KEYSTONE
Clean Air Solutions

Apex

Cleanroom Ceiling System
with Integrated Unistrut

Apex Cleanroom Ceiling System with Integrated Unistrut | Table of Contents

Product Overview

Installation Instructions

NOTE: These instructions are for Perimeter Drywall Applications with Integrated Unistrut only. Contact Keystone for other installations at *keysupport@keystonecleanair.com*, or (470)-702-9560.

Before You Start

- Inspect all cartons and boxes for flaws and shipping damage.
  - If anything is discovered to be damaged, contact the shipping company and file a freight claim.
- Review Keystone project specific submittals to ensure booms and Unistrut have been located in the correct height/locations.
- If drywall perimeter is being installed prior to the ceiling system, ensure that the opening is cut to the correct dimensions (as per the submittal), and is square on all corners.
- Ensure all tools (as listed below) are on site and ready for use.
- A minimum of two (2) people will be required to install this system.

Typical Perimeter Drywall Application

DRYWALL PERIMETER
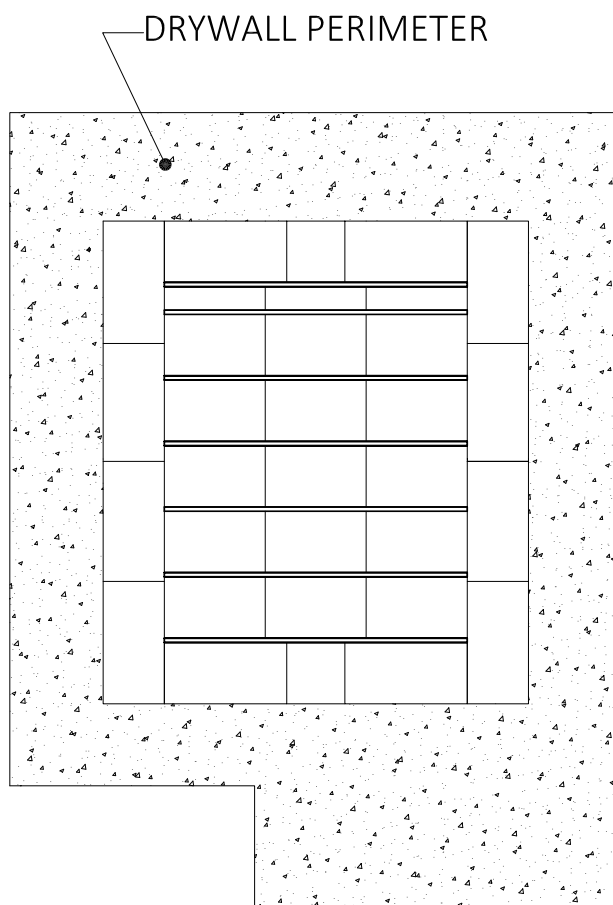
Required Tools/Parts

To be supplied by contractor

- (2+) 8 ft. ladders or scaffolding
- Laser level
- Cordless drill/impact
- #8 self-tapping screws (1/2 in. maximum length) – Apex Cleanroom Ceiling System module connections
- #12 – 14 self-tapping (3/4 in. length recommended) – Apex Cleanroom Ceiling System/Unistrut connections
- Screwdriver bit(s), or power nut driver(s) to suit self-tapping screws
- Damp cloth(s) (for cleaning)
- Utility knife
- Chalk line
- Pliers with wire cutter
- Tape measure
- Clamps/Locking plier
- Pre-stressed 12 ga. suspension wire (or approved alternative) with necessary equipment to hang wire

Price supplied

- Job specific submittal drawing showing all sizes and dimensions of ceiling modules, panels, and Unistrut locations
- Ceiling modules (refer to job submittal drawing for quantity and sizes)
- Access panels (refer to job submittal drawing for quantity and sizes)
- Universal Hold Down Clip (Part Number 026001-001) – **Figure 1**
- Access panel clips – patent pending (Part Number 026002-002) – **Figure 2**
- 1/8 in. x 1/2 in. (t x w) white gasket tape – For backside of tees (Part Number 042373-002) – **Figure 3**
- 1/32 in. x 3/4 in. (t x w) white gasket tape – For between tee sections (Part Number 042373-004) – **Figure 4**
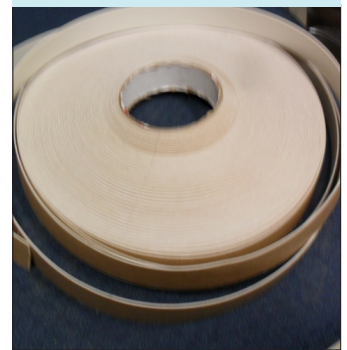
Figure 1. Universal Hold Down Clip 026001-001	Figure 2. Access Panel Clip 026002-002	Figure 3. Gasket 042373-002	Figure 4. Gasket 042373-004

Figure 1. Universal Hold Down Clip 026001-001

Figure 2. Access Panel Clip 026002-002

Figure 3. Gasket 042373-002

Figure 4. Gasket 042373-004

Installation Instructions

NOTE: Unistrut must be installed prior to installation of ceiling system. Confirm that installed locations and lengths of installed Unistrut matches dimensions and locations shown on Keystone's project specific submittals.

