Containment Solutions

ContainAire, SmartAire P, SmartAire T

Energy Efficient Solutions for Diverse and Variable Data Center Environments

Tate®


"Aisle Containment Significantly
Improved the Capacity and Energy
Efficiency of My Data Center."

Improve Cooling Efficiency

The Effectiveness of Aisle Containment in Data Centers

Typical raised floor data centers are designed using hot aisle/cold aisle layouts. This is done so that the hot exhaust air from one rack is not being ingested by the intake of another rack. This equipment layout strategy is intended to help keep the hot equipment exhaust air from mixing with the cold air being supplied from under the raised floor. While hot/cold aisle design is a necessary first step, it often doesn't go far enough.

Contain the Airflow in the Aisle

Containment systems have become a popular strategy for segregating hot and cold airflow. Containing an entire row of air has been shown to improve capacity and energy efficiency by reducing by-pass airflow. Many legacy airflow panel designs supply air in a vertical plume. Without a containment system this vertical plume can result in over 50% of the supplied airflow by-passing the equipment and mixing with the return air as shown in Figure 1. This wasted air not only reduces capacity it wastes energy.

Keys to Optimizing Cold & Hot Aisle Containment

Cold Aisle

Cold aisle containment systems increase cooling capacity by ensuring that all the supply air is funneled through the servers. However, a significant amount of leakage can occur through the servers themselves when pressure is allowed to build in the contained space (Figure 2). The key to successfully implementing cold aisle containment is to stop this leakage by modulating the airflow into the aisle in order to maintain a zero pressure differential inside and outside of the aisle as shown in Figure 3.

Hot Aisle

Most modern servers and storage devices are networked from the rear requiring occupancy within the hot aisle for servicing equipment. The increase in allowable inlet air temperature and temperature differentials (ΔT) across servers and other equipment results in temperatures over 110°F in some well designed contained hot aisles. Successful implementation of hot aisle containment requires the ability to provide cooling to the aisle during times when service is needed (Figure 4). This best practice technique allows technicians to work continuously in a contained hot aisle.

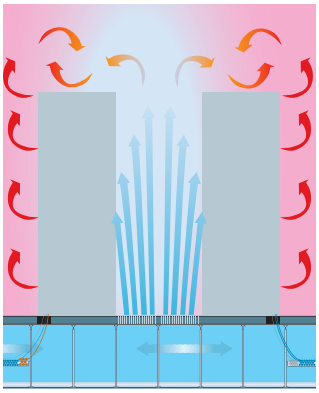


Figure 1:

Typical hot aisle/cold aisle layouts have a significant amount of mixing reducing capacity and efficiency.

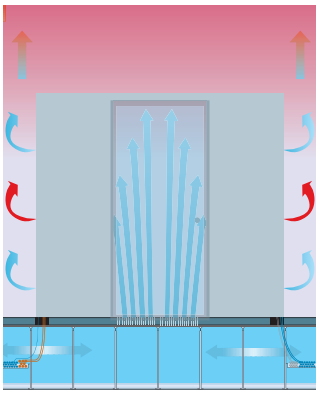


Figure 2:

Cold aisle containment systems help ensure maximum airflow to the racks but still create some bypass air when positive pressure builds.

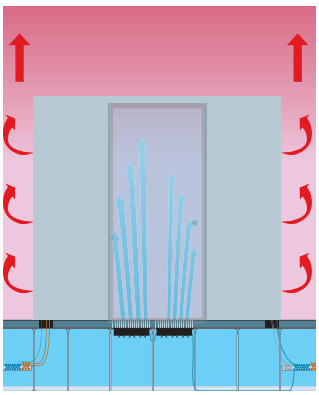


Figure 3:

Modulating the airflow into the cold aisle will help eliminate by-pass air through the servers by maintaining a neutral pressure differential.

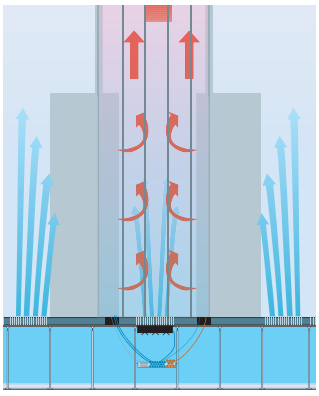


Figure 4:

Allowing cool airflow into the hot aisle when needed will help to create a comfortable working environment where technicians can service equipment without rest periods.

Tate®

Improve Aisle Containment Designs

Cold Aisle Containment with SmartAire P

Solving the Leakage Issue

Cold Aisle containment systems are very common in perimeter CRAC/CRAH unit cooling designs. Some of the advantages include easy access to wires and cables, and a reduction in the amount of space you need to cool since the air is trapped only in that aisle. However, a significant amount of leakage can occur through the servers themselves. Tate conducted a study of 10 commonly used servers from 5 leading manufacturer's and found that in off and idle modes a significant amount of air can still be forced through them.

Cold Aisle Containment with Variable Load Servers

The airflow into the aisle is designed to handle the peak load. When severs are idle the aisle becomes positively pressurized forcing additional air through the idle servers resulting in by-pass airflow and leakage from the contained aisle through the servers. In many cases a full rack of idle servers can waste between 300-600 CFM. Tate's SmartAire P can eliminate this leakage by modulating the airflow in the cold aisle so that a zero static pressure differential inside and outside of the aisle is maintained.

Hot Aisle Containment with SmartAire T

Allowing for Continuous Work

Hot aisle containment is another common containment design. In hot aisle designs the entire room is still cooled using the perimeter CRAC units but, instead of trapping the cold supply air the exhaust air is isolated to keep it from mixing with the cool air in the rest of the room. OSHA requirements limit the length of time a person can work in elevated temperatures. This limitation would typically apply to all contained hot aisles.

Creating a More Comfortable Working Environment

One of the advantages of hot aisle containment is that the overall space remains comfortable, however without the use of products such as Tate's SmartAire T the hot aisle temperature may be elevated above the OSHA limits for continuous work. SmartAire T provides on-demand airflow in the hot aisle to bring the temperature down so that continuous work can be performed.

For a white paper on by-pass air leakage through servers in a contained cold aisle visit: www.tateinc.com/resources/white_papers.aspx

ContainAire Retracting Roof | **ContainAire Hinged & Sliding Doors** | **SmartAire P VAV Damper** | **CRAC Hood**

ContainAire Partitions | **ContainAire Strip Doors** | **SmartAire T Occupancy Control** | **Ceiling Return Grilles**

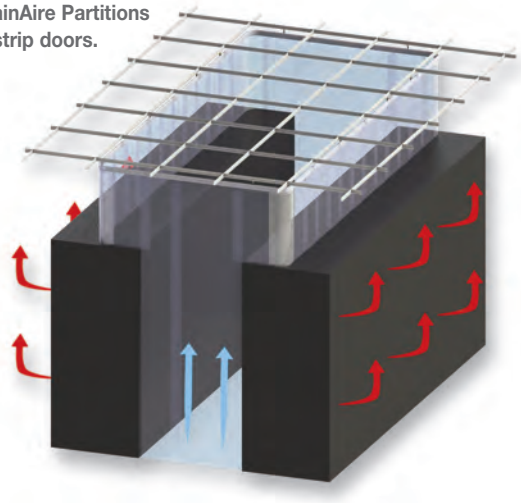
Containment Configurations

Typical Product Sets for Cold and Hot Aisle Containment Systems

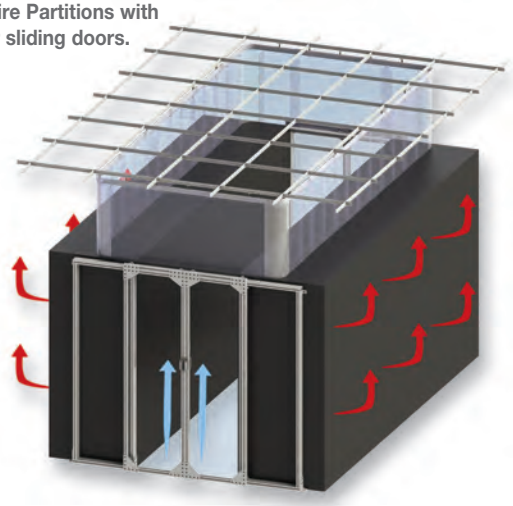
Cold Aisle Containment

A cold aisle containment system can be created using ContainAire Partitions or a Retracting Roof. A retracting roof keeps the cool air closer to the equipment and SmartAire P helps eliminate server airflow leakage. ContainAire partitions can be used around the top of the racks provided there are solid ceiling tiles in place over the aisle.

