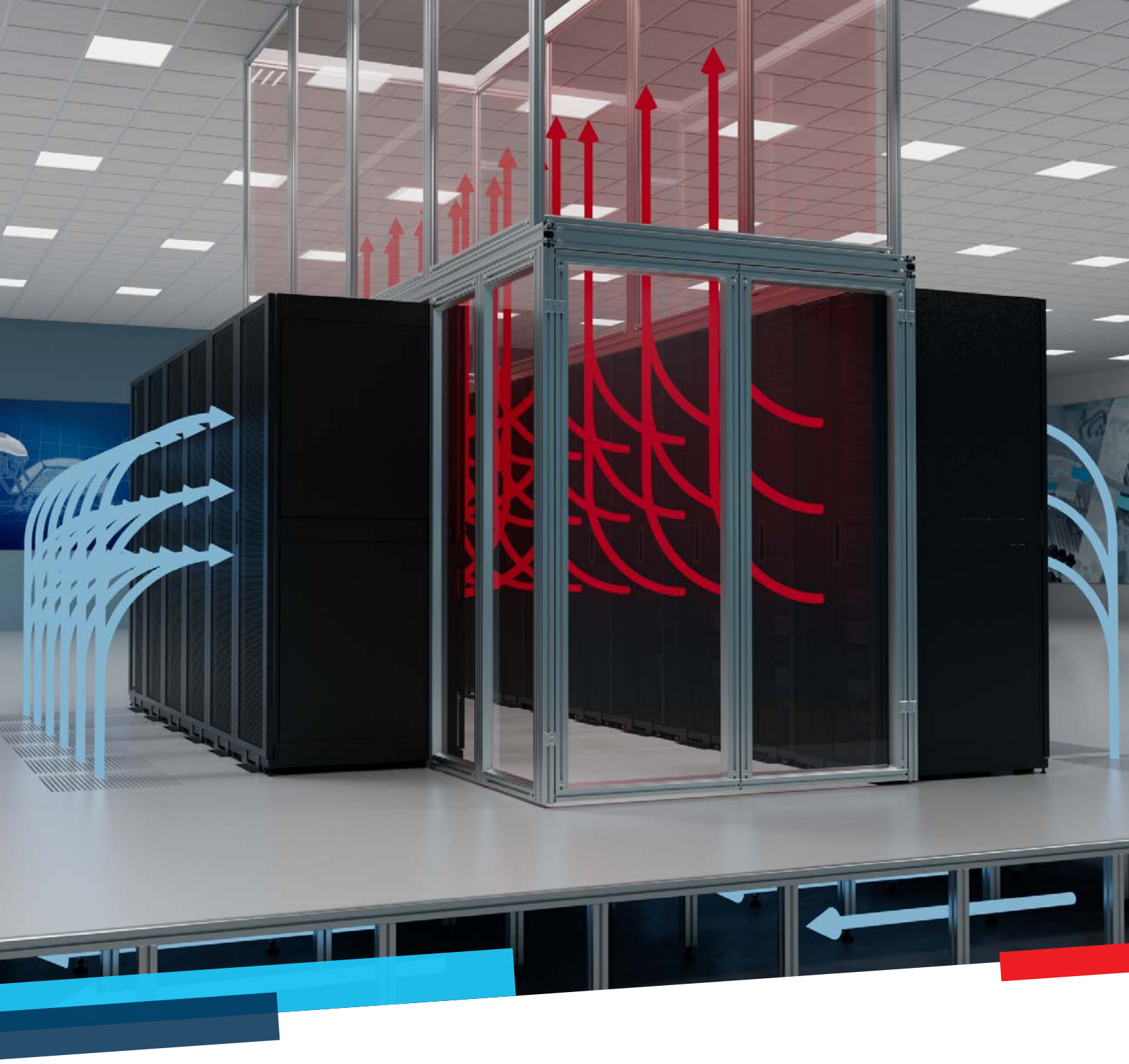

Temperature Management in Data Centers: Why Materials Matter in Data Center Construction

TECHNICAL ARTICLE

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With global trends towards AI and other data-driven initiatives, data centers are being rapidly deployed to store the IT infrastructure needed to process the massive amounts of digital data.

In fact, the average data center is approximately 100,000 sq. ft., with some of the largest being in the millions of sq. ft. All of which are filled with servers, storage drives, network equipment, security systems, and other computing hardware that require power to operate.