NOTE: Check to ensure that the perimeter drywall (if installed), Unistrut, and other equipment are installed at the correct heights using laser level.

Step 1: Snap chalk line on floor to mark locations and sizes of the ceiling module outlines.

Step 2: Unpack ceiling modules and lay them out on the floor (**Figure 5**) as per the job specific submittal package.

**NOTE:** Ensure floor surface is clean and free of debris that could damage the ceiling's finish.

Figure 5. Ceiling Modules
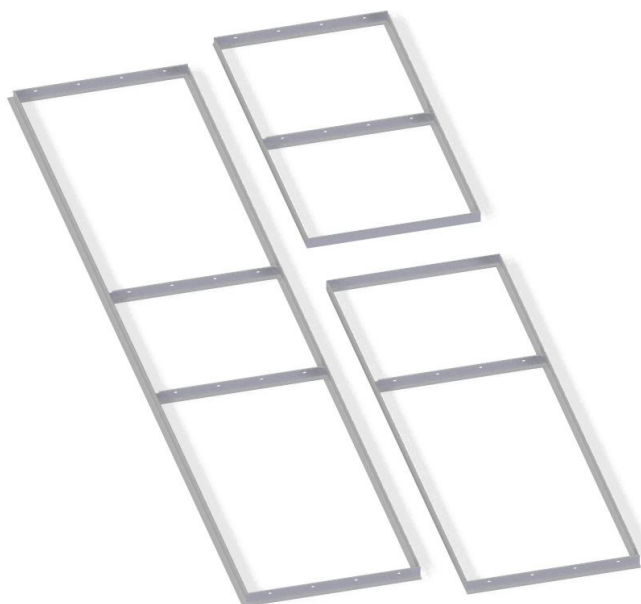
Step 3: Attach lengths of pre-stressed 12 gauge suspension wire to the slab or structural steel (**Figure 6**) above the ceiling according to ASTM C636. For ceiling modules between two Unistrut channels, hanger wire needs to be attached to cross tees.

NOTE: Hanger wire may not be required if Structural Engineer has accounted for the Unistrut to support ceiling modules and ceiling panels (diffusers should be independently supported from the ceiling).

Figure 6. Suspension wires attached to ceiling

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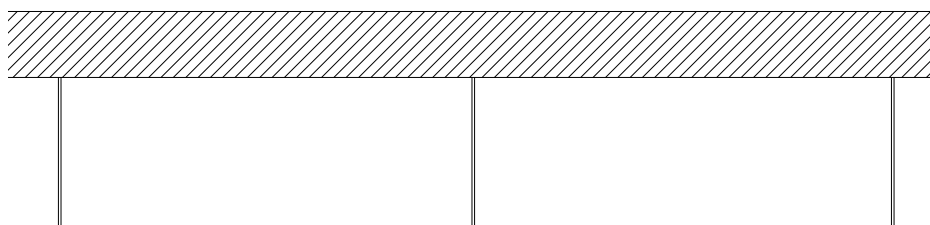
Step 4: Extend hanger wires 6 in. below the laser level line and snip to length as required.

Step 5: Ensure that the tees are clean by wiping them down with a damp cloth.

Step 6: Apply gasket to the backside (horizontal edge) of the tees (Part Number 042373-002). The gasket is supplied in 50 ft. rolls – measure and cut the gasket, as required.