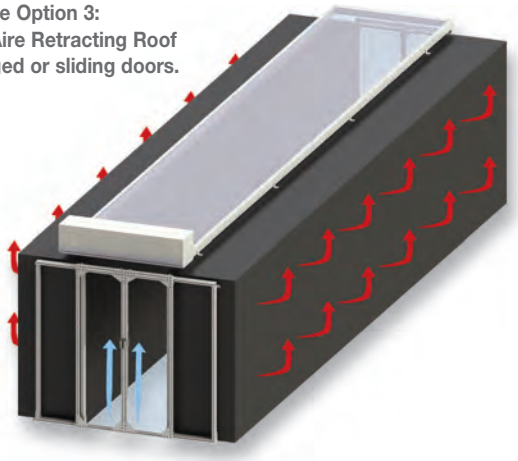
Cold Aisle Option 1: ContainAire Partitions with strip doors.



Cold Aisle Option 2: ContainAire Partitions with hinged or sliding doors.



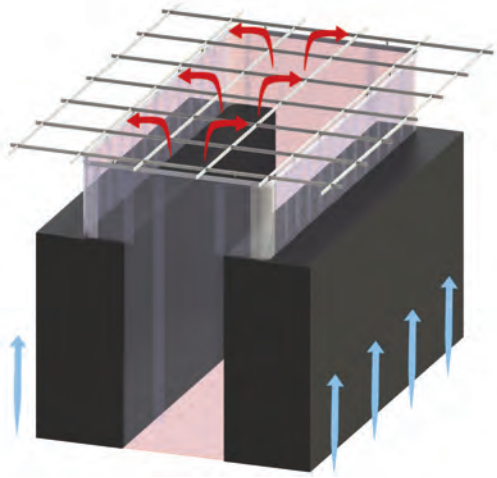
Cold Aisle Option 3: ContainAire Retracting Roof with hinged or sliding doors.



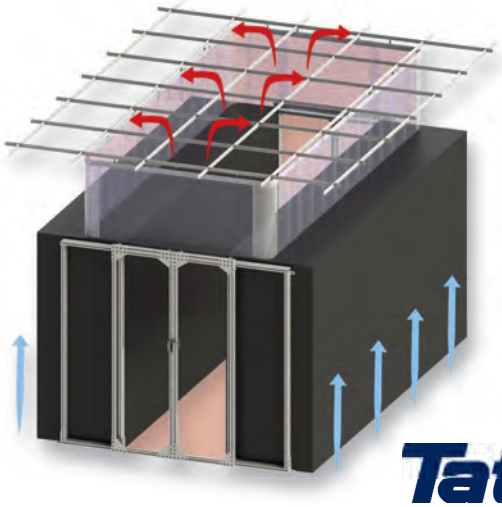
Hot Aisle Containment

A hot aisle containment system will need to use the ContainAire partitions around the top of the racks since the hot air needs to exhaust through the ceiling return grilles. These systems can be used with any door option. SmartAire T is needed to allow for continuous work in a contained hot aisle.

Hot Aisle Option 1: ContainAire Partitions with strip doors and ceiling return grilles.



Hot Aisle Option 2: ContainAire Partitions with hinged or sliding doors and ceiling return grilles.

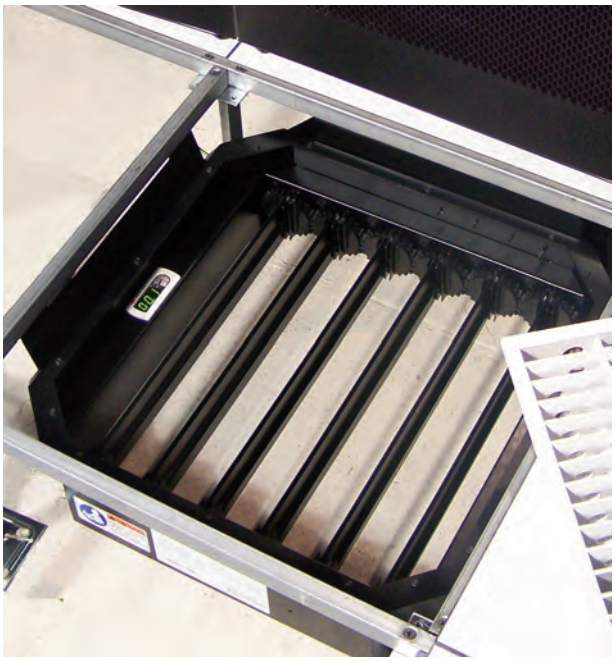


SmartAire P

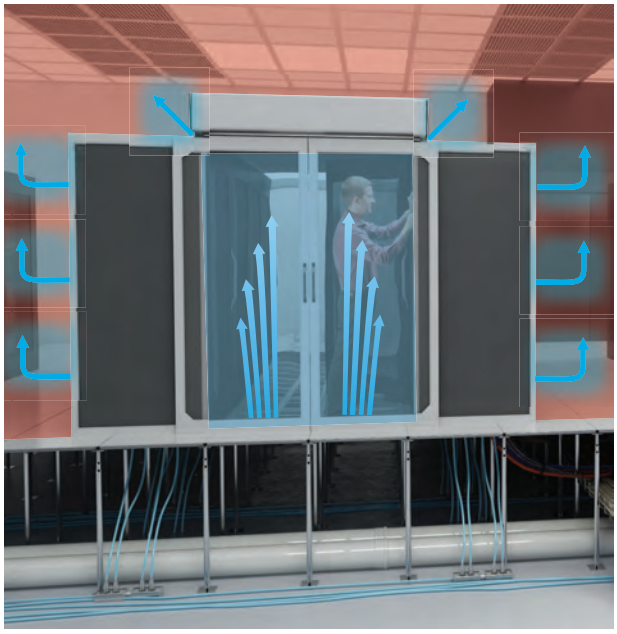
Eliminate Server Leakage in Contained Cold Aisles

SmartAire P or (pressure sensing) variable-air-volume damper is ideal for contained aisles or enclosed racks with equipment that have a variable load profile. Using constant airflow into a contained system with variable loads will waste energy during times of non peak load performance from airflow being forced through spaces around the racks and containment structure. As static pressure builds the air will also be forced through servers even if the fans are idle or off. This wasted energy can be solved with the use of SmartAire P.

By installing SmartAire P under a portion of the airflow panels in the cold aisle the airflow can be varied based on a desired static pressure. When servers enter an idle state they will draw less air from the contained system causing the static pressure in the aisle to increase. The SmartAire P is daisy chained to SmartAire C units for a primary/secondary configuration that will automatically modulate all the dampers in the aisle to control the static pressure to maintain a user defined set point.

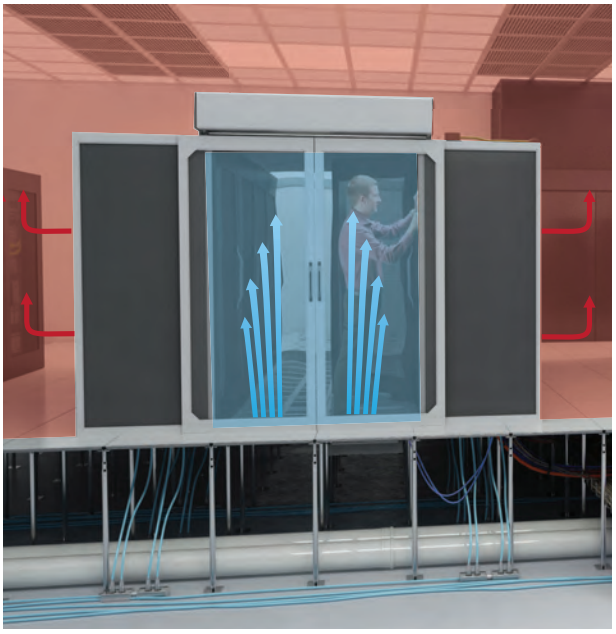


Cold Aisle Containment Air Leakage



Without SmartAire P Dampers in the cold aisle to maintain a neutral static pressure in the cold aisle, conditioned air will leak through idle servers and other gaps in the containment structure.

Cold Aisle Containment with SmartAire P



SmartAire P monitors the static pressure differential from the contained cold aisle to the hot aisle in order to maintain a balance when rack loads vary. This balance reduces bypass airflow through servers, racks and other containment structures.

SmartAire P

Application Example

The example below is based on the adjacent diagram.

Given:

A customer has a contained cold aisle using Tate's Retracting Roof and sliding aisle end framed doors. The customer initially equipped the aisle with DirectAire panels, and is operating on a raised floor with a static pressure of 0.05". Each DirectAire panel provides 1844 CFM, resulting in a total airflow supply of 36,880 CFM. During peak load the IT equipment draws approximately 32,000 CFM, but during idle conditions, the total draw is only 20,000 CFM. The current design will bypass approximately 16,880 CFM of air during idle conditions through a combination of leakage through the containment system, through the racks themselves, and through the IT hardware. The customer would like to keep a constant static pressure relative to the outside space of 0.01" maximum to minimize bypass air.

