

DESIGNFLEX™ for Formations™ Acoustical Clouds

Assembly and Installation Instructions

This system is unique to the ceiling industry. Please completely read all instructions before beginning installation to avoid potential re-work. For more information on this system visit: armstrongceilings.com/designflex

1. GENERAL

1.1 Product Description

The Shapes panels referenced in these installation instructions are made from fiberglass or mineral fiber.

Calla® and Lyra® PB panels feature an acoustically transparent membrane with a smooth white latex paint surface finish.

Ultima® and Optima® panels feature an acoustically transparent membrane with a fine textured white DuraBrite® finish.

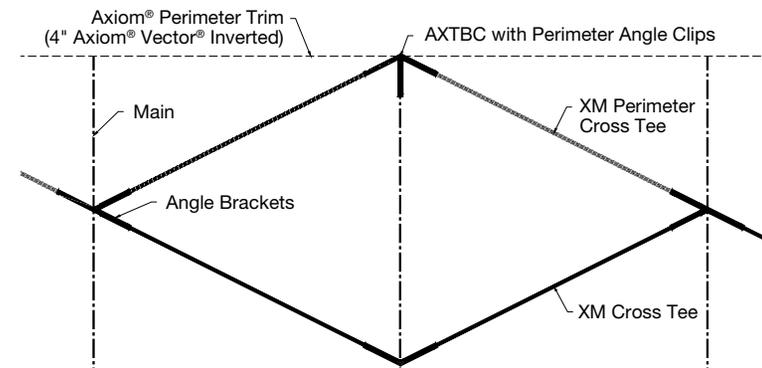
DESIGNFlex™ Shapes patterns are only available in 9/16" Suprafine®. DESIGNFlex Square and Rectangle patterns are available in 9/16" Suprafine and 15/16" Prelude®. If combining Shapes with Squares and Rectangles in a single pattern, 9/16" Suprafine must be used.

1.2 Storage and Handling

Panels shall be installed in a dry interior location and remain in cartons in a flat position to avoid damage. Proper care should be taken when handling to avoid damage or soiling. Protect finished edges – do not stand panels on edges. Keep them face-to-face, back-to-back, and flat on the work surface.

1.3 Site Conditions

Areas of installation shall be free of construction dust and debris. Products with HumiGuard® Plus performance can be installed in conditions between 32°F (0°C) and 120°F (49°C) and in spaces before the building is enclosed, where HVAC systems are cycled or not operating. These products are not recommended for exterior applications, or where standing water is present, or where moisture will come in direct contact with the ceiling.



(Fig 1)

1.4 Fire Performance

Calla®, Lyra® PB, Optima®, and Ultima® Shapes panels are tested to ASTM E84 and CAN/ULC S102 surface burning characteristics. Flame Spread Index 25 or less. Smoke Developed Index 50 or less (UL labeled).

1.5 Safety Considerations

IMPORTANT SAFETY INFORMATION

- This is a custom design and installation.
- This product cannot be installed in a sloped application.
- The final design and installation parameters are the responsibility of your design team.
- Project specific evaluation for compliance with building codes is recommended.
- Armstrong Ceilings has evaluated certain design configurations. Detailed instructions for those designs are available at the DESIGNFlex™ Pattern Gallery located at armstrongceilings.com/patterngallery
- All information provided pertains solely to Armstrong DESIGNFlex ceilings and components. Any ceiling panel, grid, component or accessory substitutions are not covered by these instructions or warranty.

1.5.1 Precautionary Measures

During the installation, be certain that the work site is well ventilated and avoid breathing dust. If high dust levels are anticipated during installation, such as with the use of power tools, use appropriate NIOSH designated dust respirator. All power cutting tools must be equipped with dust collectors. Avoid contact with skin or eyes.

1.5.2 First Aid Measures

If contact occurs, flush eyes and skin irritation with plenty of water for at least 15 minutes and remove contaminated clothing. Wash work clothes with warm water and mild soap. Refer to Armstrong® World Industries SDS (which includes information on established occupational exposure limits), available at armstrongceilings.com/commercial

1.6 Warranty

Installed DESIGNFlex™ for Formations™ acoustical clouds are warranted for 10 years. Instructions within this document must be followed and the system must only use Armstrong Ceiling Solutions components for the warranty to be valid. For full warranty information, please go to armstrongceilings.com/warranty.

1.7 Plenum

1.7.1 Installation of Calla, Ultima, Optima, and Lyra PB Shapes panels requires a minimum of 6" of space in the plenum.

NOTE: Light fixtures may require more space and may determine the minimum plenum height for the installation. See lighting considerations in Section 7.

