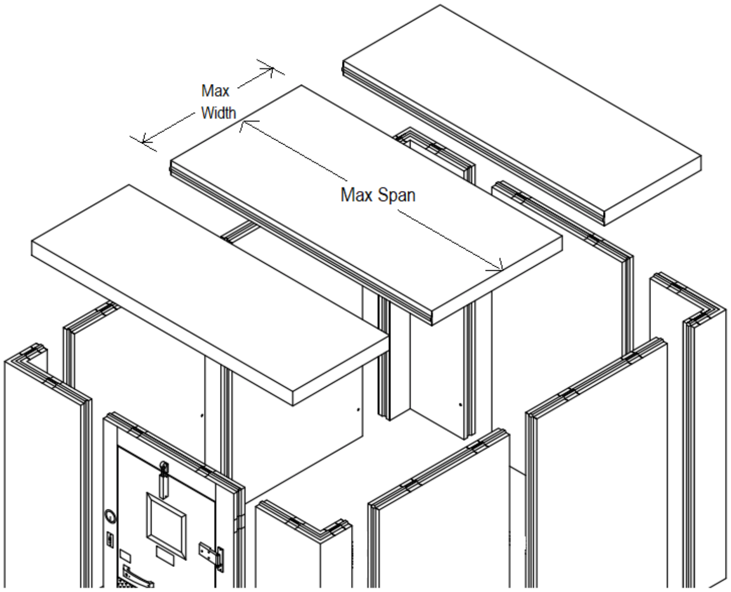
Ceiling Panels

Arctic Walk-in Cooler and Freezer Ceilings

Ceiling panels are a crucial component in the engineering design of a walk-in cooler or freezer. While floor panels benefit from transferring their loads uniformly to the facility floor, ceiling loads are engineered differently. In most cases, ceiling panels span *in the air,* supported only by the walk-in walls. Considerations such as free span, dead loads, and live loads are fundamental in any ceiling design and determine the type of ceiling required or the need for any additional structural elements. The maximum size of ceiling panels that can be manufactured for a specific project is determined by a combination of varied factors such as application, geographical location, material characteristics, manufacturing equipment, and manufacturing limitations amongst others.

Arctic has worked extensively with third-party, independent testing laboratories and structural engineering firms to scientifically test dozens of ceiling panels. These independent third-parties are used to ensure a non-biased load rating of Arctic's panels. Arctic is one of the few walk-in manufacturers committed to this level of testing and analysis by independent third parties. This ensures the safety and code compliance of our walk-ins while offering security and confidence to all our customers. Engineers at Arctic continue to make great strides in ceiling panel design, positioning Arctic at the forefront of the industry and embodying Arctic's mantra of Engineering Reimagined®.

Expanded isometric of an Arctic walk-in showing ceiling panel span and width.



Dead Loads

These are loads that are permanent. For structural analysis purposes the panel is assumed to behave as one cohesive element made of dissimilar materials (metal and foam). Examples of dead loads are the panel's own weight, refrigeration equipment, roof membranes, roof sloping material, etc.

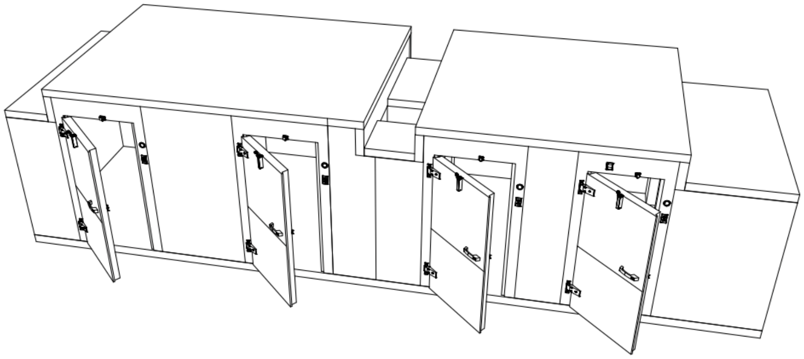
Live Loads

Unlike dead loads, these are dynamic loads that must be predicted as accurately as possible. Examples of live loads are snow, wind, maintenance personnel, etc.

