CATALOG

# Containment Solutions

HOT AISLE CONTAINMENT AND
COLD AISLE CONTAINMENT
IN DATA CENTERS

Q 360
Innovation and Technology

# Content

# Containment Solution



## INTRODUCTION

In the fast-paced world of data centers, efficiency, reliability, and sustainability are paramount. As data centers continue to expand to meet growing demands, managing heat and energy consumption becomes increasingly challenging. This is where containment solutions play a crucial role.

Containment solutions are designed to optimize the cooling efficiency of data centers by segregating hot and cold air streams. By preventing the mixing of hot and cold air, these systems not only reduce energy consumption but also enhance the performance and longevity of equipment.

## WHY CONTAINMENT SOLUTIONS MATTER:

### ENERGY EFFICIENCY

By isolating hot and cold air, containment solutions significantly reduce the energy required for cooling, leading to lower operational costs.

### ENHANCED EQUIPMENT PERFORMANCE

Stable and optimized cooling environments reduce thermal stress on servers and other critical equipment, enhancing their performance and lifespan.

### SCALABILITY

Whether you operate a small data center or a large-scale facility, containment solutions can be tailored to your specific needs, ensuring flexibility and scalability.

### ENVIRONMENTAL IMPACT

With growing concerns about the environmental footprint of data centers, containment solutions contribute to sustainability efforts by reducing energy consumption and greenhouse gas emissions.

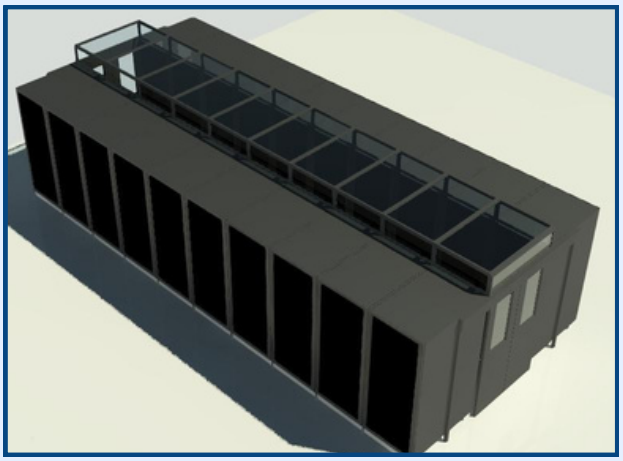
This catalog is designed to provide you with a comprehensive overview of the different types of containment solutions available, along with detailed product specifications, real-world case studies, and expert insights. Whether you're looking to implement a new system or upgrade an existing one, this guide will help you make informed decisions that align with your operational goals and sustainability objectives.

# Overview

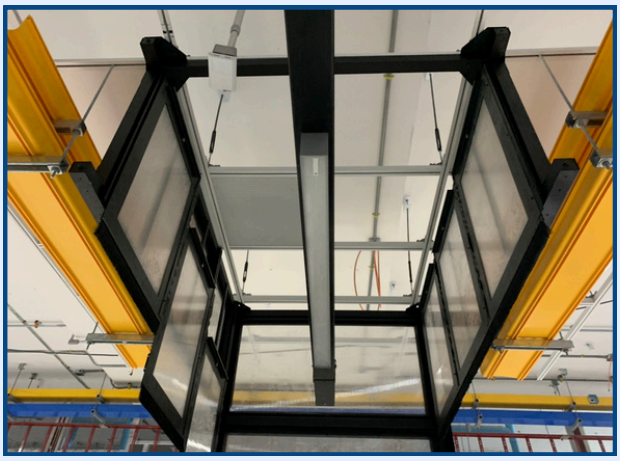
Containment solutions in data centers are designed to manage the airflow within the facility by separating hot and cold air streams. This separation is crucial for preventing hot air recirculation and ensuring that cooling systems operate at peak efficiency.