1.7.2 Independent support of MEP devices is required. There must not be weight from any lights, diffusers, speakers or similar devices supported by mineral fiber or fiberglass shapes panels. All such devices shall be independently supported.

1.8 Cleaning

Dust and loose dirt may easily be removed by brushing or with a vacuum cleaner. Vacuum cleaner brush attachments such as those designed for cleaning upholstery or walls do the best job. Be certain to clean in one direction only. This will prevent rubbing dust into the surface of the ceiling. Use a clean, dry, soft, white cloth to wipe off any dirt or greasy fingerprints. If this does not clean the panel, use a damp, clean, soft, white cloth or sponge with a mild detergent to wipe the panel. Remove any remaining moisture with a dry cloth.

2. AXIOM® VECTOR TRIM AND SUSPENSION SYSTEM INSTALLATION

2.1 Description

2.1.1 DESIGNFlex™

DESIGNFlex for Formations Acoustical Clouds offer DESIGNFlex panels in easy-to-order installation kits to create a custom look using standard components. Formations clouds are designed to work with Armstrong Calla, Lyra PB, Optima, and Ultima panels and 9/16" Suprafine® XL® suspension system.

2.1.2 Included in the kit are:

- Axiom Vector® trim
- Suspension system components cut-to-length to complete the installation
- Aircraft cable, cut to 10' length, in the amount required for the installation
- Axiom splices to join together sections of Axiom.
- Axiom Connector Clips to join suspension system components to the Axiom trim
- Axiom component diagram to properly position perimeter trim sections

- “Quick Loop” connectors
- Additional accessories will be included depending on the specific pattern layout selected
- For specific kit info, see bill of materials – armstrongceilings.com/patterngallery

NOTE: Screws and hardware required for attachment to the structure are not included.

2.1.3 Ceiling panels are ordered separately. Call 1 877 276-7876 to order panels.

2.1.4 Most building codes require non-structural building components to be restrained. Armstrong® Ceiling Solutions also recommends restraint in accordance with local building code requirements. Please consult with the building code professional having jurisdiction over the project to determine appropriate restraint requirements for this installation. Restraints are not included in this kit.

2.1.5 DESIGNFlex™ for Formations™ Acoustical Clouds, as with other architectural features located in the ceiling plane, may obstruct or skew the existing or planned fire sprinkler water distribution pattern, or possibly delay the activation of the fire sprinkler or fire detection system. Designers and installers are advised to consult a fire protection engineer, NFPA 13, and their local codes for guidance on the proper installation techniques where fire detection or suppression systems are present.

CAUTION: Ceiling panels used in DESIGNFlex for Formations Acoustical Clouds must weigh no more than 1.25 lbs/SF. Use of panels weighing more than this stated limit could result in failure of suspension system components.

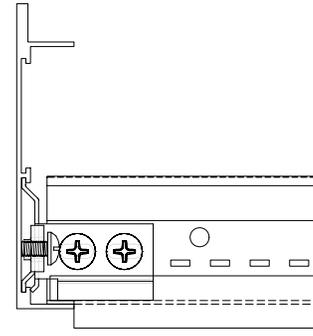
2.1.6 DESIGNFlex for Formations Acoustical Clouds installations can have an assortment of grid layouts resulting in some modules not having an opposite parallel side (triangles).

2.2 Estimating

For guidance on estimating installed costs, contact your Armstrong Ceilings Rep or Techline.

3. INSTALLATION

IMPORTANT NOTE: The Axiom® Vector® (inverted) trim is to be installed with the flange side down when being used with DESIGNFlex for Formations Acoustical Clouds. *(Fig 2)*



(Fig 2)

3.1 Pre-Assembly

Review the layout drawing for the cloud being installed and verify that kit contents are complete. Call 800-840-8521 to request replacements for missing or damaged suspension system or Axiom® components.

3.2 Installing Axiom®

3.2.1 Layout:

- Review your RCP
- Lay out the perimeter of the cloud with the dimensions provided.
- Mark out hanger wire locations on your perimeter with the dimensions provided.
- Layout and snap out the main beam locations with the dimensions provided.
- Layout wires at main beam locations.