Arctic Ceiling Panels General Specifications

- 4" and 5-⅜" thickness ceiling panels available
- UL Listed, Class 1 fire rated inner foam foamed-in-place panels
- Classified to ASTM E84 (UL Standard 723)
- High density U-Channel framing to ensure structural strength and durability
- Heavy-gauge steel panel fasteners constructed of a camlock and mating steel pin
- NSF approved vinyl gasket on the tongue edge of the panel. Gasket color is either gray, white, or black to closely match the metal skin color
- Wide tongue throat to ensure tight vapor proof joints
- Meets NSF Standard 7
- Meets Federal Energy Regulations and are EISA compliant
- Insulation does not contain any chlorofluorocarbons (CFCs) and does not contain any substances that are considered declarable according to the EPA Clean Air Act (CAA)
- Metal finish is as specified by the customer from a variety of finishes to choose from
- Can meet customer's specifications with notches, corner cut outs and sloped ceilings

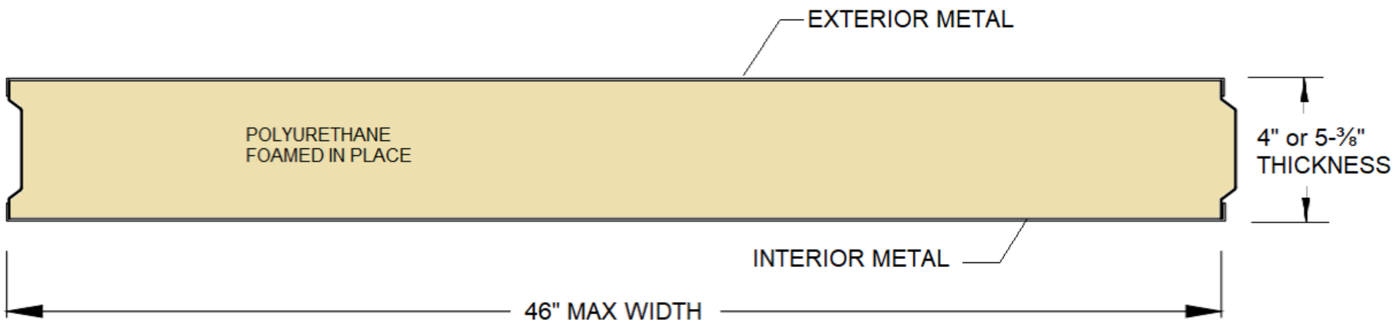
Arctic Signature Series walk-in cooler and freezer project with a custom ceiling design.



Arctic Types of Ceiling Panels

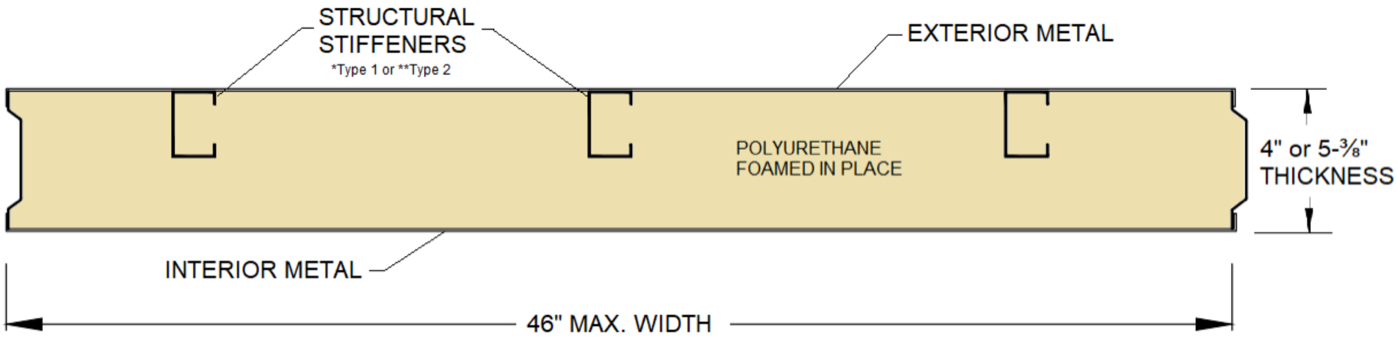
Standard Ceiling Panels

The most commonly used type of panel, standard ceiling panels provide amazing performance and affordability without compromising structural integrity. See Tables 1 (page 4) and 2 (page 5) for maximum spans for standard ceiling panels.