There are two primary types of containment: Hot Aisle Containment (HAC) and Cold Aisle Containment (CAC). Each type has its own advantages, depending on the specific needs of the data center.

## STANDARD & CUSTOMIZE



## RIGID DESIGN



## ADJUSTABLE & FLEXIBLE PANEL DESIGN

## MODULAR DESIGN

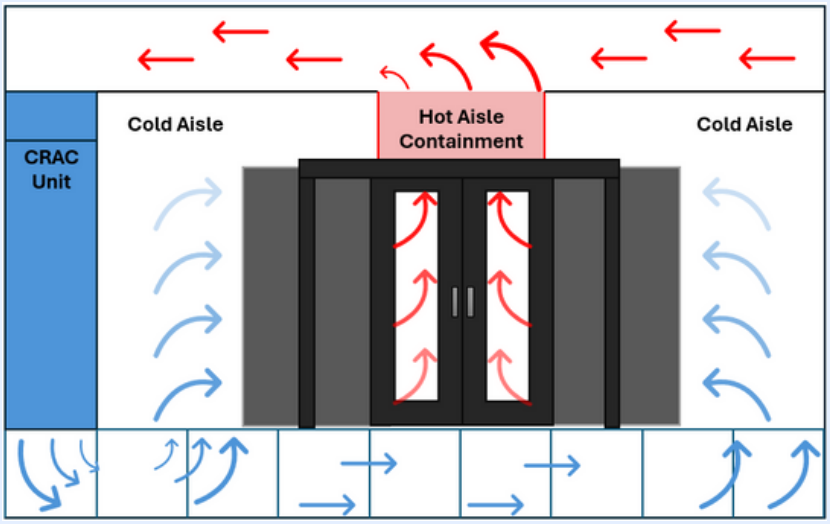
# Containment Types



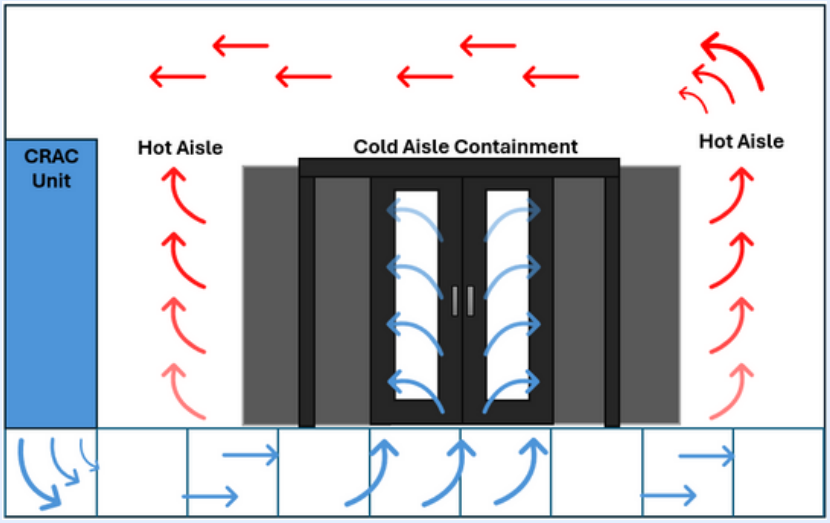
The success of a data center's cooling strategy hinges on the effective implementation of containment principles. These principles guide the design and deployment of containment systems, ensuring optimal airflow management, energy efficiency, and overall data center performance. Understanding and applying these principles is essential for maintaining a stable and efficient environment within the data center.

In the quest for optimal data center cooling, two primary containment strategies have emerged: Hot Aisle Containment (HAC) and Cold Aisle Containment (CAC). Each approach offers distinct advantages and is suited to different operational needs and facility layouts.