NOTE: Gasket should be installed as close to the edge of the tee as possible – do not extend past the lip of the tee. At corners, gasket should be cut so that the edge of one side is aligned with the edge of the perpendicular tee – do not bend gasket around at corners, or overlap pieces. Do not stretch gasket as it is being applied; this will cause it to pull away from the grid over time. Reference **Figures 7** and **8** below for proper and improper installation
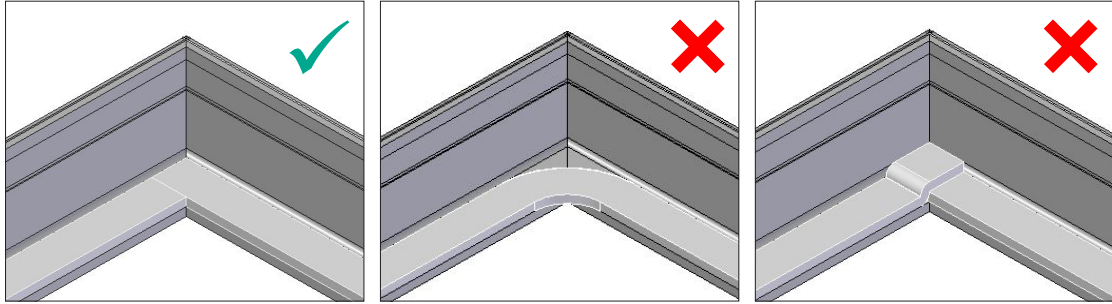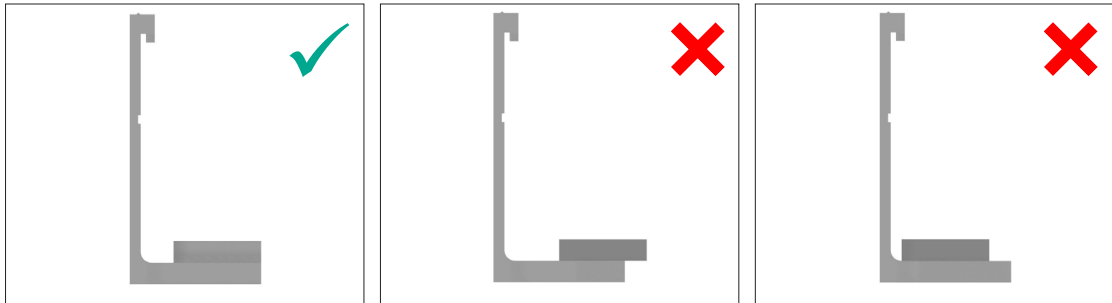
Figure 7. Gasket Installation Isometric View

Figure 8. Gasket Installation Cross Section

Step 7: Apply gasket (Part Number 042373-004) to one outside (vertical) surface of the half tee where two modules meet. Gasket must also be installed along the entire length of the half-tee where half-tee meets Unistrut channels. The gasket is supplied in 50 ft. rolls – measure and cut the gasket as required.

NOTE: Gasket should be installed as close to the top of the tee as possible – do not extend past the top of the tee. Ensure that only one half tee has the gasket applied. Do not stretch gasket as it is being applied; this will cause it to pull away from the grid over time. Reference **Figure 9** for further details.

Figure 9. Half Tee Field Joint
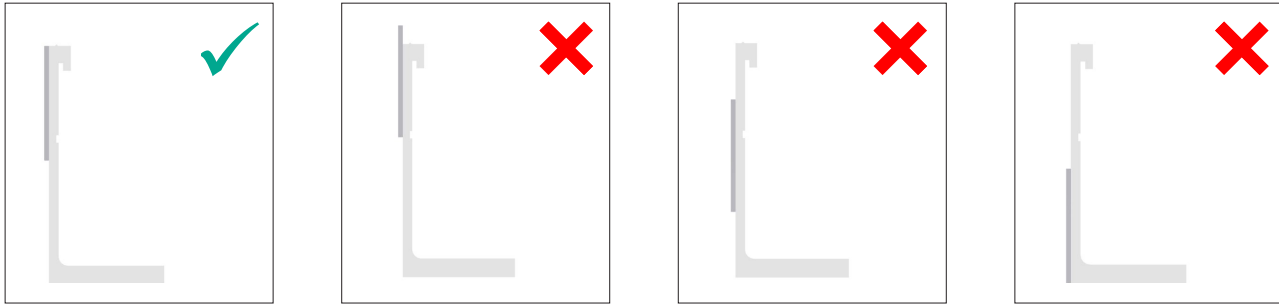
Step 8: If using Keystone supplied Closure Strip, apply Keystone supplied gasket (Part Number 042373-002) to room side horizontal edge on all of the Keystone half tees that run parallel to the Unistrut channels. Align gasket to the outside edge, as per **Figure 10** below. If using Closure Strip provided by others, follow manufacturers recommended installation.

Figure 10. Installed 1/8 in. x 1/2 in. (Part Number 042373-002) on Room Side of Keystone Half Tee

For more information visit **KeystoneCleanAir.com**

Step 9: Where ceiling system integrates with Unistrut, screw/drill the Keystone supplied half-tee to the Unistrut using contractor provided self-tapping screws (recommend #12 – 14, 3/4 in. long), **Figure 11**. The height of the tee will be detailed and called out by the medical equipment manufacturer, typically ranging from flush to 1/2 in. recess. Due to the thickness of the gasket, Keystone recommends a minimum recess of 1/16 in. Additional details are shown below in **Figure 12**.