Solution:

Determine how many airflow panels should have their flow controlled by the SmartAire P units. Given that each DirectAire flows 1844 CFM without the SmartAire P installed, 1590 CFM when the SmartAire P is installed and 100% open and 204 CFM when SmartAire P is closed, we can determine the required number of units. The minimum airflow required during idle conditions is 20,000 CFM. Based on the data in the DirectAire/SmartAire chart, we will need 10 DirectAire panels without SmartAire units and 10 with SmartAire units to supply the minimum requirement. As a secondary check, we must determine if sufficient airflow will be available during peak conditions.

Minimum Airflow:

10 x DirectAire's at 1844 CFM each = 18,440
10 x DirectAire's with SmartAire P or C at 0% = 2,040
Total minimum flow = 20,480 CFM

Maximum Airflow:

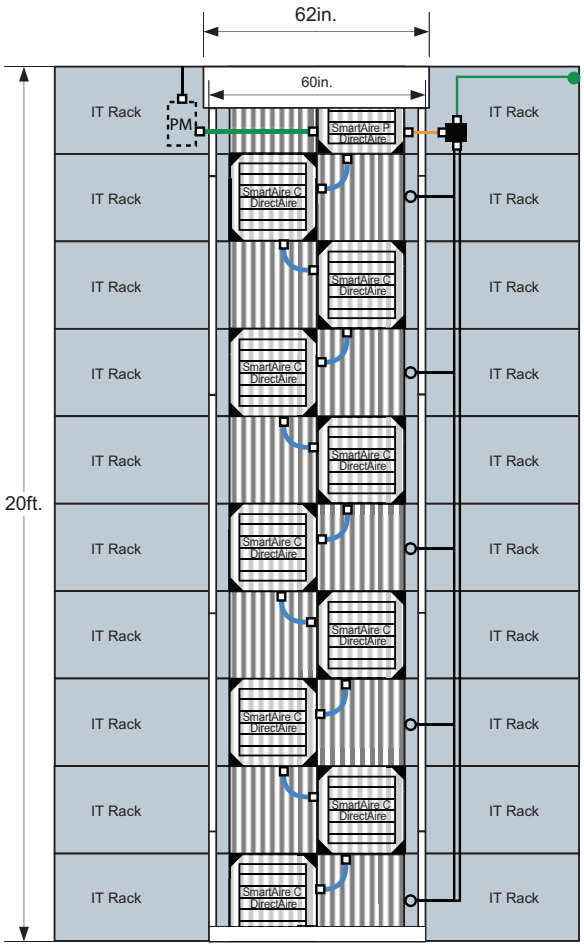
10 x DirectAire's at 1844 CFM each = 18,440
10 x DirectAire's with SmartAire P or C at 100% = 15,900
Total CFM available peak = 34,340 CFM

The required bill of material:

20–DirectAire Airflow Panels
1–SmartAire P (SA-P)
9–SmartAire C (SA-C)
1–16 Power Module (PM)
10–4' Power Cable

Airflow of DirectAire & SmartAire P Paired with DirectAire

Static Pressure	DirectAire (CFM)	SmartAire P (CFM @ 100%)	SmartAire P (CFM @ 0%)
0.02	1151	1018	126
0.04	1626	1426	181
0.05	1844	1590	204
0.06	2007	1738	224
0.08	2318	1998	260
0.10	2594	2226	292
0.12	2823	2432	321
0.14	3027	2620	347
0.16	3217	2795	372
0.18	3378	2960	396
0.20	3433	3114	417

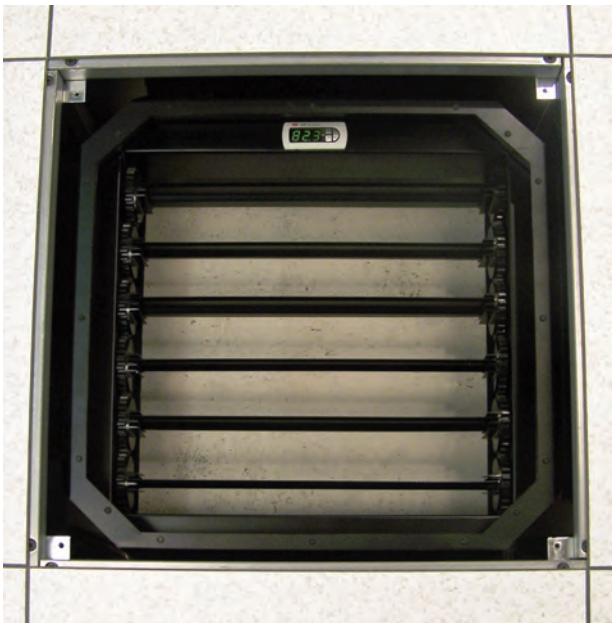


SmartAire T

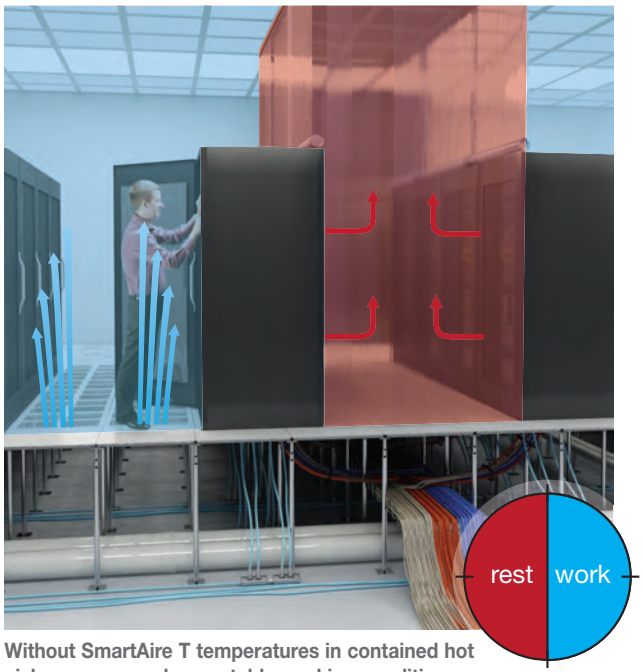
Increase Productivity with Longer Access to Hot Aisle Containment Systems

SmartAire T is designed to provide IT technicians the ability to control the temperature of the hot aisle when access to service equipment is required. Before the tech enters the hot aisle the units are activated by a user supplied trigger. Once powered on the units allow cool plenum air to enter the hot aisle until the predetermined safe working temperature is established. Once the temperature is reached the tech can comfortably work in the contained aisle without breaks until they have completed thier tasks, the SmartAire T units will maintain this temperature until the units are deactivated by the technician.

OSHA exposure limits for working environments indicate a certain ratio of rest and work when working in high temperatures. These regulations may suggest periods of rest that limit the amount of time a person can work. Further to the limitations provided by OSHA it is important to create a comfortable working environment as some individuals may have a lower tolerance to heat. By using SmartAire T daisy chained to SmartAire C units in a primary/secondary configuration all the dampers in the aisle will automatically modulate together to quickly reduce the temperature allowing for maximum productivity by all employees.

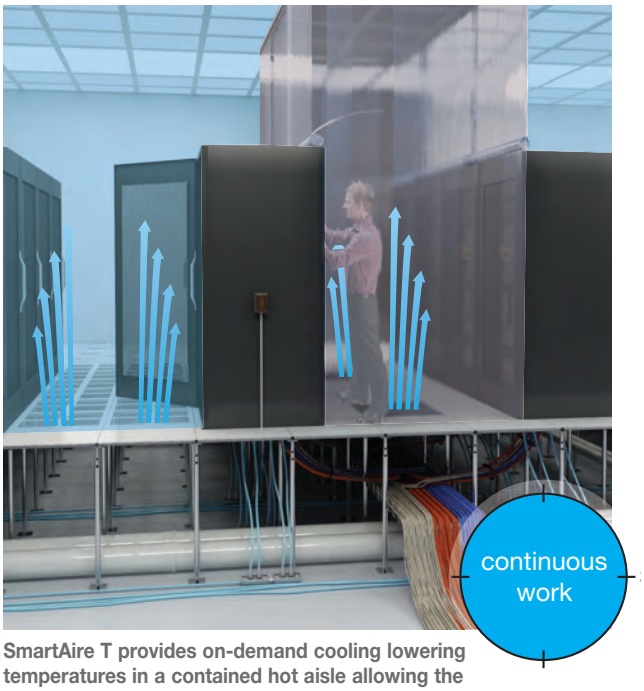


Containment Limits Time Spent in the Hot Aisle



Without SmartAire T temperatures in contained hot aisles can exceed acceptable working conditions and limit the amount of time a technician can safely work on equipment in the aisle.

Work Continuously in the Hot Aisle with SmartAire T



SmartAire T provides on-demand cooling lowering temperatures in a contained hot aisle allowing the technician to safely work on equipment in the aisle for an extended period of time.