3.2.2 Install Aircraft Cables

- Review your RCP

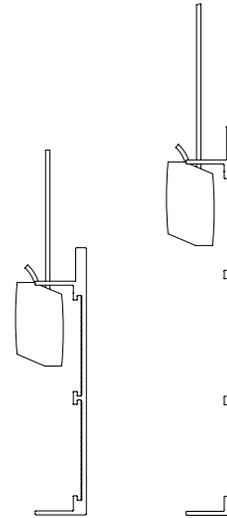
3.2.3 Marking the Axiom® Trim:

- Use provided templates to mark all tee locations that engage the trim.
- Pre-attach all Axiom T-Bar Connection Clips (AXTBC) and pre-bend in the direction of the main beam/primary tee at the marked locations along the Axiom trim. Clips are to be centered between the marks.

3.2.4 Installing and Suspending Perimeter Trim:

- Layout cable locations on top flange of perimeter trim.
- Drill through the top of the flange/Axiom trim at the hanger wires locations with a 1/8 drill bit.
- Install perimeter trim with cable running through top of flange and the “Quick Loop” connector installed under the Axiom flange
- Use the “Quick Loop” connector to level
- Verify trim is level and adjust the “Quick Loop” connector as needed
- Once trim is level, and at final location, run remaining tail of cable back through the the “Quick Loop” connector

NOTE: When installing, make sure the “Quick Loop” connector is installed close to the top of the grid so it cannot be seen above the perimeter trim. (Fig 3)



(Fig 3)

3.3 Installation of Suspension System

3.3.1 Install main beams so that the ends are cut at an angle and intersect sections of the Axiom® trim. Review the layout drawing to make sure main beams are correctly installed and that the long side of the angle is positioned toward the center of the cloud.

3.3.2 Bend the leg of the AXTBC to match the angle of the template and attach the AXTBC to the Axiom trim.

NOTE: When installing, make sure the “Quick Loop” connector is installed close to the top of the grid so it cannot be seen above the perimeter trim. (Fig 3)

3.4 Install Tees/Angle Brackets if Applicable

3.4.1 Move each clip by tapping with a hammer or similar tool, and position near the center of each pair of suspension system marks. Final position will be adjusted later.

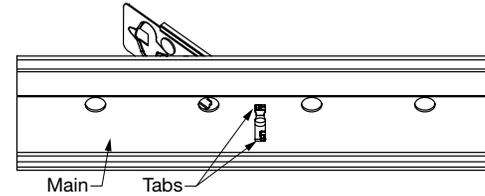
- **XL Cross Tees (if applicable)**

Install any standard cross tees that are perpendicular to the mains at this time to aid with spacing and aligning of the system. Any single cross tee connection must be addressed.

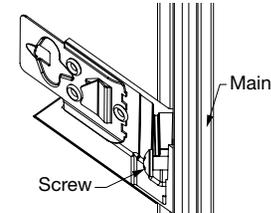
- **Angle Brackets (if applicable)**

Attach the corresponding angle brackets to the main beams per the locations specified in the drawings.

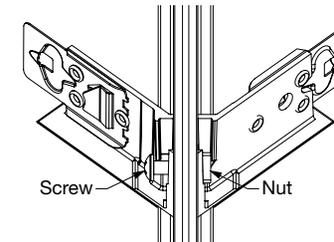
- When two angle brackets occupy the same rout hole, a screw, and nut are necessary to secure them back to back.
- Place one of the angle brackets with the tabs registering inside of the rout hole. (Fig 4)
- Partially insert a screw from the front side to temporarily hold the bracket in place. (Fig 5)
- Insert a nut into the slot of the second angle bracket and place the bracket back to back with the first bracket, with the tabs registering inside of the rout hole. (Fig 6)
- Drive the screw into the first bracket until it pulls both brackets tight against each other. (Fig 7)



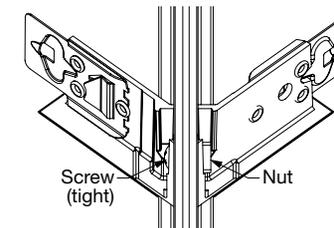
(Fig 4)



(Fig 5)

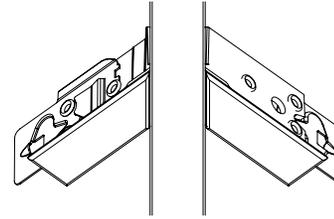


(Fig 6)

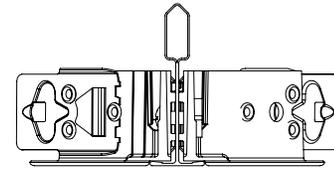


(Fig 7)