## 1. HOT AISLE CONTAINMENT (HAC)




## 2. COLD AISLE CONTAINMENT (CAC)

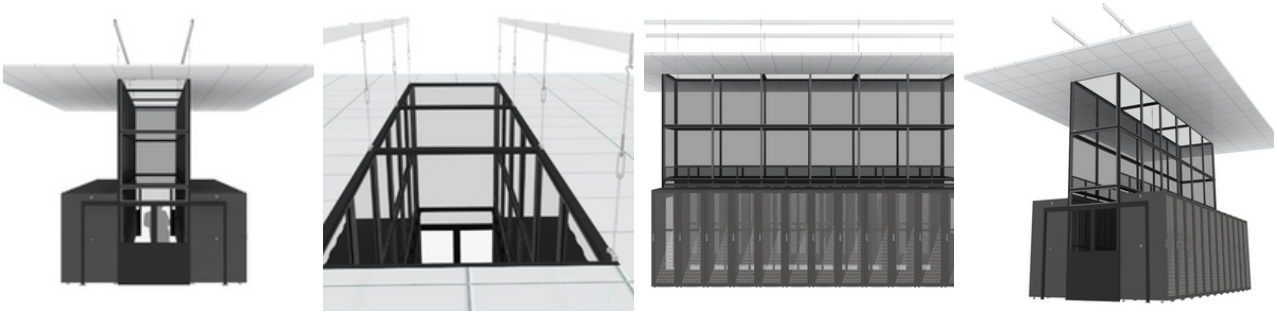


CONTAINMENT SOLUTION

# Hot Aisle Containment (HAC)

## 1. HOT AISLE CONTAINMENT (HAC)

Hot Aisle Containment (HAC) focuses on enclosing the hot aisle, the area where the hot air exhaust from servers is concentrated. By isolating this hot air, HAC prevents it from mixing with the cold air in the rest of the data center. This strategy directs the hot air back to the cooling units more efficiently, ensuring that only cool air is used for server intake.



**Key Features:**

- **Enclosures:** The hot aisle is typically enclosed by doors at each end and a roof or ceiling panels above, forming a contained space.
- **Airflow Control:** Hot air is channeled directly to the cooling units, reducing the workload on the cooling system.
- **Flexibility:** HAC can be implemented in both new data centers and retrofitted into existing ones.

**Advantages:**

- **Energy Efficiency:** HAC allows cooling units to operate at higher temperatures, which can significantly reduce energy consumption.
- **Enhanced Cooling Efficiency:** By containing the hot air, the cooling units can more effectively remove heat, maintaining consistent temperatures across the data center.
- **Reduced Hot Spots:** HAC minimizes the risk of hot spots by ensuring that hot air is properly managed and directed.

**Applications:**

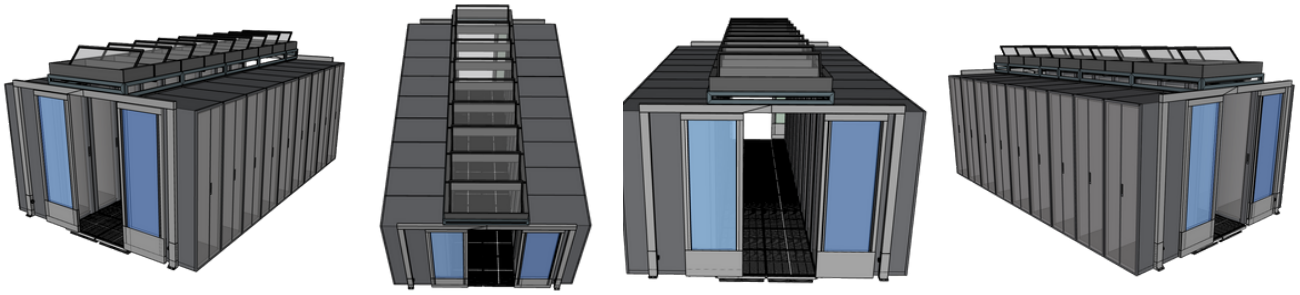
- **Large Data Centers:** Particularly beneficial in large facilities where heat management is a major concern.
- **High-Density Environments:** Ideal for data centers with high-density server racks that generate substantial heat.