SmartAire T

Application Example

OSHA Exposure Limits for Working Environment Temperature*			
Work/Rest Ratio (hourly)	Light Work (Max WBGT)	Moderate Work (Max WBGT)	Heavy Work (Max WBGT)
Continuous	86F/30C	80F/26.7C	77F/25C
45 Minutes Work - 15 Minutes Rest	87F/30.6C	82F/27.8C	78F/25.6C
30 Minutes Work - 30 Minutes Rest	89F/31.7C	85F/29.4C	82F/27.8C
15 Minutes Work - 45 Minutes Rest	90F/32.2C	88F/31.1C	86F/30C

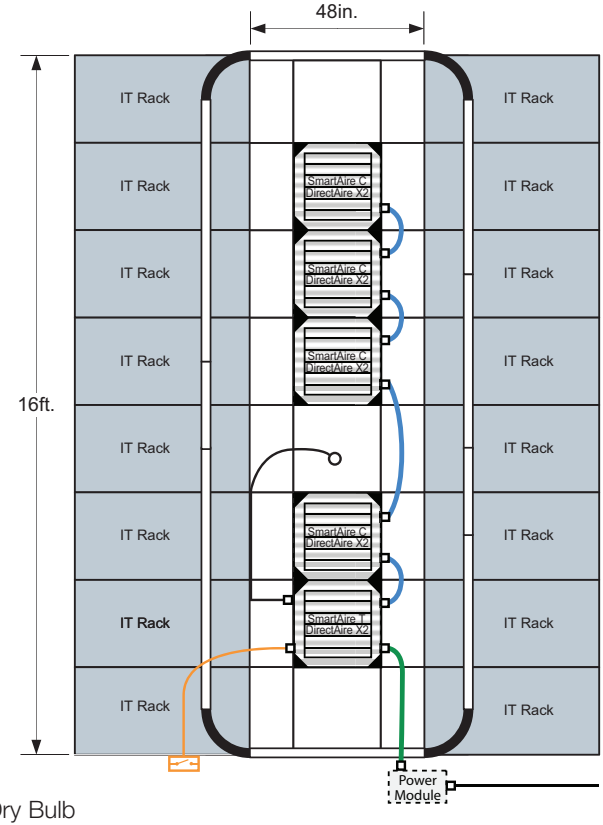
**OSHA Technical Manual Section III: Chapter 4*

Airflow SmartAire T / DirectAire		
Static Pressure	SmartAire T (CFM@100%)	SmartAire T (CFM@0%)
0.02	945	51
0.04	1313	73
0.06	1592	91
0.08	1824	106
0.10	2026	119

The example below is based on the adjacent diagram.

Given:

The two rows of IT equipment are equipped with hot aisle containment. Each rack has an installed load of 9kW, for a total pod load of 144kW. The hot air from the servers entering the contained hot aisle is 115.5F DB / 75.2 WB. The total air volume entering the aisle is 797 CFM per rack, or a total of 12,752 CFM. The underfloor air temperature is 80.0F DB / 65.8 WB at 0.10" of H2O static pressure. The current WBGT without using the SmartAire T is calculated to be 87.3F. (WBGT = 0.7 x 75.2 + 0.3 x 115.5 = 87.3) The user would like to allow for continuous moderate work.



Solution:

A simple ratio of the dry bulb temperatures can be used to determine the total CFM required to be delivered into the hot aisle to bring the temperature below the threshold required by OSHA. Continuous work requires a WBGT of less than 80F due to the moderate work load expected in the hot aisle. To solve for this, we create the following:

Equation For Data Centers: WBGT = 0.7 x Wet Bulb + 0.3 x Dry Bulb

$$80°F\ WBGT = 0.7 \times \left(75.2° \times \frac{(12752\ CFM)}{Total\ CFM} + 65.8° \frac{Total\ CFM - 12752\ CFM}{Total\ CFM}\right)$$

$$+ 0.3 \times \left(115.5° \times \frac{(12752\ CFM)}{Total\ CFM} + 80.0° \frac{Total\ CFM - 12752\ CFM}{Total\ CFM}\right)$$

Solving for the equation above, we find that the total CFM required to be delivered into the hot aisle is 22,104 CFM. Of this, only 9,352 CFM is required from the SmartAire T units, given the 12,752 CFM from the servers. The airflow chart above shows that we need five SmartAire T's to reach the 80° WBGT in this example making the bill of materials:

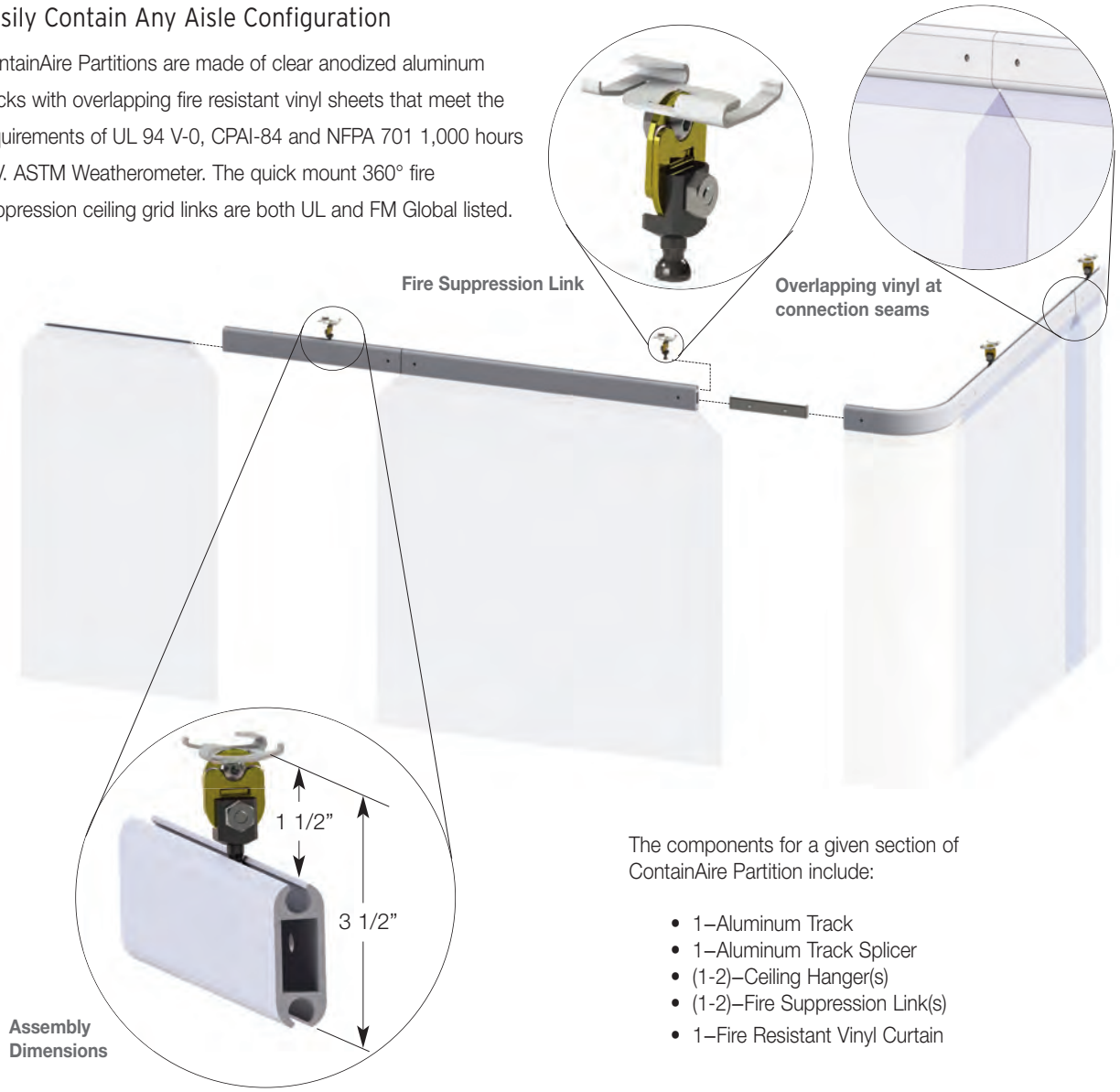
1–SmartAire T
4–SmartAire C
5–DirectAire X2 Airflow Panels
1–16 Power Module
5–6' Power Cable

The user would be required to provide the hot aisle entrance signal, in this case a latching entrance switch has been chose to signal to the SmartAire T to begin temperature control of the hot aisle.

ContainAire Partitions

Easily Contain Any Aisle Configuration

ContainAire Partitions are made of clear anodized aluminum tracks with overlapping fire resistant vinyl sheets that meet the requirements of UL 94 V-0, CPAI-84 and NFPA 701 1,000 hours U.V. ASTM Weatherometer. The quick mount 360° fire suppression ceiling grid links are both UL and FM Global listed.