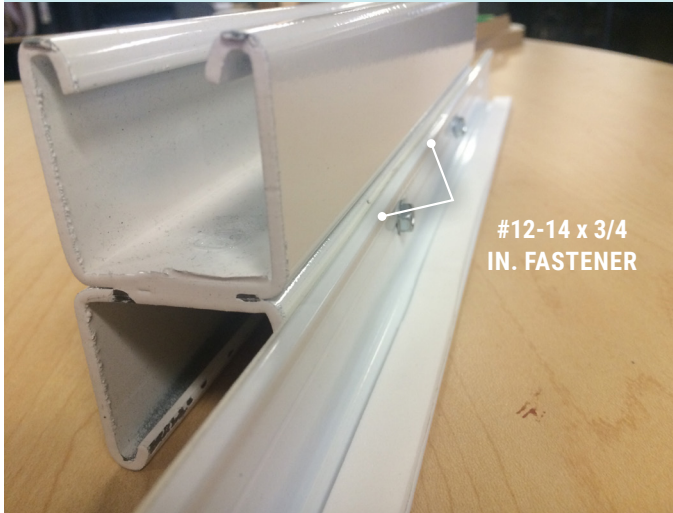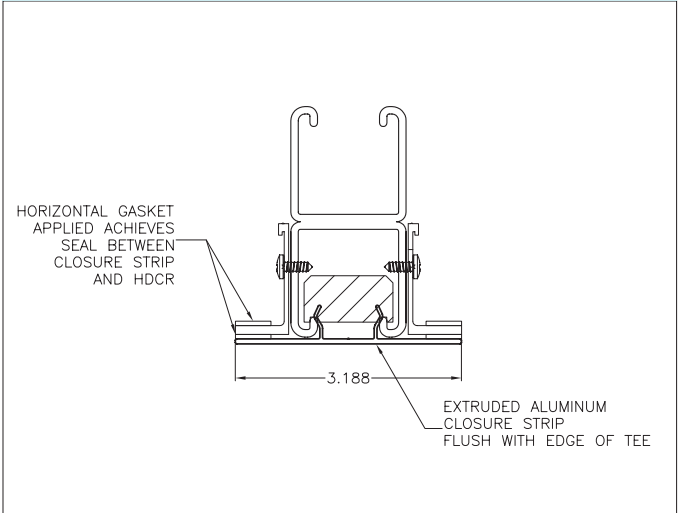**Figure 11. Unistrut and Keystone Half Tee Installation**

#12-14 x 3/4 IN. FASTENER

Figure 12. Cross Sectional Detail of Unistrut, Closure Strip, and Apex Cleanroom Ceiling System Half Tee

HORIZONTAL GASKET APPLIED ACHIEVES SEAL BETWEEN CLOSURE STRIP AND HDCR

3.188

EXTRUDED ALUMINUM CLOSURE STRIP FLUSH WITH EDGE OF TEE

NOTE: 12 in. recommended fastener spacing, ensuring to not block/interfere with any of the fixing blocks or any equipment located within the Unistrut channel. See **Figure 13** for details.

NOTE: Ensure that the 0.031 in. x 3/4 in. gasket (Part Number 042373-004) is installed along the vertical edge of the tee prior to installation. Gasket should be flush with top of the tee. 1/8 in. x 1/2 in. gasket (Part Number 042373-002) should also be applied to the backside of the tee and be flush to the horizontal edge of the tee.