Reinforced Ceiling Panels

With the addition of structural elements, the ceiling strength is increased significantly resulting in the capacity for much longer ceiling spans. Additional structural elements are foamed-in-place making the panel a single cohesive structure that is significantly stronger than a standard ceiling panel. See Tables 1 and 2 for maximum spans for reinforced ceiling panels.



Arctic Ceiling Panels Maximum Spans

The following tables provide a quick general reference for maximum ceiling spans; however, it is important to consider that many factors influence the maximum span of a ceiling panel. Contact your Arctic representative for advice on engineering the best ceiling solution for your project.

Table 1 – Indoor Walk-ins

Arctic WALK-IN COOLERS AND FREEZERS

Engineering Reimagined®

INDOOR WALK-IN COOLER AND FREEZER CEILING PANEL MAXIMUM SPANS

Ceiling Panel Thickness	Structural Stiffener	Ceiling Dead Weight (PSF)	MAXIMUM SPAN	
			10 PSF LIVE LOAD	20 PSF LIVE LOAD
4"	None	3.5	14' - 6"	11' - 3"
4"*	Yes	4.3	19' - 9"	11' - 8"
5-3/8"	None	4	15' - 8"	11' - 4"
5-3/8"*	Yes	4.9	25' - 0"	18' - 9"
5-3/8"**	Yes	5.1	25' - 0"	19' - 6"

Important considerations:

- Span measured from outside edge to outside edge
- Includes 150 lbs/ft evaporator coil load installed at 12” from the wall
- 10 PSF LIVE LOAD: No personnel access / no equipment / no condensing units
- 20 PSF LIVE LOAD: Infrequent one-person maintenance / top mount self-contained units
- 4”* and 5-⅜”*: Reinforced ceiling panel with structural stiffener type 1
- 5-⅜”**: Reinforced ceiling panel with structural stiffener type 2

Table 2 - Outdoor Walk-ins

WALK-IN COOLERS AND FREEZERS

Engineering Reimagined®

OUTDOOR WALK-IN COOLER AND FREEZER CEILING PANEL MAXIMUM SPANS

Ceiling Panel Thickness	Structural Stiffener	MAXIMUM SPAN								
		20 PSF LIVE LOAD	30 PSF LIVE LOAD	40 PSF LIVE LOAD	50 PSF LIVE LOAD	60 PSF LIVE LOAD	70 PSF LIVE LOAD	80 PSF LIVE LOAD	90 PSF LIVE LOAD	100 PSF LIVE LOAD
4"	None	10' - 6"	9' - 6"	8' - 5"	7' - 5"	7' - 4"	7' - 0"	6' - 7"	6' - 4"	---
4"*	Yes	11' - 4"	9' - 6"	---	---	---	---	---	---	---
5-3/8"	None	11' - 2"	9' - 9"	9' - 1"	8' - 4"	7' - 10"	7' - 4"	7' - 1"	6' - 10"	6' - 4"
5-3/8"*	Yes	18' - 6"	14' - 4"	12' - 6"	10' - 8"	9' - 5"	---	---	---	---
5-3/8"**	Yes	19' - 2"	16' - 4"	14' - 4"	11' - 9"	10' - 0"	8' - 7"	8' - 5"	---	---

Important considerations:

- Span measured from outside edge to outside edge
- Includes 2PSF for roof membrane
- Includes 150 lbs/ft evaporator coil load installed at 12" from the wall
- 20 PSF LIVE LOAD: Infrequent one-person maintenance
- 30 PSF and up: Utilized with the maximum snow load criteria to meet local building code requirements
- 4"* and 5-⅜"*: Reinforced ceiling panel with structural stiffener type 1
- 5-⅜"**: Reinforced ceiling panel with structural stiffener type 2

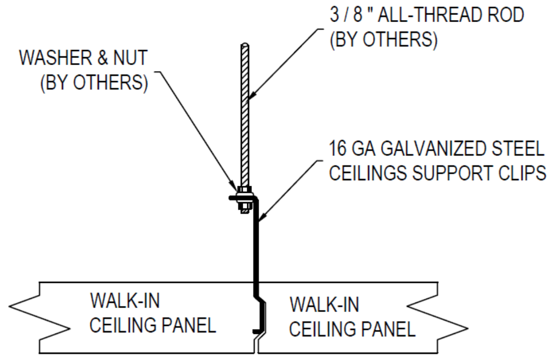
Suspended Ceilings for Indoor Walk-ins

Customers can specify suspended ceilings if they have access to anchoring points at their location. With suspended ceilings, large free span areas of several hundred feet can be achieved for walk-in coolers and freezers. Ceiling panels are supported using a clip and all-thread rod anchoring hardware system, specifically engineered for walk-in ceiling panels that use the existing building's ceiling structures for support. Customers are responsible for verifying that the existing building structure can accommodate the load imposed by the walk-in ceiling.

