

CONTAINAIRE™
APPLICATIONS GUIDE

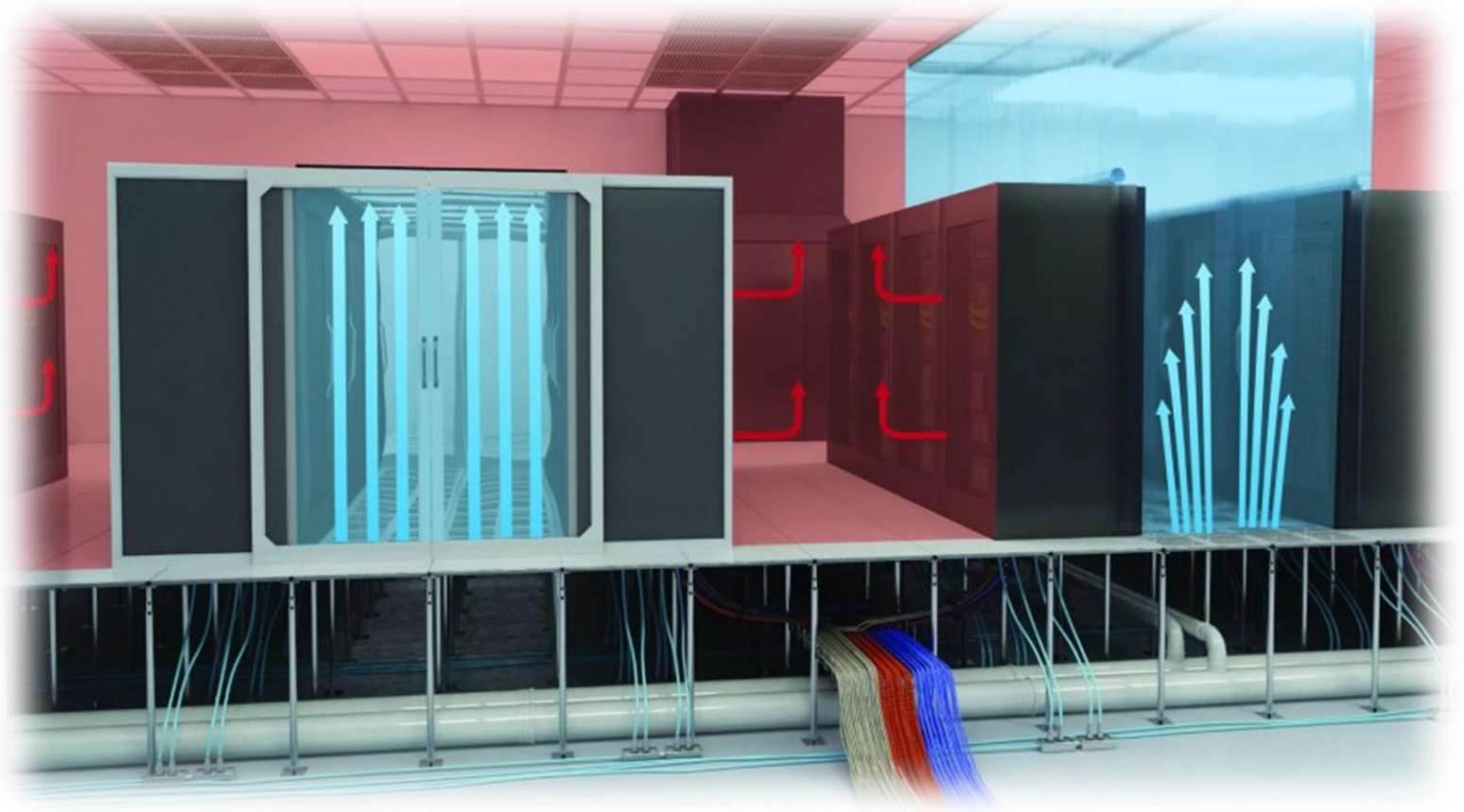


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Introduction

Thank you for your interest in Tate ContainAire products. We have written this application guide to inform our customers and partners on available options and to guide them through future job-walks and estimates.

This document is divided into sections based on product category. Each section has a problem-set, where a model data center is provided and where we describe how to apply the product, given the unique dimensions of the data center. We explain our decision making process throughout the document, as we specify dimensions and describe installation considerations for each component.

Though it's not possible to account for all installation possibilities, we believe this document to be a comprehensive manual that we will continue to refine. If you have any suggestions for improvement, we'd welcome your reply to tateinfo@tateinc.com

Disclaimer

It's impossible to discuss aisle containment without discussing fire suppression too. We have broached fire suppression at several points in this document; however, a reader shouldn't view this text as all-encompassing. Fire suppression is a local/regional topic that's best described by local authorities having jurisdiction. Codes and standards are enforced differently throughout the areas where this document may be read.

As such, this document will describe the application of various Tate ContainAire products, but Tate makes no guarantee about their compliance with fire codes/standards in a particular jurisdiction.

1. ContainAire™ Hard Partitions

What are they?

Hard partitions are vertical panels created by aluminum framing surrounding polycarbonate inserts. In many instances, hard partitions have come to replace the vinyl curtain containment that was very popular in the late 2000s. Many end users have found them to be more aesthetically pleasing than curtains.



Hard Partitions resting atop cabinets

How are they applied?

Hard partitions can serve a few purposes. The simplest is an air barrier in a cold aisle, sealing off empty cabinet locations. Cabinets/hardware can go in-and-out depending on the needs of the data center, so a hard partition serves as a barrier to fortify the cold aisle in case there are open spaces.

One of the most frequent uses of hard partitions is the creation of a hot aisle containment “chimney” or “HAC.” The panels are installed vertically and surround the hot aisle, ascending between the top of the cabinets and bottom of the ceiling. Return air is then pulled through ceiling grilles and returned to the mechanical system. The hard partitions ensure the rising hot air doesn’t have an opportunity to mix with ambient air before reaching return grilles.



Hard Partitions suspended from above as part of hot aisle containment; note ceiling return grilles

What options are there?

Customers have two (2) choices of finish (color) options and (2) choices of polycarbonate insert types:

Aluminum Finish

Clear Anodized

Black Anodized

Polycarbonate Insert Type

Semi-transparent multiwall

Fully Transparent polycarbonate

Custom options are possible for both the finish and insert types. In the picture above, clear anodized and semi-transparent were chosen. In the image below, semi-transparent is shown up close.



What sizes are available?

ContainAire Hard Partitions are custom-sized for each application.

Max Height: 96"

Max Length: 48"

Depth (standard): 1.575"

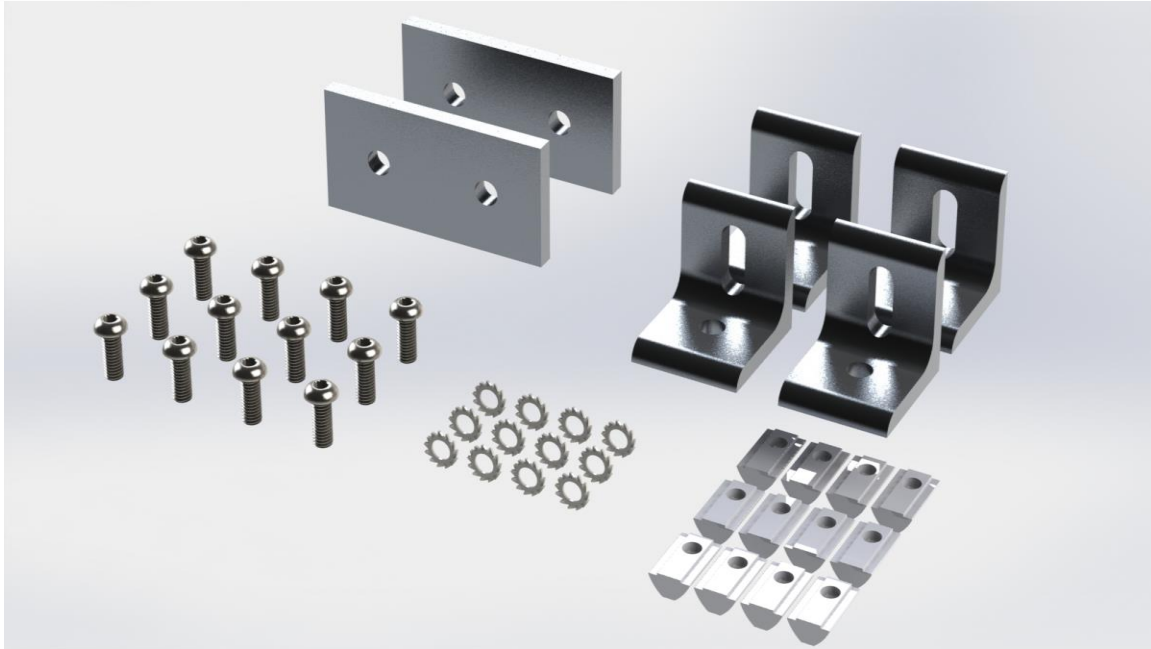
For example, a 48" long partition will have (2) 1.575" extrusions at each end. Thus, the insert in this case is 44.85" long.

In the photo below, note the "mini" partitions installed directly next to the door assemblies. These partitions are 11.5" tall. There are countless dimension possibilities for hard partitions.

**What do I need to know to recommend, order, and install?**

The ContainAire Hard Partitions arrive in pre-assembled panels, which must be ordered to meet the dimensions of your specific aisle containment needs. Thus, it's very important that measurements are precise. Hard partitions embody the popular cliché: "off by an inch, off by a mile."

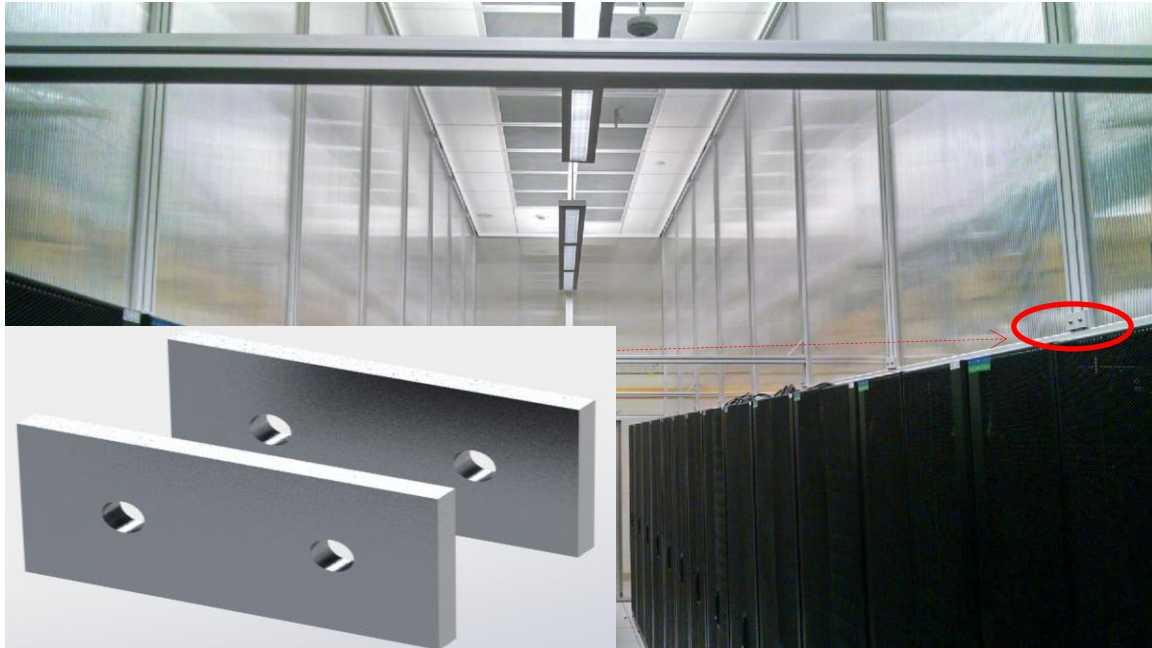
When ordering ContainAire Hard Partitions as part of a vertical containment solution, one must consider both the length of the intended aisle and the height difference between top of cabinets and the bottom of the ceiling surface. A typical order will consist of a sum of horizontal panel lengths that equals the total length of the intended aisle. In cases that cabinet heights are equal throughout an aisle, all panels can be ordered with the same height measurements. If cabinet heights are varied, however, each panel must be ordered so that the sum of the height of the panel and the height of the cabinet is constant throughout the aisle.



Hardware bag including angle brackets, straight brackets, t-nuts, washers, and screws



In this installation, angle brackets are used to secure the hard partitions to their above support member



Same installation; flat brackets are used to secure individual hard partitions together.

Note: In order to best achieve the desired partition length, it is advised that the total length of the partition be the sum of 48" long panels and one custom length panel to make up for the remainder.