**Figure 13. Isometric View of Unistrut and Apex Cleanroom Ceiling System Section**

12" RECOMMENDED CENTER TO CENTER FASTENER SPACING

P1001 UNISTRUT

APEX CLEANROOM CEILING SYSTEM HALF TEE
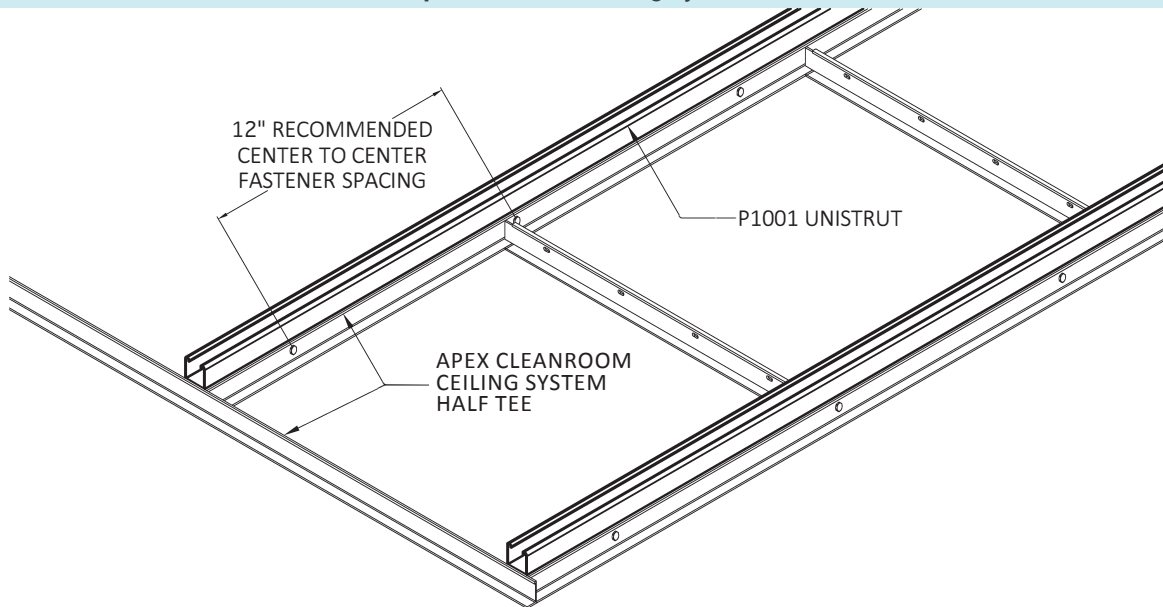
Step 10: For any full-tees located between Unistrut lengths, hang using 12 ga. suspension wire as per ASTM C636.

Step 11: Install all remaining Apex Cleanroom Ceiling System modules (both along Unistrut and between Unistrut), repeating steps 9 and 10.

Step 12: Install remaining Apex Cleanroom Ceiling System located outside of the Unistrut area, starting by raising the first section, temporarily supporting it using hanger wire. Do not twist the wires at this stage; bend in loose 180 degree loops (**Figure 14**) allowing leveling of the ceiling system once all sections are in place.

Figure 14. Hanger Wire
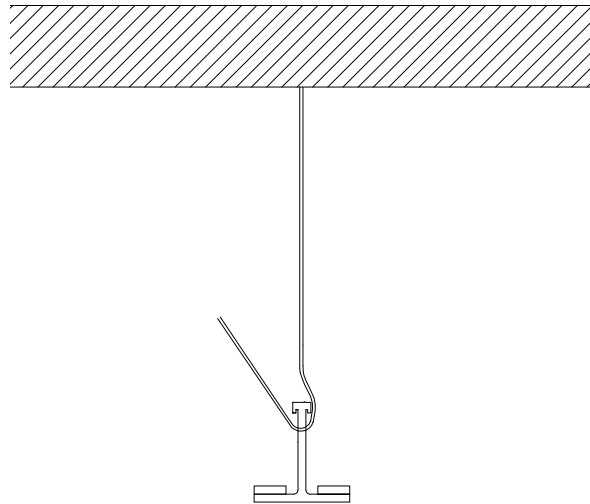
NOTE: If using perimeter Apex Cleanroom Ceiling System, use steps 13A-15A. If using perimeter drywall, skip to step 13B and proceed.

NOTE: It is recommended to start working at one corner of the Unistrut and moving clockwise/counter clockwise around the Unistrut. This method allows for the contractor to trim or extend the drywall to meet up with the perimeter Apex Cleanroom Ceiling System tees to provide a proper fit and seal. As seen in **Figure 15**.

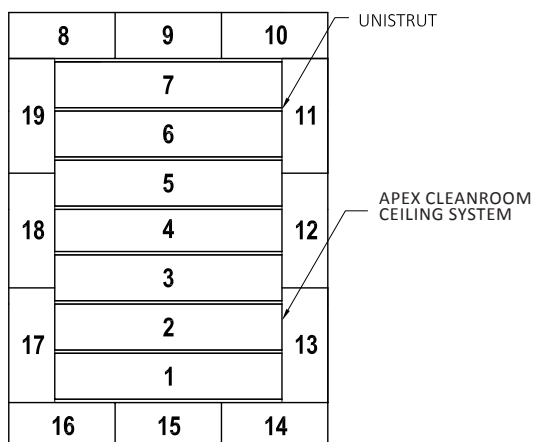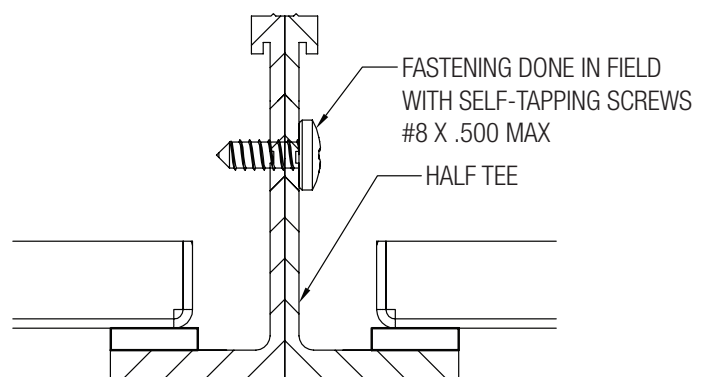**Figure 15. Apex Cleanroom Ceiling System Perimeter Detail**

**Figure 16. Fastening Adjacent Apex Cleanroom Ceiling System Modules**

Step 13A: When connecting adjacent Apex Cleanroom Ceiling System modules, clamp sections together and fasten together using self-tapping screws (**Figure 16**). Bottom of tees should be flush and level prior to screwing together.