# Cold Aisle Containment (CAC)



## 2. COLD AISLE CONTAINMENT (CAC)

Cold Aisle Containment (CAC) focuses on enclosing the cold aisle, the area where the cooling air is delivered to the servers. This method ensures that the cold air is directed exclusively into the server intakes, preventing it from mixing with the hot exhaust air in the data center. By containing the cold air, CAC improves the efficiency of the cooling process.



**Key Features:**

- **Enclosures:** The cold aisle is typically enclosed by doors at the ends and a roof or ceiling panels, similar to HAC.
- **Targeted Cooling:** Cold air is concentrated in the areas where it's most needed, directly at the server inlets.
- **Scalability:** CAC systems can be easily expanded as the data center grows.

**Advantages:**

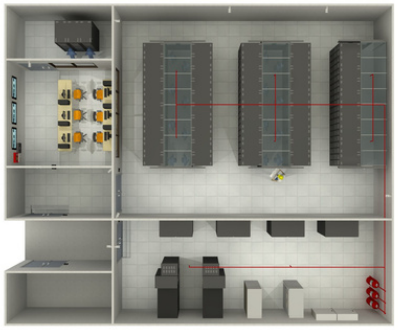
- **Improved Cooling Efficiency:** CAC ensures that cold air is used effectively, reducing the amount of cold air required and lowering energy costs.
- **Consistent Temperatures:** By preventing cold air from mixing with hot air, CAC helps maintain stable temperatures within the cold aisle.
- **Enhanced Equipment Performance:** With better temperature control, servers operate more efficiently and reliably.

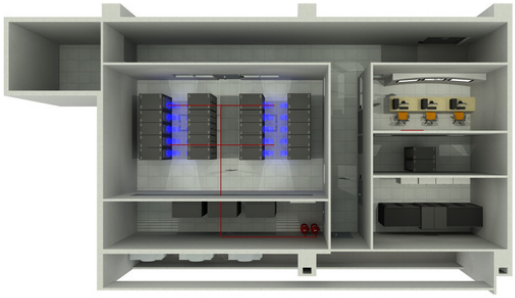
**Applications:**

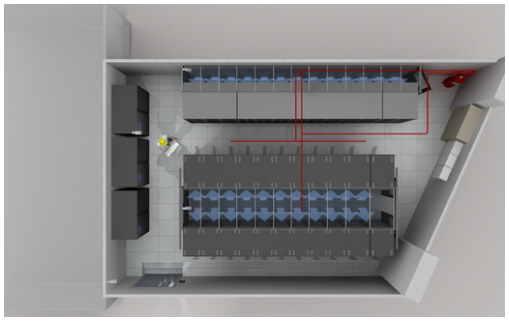
- **Small to Medium Data Centers:** Often preferred in smaller facilities where the layout allows for effective cold air containment.
- **Mixed Density Environments:** Suitable for data centers with varying densities, where specific areas require targeted cooling.

# Containment Types

## CHOOSING RIGHT CONTAINMENT TYPE







**Factors to Consider:**

- **Data Center Layout:** The physical layout and existing infrastructure of your data center may influence the choice between HAC and CAC.
- **Cooling Requirements:** Consider the specific cooling needs of your equipment, including the density of your server racks and the heat they generate.
- **Energy Efficiency Goals:** If reducing energy consumption is a top priority, HAC might offer more significant savings, particularly in larger facilities.
- **Scalability:** Both HAC and CAC can be scaled, but the choice may depend on your future expansion plans and the flexibility of each system.

**Conclusion:**

Both Hot Aisle Containment and Cold Aisle Containment offer powerful solutions for managing airflow in data centers. The choice between them should be based on your specific operational needs, facility layout, and long-term goals. In some cases, a hybrid approach combining elements of both HAC and CAC may provide the optimal solution.