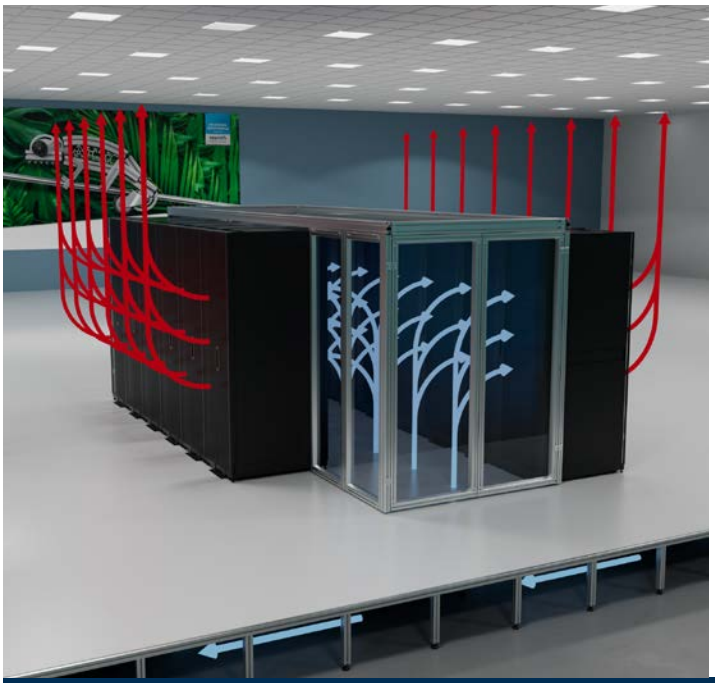
All this equipment running 24/7 under one roof means that without the right environmental control infrastructure, equipment is in danger of overheating, and this puts the data center in danger of hardware failure, service downtown, and permanent damage.

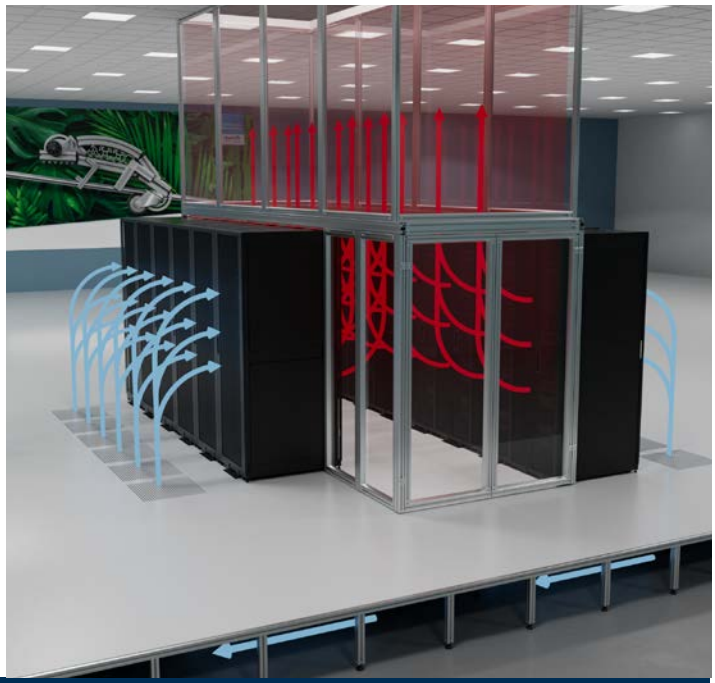
While not the sole solution to temperature management in data centers, the material with which a data center is constructed can support critical environment control components such as cooling towers, air conditioning, and humidity control systems to help protect the data it supports. Compared to alternative materials like steel, aluminum framing boasts superior thermal conductivity to help enhance cooling efficiency in data centers.

THE COOLER CHOICE FOR DATA CENTER CONSTRUCTION

It's no secret that aluminum has high thermal conductivity properties. The Aluminum Extruders Council reports that "With a coefficient of thermal conductivity of 239, aluminum conducts heat much more easily than steel (coefficient of thermal conductivity of 50)."

Because of this, aluminum framing is often used to enhance cooling efforts in data centers by pulling heat away from sensitive equipment and lowering server temperatures as server racks or isolating cold/hot air in aisle containment units with additional thermal barriers.





Cold/Hot aisle containment systems are paramount to reduce energy consumption and improve overall efficiency in data centers.

Raised floors support cable management, as well as a distribution system for cold air to server racks.

KEY DATA CENTER APPLICATIONS WHERE THERMAL MANAGEMENT MATTERS

While not an exhaustive list, aluminum framing's thermal conductivity benefits data centers in these key applications:

Cold/Hot Aisle Containment

Cold/Hot aisle containment systems are paramount to reduce energy consumption and improve overall efficiency by preventing the mixing of hot exhaust air and cold supply air. With its ability to form an air-tight containment seal, thermal-conductivity benefits, and easy installation, aluminum framing is the ideal material structure for these critical enclosures.

Server Racks

Server racks are the backbone of a data center – it's imperative that the servers stay operational. Racks made of aluminum offer better heat dissipation, which helps keep the servers at the ideal temperature. As a bonus, aluminum framing is lightweight, which makes it easier to transport safely if it needs to move to another part of the center.

Raised Floors

Data centers require raised floors, also known as false floors, that are elevated between 1-2 feet and support cable management, as well as a distribution system for cold air to server racks. With its impressive strength-to-weight ratio and easier installation, aluminum framing makes an efficient material for false floors that improve cooling efficiency by supporting underfloor airflow.

Aluminum framing has been relied on in the industrial industry for over 40 years, building a strong foundation for the backbone of the global manufacturing system. Now data center construction is reaping the same benefits with a proven product that not only has the thermal properties to support a mission-critical IT infrastructure but has also stood the test of time for reliability, efficiency, and durability.

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