The components for a given section of ContainAire Partition include:

- 1–Aluminum Track
- 1–Aluminum Track Splicer
- (1-2)–Ceiling Hanger(s)
- (1-2)–Fire Suppression Link(s)
- 1–Fire Resistant Vinyl Curtain

The ContainAire Partitions come in pre-packaged sections which must be ordered to meet the dimensions of your specific aisle containment need. A typical order would include a number of sections to match the length and height of a given aisle, and four corners.

Partitions come in sizes based on two measurements: Vinyl drop-down heights, and horizontal track lengths. Note that the additional 3.5” of height of the track and hanger are not listed the dimensions below.

ContainAire Partition Product Selection Chart

Vertical Length of Vinyl	Horizontal Track Length						
	1'	2'	3'	4'	5'	6'	1’x1’ Corners
25.5"	CA255x01	CA255x02	CA255x03	CA255x04	CA255x05	CA255x06	CACOR255
52.5"	CA525x01	CA525x02	CA525x03	CA525x04	CA525x05	CA525x06	CACOR525
94.5"	CA945x01	CA945x02		CA945x04			CACOR945
106.5"	CA1065x01	CA1065x02		CA1065x04			CACOR1065
118.5"	CA1185x01	CA1185x02		CA1185x04			CACOR1185
142.5"	CA1425x01	CA1425x02		CA1425x04			CACOR1425
178.5"	CA1785x01	CA1785x02		CA1785x04			CACOR1785

ContainAire Partitions

The Example below is based on the adjacent diagram.

Given:

Two rows of 8 racks each forming an aisle; one row is comprised of 8 - 24" wide x 8' tall racks while the other row is comprised of 8 - 24" wide x 7' tall racks. There is a 4' cold aisle between the two racks, and you would like to use ContainAire Partitions to seal the area over the racks.

Solution:

Multiple parts will need to be specified, 4 corners and enough sections of horizontal track to fill the containment space above the racks. First the height between the racks and the ceiling should be measured. In our example we have the following:

49" above the 8' row of racks and 61" above the 7' row of racks.

To fill the partition space above the 8' racks the vinyl curtain would need to be a minimum: 49" – 3.5" (hanger & track) = 45.5". After consulting the chart 52.5" is the next largest size and therefore the length required to fill the containment space. After looking at the 7' row of racks it can be determined that the 94.5" height is required. (61"-3.5" = 57.5")

Note: Tate recommends ordering lengths that are a minimum of 3-6 inches longer than required.

For cases in which the rack heights are uneven in a single row you should always select the vinyl length of the partition based on the distance from the shortest rack to the ceiling for that section of horizontal track.

We can also select our corners based on the dimensions above. We will need four: two for each size for each end of the racks.

The next thing to determine is the length and quantity of track required. After measuring our row of racks we can see that the row is a total of 16' long. As the corners are each 1' x 1' we can subtract 2' from our 16' length resulting in 14' of horizontal track length for both rows.

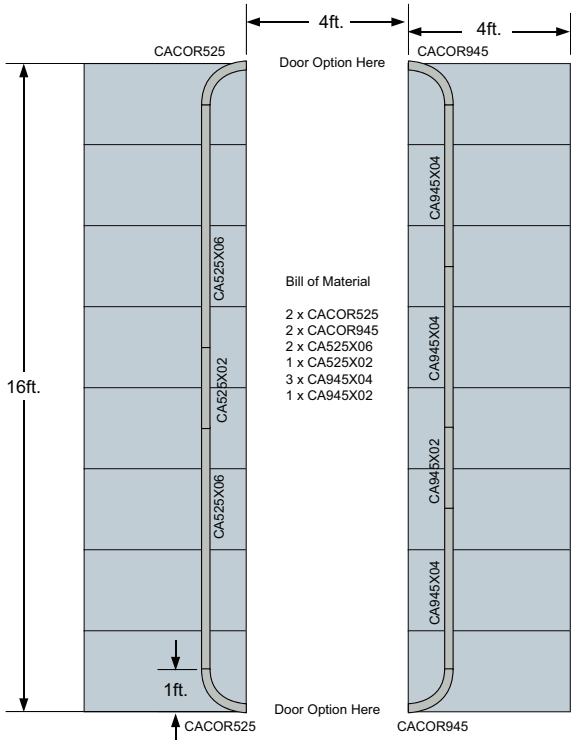
For our example, on the 8' row of racks to meet 14' of horizontal track at 52.5", the order will be:

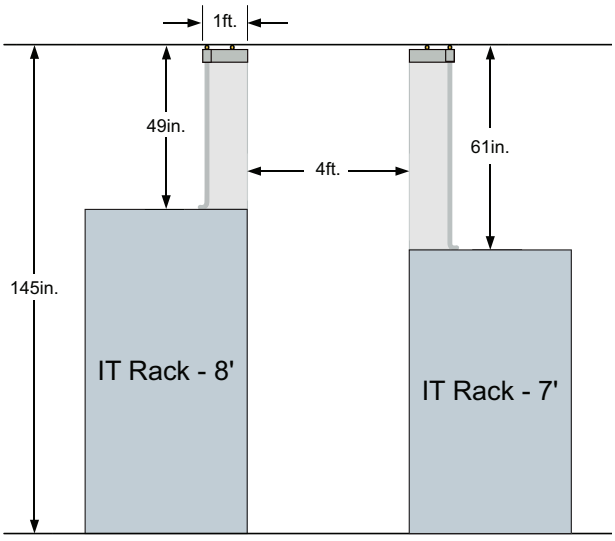
2–CA525X06 (6' x 52.5") and 1–CA525X02 (2' x 52.5")

However, for the 7' row of racks to meet 14' of horizontal track at 94.5" no 6' track lengths are available so the order will be:

3–CA945X04 (4' x 94.5") and 1–CA945X02 (2' x 94.5")

ContainAire Partition Row Layout





Note: Although you may choose any combination of track lengths to add up to your total horizontal row length, it is recommended you use the minimal number of track lengths possible to reduce costs, improve ease of installation and reduce potential air leakage at each seam. It is important to ensure that the overall partition track length is greater than or equal to the total row length measured.

ContainAire Strip Doors

ContainAire strip doors are made of clear anodized aluminum tracks with overlapping fire resistant vinyl sheets that meet the requirements of UL 94 V-0, CPAI-84 and NFPA 701 1,000 hours U.V. ASTM Weatherometer. The quick mount 360° fire suppression ceiling grid links are both UL and FM Global listed.

The components for a given ContainAire Strip Door include:

- 1–Aluminum Track
- 1–Aluminum Track Splicer
- (1-2)–Ceiling Hanger(s)
- (1-2)–Fire Suppression Link(s)
- (1-6)–Fire Resistant Vinyl Strip Door(s)

The ContainAire Strip Doors come in pre-packaged sections which must be ordered to meet the dimensions of your specific aisle containment need. However unlike the Partitions, a typical order should only require one model number. Strip Doors come packaged with the proper number of 1' vinyl strip to fill the horizontal track length at a specified height.

Strip Door

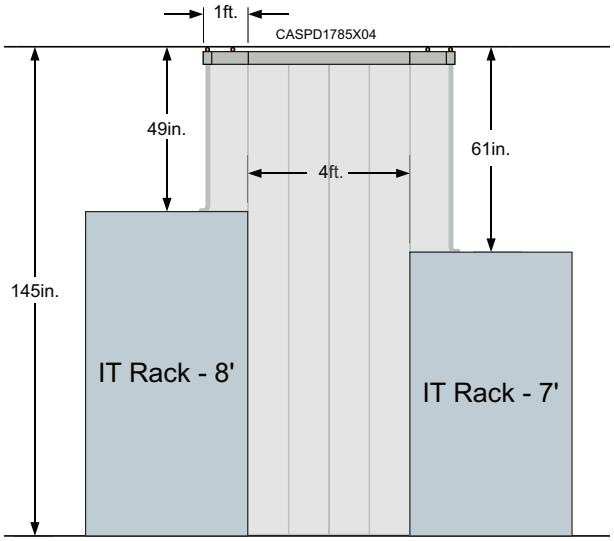
ContainAire Strip Door Product Selection Chart

Vertical Length of Vinyl	Horizontal Track Length					
	1'	2'	3'	4'	5'	6'
96"	CASPD960x01	CASPD960x02	CASPD960x03	CASPD960x04	CASPD960x05	CASPD960x06
106.5"	CASPD1065x01	CASPD1065x02	CASPD1065x03	CASPD1065x04	CASPD1065x05	CASPD1065x06
118.5"	CASPD1185x01	CASPD1185x02	CASPD1185x03	CASPD1185x04	CASPD1185x05	CASPD1185x06
142.5"	CASPD1425x01	CASPD1425x02	CASPD1425x03	CASPD1425x04	CASPD1425x05	CASPD1425x06
178.5"	CASPD1785x01	CASPD1785x02	CASPD1785x03	CASPD1785x04	CASPD1785x05	CASPD1785x06

The example below is based on the adjacent diagram.

