

Power System Computer Room Hot Aisle Rack Type



AI Overview

Hot aisle racks in computer rooms are designed to channel hot exhaust air efficiently back to cooling units, with rack types including air-cooled, liquid-cooled, and high-density power racks.

Hot Aisle Containment Overview Hot aisle containment (HAC) is a data center cooling strategy where server racks are arranged back-to-back, forming aisles that capture hot exhaust air and direct it to the computer room air conditioning (CRAC) units through overhead plenums. This prevents hot and cold air from mixing, improving cooling efficiency and allowing higher return air temperatures, which enhances free cooling opportunities. Hot aisles typically house power distribution equipment such as UPS, switchgear, and PDUs, which may generate additional heat.

Rack Types in Hot Aisles

- Air-Cooled Racks** Standard racks use front-to-back airflow, drawing cold air from the cold aisle and expelling hot air into the hot aisle. Suitable for power densities of 1–5 kW per rack. Efficiency can be improved with blanking panels to prevent recirculation of hot air and ensure proper airflow over IT equipment.
- Liquid-Cooled Racks** Incorporate integral heat exchangers or coils where cold liquid absorbs heat from the equipment. Ideal for high-density racks (5–80 kW) where air cooling alone is insufficient. Liquid cooling can transfer heat up to four times more efficiently than air, making it suitable for power-intensive servers and blade systems.
- High-Density Power Racks** Designed for blade servers or consolidated power systems, often exceeding 15 kW per rack. May include shared power feeds, fans, and cabling to optimize space and reduce floor footprint. Require careful integration with hot aisle containment to prevent hotspots and maintain ASHRAE-recommended supply temperatures below 27°C.

Best Practices Rack Orientation: Align racks back-to-back to form hot aisles and front-to-front for cold aisles, ensuring proper airflow separation

Article Content

Aisle containment system buying guide

Discover the key factors to consider when choosing a hot aisle/cold aisle containment system. This buying guide will help you understand the features of an aisle containment system, learn the

Hot Aisle vs. Cold Aisle Containment for Data Centers

Today's two main data containment systems are used in data centers: hot aisle containment and cold aisle containment. Hot or cold

Specifying Data Center IT Pod Architectures

However, there is no similar industry standardization and “black box” method to deploy groups of racks and supporting larger infrastructure into the white space. Many data center operators have

The Energy Efficiency Benefits of Cold and Hot Aisle

Hot-aisle containment ensures that the open server room area is colder and provides a more acceptable working environment for technicians and

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.

Hot Aisle Containment: How It Works and What It Costs

How hot aisle containment cuts cooling bills, how it compares to cold aisle, and what a retrofit costs. A clear guide for anyone planning a data center

Move to a Hot Aisle/Cold Aisle Layout

Hot aisle/cold aisle layout can still be used in server rooms without raised floors: distinct hot and cold aisles can be created by rearranging server rack locations

Aisle Containment Systems Physical Containment Systems ...

Hot aisle/cold aisle configuration is a best practice solution that separates hot and cold air streams. This method raises the temperature of the air returning to a Computer Room Air Conditioner (CRAC) unit,

Hot and Cold Aisle Containment Solution | Legrand

Effective aisle containment is critical to maintaining peak data center cooling efficiency. By creating a physical barrier between cold supply air and hot exhaust

Data Center Server Rack Guide (2026): Types, Design,

There are three primary rack types - open-frame racks, enclosed cabinets, and wall-mount racks, each suited for different levels of security,

Data Center Aisle Containment Systems | Profile IT

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

ASHRAE TC9.9 Data Center Power Equipment Thermal Guidelines

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

Aisle Containment | Vertiv Hot/Cold Aisle Containment

Freestanding, Rack-independent system with the flexibility to maximize efficiency and capacity from the core to the edge for raised floor and slab data centers.

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

Install In-rack or In-row Cooling

Generally speaking, in-row and in-rack cooling systems have higher capital costs than room-based cooling systems, but lower operating costs – particularly at

Hot Aisle Containment | Legrand

Legrand hot aisle containment solutions optimize airflow, reduce energy consumption, and ensure peak performance for critical infrastructure. Hot aisle containment is the most common method for

Data center HVAC cooling systems

Data center HVAC cooling systems. How the different types work and comparison of design with CFD, CRAC units, hot and cold aisle, hot aisle

Data Center Design: Hot Aisle & Cold Aisle – Length

Proper aisle planning isn't just about airflow—it's about optimizing safety, serviceability, and system efficiency. By adhering to these length and width

Data Center Aisle Containment

Room temperature is governed by the supply air temperature leaving the PAC unit. With higher cooling output per footprint, the InRak™ in-row cooling system frees

FOCUSED COOLING USING COLD AISLE CONTAINMENT

While either hot aisle or cold aisle containment systems can be installed and are both capable of increasing efficiency and cooling today's high heat data centers, meaningful differences exist in how

Aisle Containment Systems Physical Containment Systems ...

Retractable System: The Easy-To-Install Containment Solution The Retractable System exclusively for a 4" or 6" aisle ceiling, is a truly unique and easily deployed solution.

A Guide to Hot and Cold Aisle Containment for Optimizing Server Room ...

Training and Awareness The hot and cold aisle strategy is a proven method for improving cooling efficiency and reducing energy consumption in data centers. By carefully planning the layout of

Hot Aisle vs Cold Aisle Containment Explained (Data

While advanced cooling systems like chilled water plants and CRAH units play a major role, one of the most effective strategies is much simpler:

Hot Aisle Containment: Enhancing Data Centre Efficiency

By isolating hot exhaust air emitted from server racks, HAC ensures that this hot air returns directly to the computer room air conditioning (CRAC) by funnelling it through an overhead plenum.

Hot Aisle Containment: Enhancing Data Centre Efficiency

Hot Aisle Containment (HAC) is a leading data centre cooling strategy designed to improve cooling efficiency and reduce energy costs. By isolating hot exhaust air

Hot vs Cold Aisle Containment: Which Datacenter Cooling Strategy Is ...

Hot aisle containment offers superior scalability for high-density deployments, effectively handling power densities exceeding 30kW per rack. This approach provides consistent cooling

Comprehensive Guide to Rack Cooling in Data Centers

Rack cooling vs. traditional room cooling: Unlike conventional cooling, rack-level solutions prevent hot spots, improve airflow efficiency, and reduce energy consumption.

Aisle Containment

Hot Aisle Containment With hot aisle architecture, the supply air is directed onto the front of the racks and the hot discharge air ducted back to the PAC units through

Data Center HVAC Systems

Learn how Data Center HVAC Systems work using cold and hot aisle strategies and air cooled versus liquid cooled IT equipment racks.

Contact Us

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