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Step 14A: Repeat step 13A until all sections are installed. Proceed to Step 16.

Step 15A: Pull down the perimeter modules to tension the wires, and adjust the wire to minimize settling and movement of the grid once the diffusers, panels and lights are installed. Ensure that they are tight to the drywall (if installed), and/or at the correct height and there is no slack in the hanger wires. A sample perimeter installation detail is shown in **Figure 17**.

Step 13B: When using perimeter drywall, half tees will be shipped loose for perimeter finishing. Locate half tees and attach 1/8 in. x ½ in. gasket along backside (horizontal edge) of the tees (Part Number 042373-002), as per step 6.

Figure 17. Perimeter Installation Detail
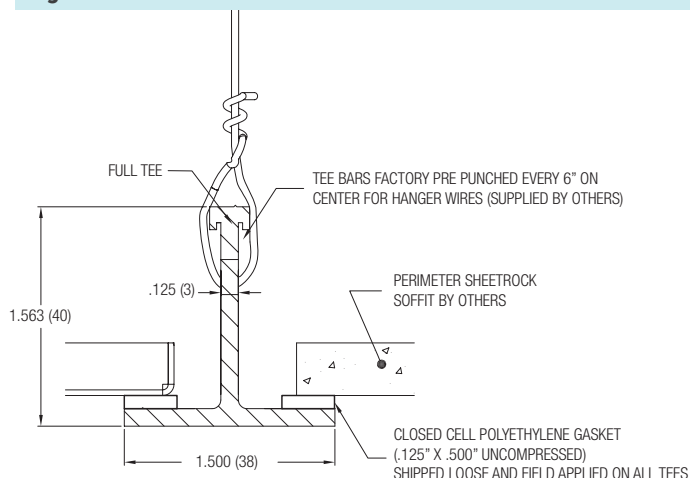
Step 14B: Apply gasket (Part Number 042373-004) to one outside (vertical) surface of the half tee where two modules, or Unistrut and half tee meet per Step 7.

NOTE: Ensure that only one vertical piece (Unistrut or half tee) has gasket applied. Back-to-back gasket may not provide proper seal between room side and ceiling space.

Step 15B: Attach half tees along the edges of the Perimeter Unistrut and perimeter half tees (Figure X and X) using self-tapping screws (by others). Proceed to step 16.

Step 16: Tighten hanger wire by twisting and securing per ASTM C636.

Step 17: Adjust all sections, starting with the immediate adjacent sections, making the entire ceiling grid level and flush. Tightening hanger wires by twisting and securing per ASTM C636, after each module is properly tensioned (**Figure 18**).

Figure 18. Tee Profile with Twisted Wire
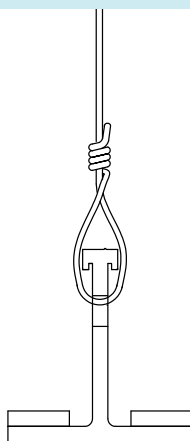
Step 18: Identify ceiling panels that require field cutting for equipment or light booms (panels will have dotted circles shown on submittal drawings, **Figure 19**). Refer to equipment/light manufacturer's instructions for size of hole, mark on the back of the ceiling panel, and cut accordingly.