Example:

A customer wants to add ContainAire Hard Partitions to a hot aisle with a length of 159". To achieve this length, it is advised the customer order three 48" partitions and one 15" partition for each side. $48" + 48" + 48" + 15" = 159"$

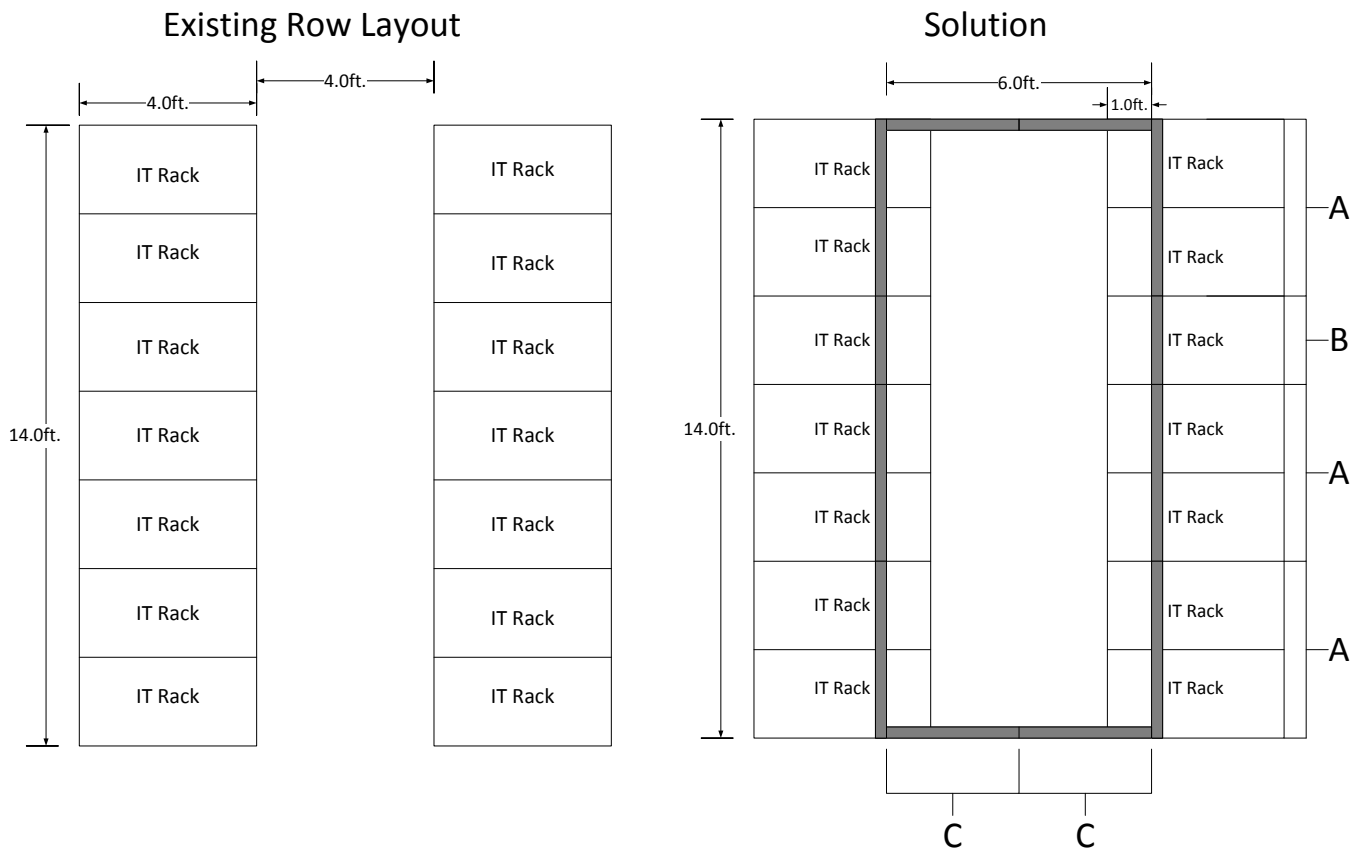
Are there any special considerations?

1. To form vertical containment pieces, hard partitions can either be suspended from an above superstructure (like a Tate structural ceiling) or they can rest atop of cabinets. Depending on the choice, one should do a thorough inventory to ensure a smooth installation. Some things to consider:
 - a. Along what "plane" will the partitions be installed? For example, will they be recessed 12" from the rear of the cabinets? This choice must be made as part of the installation plan.
 - b. What overhead service must we account for? Are there power busways, cable trays, lights, or other potential impediments to the installation?
 - c. If they're to be rack supported, what mounting possibilities exist atop the cabinets?
2. All containment considerations are inseparable from fire suppression considerations. With hard partitions, this mostly pertains to the choice of insert. Polycarbonate will burn in a fire, so the inserts carry different ratings and approvals. Thus, the choice of insert shouldn't be strictly based upon appearance or cost.

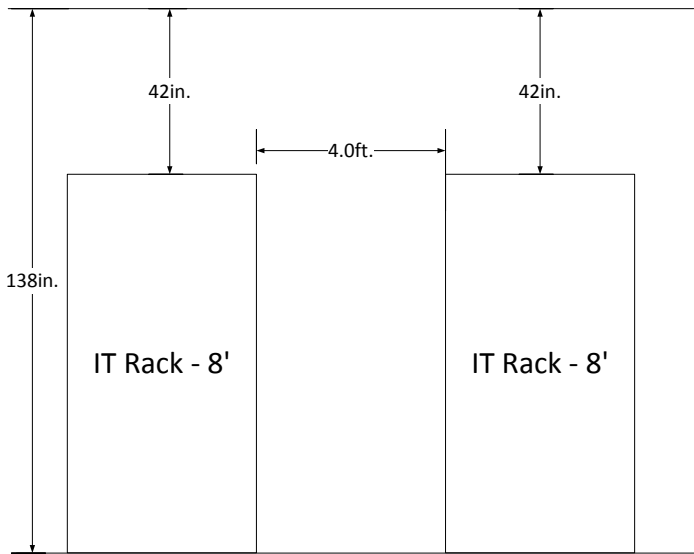
3. In some cases, there are requirements to cut the inserts to allow for passage of cable trays. The inserts can be cut with ease but a brush or grommet should be used afterward to provide the best possible seal.
4. Any hard partition design should discuss how moves, adds, and changes will be addressed. Few data centers are uniform in their cabinet deployments. Different cabinet models will impact containment design. A suspended partition design would allow for some variation in cabinet heights, where a rack-supported design would be more complex for different cabinet heights.
5. When installing hard partitions over racks where ContainAire doors will be used, it may be beneficial to plan for the hard partitions to extend approximately 1.5" on either end of the row to sit on top of the doors to be installed at the end of the aisle. This will allow for a tighter air seal at the aisle end, without requiring the use of brush or gaskets.

Let's consider the following examples:

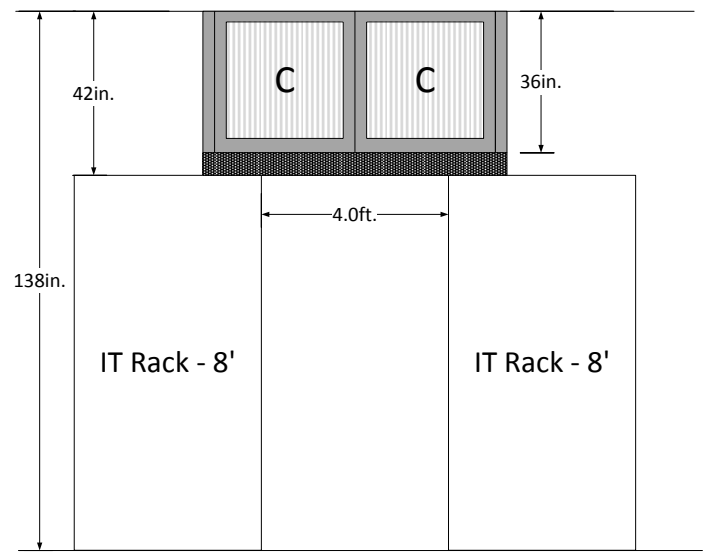
Example Layout (1):



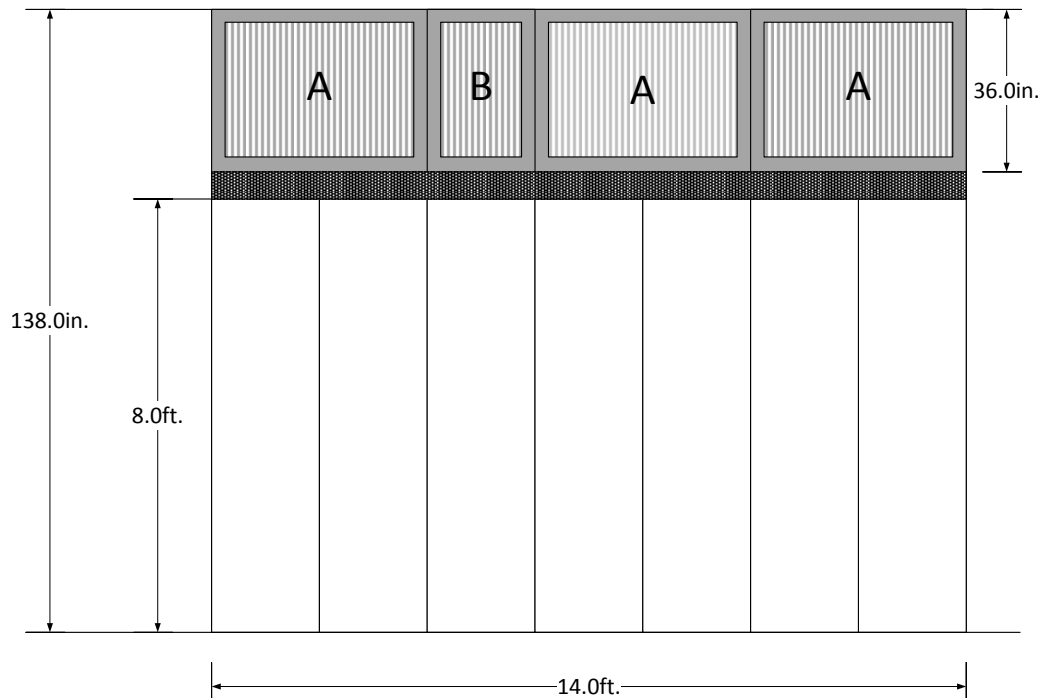
Existing Aisle Layout

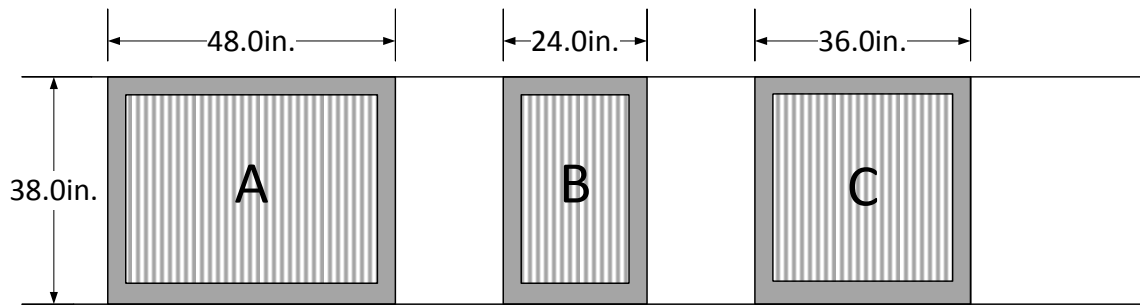


Solution



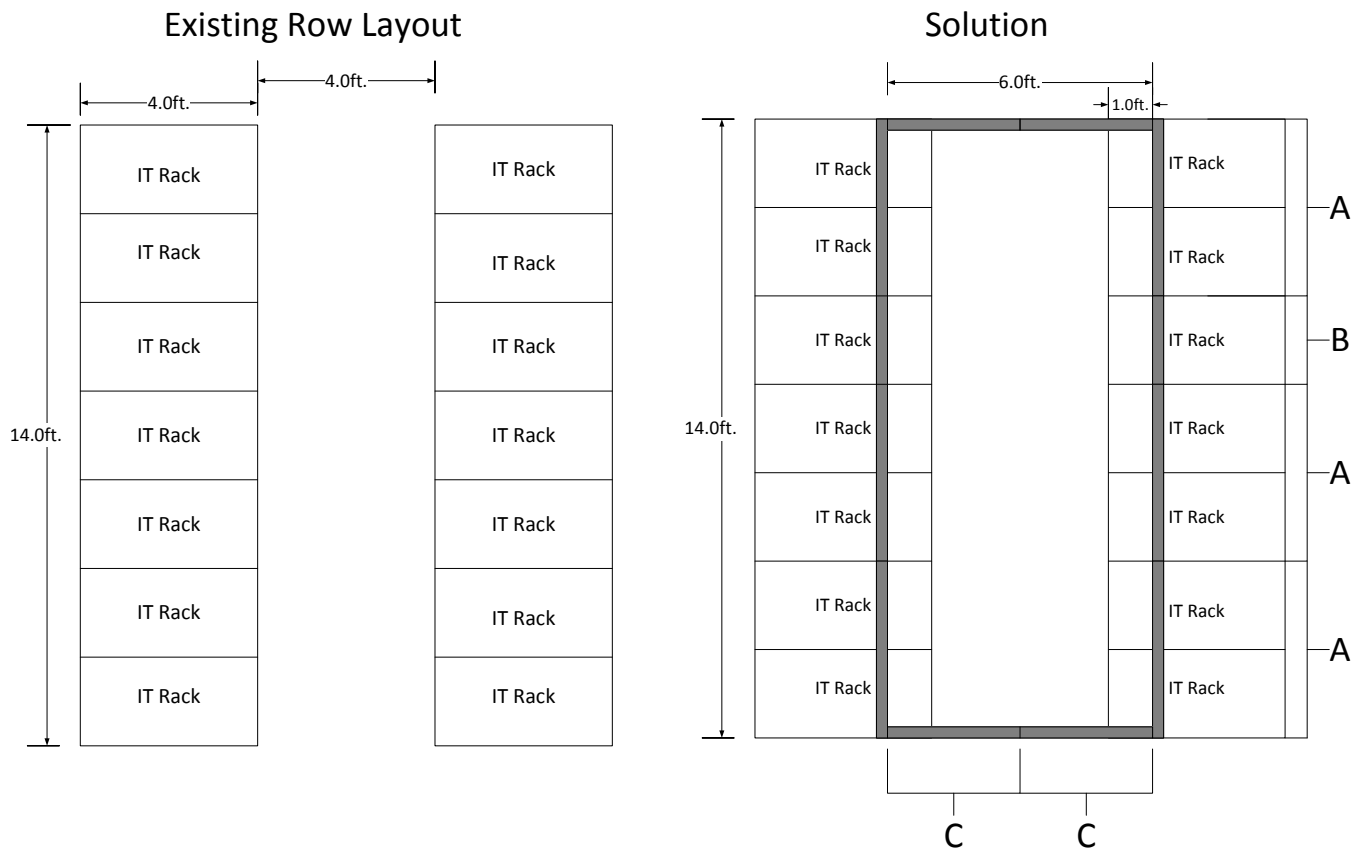
Example Layout (1):



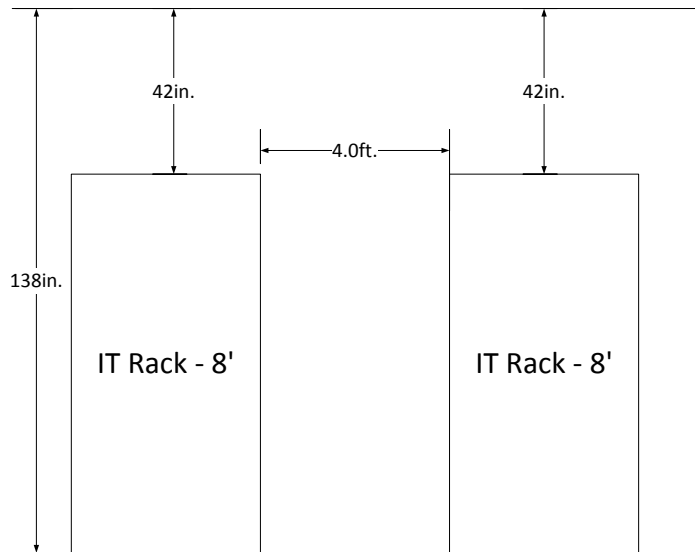


6 in. brush is connected along bottom of hard partitions. This ensures no air leakage.