Arctic's hanging clip system has undergone extensive engineering calculations and full-scale durability testing by third party, independent engineering firms. These extraordinary measures give Arctic the confidence to offer its customers safe and reliable walk-in cooler and freezer ceiling panel solutions for their projects.

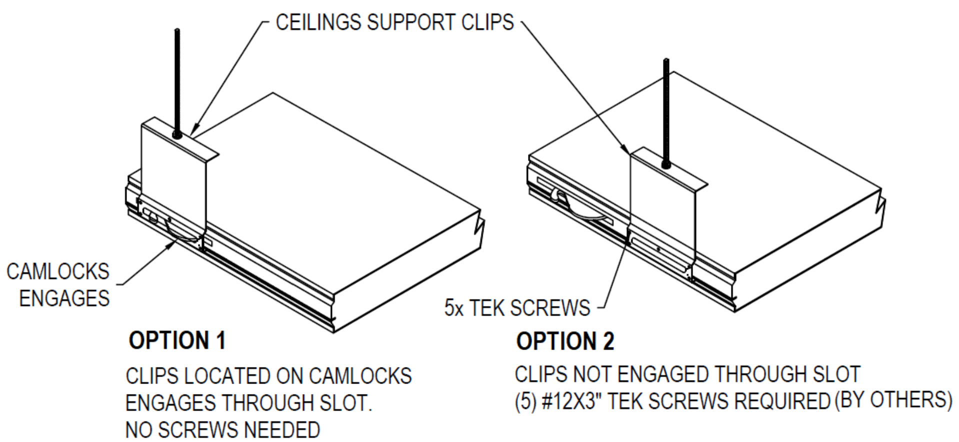
Highlights:

- 16 GA heavy duty galvanized steel clips
- Available for 4" and 5-⅜" panels
- ½" lip design embeds hanging clip into the hard rail
- Specially engineered grooved panels to accept ½" lip from hanging clips



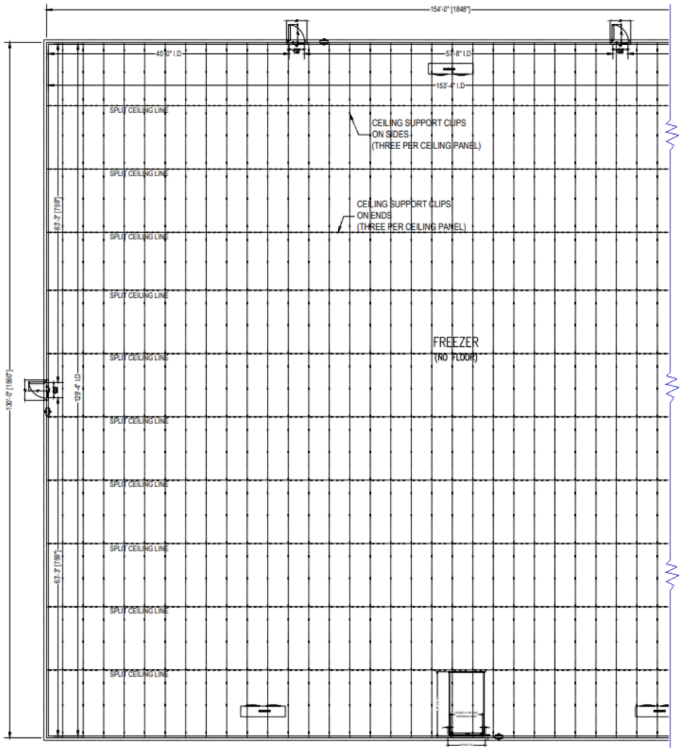
Connection types for hanging clips on suspended ceilings:

- Option 1: Uses the cam-lock panel connection through a long-slotted hole in the clip
- Option 2: Uses five (5) #12 Tek screws anchored directly into the panel's hard rail



Arctic 69' x 36' walk-in freezer project with suspended ceiling panels using hanging clips widthwise (on panel ends).