Figure 19. Sample Job Specific Submittal
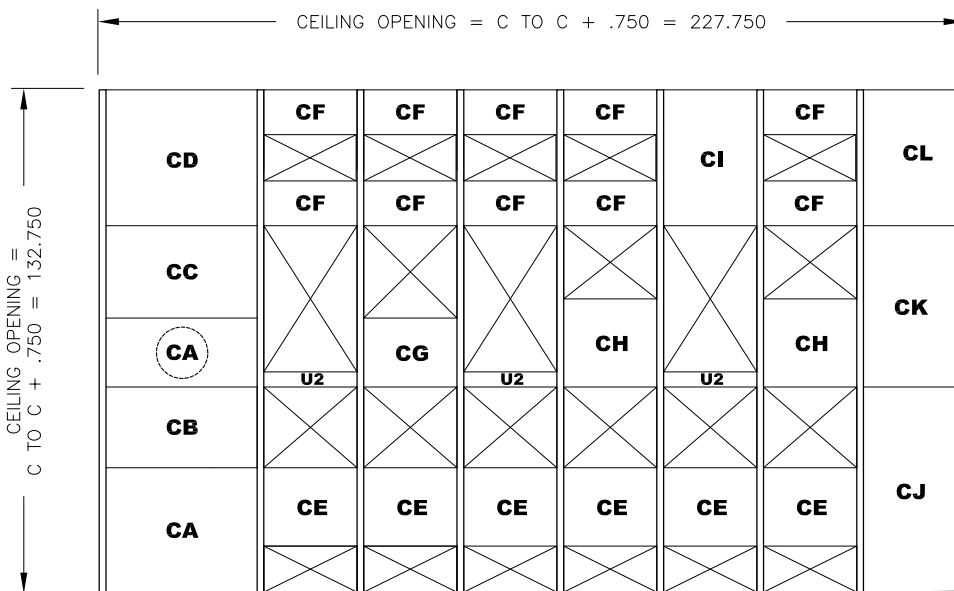
NOTE: Ensure the hole will be covered by the equipment escutcheon (cover plate).

Step 19: Identify ceiling panel locations, denoted with a letter on the job specific submittal. There are two types of ceiling clips used on the Integrated strut systems.

- For panels located between/beside Unistrut pieces, install Universal Hold Down Clips (Part Number 026001-001) by hooking them under the ceiling tee. Refer to **Figure 20** for details.

- For cross tees, or back-to-back modules, install ceiling Install ceiling access clips (Part Number 026002-002) along two opposite sides of where the panel will be installed. To install hold down clips, press the clips on the top of the tee until they snap in place (no tools required). Refer to **Figure 21** for details.
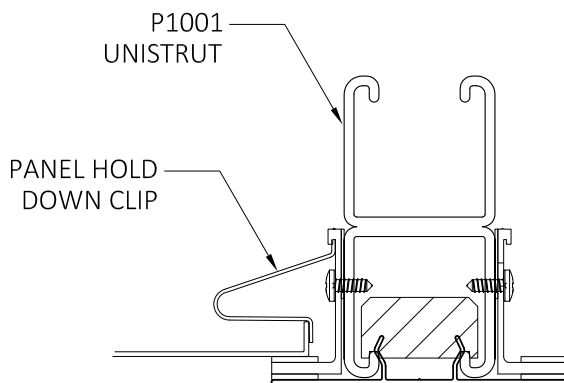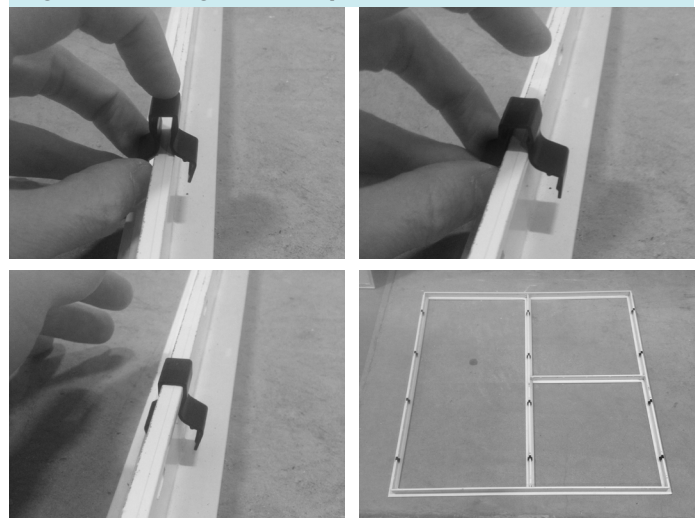
Figure 20. Unistrut Panel Clip

P1001 UNISTRUT

PANEL HOLD DOWN CLIP

Figure 21. Ceiling Access Clips Installation

NOTE: Clips should be installed along the long side of the panels. For square panels, place clips along sides that are parallel to the long dimension of adjacent panels. The first clip should be installed 6 in. from the corner of the panel with the remaining clips spaced equally apart (12 in. in most cases).

Step 20: Install ceiling panels in appropriate locations (refer to job specific submittal for locations). Maneuver panel through the grid opening so that the entire panel is above the tee surface. Place the panel at a 30 degree angle and push one edge of the panel against the ceiling access clips. Drop the panel to engage remaining ceiling access clips (**Figure 22**). For small panels, it may be necessary to push down on some edges to ensure all clips have been locked in place.


Figure 22. Ceiling Access Panel Installation

NOTE: You may need to press the panel in place to ensure all ceiling access clips are engaged. Leave a large panel as the last panel installed. All ceiling panels should be installed prior to the installation of the booms and other equipment.