Given:

Two rows of 8 racks each forming an aisle; one row is comprised of 8 x 8' racks while the other row is comprised of 8 x 7' racks. There is a 4' hot or cold aisle between the two rows and you would like to use ContainAire Strip Doors as the aisle end containment components.



Solution:

Based on a 4' (48") cold aisle and a total height of 145", the appropriate Strip Doors for both ends of the aisle are the 4' length, 178.5" height models (2–CASPD1785X04).

Note: When sizing your height, remember to note that an additional 3.5" of height of the track and hanger are not listed in the dimensions above.

Always select the height greater than that of the space you are trying to contain. Excess door can be trimmed or folded over. It is recommended that strip doors be cut even with the floor as to prevent a trip hazard.

ContainAire Framed Doors with Partitions

Shown Below with Sliding Doors

ContainAire framed door systems are available in hinged or sliding access styles. Both designs feature no bottom threshold to prevent tripping. Available with custom locks and stays each design can be installed to open from the left, right or centered double sliding door option. The frame is made of clear or black anodized aluminum and a clear center panel consisting of rigid acrylic materials.

All ContainAire Sliding Doors are 89” Width x 80” Tall. Handedness is best described as the side of the door that the handle is located when viewed from outside of the aisle, the door will then slide away from the side the handle is located. In a given rack it may be necessary to purchase additional ContainAire Partitions to fill the space above the door. It may also be necessary to purchase additional ContainAire Extension Walls if the aisle width exceeds 89”. It is important to not leave any area of the aisle end uncovered as air leakage will drastically reduce effectiveness.

ContainAire Framed Door Product Selection Chart

	Left Handed	Right Handed	2-Split Center	24" extension
Sliding Clear Anodized	CASLD89x80LC	CASLD89x80RC	CASLD89x80CC	CCAEW24X80C
Sliding Black Anodized	CASLD89x80LB	CASLD89x80RB	CASLD89x80CB	CCAEW24X80B
Hinged Clear Anodized	CASD56x80LC	CASD56x80RC	-	CCAEW24X80C
Hinged Black Anodized	CASD56x80LB	CASD56x80RB	-	CCAEW24X80B

The Example below is based on the adjacent diagram.

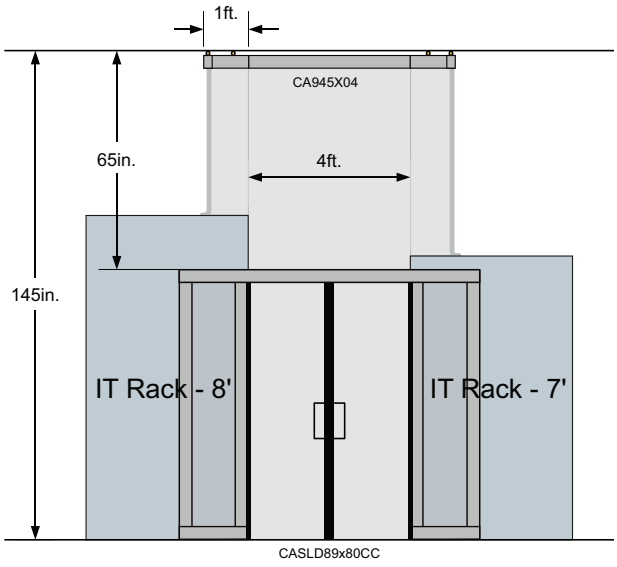
Given:

Two rows of 8 racks each forming an aisle; one row is comprised of 8 x 8’ racks while the other row is comprised of 8 x 7’ racks. There is a 4’ hot or cold aisle between the two rows and you would like to use 2-Split Center ContainAire Sliding Doors as the aisle end containment components.

Solution:

As the aisle width is not so great as to require an extension panel, only centered, clear anodized Sliding Doors (2–CASLD89X80CC) are required for both ends of the aisle.

Looking at the vertical height to the ceiling a 145” height needs to be filled; our Sliding Door will make up 6’-8” (80”) of that length. The additional 65” will need to be filled with a ContainAire Partition. Looking at the partition selection chart, we see that two 94.5” high x 4’ long (2–CA945x04) will be required to seal above the doors on each end of the aisle.

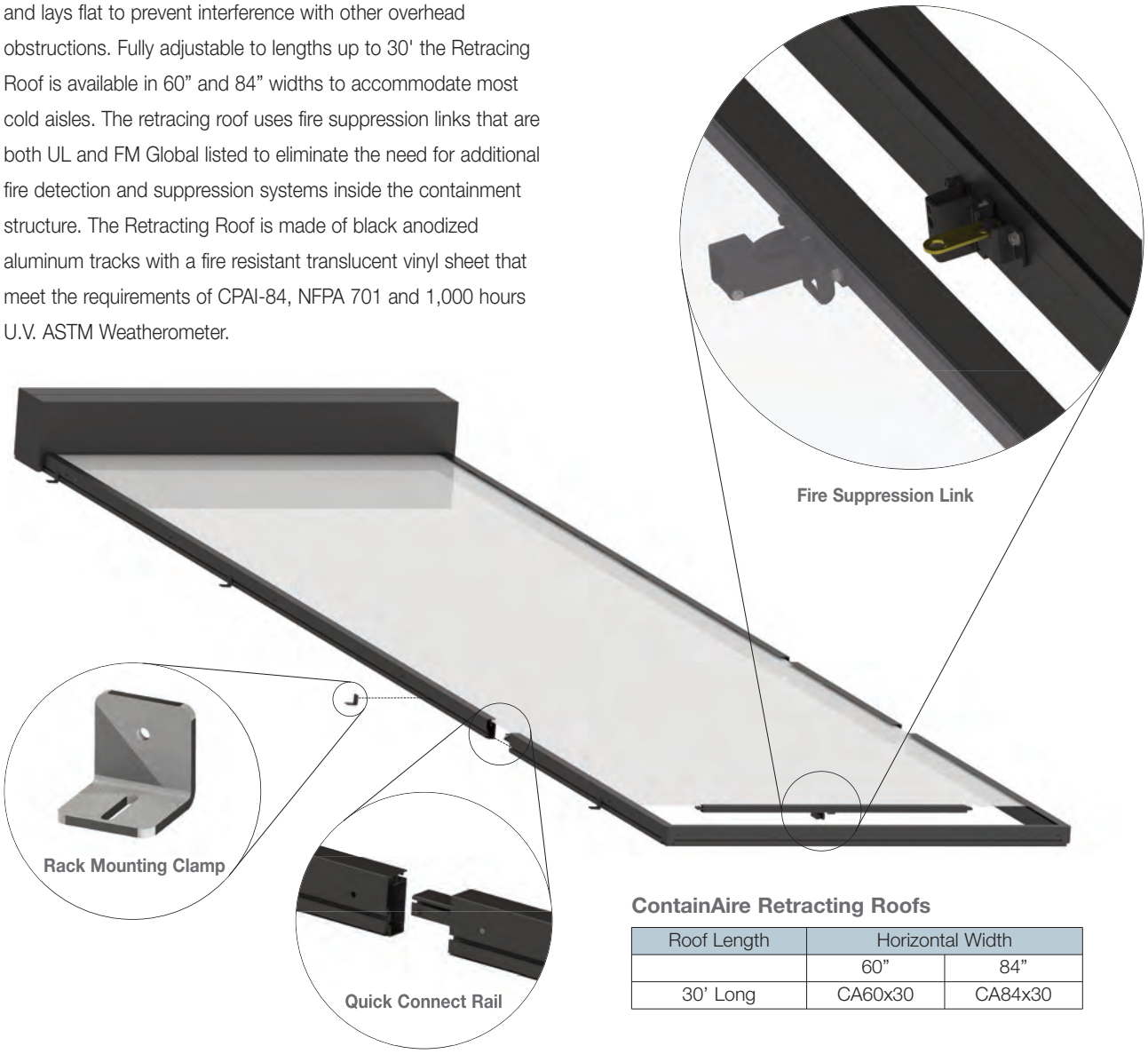


Note: The same instructions would be followed for Hinged doors using part numbers from the ContainAire Framed Door Product Selection Chart.

ContainAire Retracting Roof

Retracting Roofs

The ContainAire Retracting Roof attaches to the top of the racks and lays flat to prevent interference with other overhead obstructions. Fully adjustable to lengths up to 30' the Retracing Roof is available in 60” and 84” widths to accommodate most cold aisles. The retracing roof uses fire suppression links that are both UL and FM Global listed to eliminate the need for additional fire detection and suppression systems inside the containment structure. The Retracting Roof is made of black anodized aluminum tracks with a fire resistant translucent vinyl sheet that meet the requirements of CPAI-84, NFPA 701 and 1,000 hours U.V. ASTM Weatherometer.