West side of a large Arctic 154' x 130' walk-in freezer project with suspended ceilings using hanging clips lengthwise (panel sides) and widthwise (panel ends).

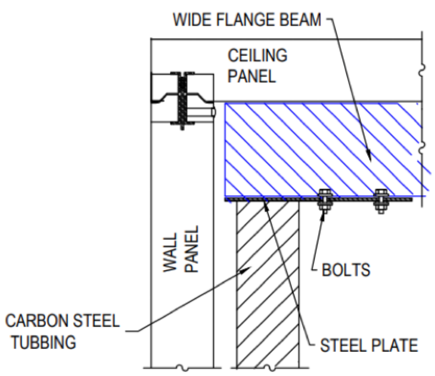


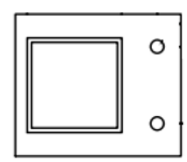
Internally Supported Ceilings

Large indoor walk-ins where the building ceiling is not able to support a hanging ceiling solution and large outdoor walk-in applications are engineered with a system of steel columns and beams to adequately support the ceilings. Additional factors such as: desired free spans, traffic volume, interior equipment placement and size, storage racks, etc. affect column and beam design.

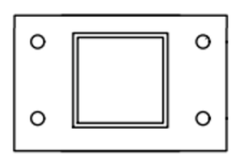
The ceiling design for these applications is unique to the specifications and needs of each project. Arctic works in conjunction with a third party, independent structural engineering firm to design the most economically sensible, dependable, and code compliant solution for each customer.

- Available for 4” and 5-⅜” panels
- HSS Carbon Steel Tubing Columns
- Wide Flange Steel Beams
- Bolts, nuts, and floor anchoring hardware included





TOP PLATE



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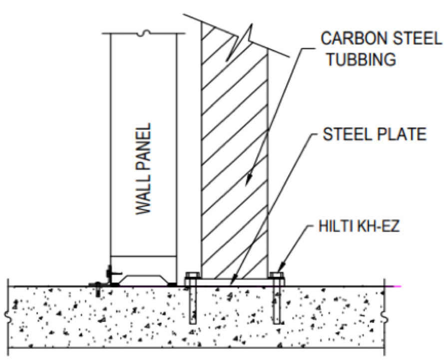
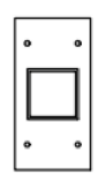
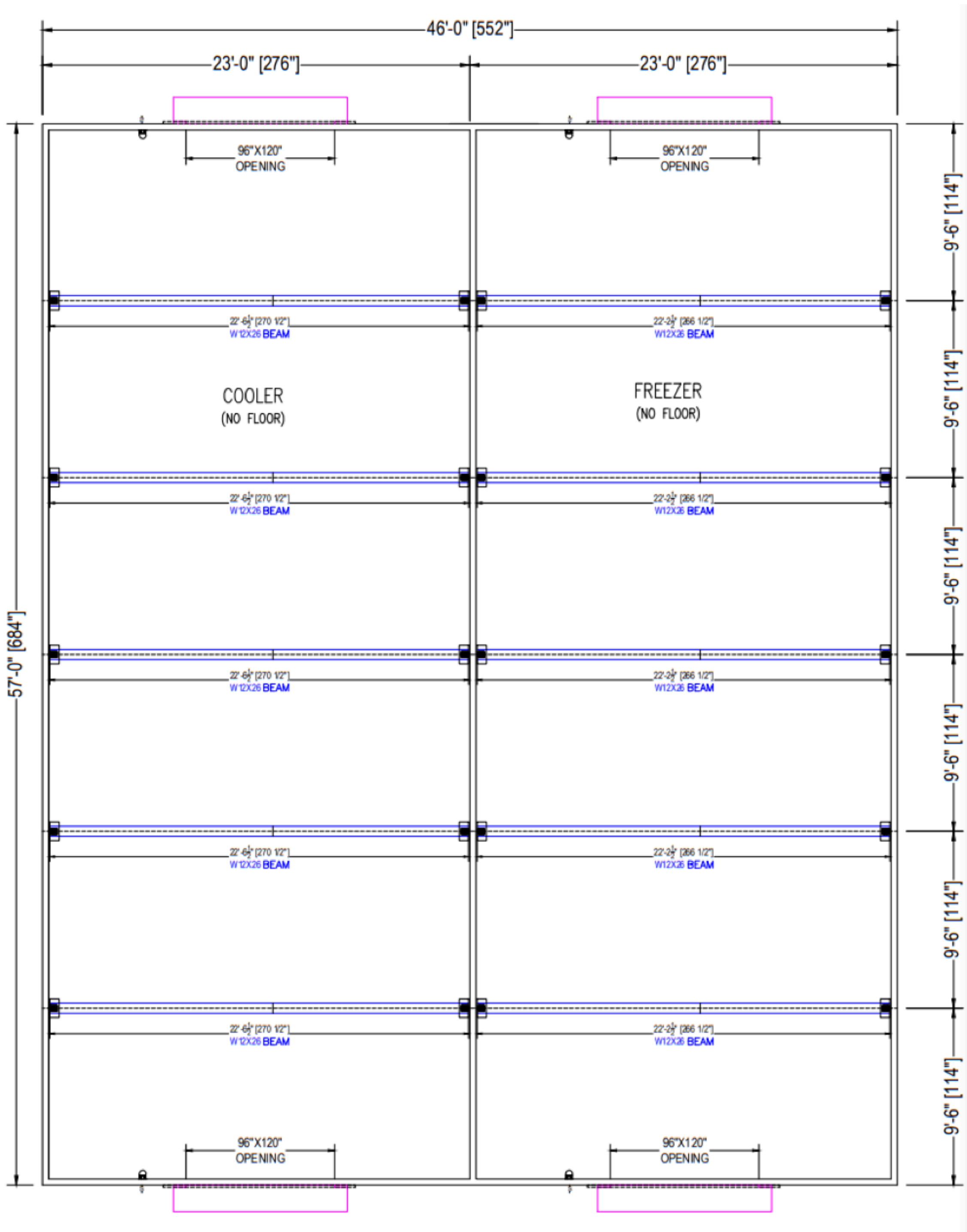