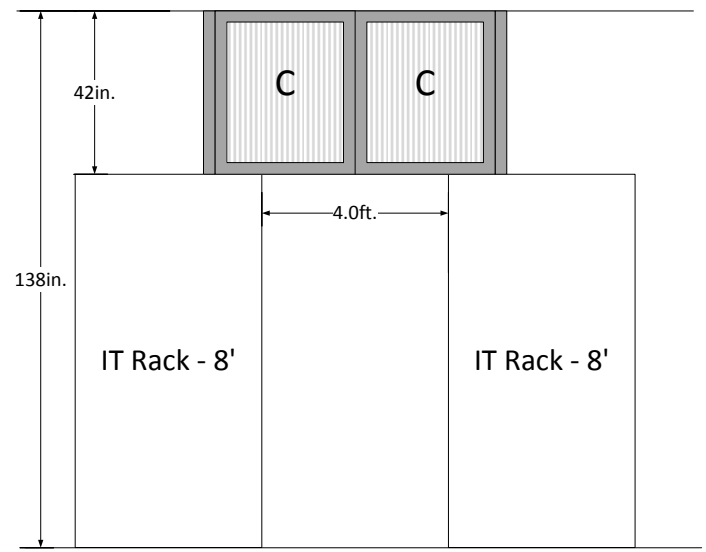
Example Layout (2):



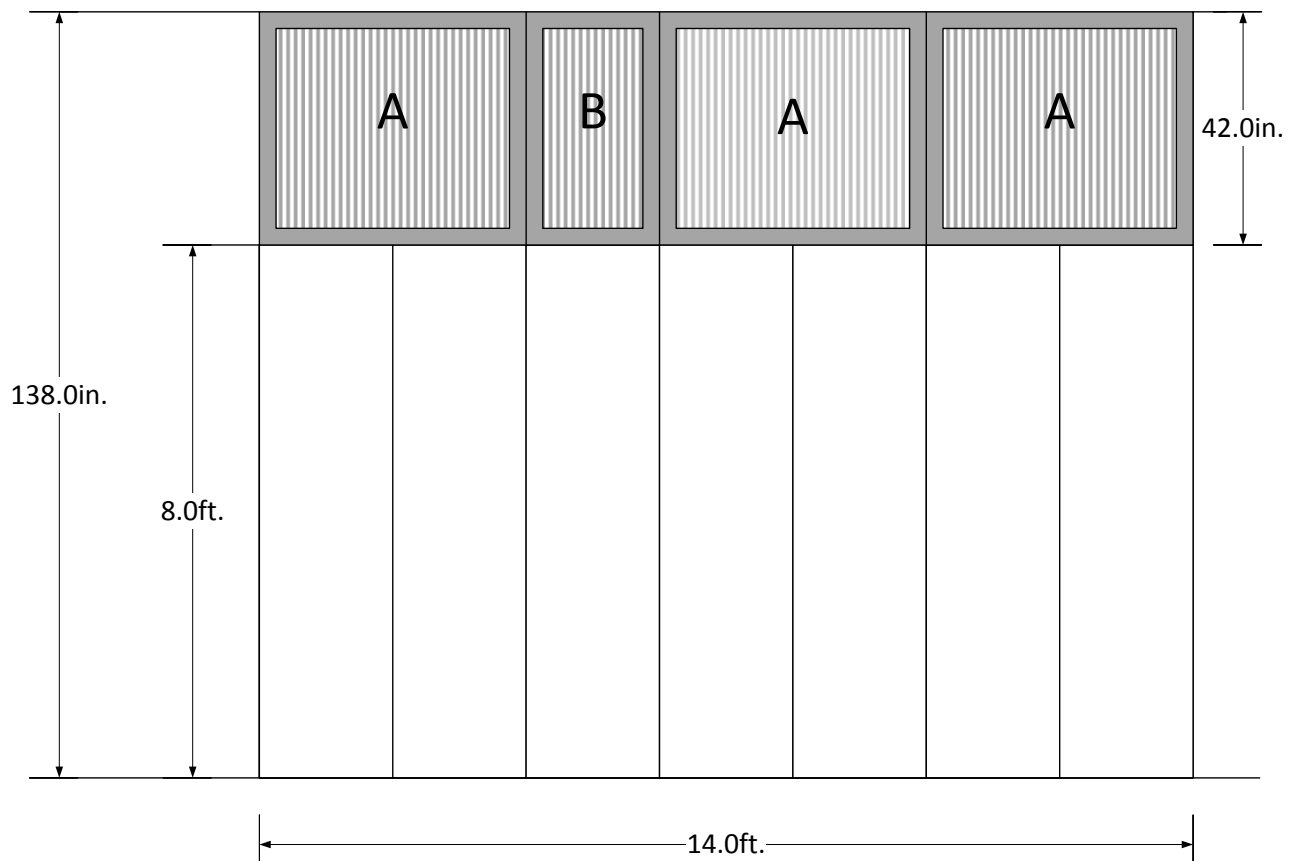
Existing Aisle Layout

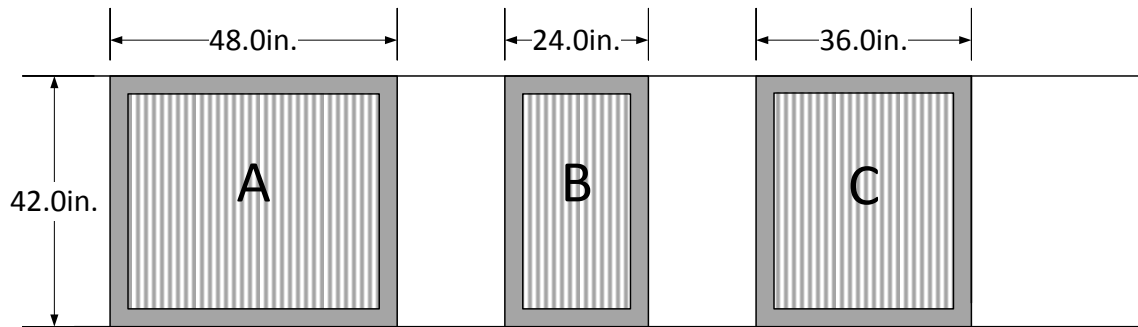


Solution



Example Layout (2):





Based on the diagrams on the previous pages consider the following example:

Given:

Two rows of 7 racks each form an aisle; both rows are comprised of 7 x 8' racks. There is a 4' cold aisle between the two racks. The end user has chosen to use ContainAire Hard Partitions for the vertical containment component.

Solution:

There are 2 common methods of installing ContainAire Hard Partitions as a vertical containment component:

1. Suspended from Ceiling: Example Layout (1)

Multiple parts will need to be specified. First, one needs to measure the distance between the surface of the racks and the ceiling. In our given example we are given the following:

42" above both the 8' row of racks

To fill the partition space above the 8' row of racks the hard partition would therefore have to be 36" tall, leaving 6" for the extended brush. Because the aisle is of even height throughout, we know each partition will have a height of 36".

Now we must account for the length of the aisle. Because the aisle is 14' long, we know it is best to order 3 x 4' long partitions and 1 x 2' long partition for each cabinet row.

For the end sections of each aisle, we know we need to cover 6' of partition length. Because the end sections are most exposed, it is better, if the section is over 4' long, to order two equally long partitions for each end section. Although for the sides it is advised to buy 4' long partitions as the mode length, the end sections must be more aesthetically pleasing, so the total length of each end section must be split evenly.

That being said, we can order 2 x 3' long partitions for either end.

Total Bill of Materials:

6 x CAHPC36X48M	2 x CAHPC36X24M
4 x CAHPC36X36M	8 x K10098

Note: If an end user, like our example, has decided to suspend his/her ContainAire Hard Partitions, it may be necessary to leave excess room for an extended brush. If the area of installation guarantees a certain snow load, space between the cabinet surface and the bottom of the partition may be necessary, for it allows some flexibility. If snow load is out of the equation, the hard partitions can be bolted to the surface of the cabinets while being suspended.

Note: Remember, In order to best achieve the desired partition length, it is advised that the total length of the partition be the sum of 48" long panels and one custom length panel to make up for the remainder.

2. Bolted to Cabinet Surface: Example Layout (2)

Multiple parts will need to be specified. First, one needs to measure the distance between the surface of the racks and the desired height. In our given example we are given the following:

42" above both the 8' row of racks

To fill the partition space above the 8' row of racks the hard partition would therefore have to be 42" tall. Because the aisle is of even height throughout, we know each partition will have a height of 42".

Now we must account for the length of the aisle. Because the aisle is 14' long, we know it is best to order 3 x 4' long partitions and 1 x 2' long partition for each cabinet row.

For the end sections of each aisle, we know we need to cover 6' of partition length. Because the end sections are most exposed, it is better, if the section is over 4' long, to order two equally long partitions for each end section. Although for the sides it is advised to buy 4' long partitions as the mode length, the end sections must be more aesthetically pleasing, so the total length of each end section must be split evenly.

That being said, we can order 2 x 3' long partitions for either end.

Total Bill of Materials:

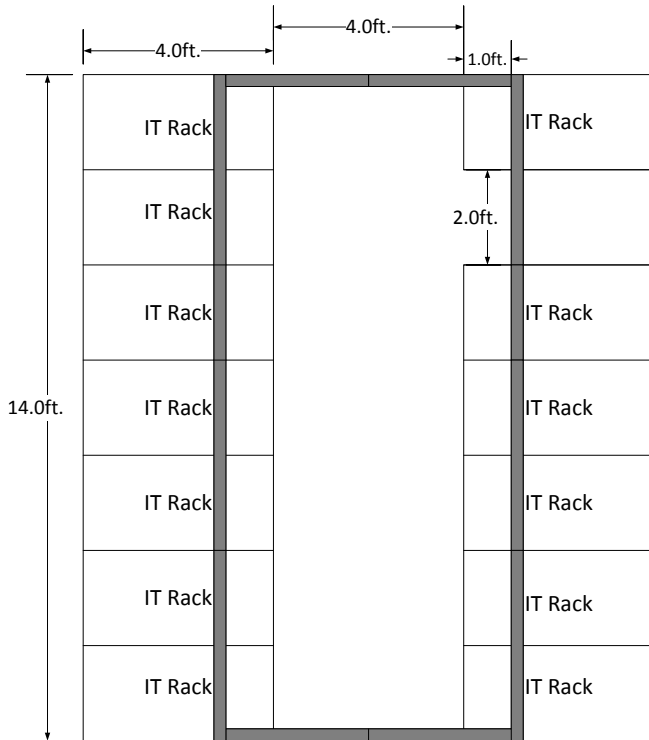
6 x CAHPC42X48M

2 x CAHPC42X24M

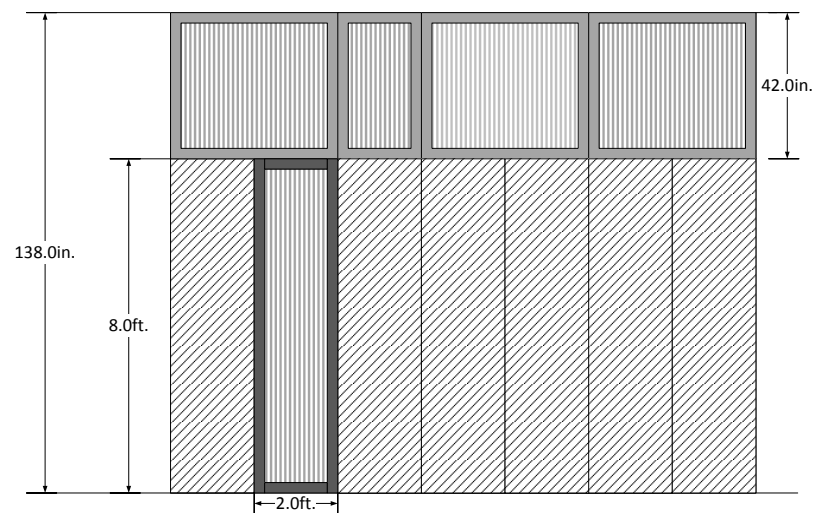
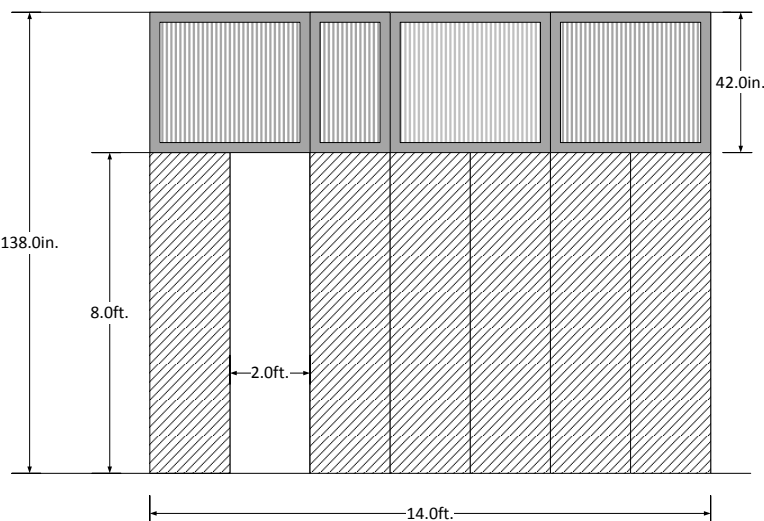
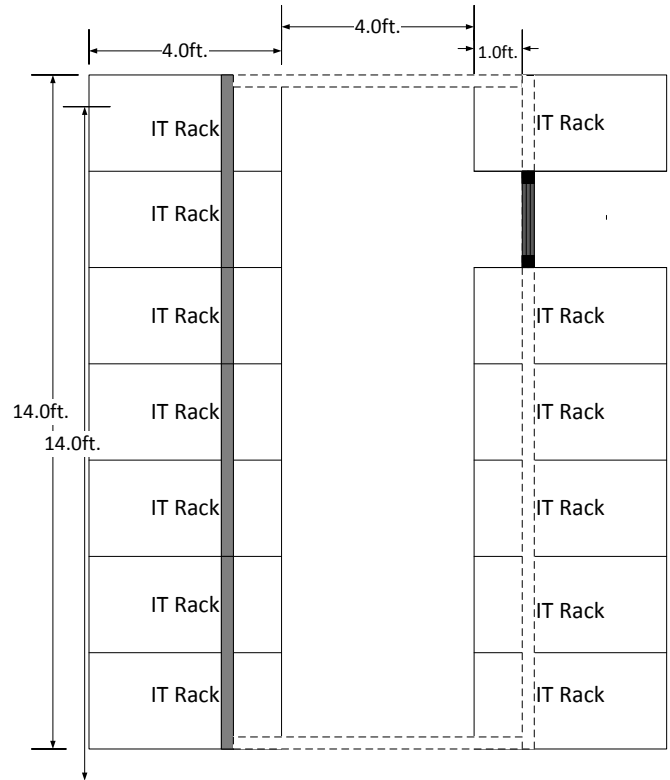
4 x CAHPC42X36M