# Containment - Components



The effectiveness of a containment system in a data center largely depends on the quality and compatibility of its individual components. Each element plays a crucial role in ensuring that the system operates efficiently, providing the necessary separation between hot and cold air.

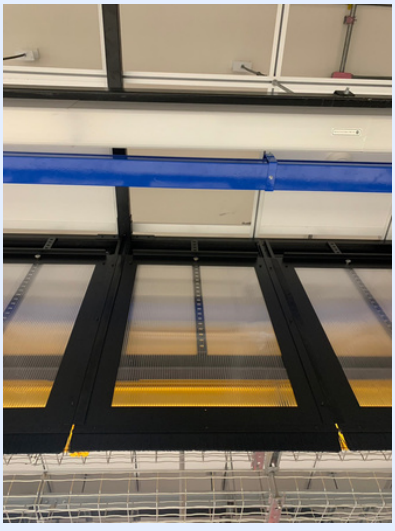
## DESIGN FEATURE

- Design for 42U Server rack or any high of rack (Option: 45U, 47U or up to request: Fix or Adjustable)
- Length of containment vary up to racks quantity/row
- Prevention Cold & Hot air mix
- Compatible with all kind of racks
- Compatible to install Fire suppression system, Smoke detection device
- Compatible to install Access control, CCTV, Temperature/Humidity sensor
- Compatible to install Row cooling unit, UPS-Row base, PDU, RPP inside containment
- Compatible to install with of ceiling & ceiling grid vendor
- Compatible to install DC hall busway, Cable tray, Cable basket, Fiber raceway and lighting

## SOLUTION COMPONENT

- Swing Door (Single, Dual)
- Slide Door (Single, Dual)
- Overhead Vertical Panel
- Vertical Cabinet Filler Panel
- Ceiling Suspended Overhead Panel
- Roof Panel
- Bottom panel
- Accessories

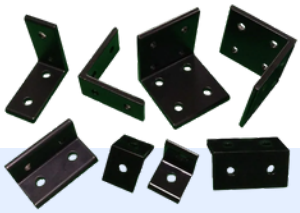




# Containment - Material

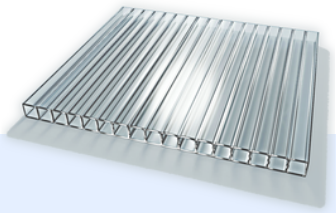
**Frame :** Aluminum profile with powder coated
(Black color standard or another color option customize)
**Door :** Aluminum profile with powder coated with Polycarbonate clear sheet
(Option : Tempered glass or acrylic sheet)
**Vertical, Horizontal, Ceiling suspended Overhead & Roof panel :**
Polycarbonate clear sheet
**Frame thickness :** Aluminum profile 2.0 mm. (Aluminum extrusion)
**Panel :** Aluminum thickness 2 mm. with polycarbonate thickness 6 mm. in standard (Option : thickness 8, 10 mm.)
**Seal brush strip :** Nylon material high 10 mm. (or by request)
Manual Sliding Door Closer or Automatic slide door closer
(Option : Automatic slide door closer operation) by Self-Closing sliding rail design feature for long service life.
(Option : Clear polycarbonate fire-resistant standard UL94-HB or ASTM)