BOTTOM PLATE

Plan view of an Arctic 57’ x 46’ outdoor walk-in cooler-freezer project in a high snow load location utilizing columns and beams to internally support the ceiling panels.

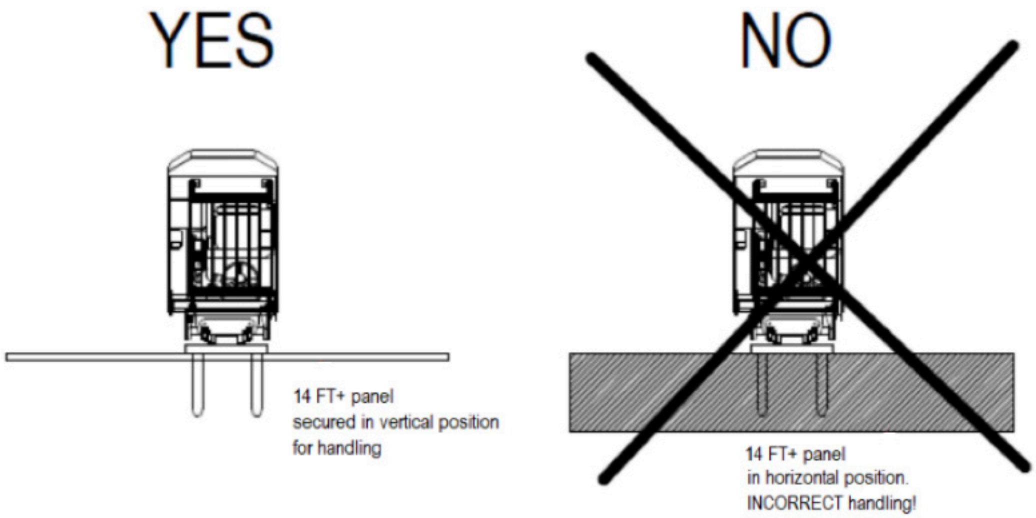


Handling Long Ceiling Panels

When handling panels 14’ or longer, mechanical assistance from lifting equipment such as forklifts or manual hydraulic lifts is recommended.

14’ and larger panels should be secured in vertical position before handling.

Some large walk-in ceiling installations may require temporary framing to support the ceiling panels during assembly. Contact your Arctic representative for advice.



Take Away

Arctic’s continuous pursuit of Engineering Reimagined® provides customers the peace of mind that every ceiling panel design has undergone strict and extensive testing via independent, third party firms. Arctic’s designed solutions prioritize safety, affordability, and quality.

Think Inside The Box™