Note: Remember, In order to best achieve the desired partition length, it is advised that the total length of the partition be the sum of 48" long panels and one custom length panel to make up for the remainder

**Example Layout (3):
Solution**



Solution



Based on the diagrams on the previous pages consider the following example:

Given:

Two cabinet rows of 14' each form an aisle; one row is comprised of 7 x 8' racks, while the other is missing a cabinet, and is therefore comprised of 6 x 8' racks. There is a 4' cold aisle between the two racks. The end user has chosen to use ContainAire Hard Partitions for the vertical containment component.

6 x CAHPC36X48M

2 x CAHPC36X24M

4 x CAHPC36X36M

8 x K10098

The end user would also now like to use ContainAire Hard Partitions to fill in the space created by the missing cabinet. The empty section is measured to be 2' wide and 8' tall. In order to fill this space, the end user must order the ContainAire Hard Partitions in these same dimensions, 2' x 8', so that the partition slides evenly into the missing slot. When making measurements, the end user must ensure his dimensions are accurate, as the partition must fit evenly into position. It is important to position the hard partition directly under the track of the hard partitions used above the aisle. If the top of the replacement partition is not directly below the containment partitions, the aisle is no longer airtight, which is detrimental to the efficiency of the aisle. If necessary, the above partition can be bolted to the top of the replacement partition, just as it is to the cabinets.

Note: In a scenario where a ContainAire Hard Partition must replace a cabinet, it is important that the hard partition be ordered to fit **into** the open slot. The hard partition should not be ordered wider than the width of the space it is filling for any overlap will restrict the cabinets from opening.

Total Bill of Materials:

1 x CAHPC96X24M

2. ContainAire™ Soft Partitions & Corner Tracks

What are they?

The ContainAire Soft Partitions are vinyl curtains used as air barriers along the length of an aisle and at aisle entryways. They come in pre-packaged sections, which must be ordered to meet the dimensions of your specific aisle containment needs. They come in a variety of heights, referenced in the table below. Varied ContainAire Soft Partition heights may be needed if cabinet heights are diverse in a given aisle.

Corner tracks are 90 degree pieces used near aisle entryways. They integrate with the soft partitions to form a rectangular shape above the cabinet rows.

Soft Partitions

Available Heights	36"	96"	144"
Available Lengths			
48" Track	CASPC36X48V	CASPC96X48V	CASPC144X48V

Corner Tracks

Available Heights	36"	96"	144"
Available Lengths			
12" x 12" Track	CASCC36X12V	CASCC96X12V	CASCC144X12V

What's included with each part number?

The soft partitions include:

- 1 x 48" long header Rail
- 1 x Straight Connector w/ Color Matching Thumb Screws
- 2 x Ceiling Grid Connector with 135F thermally-activated fusible links
- 1 x 48" long Vinyl Curtain with 2" overlap on each end

The corner pieces include:

- 1 x 12"x12" corner assembly
- 1 x Straight Connector w/ Color Matching Thumb Screws
- 1 x ceiling grid connector with 135F thermally-activated fusible link
- 1 x 24" vinyl curtain with 2" overlap on each end

What do I need to know to recommend, order, and install?

A typical order would include the minimum number of horizontal lengths needed to either equal or, in most cases, overshoot the length of a given aisle. Adjustments can then be made on sight to ensure a more accurate fit.

When accounting for the height of one's ContainAire Soft Partitions, one must order the closest option greater than or equal to the intended height. The excess length of the ContainAire Soft Partitions can be rolled up on the surface of the cabinets.

ContainAire Soft Partitions are only available with a 48" track length, and thus if the aisle length minus 24" (2 x 12" corner pieces) is not evenly divisible by 48", one must order the minimum number of soft partitions needed to surpass the necessary length.

Example: A customer wants to add ContainAire Soft Partitions to a hot aisle with a length of 160".

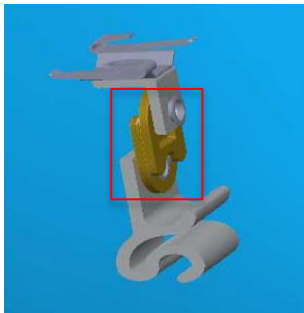
- To achieve this length, the customer must first take into account the corner pieces, recognizing that he/she must order for a total track length of 136", because the 2 corner pieces will take up 12" each
 - $160" - 12" - 12" = 136"$
- So, the customer must order 3 ContainAire Soft Partitions for each side: $3 \times 48" = 144"$
- On site, the installer can then cut down one header 8" on each side to achieve an accurate fit. A band saw (or other with a metal cutting blade) is the most appropriate tool for this task.

Are there any special considerations?

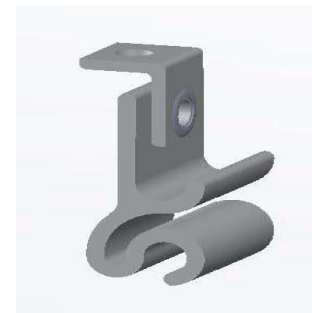
1. The biggest variable to soft partition use is attachment. These products have historically been attached to a "T-bar" grid that's part of an acoustical ceiling. There's no guarantee a facility will have an acoustical ceiling (to start), and acoustical ceilings are not one-size fits all.

To address these variations, we have a variety of ceiling connectors for different ceiling types. These connectors include:

- 15/16 T-Grid (shipped with standard partition part numbers)
- 9/16 T-Grid ceiling grid
- Armstrong 9/16 Bolt-Slot Grid
- ¼-20 All Thread Hanger



15/16" ceiling clip with fusible link



¼"-20 all thread clip

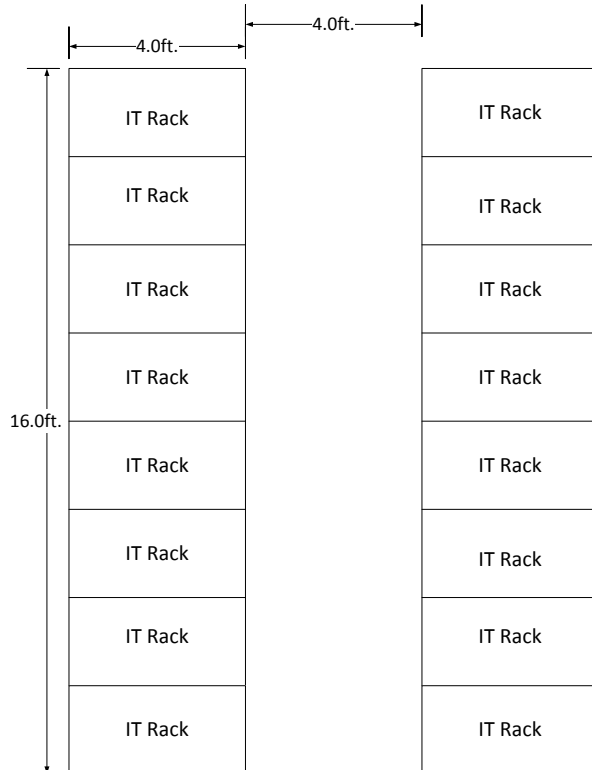
The following chart compiles our attachment hardware part numbers.

Connecting to:	Clear Anodized		Black Anodized	
	w/ Fusible Link	w/o Fusible Link	w/ Fusible Link	w/o Fusible Link
Acoustical Ceiling Grid	CAFCCC	CACCC No F Link	CAFCCB	CACCB No F Link
Unistrut Grid	CAFCCC-Unistrut	CACCC-Unistrut No F Link	CAFCCB-Unistrut	CACCB-Unistrut No F Link
Structural Ceiling Grid	CAFCCC for SCGS	CACCC-SCGS No F Link	CAFCCB for SCGS	CACCB-SCGS No F Link

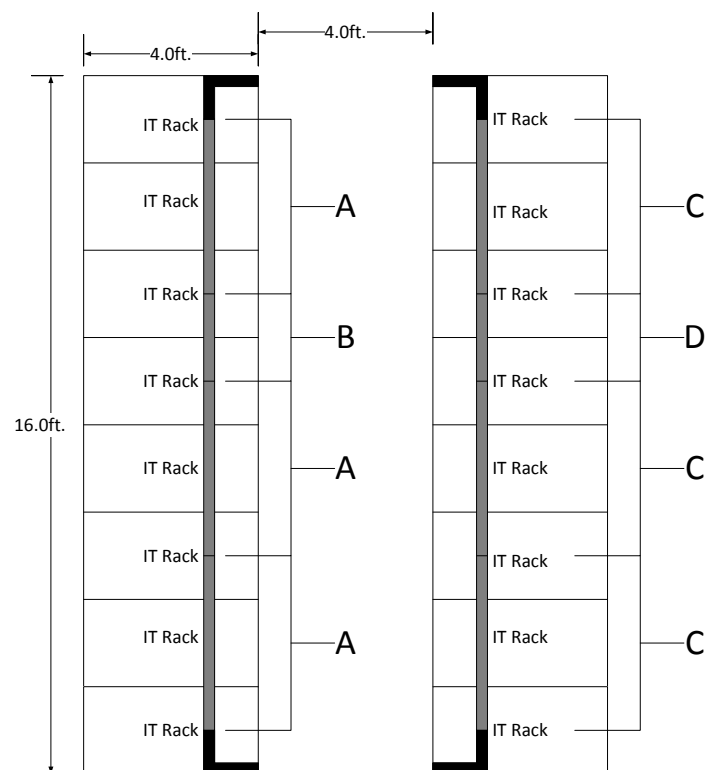
- Another consideration is the fusible link—the gold object in the image above. Tate Soft Partitions are shipped with fusible links that will separate at 135F, releasing the curtain track to the floor below. The engineer on a given installation should coordinate the fusible link specs with other elements of the fire system—for example, looking at the rated temps of the fusible links and the sprinkler heads to be used.
- There can be broader fire suppression considerations too. Fire codes are the province of fire marshals or building inspectors. They may be enforcing new standards or they may be working with legacy versions. Before planning this installation, it's always best to solicit their input.

Example Layout:

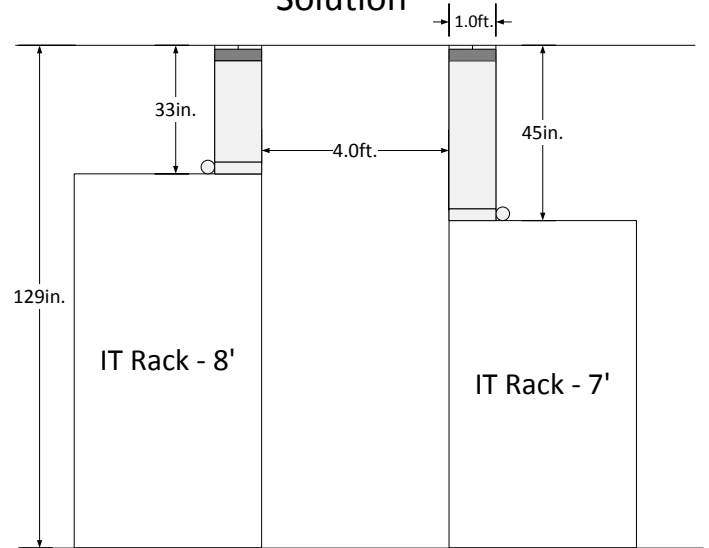
Existing Aisle Layout



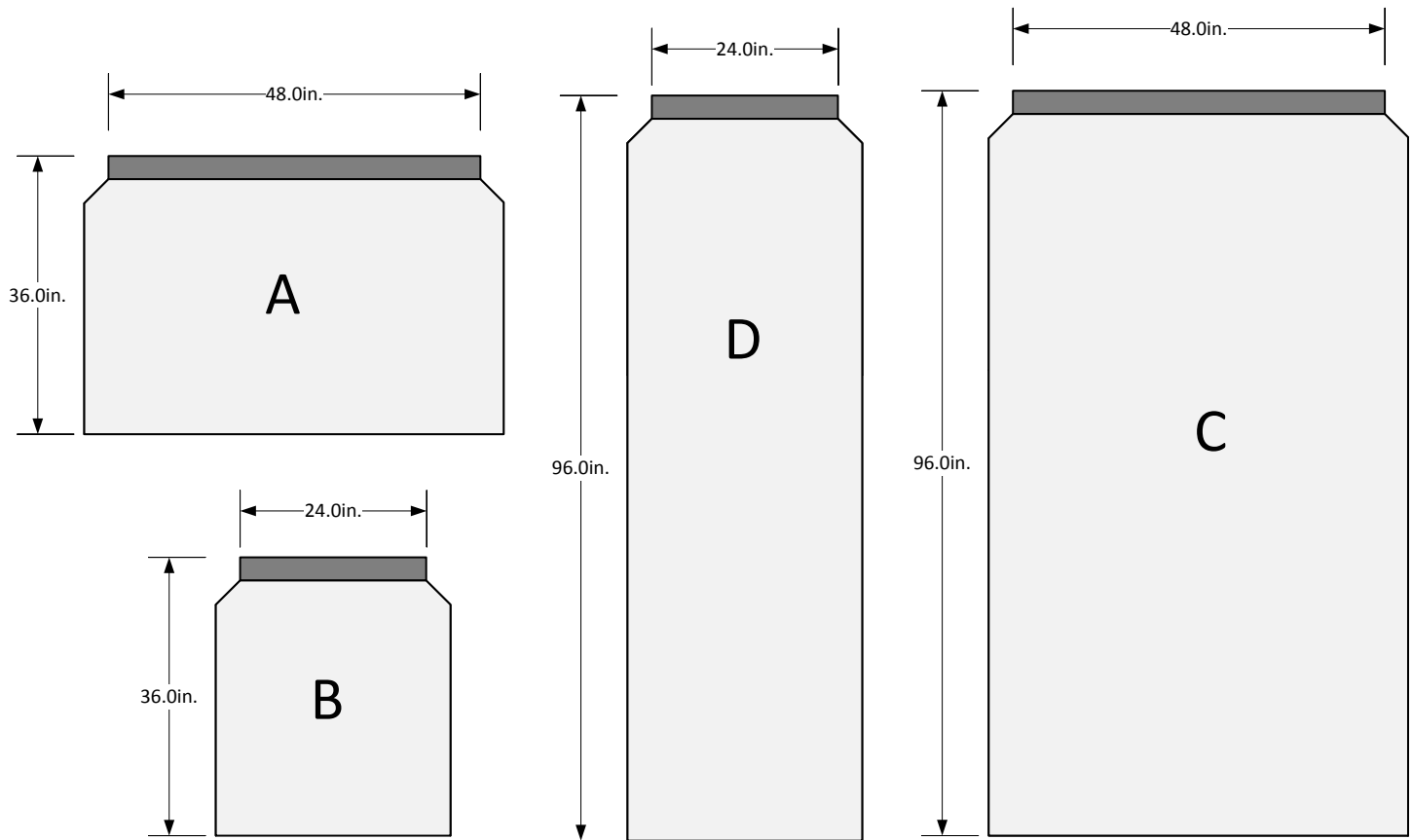
Solution



Solution



The image contains two elevation drawings of a building facade. The left drawing shows a section 16.0ft wide and 129.0in high. The top 33.0in section is divided into four panels labeled A, B, and A, A. The bottom section is 8.0ft high. The right drawing shows a section 16.0ft wide and 7.0ft high. The top 45.0in section is divided into four panels labeled C, C, D, and C. The bottom section is 7.0ft high.



Based on the diagrams on the previous pages consider the following example:

Given:

Two rows of 8 racks each form an aisle; one row is comprised of 8 x 8' while the other row is comprised of 8 x 7' racks. There is a 4' cold aisle between the two racks. The end user has chosen to use ContainAire Soft Partitions for the vertical containment component.

Solution:

Multiple parts will need to be specified. First, one needs to measure the distance between the surface of the racks and the ceiling. In our given example we are given the following:

45" above the 7' row of racks

33" above the 8' row of racks

To fill the partition space above the 7' row of racks the soft partition would therefore at minimum have to be 45". After consulting the chart, 96" is the next greatest length and therefore the length required to fill the containment space. Now looking at the 8' row of racks, it can be determined that a soft partition of 36" height is required. Because height is the only variable, we now know what models need to be purchased:

Available Heights	36"	96"	144"
Available Lengths			
48" Track	CASPC36X48V	CASPC96X48V	CASPC144X48V

We also now know what corner pieces to order.

Available Heights	36"	96"	144"
Available Lengths			
12" x 12" Track	CASCC36X12V	CASCC96X12V	CASCC144X12V
2 x CASCC36X12V			
2 x CASCC96X12V			

Note: One should always order the closest "longer" length available to avoid gaps between vinyl and server racks. For example, if you require a 53" drop, you would order our standard 96" drop. You then have the option to either cut the excess or leave the excess rolled on top of the cabinet or floor. It is recommended to leave an additional 3-6" of excess to produce an effective air seal.

Note: For case in which rack height is uneven in a single row of equipment racks, it will be necessary to select the partitions based on the greater height requirement of the shortest rack height for that section of horizontal track.

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.

In order to meet 14' of horizontal track, we must order 4 x 48" track lengths for each side of the aisle. This gives us the following:

8' Row of Racks: 4 x CASPC36X48V (48" x 36")

7' Row of Racks: 4 x CASPC96X48V (48" x 96")

This means we will have ordered 16' of horizontal track length for each side. Because 16' is 2' longer than our required 14', the end user will have to cut one partition down 2' on each side, giving the required length.

Note: In cases where the desired aisle length is not divisible by 48" or 4', the customer must order the smallest number of partitions that produce a sum greater than the desired track length. In our example, for instance, we needed to account for 14' of track length. The smallest number of partitions that produce a sum greater than 14' is 4: $4 \times 4' = 16'$

Total Bill of Materials:

4 x CASPC36X48V 2 x CASCC36X12V

4 x CASPC96X48V 2 x CASCC96X12V

3. ContainAire™ Dual Sliding Doors

What are they?

ContainAire Dual Sliding Doors provide entry into contained aisles while providing air blockage at aisle ends. Like ContainAire hard partitions, the doors are constructed of polycarbonate inserts and aluminum extrusion framing. Both 4040 and 4080 aluminum extrusions are used for constructability and rigidity requirements. Doors arrive in pre-assembled frame parts with final assembly happening on site.

What do I need to know to recommend, order, and install?

Doors are available in the same frame colors as hard partitions—clear anodized and black anodized.

In most cases, ContainAire Dual Sliding Doors are often ordered in the standard frame width of 90.6" with a custom height that matches the cabinets.

Dimensions:

90.6" wide x 4.85" depth x CUSTOM HEIGHT

Width dimensions cannot exceed 130.0"

Height dimensions cannot exceed 98.24"

90.6" was selected as the frame width because it can cover both 4ft and 6ft wide aisles. Custom widths are available also, depending on the customer's desired opening size. The standard 90.6" frame facilitates a 31.25" open area. If a wider opening is required, we can use the following table and formula as a guide.

Example Sizing Chart: Estimating Frame Width from Desired Opening Width

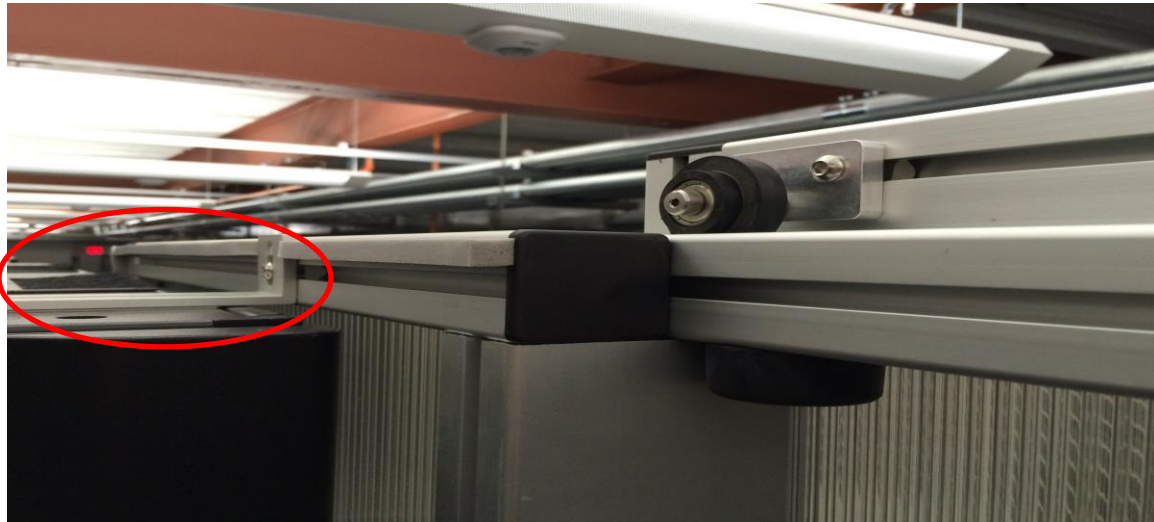
Desired Opening Width	Process	Frame Width
X	To order a door with an opening width of X , you can follow this process: $2(\mathbf{X} + 10") + 8" = \mathbf{Y}$	Y
42"	$2(42 + 10) + 8 =$	112"
31.25"	$2(31.25 + 10) + 8 =$	90.5"
48"	$2(48 + 10) + 8 =$	124"

When selecting the height of your ContainAire Sliding Doors, please note that the ultimate height of the door will be just under 2" greater than your selected height. This occurs because the sliding mechanisms sit on top of the header bar. To ensure proper function, make sure all obstacles clear the ultimate height of the door (see image below)



Door ordered at 80" tall would have an overall dimension of 81.5"

Tate has often recommended that the frame height exceed the cabinet height by 2". Thus, an 80" frame would be ordered for a 78" tall cabinet. This is a simple rule-of-thumb, and greater spreads can be used.



Angle bracket used to attach door to end cabinet – 78" tall cabinet to 80" tall door (81.5" overall height)



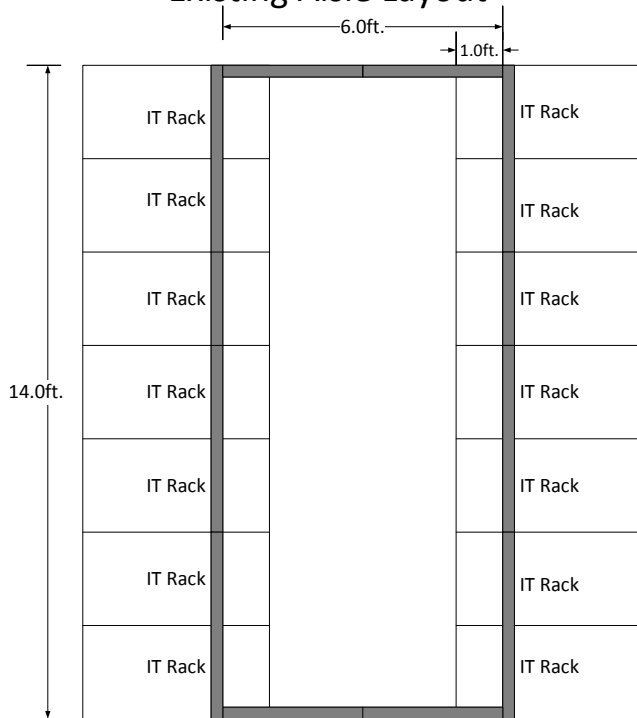
The doors in this example are about 6" greater than cabinet height

Tate recommends that doors are secured both through the floor (access floor or slab) and laterally connected to cabinets at the aisle ends. Tate provides a variety of hardware for cabinet mounting.

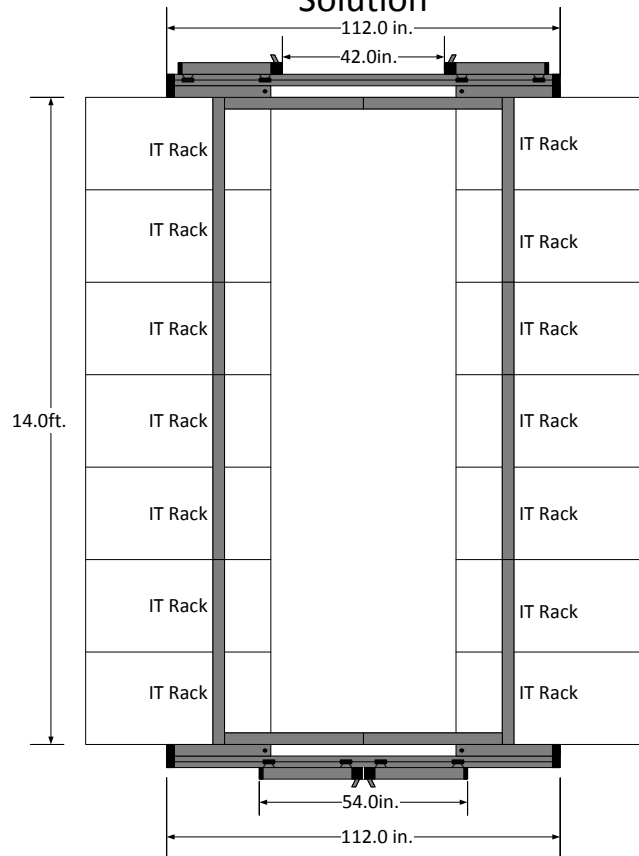
When installing hard partitions over racks where ContainAire doors will be used, it may be beneficial to plan for the hard partitions to extend approximately 1.5" on either end of the row to sit on top of the doors to be installed at the end of the aisle. This will allow for a tighter air seal at the aisle end, without requiring the use of brush or gaskets.