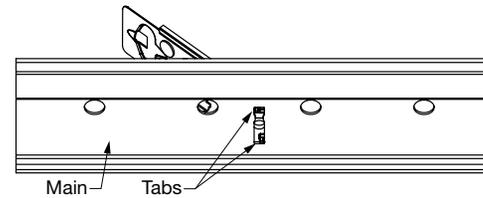
- The finished visual should have the overrides of the brackets flush with the main beam. **(Fig 8 and 9)**
- When only one angle bracket occupies a rout hole, a screw, washer, and nut are necessary to secure it.
- Insert a nut into the slot on the angle bracket and place the angle bracket with the tabs registering inside of the rout hole. **(Fig 10)**
- While holding the bracket in place, insert a screw with a washer into the back side of the bracket. **(Fig 11)**



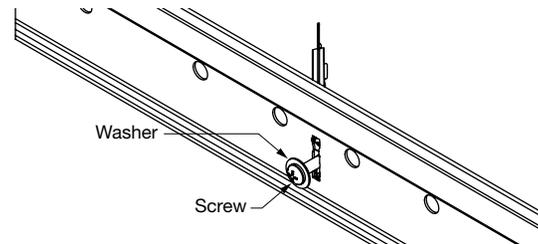
(Fig 8)



(Fig 9)



(Fig 10)



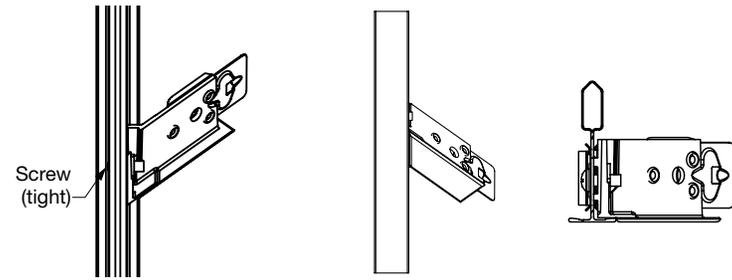
(Fig 11)

- Drive the screw until it pulls the bracket tight and the override is flush with the main beam. *(Fig 12)*
- **Connect XM Angle Cross Tees**
 XM angle cross tees are installed with a stab connection to the angle brackets *(Fig 13)*. These connections are only compatible with the brackets, ensuring that all non-cut XM cross tees will connect to a bracket on both ends. Installations that create a truss-like layout may require a progressive/directional installation of the cross tees as the system will become very rigid as more cross tees are added.

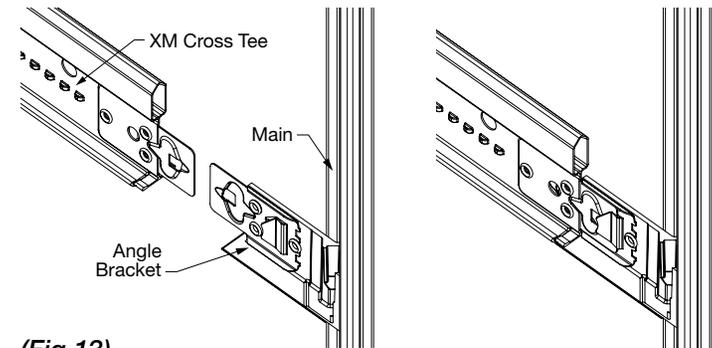
- **Corner Brackets (if applicable)**

To connect cross tees that require corner brackets:

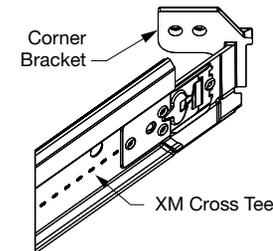
1. Connect the XM end detail of the corner bracket with the XM end detail of the XM cross tee. *(Fig 14)*
2. Connect the XM end detail of the corner bracket with the XM end detail of the XM cross tee. *(Fig 15)*
3. Clamp the corner bracket to hold in position during screw attachment.



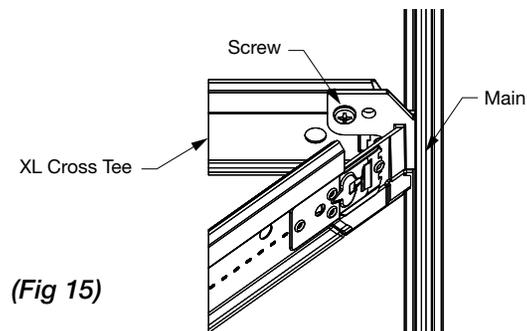
(Fig 12)



(Fig 13)



(Fig 14)



(Fig 15)

4. Secure in place with a 1/2" framing screw through one of the pilot holes into the bulb of the adjacent grid (*Fig 16*).