**Aluminum profile 2.0 mm.**



**Angle Support**

**Strip Brush**



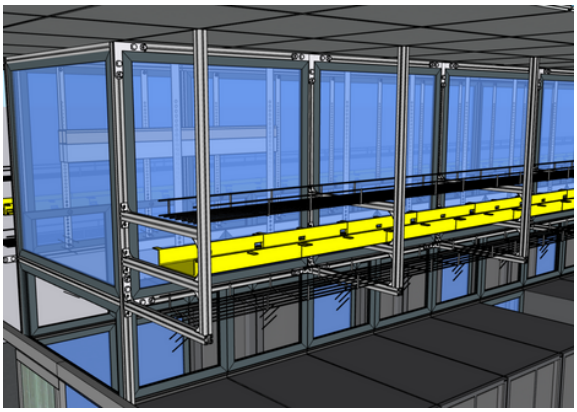
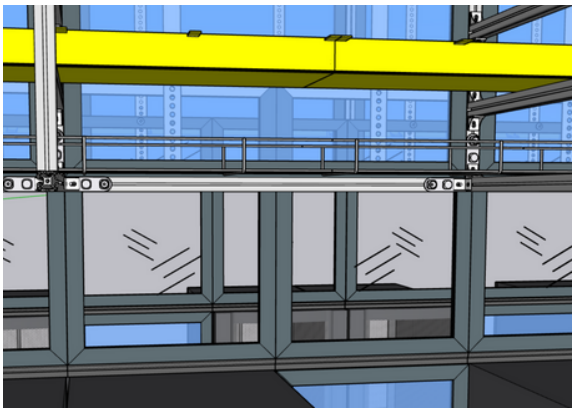
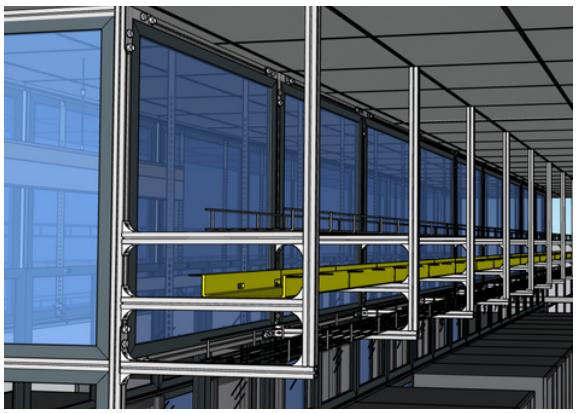
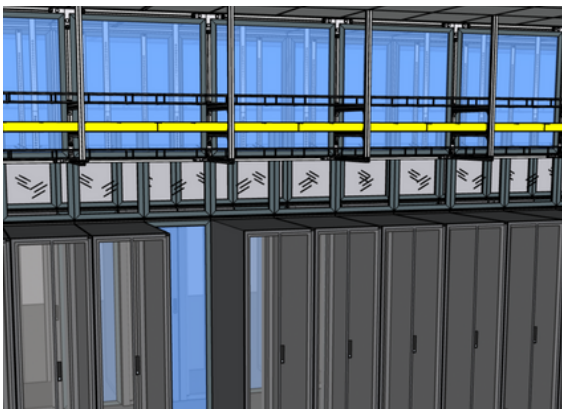
**Polycarbonate 6 mm.**

**Dual Door**

**Single Door**

# Accessories



## SPECIAL OPTIONAL

- Extend Rack Kit
- CFD Air flow simulation report
- LED Lighting strip, Alarm Light & Buzzer
- Access Control Security and CCTV System
- Lighting (Manual or Automatic Control Option)
- Key Rack lock (Digi Lock or Mechatronic Locks)
- Rack PDU, C13/C14, C19/C20 power cord color
- Automatic Motion Door Sensor (Automatic Open & Close)
- Blanking Panels or Height Adapters, Under Rack Blanking Panel
- Status signal for Monitoring System (Door closed/opened, Roof closed/opened)
- Roof automatic drop (Automatic, Key Manual function, LED closed/opened status)
- LCD Display for containment environmental monitoring, Temperature & Humidity Sensor
- Modular power raceway unique design to eliminates sharp edges and creates a smooth cable pathway
- Modular busway with continuous access slot and free maintenance connection, TOU with outlet monitoring or none monitoring
- Modular Network raceway unique design to eliminates sharp edges and creates a smooth cable pathway (Copper and Fiber)
- Aluminum profile support structure for Busbar system, Cable basket, Fiber raceway, lighting and Security system

CONTAINMENT SOLUTION

# Future Culture Technology

Building the Future of Technology through Advanced Containment.



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