Example Layout:

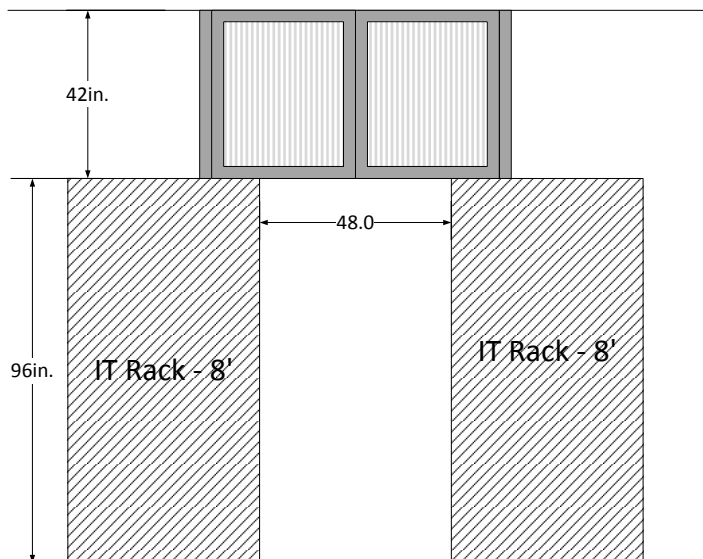
Existing Aisle Layout



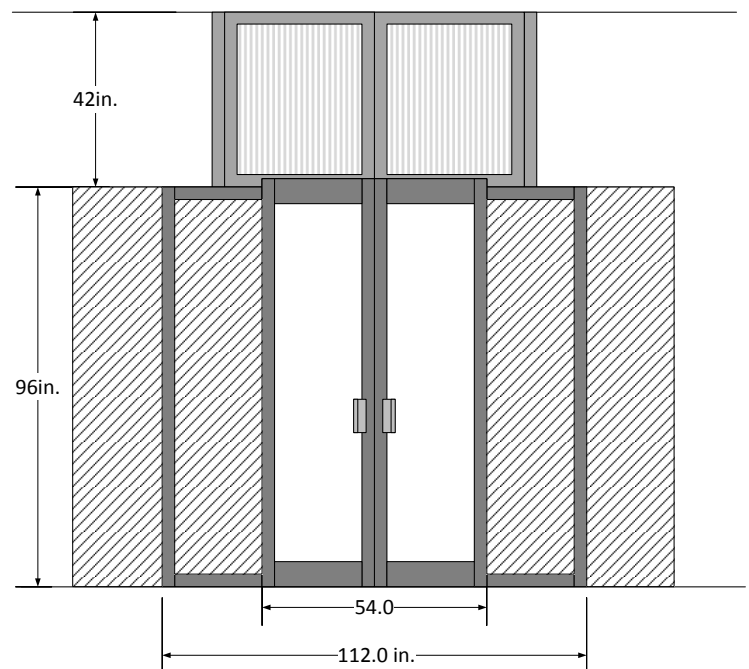
Solution



Existing Aisle Layout



Solution



Based on the diagrams on the previous pages consider the following example:

Given:

Two rows of 7 racks each form an aisle; both rows are comprised of 7 x 8' racks. There is a 4' cold aisle between the two racks. The end user has chosen to use ContainAire Hard Partitions for the vertical containment component.

6 x CAHPC36X48M

2 x CAHPC36X24M

4 x CAHPC36X36M

8 x K10098

The end user would also now like to use ContainAire Dual Sliding Doors as the aisle end containment component.

Solution:

Based on a 4' wide cold aisle with a cabinet height of 96", the appropriate ContainAire Dual Sliding Door will also have a height of 96", sitting flush with the surface of the cabinets.

Since we want to achieve an opening width of 42", we can use the formula to estimate the best door width.

$$2(X + 10") + 8" = Y$$

$$2(42 + 10) + 8 = 112"$$

For this particular aisle layout, a ContainAire Dual Sliding Door with a total width of 112" will work the best. Remember, in order to maximize entry space, the total width of the dual sliding door frame must be greater than twice the desired entry width. This is because the 2 doors slide along a header bar and thus the wider the frame the wider the entry width. In this case, the sliding doors make up 54", each one at 27". With the total width being 112", each door can slide 21", enabling a 42" entry width. The total width of 112" enables the door frame to overlap the cabinet, ensuring an air tight seal.

Total Bill of Materials:

2 x CADDC96X102C

4. ContainAire™ Single Sliding Doors

What are they?

ContainAire Single Sliding Doors provide entry into contained aisles while providing air blockage at aisle ends. Like ContainAire hard partitions, the doors are constructed of polycarbonate inserts and aluminum extrusion framing. Both 4040 and 4080 aluminum extrusions are used for constructability and rigidity requirements. Doors arrive in pre-assembled frame parts with final assembly happening on site.

What do I need to know to recommend, order, and install?

Doors are available in the same frame colors as hard partitions—clear anodized and black anodized.

In most cases, ContainAire Single Sliding Doors are often ordered in the standard frame width of 90.6" with a custom height that matches the cabinets.

Dimensions:

90.6" wide x 4.85" depth x CUSTOM HEIGHT

Width dimensions cannot exceed 100.65"

Height dimensions cannot exceed 98.24"

90.6" was selected as the frame width because it can cover both 4ft and 6ft wide aisles. Custom widths are available also, depending on the customer's desired opening size. The standard 90.6" frame facilitates a 39.25" open area. If a wider opening is required, we can use the following table and formula as a guide.

Example Sizing Chart: Estimating Frame Width from Desired Opening Width

Desired Opening Width	Process	Frame Width
X	To order a door with an opening width of X , you can follow this process: $2X + 12" =$	Y
48"	$2(48) + 12 =$	108" => 100.65" **
39.25	$2(39.25) + 12 =$	90.5"

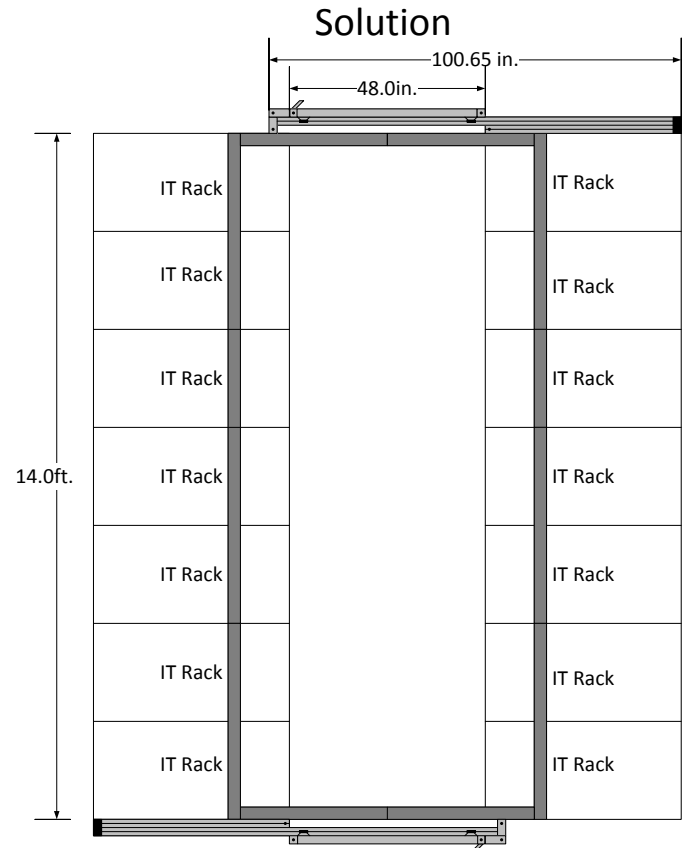
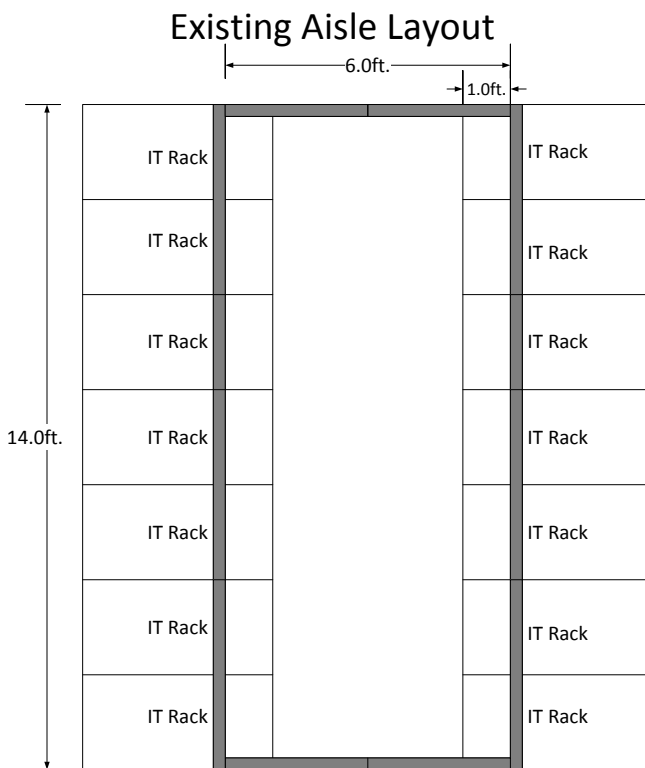
**If your estimated required width is over the maximum available width, it is best to order the maximum width. As the table and formula shows, the maximum achievable opening with the single slider is 44.325"

Like the double sliding doors, please note that the ultimate height of this door will be just under 2" greater than your selected height. This occurs because the sliding mechanisms sit on top of the header bar. To ensure proper function, make sure all obstacles clear the ultimate height of the door.

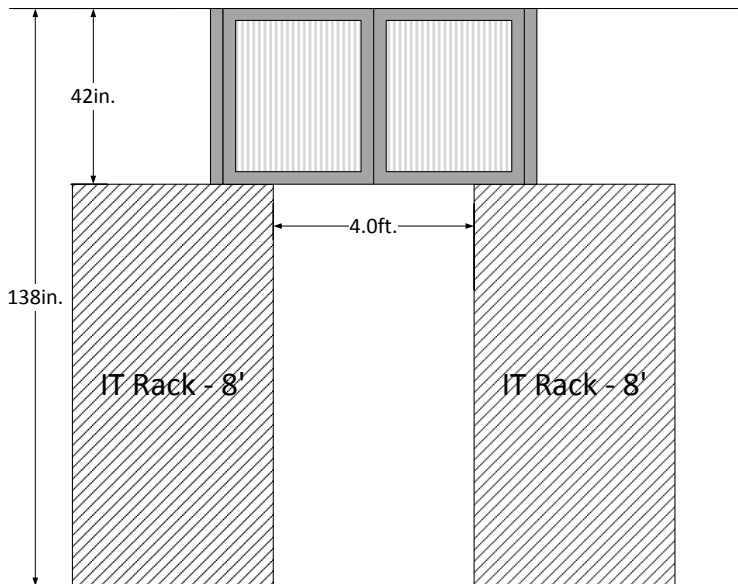
The only unique variable to single sliding doors is the direction in which they slide. Separate part numbers exist for doors that slide LEFT and slide RIGHT. The direction is defined by someone standing outside of the aisle.

The same installation guidelines apply for both double and single sliding doors.

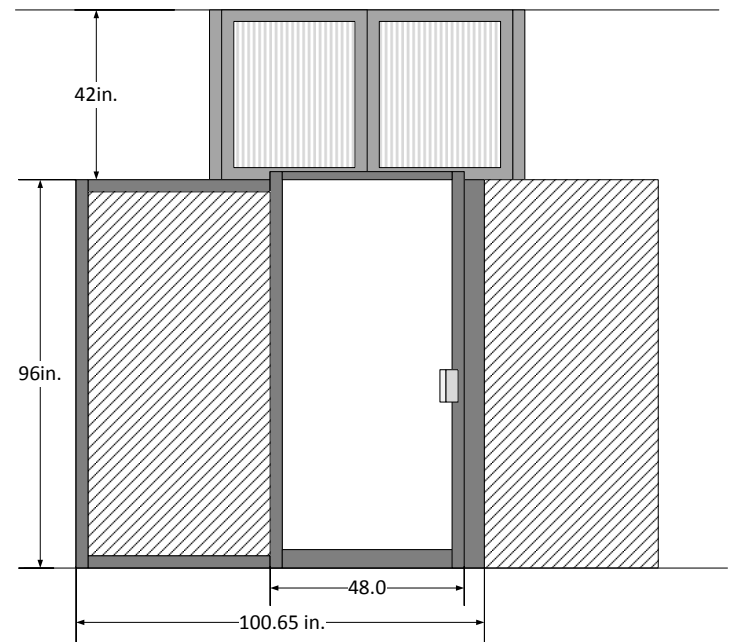
Example Layout:



Existing Aisle Layout



Solution



Based on the diagrams on the previous pages consider the following example:

Given:

Two rows of 7 racks each form an aisle; both rows are comprised of 7 x 8' racks. There is a 4' cold aisle between the two racks. The end user has chosen to use ContainAire Hard Partitions for the vertical containment component.

6 x CAHPC36X48M

2 x CAHPC36X24M

4 x CAHPC36X36M

8 x K10098

The end user would also now like to use ContainAire Single Sliding Doors as the aisle end containment component.

Solution:

Based on a 4' wide cold aisle with a cabinet height of 96", the appropriate ContainAire Single Sliding Door will also have a height of 96", sitting flush with the surface of the cabinets. For this particular aisle layout, a ContainAire Single Sliding Door with a total width of 101" will work the best. In order to maximize entry space, the total width of the single sliding door frame must be greater than twice the sliding door itself. This is because the door slides along a header bar, and thus to open fully it must slide its own width. In this case, the sliding door itself is 48", equal to the width of the aisle, so in order to open the aisle completely, the door must slide 48" to the left. 101" works well in this scenario because it sits flat with the left side of the cabinets.

Note: Although plugging an opening width of 48" into the equation mentioned earlier would estimate that a door of width 108" be advised, 101" wide works better for aesthetic purposes as it sits flush with the edge of the cabinet.

Total Bill of Materials:
2 x CARD96X101C

Note: When selecting the height of your ContainAire Single Sliding Doors, know that the ultimate height of the door will be just under 2" greater than your selected height. This occurs because the sliding mechanisms sit on top of the header bar. To ensure proper function, make sure all obstacles clear the ultimate height of the door.

When installing hard partitions over racks where ContainAire doors will be used, it may be beneficial to plan for the hard partitions to extend approximately 1.5" on either end of the row to sit on top of the doors to be installed at the end of the aisle. This will allow for a tighter air seal at the aisle end, without requiring the use of brush or gaskets.

5. ContainAire™ Single Hinged Doors

What are they?

ContainAire Hinged Doors provide entry into contained aisles while providing air blockage at aisle ends. Like ContainAire hard partitions, the doors are constructed of polycarbonate inserts and aluminum extrusion framing. Both 4040 and 4080 aluminum extrusions are used for constructability and rigidity requirements. Doors arrive in pre-assembled frame parts with final assembly happening on site.

What do I need to know to recommend, order, and install?

Doors are available in the same frame colors as hard partitions—clear anodized and black anodized.

Hinged doors offer more width options than either sliding door as shown below.