To remove ceiling panels, push up on the face of the panel near any edge and remove the panel through the opening to access the ceiling above (**Figure 23**).

**Figure 23. Removal of Ceiling Access Panel**
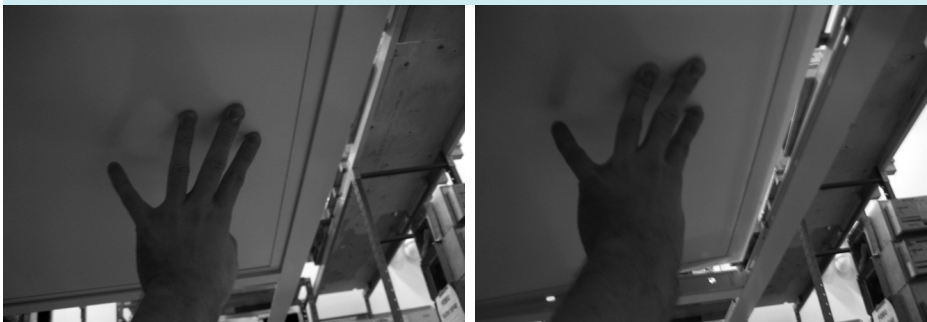
Step 21: For diffuser installation, refer to Keystone Diffuser Installation Manual.

Step 22: Measure distances between breaks in Closure Strip between equipment rails, as well as between equipment rails and end of Unistrut to determine length of closure strips required.

Step 23: Cut closure strips to required lengths. Where Unistrut ends, it is recommended to increase the length of the closure strip by 5/8 in. and cope 1 in. of the vertical pieces so that it butts up flush to Price half-tee. Refer to **Figure 24** for further detail.

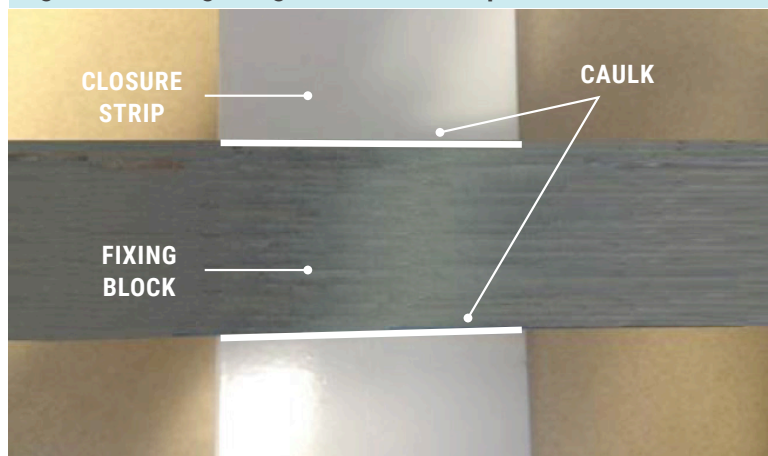**Figure 24. Coped Closure Strip and Side View of Assembly**
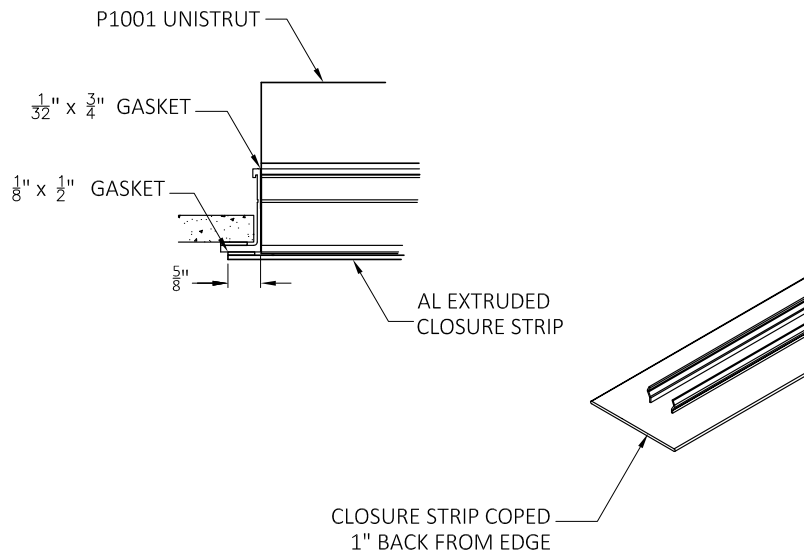
Step 24: Insert closure strip, ensuring that it is tight against the fixing block.

Step 25: Apply thin layer of caulking to seal between fixing block and closure strip (**Figure 25**).

For any questions or concerns with installation please contact *keysupport@keystonecleanair.com* or call (470)-702-9560.

Figure 26. Sealing Fixing Block/Closure Strip

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