ContainAire Retracting Roofs

Roof Length	Horizontal Width	
	60”	84”
30’ Long	CA60x30	CA84x30

All ContainAire Retracting Roofs come packaged to reach a maximum of 30 feet in length. Given a cold aisle of less than 30 feet it is possible to remove rails at quick connect points in 5’ (60”) segments. Rails can be cut down in the field to meet aisle lengths with more precision. Although the maximum length a single Retracting Roof can reach is 30 feet, roofs can be installed either end to end or more aesthetically mirrored from opposing ends of an aisle. It is important to not leave any length of aisle uncovered as air leakage will drastically reduce effectiveness.

The components for a ContainAire Retracting Roof include:

- 1–Aluminum Housing
- 1–ESD/ Fire Resistant Vinyl Roof
- 5–Side Rails
- 5–Sliding Rails
- 2–End Rails
- 1–UL/FM Fire Suppression Link
- 1–Rope Ratchet

ContainAire Retracting Roof

The example below is based on the adjacent diagram.

Given:

There are two rows of 20 x 2’ racks forming a 40’ long aisle. Each rack is 8’ high and there is a 4’ cold aisle between the two rows. You would like to use ContainAire Retracting Roof for the vertical containment component.

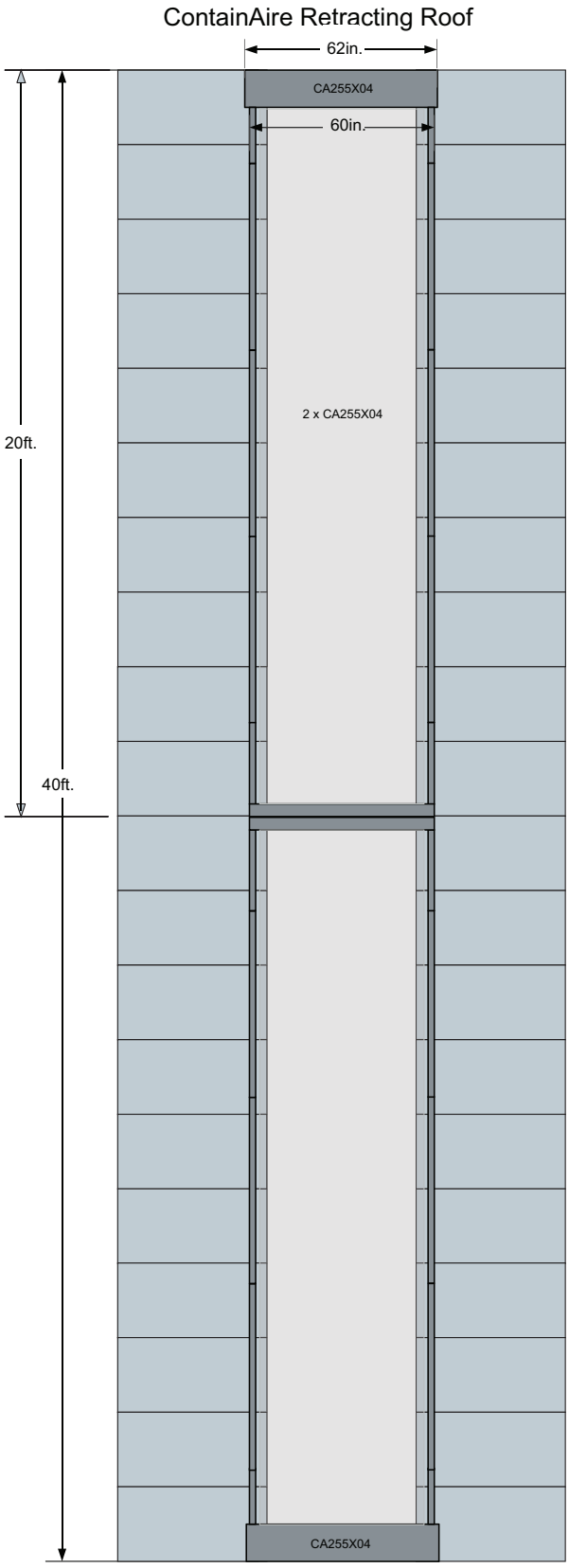
Solution:

Based on a 4’ (48”) cold aisle, the appropriate size retracting roof would be the 60” wide model (CA60X30). Given a 40’ long aisle, a single retracting roof will be unable to meet the total length, it is suggested you order two (2–CA60X30) to be installed opposite of one another on opposing ends of the aisle. On each of these roofs, two 5’ quick connect rails will be removed to installed 2 x 20’ length roofs for a 40’ total length therefore the order would be:

2–CA60X30

Note: The ContainAire Retracting Roof is most applicable in cold aisle configurations with typical rack heights on both sides of the aisle.

If one or more racks are either missing or of a lower height, it is suggested a ContainAire partition kit be purchased and slide into an existing track on the retracting roof to eliminate air leakage.



ContainAire Framed Doors with Retracting Roof

Shown Below with Hinged Doors

vContainAire framed door systems are available in hinged or sliding access styles. Both designs feature no bottom threshold to prevent tripping. Available with custom locks and stays each design can be installed to open from the left or right with a double sliding door design option available. The frame is made of clear or black anodized aluminum and a clear center panel consisting of rigid acrylic materials.

All ContainAire Hinged Doors are 56" Wide x 80" High with a 36" wide swinging door. Handedness is best described as the side of the door that the handle is located when viewed from outside of the aisle, on the opposite is the hinge and all doors swing outward. In a given rack it may be required to purchase an additional ContainAire Partition if the racks exceed the 80" height or if a ContainAire Partition is being used with the Hinged Door. It is important to not leave any area of the aisle uncovered as air leakage will drastically reduce effectiveness.

Hinged Door

ContainAire Framed Door Product Selection Chart

	Left Handed	Right Handed	2-Split Center	24" extension
Sliding Clear Anodized	CASLD89x80LC	CASLD89x80RC	CASLD89x80CC	CCAEW24X80C
Sliding Black Anodized	CASLD89x80LB	CASLD89x80RB	CASLD89x80CB	CCAEW24X80B
Hinged Clear Anodized	CASD56x80LC	CASD56x80RC	-	CCAEW24X80C
Hinged Black Anodized	CASD56x80LB	CASD56x80RB	-	CCAEW24X80B

The example below is based on the adjacent diagram.

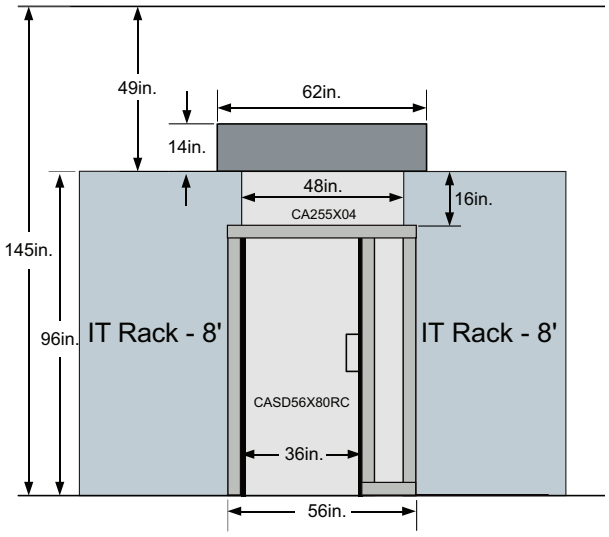
Given:

There are two rows of 20 x 2' racks forming a 40' long aisle. Each rack is 8' high and there is a 4' cold aisle between the two rows. A ContainAire Retracting Roof has been used for the vertical containment and you would like to install right handed, clear anodized Hinged Doors as the aisle end containment components.

Solution:

As the Aisle width is not so great as to require an extension panel, only right handed, clear anodized Hinged Doors (2–CASD56x80RC) are required.

Looking at the vertical height to the Retracting Roof an 8' (96") height needs to be filled; our Hinged Door will make up 6'-8" (80") of that length. The additional 16" will need to be filled with a ContainAire Partitions. Looking at the partition selection chart, we see that the 25.5" high x 4' long (2–CA255x04) will be required. The vinyl can then be slid into the slot in the bottom of the Retracting Roof.



Note: The same instructions would be followed for Sliding doors using part numbers from the ContainAire Framed Door Product Selection Chart.

CRAC Hood

For use with all Hot Aisle Containment Systems

Improve CRAC Unit Efficiency

The Tate CRAC Hood is a custom fabricated ceiling return extension that connects the top of the CRAC unit directly to a ceiling return plenum increasing cooling capacity and efficiency by channeling hot exhaust air directly into the CRAC unit.