Dimensions:

CUSTOM WIDTH x 4.85" depth x CUSTOM HEIGHT

Width dimensions cannot exceed 150.8"

Height dimensions cannot exceed 98.24"

When selecting the width of your ContainAire Single Hinged Doors, it is advised that you choose a measurement 20" greater than that of the intended aisle. This allows for an overlap of about 10" on either side, ensuring minimum air leakage and flexible mounting positions. Tate has developed a few standard part numbers for hinged doors at a 66.5" width, which works nicely with a 48" wide aisle as shown in the image below.



ContainAire Hinged Door

Hinged doors also have separate part numbers depending on the direction they swing. The door in the image above would swing right when facing the outside of the aisle.

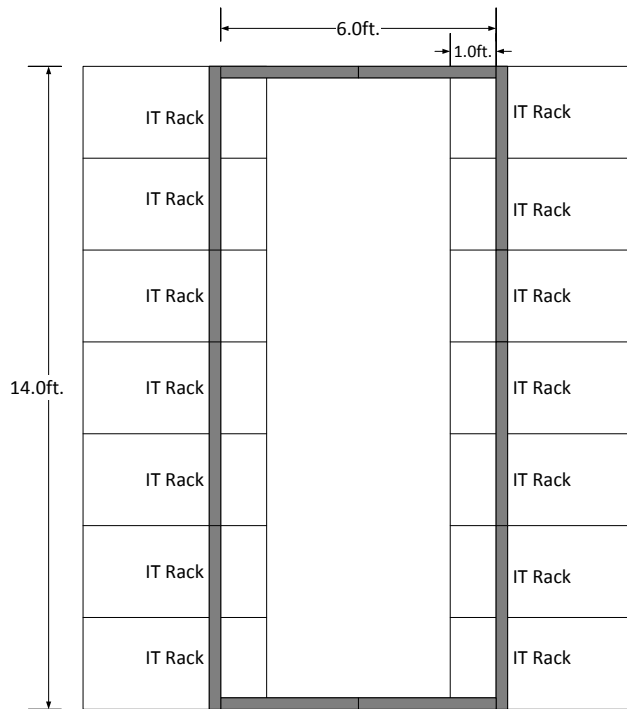
Are there any special considerations?

Some hinged doors are described as “café” doors or “saloon” doors—meaning they are free-swinging in either direction. This trait can be useful in data centers when using equipment carts. Tate Single-Hinged Doors are not constructed this way; they require an operator to use the handle to open.

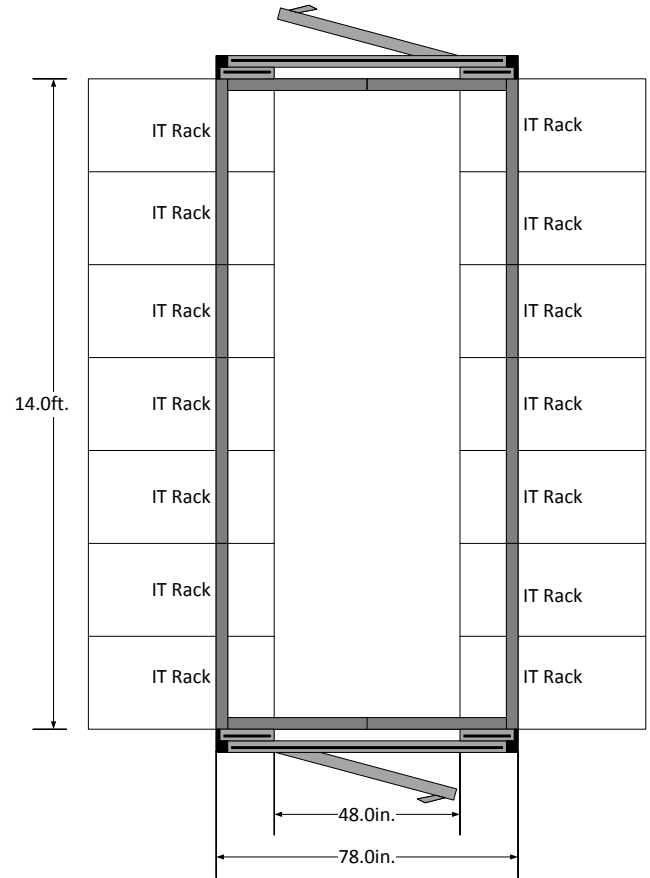
Tate can quote café-style doors as a special order.

Example Layout:

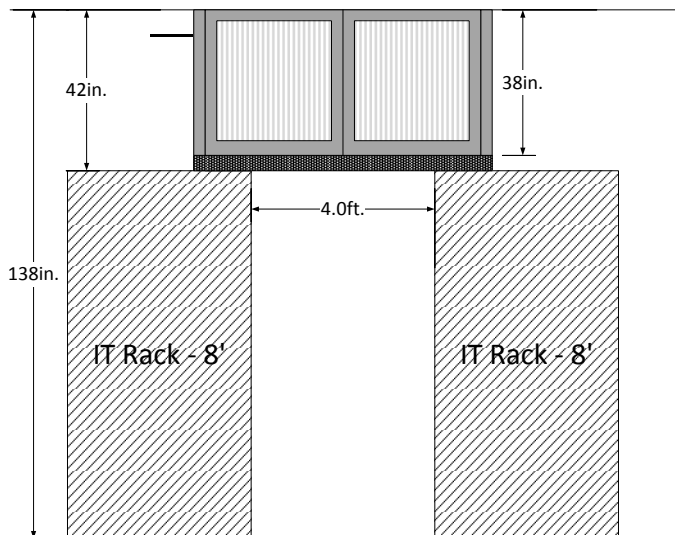
Existing Aisle Layout



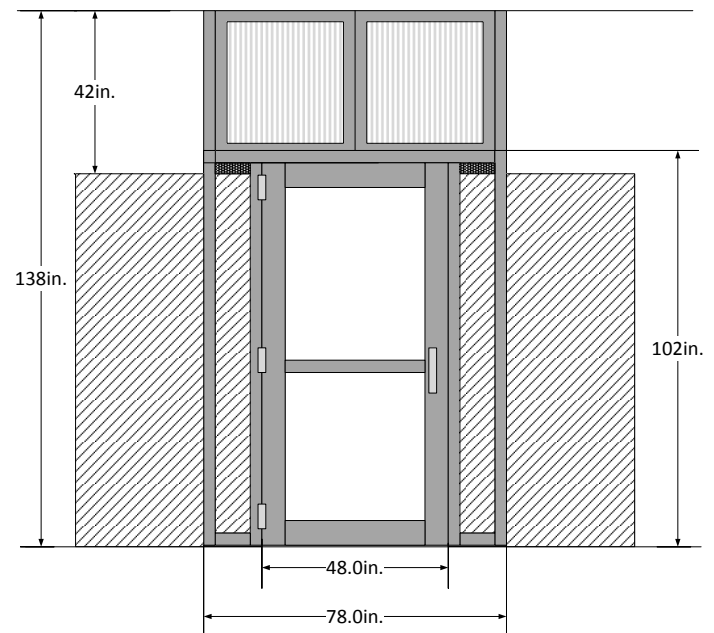
Solution



Existing Aisle Layout



Solution



Based on the diagrams on the previous pages consider the following example:

Given:

Two rows of 7 racks each form an aisle; both rows are comprised of 7 x 8' racks. There is a 4' cold aisle between the two racks. The end user has chosen to use ContainAire Hard Partitions for the vertical containment component.

6 x CAHPC36X48M
4 x CAHPC36X36M

2 x CAHPC36X24M
8 x K10098

The end user would also now like to use ContainAire Single Hinged Doors as the aisle end containment component.

Solution:

Based on a 4' wide cold aisle with a cabinet height of 96", the appropriate ContainAire Single Hinged Door can be no less than 96" tall. In this case, a door height of 102" is advised because it overlaps the 6" brush of the suspended hard partitions, creating a more airtight seal. A total door width of 78" is an appropriate measurement for this specific aisle end because it is the same width as the end hard partitions, adding aesthetic and minimizing gaps, and also because it allows for about 1' of overlap on either side. It is advised that the opening width, the width through which someone would enter and exit the door, is no greater than the width of the aisle. In this case, an opening width of 48" fits well.

Total Bill of Material:

2 x CAHDRC102X78C

6. ContainAire™ Strip Doors

What are they?

The ContainAire Strip Doors are the least expensive option to provide entry into contained aisles while also serving as an air barrier. The doors are made of the same material as ContainAire Soft Partitions.

The ContainAire Strip Door arrives arrive in pre-assembled panels, which must be ordered to meet the dimensions of your specific aisle containment needs. A typical order would include the minimum number of horizontal track lengths needed to either equal or, in most cases, overshoot the width of a given Aisle. Adjustments can then be made on sight to ensure a more accurate fit. When accounting for the height of one's ContainAire Strip Door, one must order the closest option greater than or equal to the intended height. The excess length of the ContainAire Strip Door can be cut even with the floor.

What do I need to know to recommend, order, and install?

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

It is critical to order your ContainAire Strip Door in a width greater than or equal to the width between the ContainAire Soft Partition corner pieces. If the width between corner pieces is greater than the width of the aisle, the excess vinyl can either be rolled up on top of the cabinet or left overlapping the cabinet.

Strip doors are ordered in a fashion similar to the ContainAire Soft Partitions. The curtain heights are noted in the table below:

Dimensions:

Available Heights	36"	96"	144"
Available Lengths			
48" Track	CASDC36X48V	CASDC96X48V	CASDC144X48V

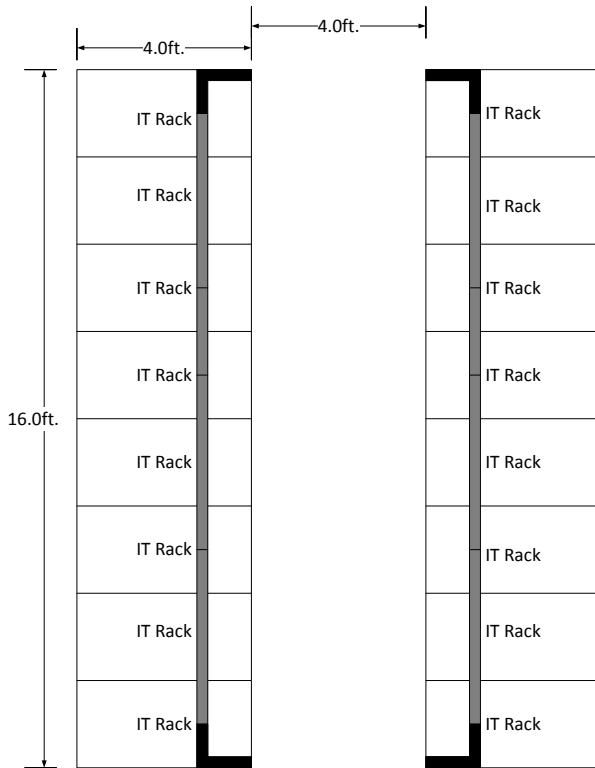
Included Components:

- 1 x 4' Long Header Rail
- 1 x Straight Connector w/ Color Matching Thumb Screws
- 2 x Ceiling Grid Connector
- 1 x 4' Long Curtain Rock and Lock Bracket

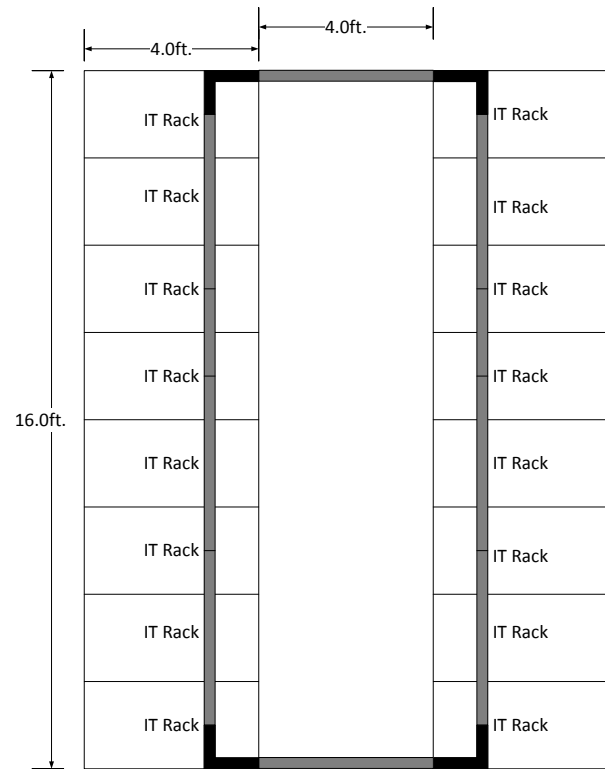
Are there any special considerations?

The special considerations for ContainAire soft partitions also apply to the strip doors. Of particular note are the ceiling clip variants and the use of thermal fusible links.

