aisle Containment Systems by VertivTM Aisle Containment is the logical extension of the hot aisle/cold aisle concept of data center design. n is a best practice solution that separates hot and cold air

Data Center Aisle Containment

Traditional open aisle data centers use perimeter PAC (precision air conditioning) or CRAC (computer room air conditioning) units to channel cold air up through a raised floor void via grilles positioned in

Data Center Cooling Systems for ASHRAE 90.4

Data center HVAC systems are energy-hungry infrastructures. Optimize your data center cooling design for ASHRAE standard 90.4 with

Aisle Containment Systems for Hot & Cold Aisle Solutions

Cool Shield Aisle containment solutions reduces server row temperatures in active data centers. Learn more about the benefits of hot and cold containment.

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Explore hot and cold aisle containment for your data center

Hot and cold aisle containment can help you maintain the best air flow, temperature and humidity in the data center to keep servers running efficiently.

Cold Aisle Containment: The Ultimate Guide To

Additionally, cold aisle containment tends to be easier to implement compared to hot aisle containment, as it typically requires fewer modifications to the existing

Data Center Hot Aisle/Cold Aisle Layout Design

Are you interested in creating the most energy efficient design for your Data Center Server Room? Consider the Hot Aisle/Cold Aisle layout design.

Data Center Cooling Best Practices

Noticing dramatically different temperatures while walking through a computer room with Cold Aisles/Hot Aisles is a demonstration of successful implementation and operating practices.

The cold aisle containment advantage

The majority of installed computer equipment is placed in racks that are designed to intake cold air from the front and exhaust hot air through the rear of the cabinet. This has driven an industry standard of

Cold Aisle Containment & Hot Aisle Containment

Executive Summary of Aisle Containment This article examines cold aisle containment and hot aisle containment (also known as cold or hot air containment) from a neutral perspective. Cross-Guard, as

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Best Practices for Implementing Hot and Cold Aisles Planning and Design Regular Monitoring Maintenance Scalability Training and Awareness The hot and cold aisle strategy is a proven method

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