The components for a CRAC hood include:

- 2–End of hood with or without door option
- 2–Side of hood
- 100–Self tapping Screw, 12-24, 0.5" L Coated stell hex washer head

The CRAC Hood can be ordered to any dimensions necessary for proper installation.

The example below is based on the adjacent diagram.

Given:

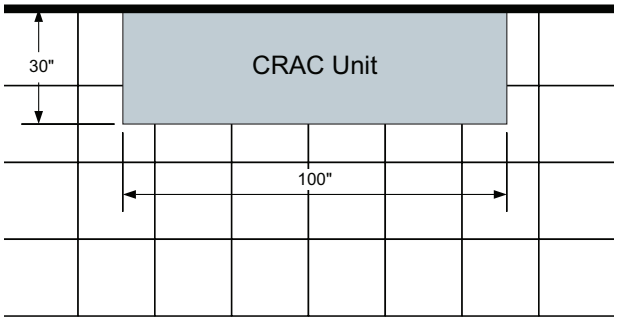
The CRAC unit is a standard dimension of 105” Tall by 100” wide and 30” deep. the ceiling hight from the floor to the drop ceiling is 145”. The CRAC Hood orders for this particular unit would be:

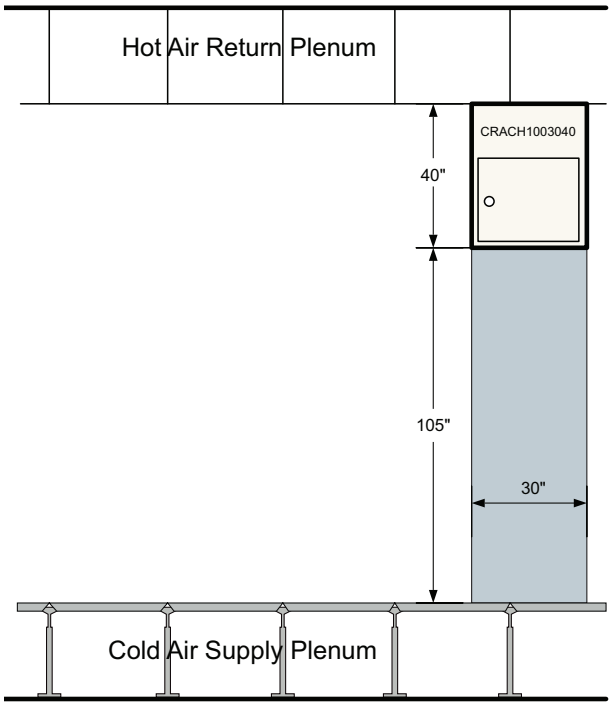
CRACH1003040- 100” wide, 30” deep, and 40” high.

Another example part number for a different dimension would be:

CRACH973736- 97” wide, 37” deep, and 36” high.

CRAC Hood





Additional Containment Products by Tate

Snap-In Modular Blanking Panels

Tate's Snap-In Modular Blanking Panels are the best way to eliminate the migration of hot and cold air through unoccupied areas of an IT equipment rack. This innovative 19" wide snap-in blanking panel is designed to fit in most standard racks. Ergonomicly designed for simple tool free installation the Snap-In Modular Blanking panels are available in prefabricated sizes designed to fill One or Two U openings these panels provided a 99.97% effective seal. The blanking panels are also available with a quick view temperature strips that display a temperature range from 50°- 102° F.

1U & 2U Snap-In Modular Blanking Panels

Blanking Panel Product Selection Chart

Product Type	Height	
	1U	2U
w/o Temp Strip	TSBP1U	TSBP2U
with Temp Strip	TSBP1UT	TSBP2UT

Rack Shield

The Tate Rack Shield isolation system is designed to capture subfloor supply and dedicate it to the IT equipment thermal load. The Rack Shield ensures that cold supply air will not spill across the raised floor. Available in 3 standard widths the 80" tall by 24" deep shields are designed to be placed directly over an airflow panel in front of a standard IT hardware rack. The frame is made of clear anodized aluminum resting on heavy duty casters and a clear viewing panel consisting of rigid acrylic materials.

Rack Shield Product Selection Chart

Depth	Width		
	24"	48"	72"
24"	RS242480	RS244880	RS247280

In-Ceiling High Volume Return Grille

Tate's In-Ceiling high volume return grilles are ideal for use with the partition system in a hot aisle configuration. With 81% open area the grilles are available in 24" square and 24"x48" to fit in most standard ceiling systems.

Return Grille

Return Grille Product Selection Chart

Width	Length	
	24"	48"
24"	HARG2424	HARG2448

24" wide Rack Shield

Additional Containment Products by Tate

Velocity Adjustor

Tate's In-Floor Velocity Adjustor is designed to eliminate low pressure in the subfloor supply by controlling airflow velocity. This device is only needed when using CRAC/CRAH units with internal or above floor fans. EC and other below floor mounted fans deliver air in a 360° pattern to avoid directionality therefore stabilizing underfloor static pressure.

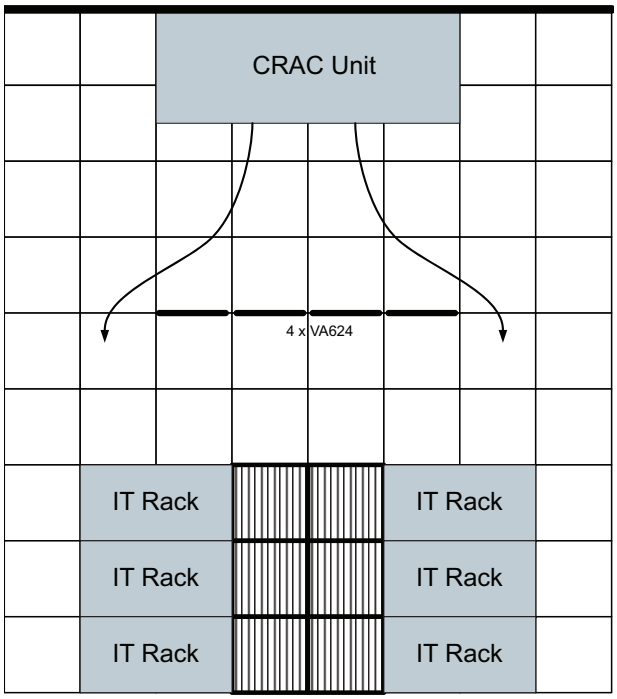
Made of fire proof Sandel Fabric the Velocity Adjustor requires no tools to assemble and installs in the subfloor between raised floor pedestals. Careful placement is a must so as to properly affect the air stream and to ensure product longevity.

The size and number of Velocity Adjustors should be selected based on the width of the CRAC unit discharge and half of the depth of the access floor.

For Example: If you have a 8' CRAC, and a 12" deep Access Floor, (4–VA624) would be required. (see adjacent figure)

All In-Floor Velocity Adjustors come in black fireproof material. The In-floor Velocity Adjustor should be installed no closer than 4' from the AC unit discharge. The preferred distance is between 5' to 8'.

Velocity Adjustor



Velocity Adjustor Product Selection Chart

Width	Vertical Height			
	6"	12"	18"	24"
24"	VA624	VA1224	VA1824	VA2424

Additional Data Center Products

Visit www.tateinc.com for more information

SmartAire

VAV damper to automatically control airflow at the rack level improving energy efficiency.

DirectAire

68% open area all steel panel that angles airflow directly to the face of the rack.

PowerAire

Fan assisted airflow at the rack level for handling extremely high & diverse heat loads.

Tate KOLDLOK

Superior floor mounted cutout air seal for wires cables and other penetrations.

Tate®

Corporate Headquarters:
7510 Montevideo Road, Jessup, MD 20794
Tate Hotline: 1-800-231-7788
Tel: 410-799-4200 Fax: 410-799-4207

Production Facilities:
7510 Montevideo Road, Jessup, MD 20794
52 Springvale Road, Red Lion, PA 17356

tateinc.com
kingspan.com

International Sales & Support Office:
169 Jalan Jurong Kechil
#7-011, Sherwood
Singapore 598669
Tel: 65-6468-1332 Fax: 65-6468-6681

tateglobal.com
kingspan.com

Tate Access Floors, Inc. components are proudly made in the U.S.A.

Tate asp ACCESS FLOORS

Canadian Office & Production Facilities:
880 Equestrian Court, Oakville, ON L6L 6L7 Canada
Tate Hotline: 1-800-231-7788
Tel: 905+847-0138 Fax: 905+847-0141

tateasp.com
kingspan.com

For a white paper on by-pass air leakage throug servers in a contained cold aisle visit:
http://www.tateaccessfloors.com/resources/white_papers.aspx

A member of Kingspan®

Our manufacturing supports wind power
renewablechoice.com