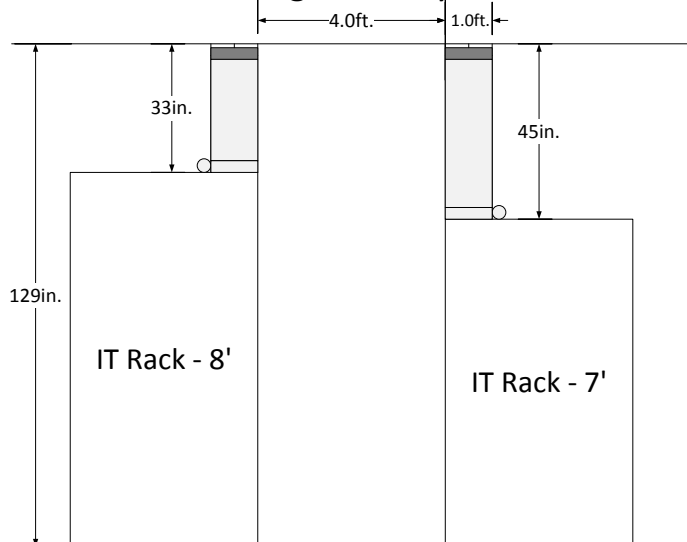
**Example Layout:
Existing Aisle Layout**



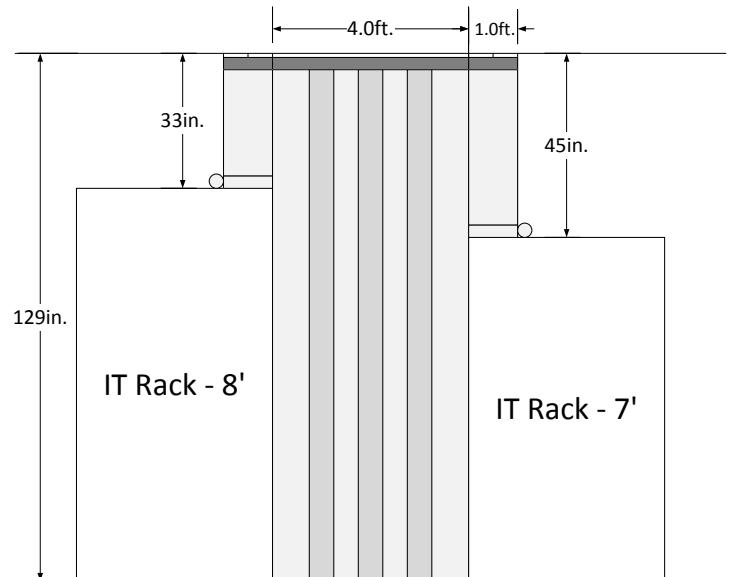
Solution



Existing Aisle Layout



Solution



Based on the diagrams on the previous pages consider the following example:

Given:

Two rows of 7 racks each form an aisle; both rows are comprised of 7 x 8' racks. There is a 4' cold aisle between the two racks. The end user has chosen to use ContainAire Soft Partitions for the vertical containment component.

4 x CASPC36X48V 2 x CASCC36X12V
4 x CASPC96X48V 2 x CASCC96X12V

The end user would also now like to use ContainAire Strip Doors as the aisle end containment component.

Solution:

Based on a 4' wide cold aisle with a total height of 129", the appropriate ContainAire Strip Door must be greater than 129". This means we must order the strip door with height 144". We need only order one track length for each end because the standard length of 48" matches the width required for the cold aisle.

Available Heights	36"	96"	144"
Available Lengths			
48" Track	CASDC36X48V	CASDC96X48V	CASDC144X48V

Total Bill of Materials:

2 x CASDC144X48V

Note: 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.

7. ContainAire™ Hard Roof

What is it?

The ContainAire Hard Roof is an option for cold aisle containment. The roof encapsulates the cold aisle, keeping cool supply air in the aisle and keeping warm return air outside of it.

The ContainAire Hard Roof is custom ordered with 3 main components: the main runners, the structural tees, and the tiles. The main runners and structural tees account for the structural ceiling grid, while the tiles, which are custom cut and then placed in each grid, create an air tight seal.

The tiles are composed of Ceilume material which shrinks in the event of a fire condition. As the material shrinks, overhead sprinklers can achieve their necessary coverage.

What do I need to know to recommend, order, and install?

The foundations of the Hard Roof are the aluminum extrusions used in Tate's Structural Ceiling Grid. These pieces are sold in 12ft, 4ft, and 2ft pieces and are assembled together to create grids that are 2ft x 4ft and 2ft x 2ft. However, the extrusions can be cut into different dimensions depending on aisle dimensions.

There are no *standard* part numbers for the Hard Roof design. Tate can provide pricing based on detailed aisle dimensions.

The grid color is available as clear anodized or painted (black and white are popular color options).

Are there any special considerations?

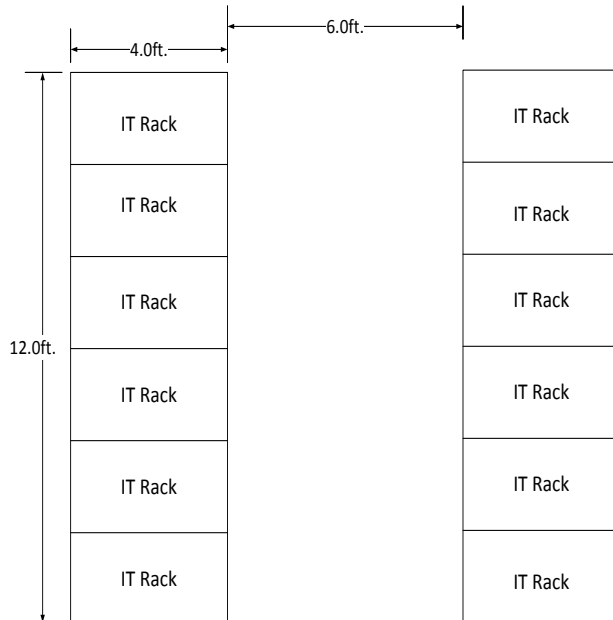
1. **Attachment:** The simplest installation has the roof lying flat on cabinets and extending across a cold aisle. This solution is complicated by the fact that most cold aisles aren't uniform in their cabinet choices. Different cabinet heights make this method of attachment difficult

The roof can be combined with small hard partitions resting atop shorter cabinets to create a level mounting surface.

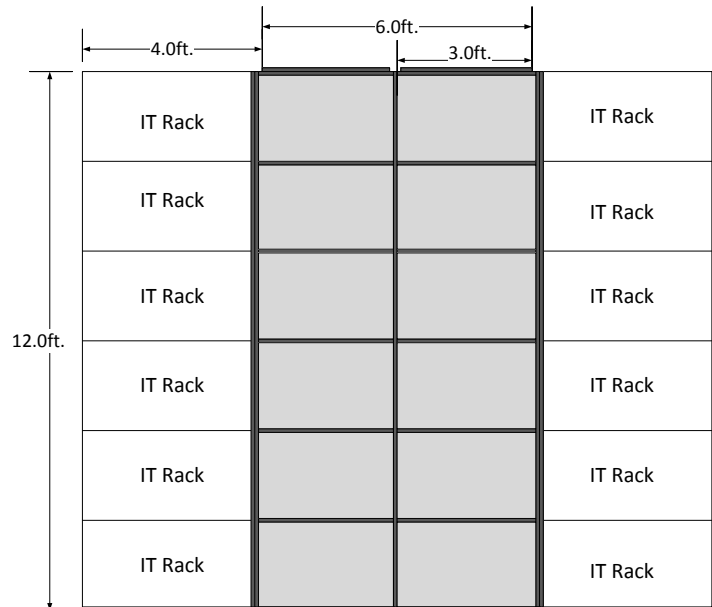
2. **Fire Suppression:** This installation is particularly relevant to fire suppression topics, as a roof essentially creates a "room within a room." These products are used most often with overhead sprinklers, and as such, one should take care to note compare the activation temperatures of the sprinklers versus the activation temperatures of the Ceilume tiles.

Example Layout:

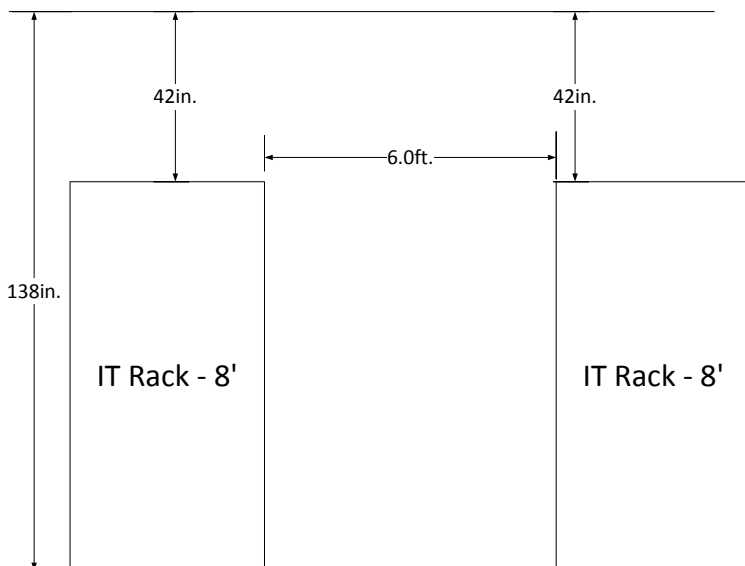
Existing Aisle Layout



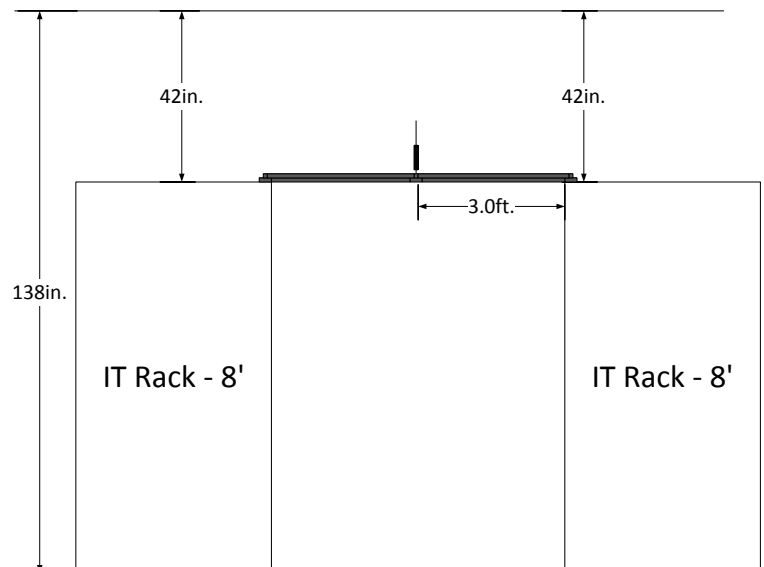
Solution

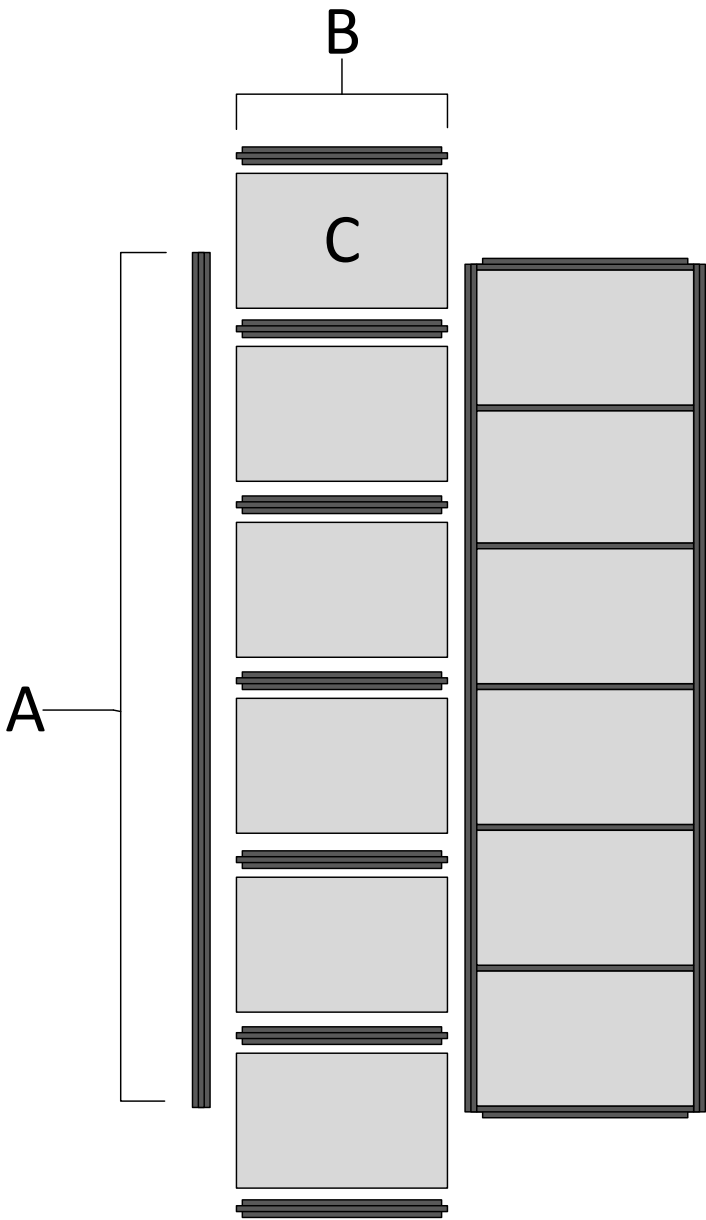


Existing Aisle Layout



Solution





A	B	C
12' Long Main Runners (3 x Required)	3' Long Structural T's (14 x Required)	23.75" x 35.75" Ceiling Tiles (12 x Required)

Based on the diagrams on the previous pages consider the following example:

Given:

Two rows of 7 racks each form an aisle; both rows are comprised of 7 x 8' racks. There is a 6' cold aisle between the two racks. The end user has chosen to use a ContainAire Hard Hoof for the horizontal containment component.

Solution:

In order to determine the dimensions required for order, the end user must consider both the length and width of the aisle.

The aisle is measured to be 12' long, while only 6' wide. That being said, the standard grid dimensions, 2'x2' and 2'x4', cannot solely be used to cover the required space. The end user can now choose to use a mix of standard grid dimensions and custom dimensions or use a set of equivalent custom grids. In most cases, the hard roof will be most aesthetically pleasing if each grid is equal in dimension. To achieve this, the end user must order a hard roof with 2 symmetric rows of grid dimensions 2' x 3'. That being said, 3 12' long main runners will layout the base frame, 2 positioned on opposite cabinets and 1 running down the middle, and then 7 x 3' long structural T's can be positioned evenly along either side of the center runner. Once the structural T's, 14 in total (7 on each side), have been secured onto the main runners, the ceiling tiles can be laid into the corresponding grids. The Ceilume Polyline ceiling tiles, which are made of vinyl plastic, come with a length and width .25" shorter than the desired length and width of each grid. In this case, each grid is 2' x 3', or 24" x 36", so the ceiling tiles will need to be 23.75" x 35.75". This enables the ceiling tiles to rest seamlessly within each grid. Our final order will then be:

14 x 3' long Structural T's.

3 x 14' long Main Runners

142 x (23.75" x 35.75") Ceiling Tiles

Note: The Ceilume Polyline ceiling tiles were observed to drop out of their ceiling grids at approximately 135° F. That being said, the ceiling tiles are guaranteed to drop out of the ceiling grid before the sprinkler system is activated.