3.5 Squaring and Leveling

Prior to installation, verify diagonal layout dimensions shown on the drawing. Bracing may be required.

4. DESIGN AND INSTALLATION CONSIDERATIONS

4.1 Directionality

4.1.1 Suspension System:

The suspension system must be installed in accordance with the architectural layout drawings.

4.1.2 Panel Substrate Types:

All Lyra® PB and Calla® Shapes panels are 180 degrees directional due to finish visual. Optima® and Ultima® Shapes panels are non-directional.

4.1.3 Panel Shapes:

All panels must be installed in a specific orientation in order to match the openings of the grid. The specified layout design will dictate the direction of the panels. Panels have a “base” side that runs parallel with the main beams. All Shapes panels, except for Right Triangles, can only be installed in one orientation in relation to the main beam direction. Right Triangle panels are the only shapes for which layouts can be designed with the panels quarter turned so that the “base” side is perpendicular to the mains beams.

4.2 Panel Offset

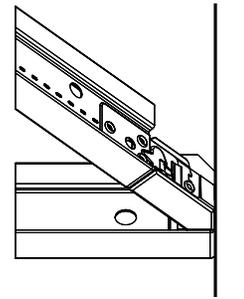
The finish face of the tegular panels drops 1/4" below the face of the grid. (*Fig 17*)

The installed height of components that interface with these ceiling panels, such as sprinkler heads and light fixture trim rings, will have to be adjusted to accommodate this 1/4" offset.

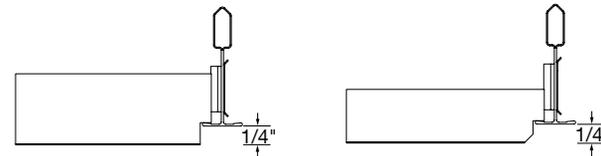
4.3 Approximate System Weight

4.3.1 Overall system weight will be primarily based on the panel type.

- Lyra PB panels weigh 0.50lbs/SF
- Calla® panels weigh 1.1lbs/SF
- Optima® panels weigh 0.50lbs/SF
- Ultima® panels weigh 1.1lbs/SF



(Fig 16)



(Fig 17)

4.3.2 The weight of the suspension system ranges between 0.2 – 0.4lbs/SF.

4.3.3 Hanger connections to the structure must follow the manufacturer's instructions and referenced code. Average system weight per square foot will vary based on panel types and layout.

4.4 Accessibility

4.4.1 Full-size panels without penetrations are accessible. Border panels may not be accessible based on the perimeter interface and the installation method.

5. SUSPENSION SYSTEM

The requirements listed here represent the manufacturer's minimum acceptable installation recommendations, and may be subject to additional requirements established by the local authority having jurisdiction.

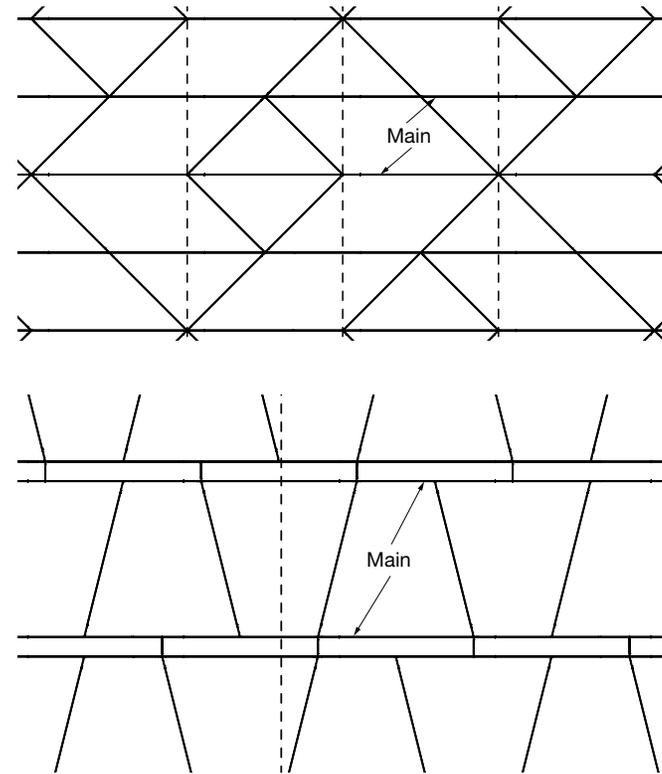
- All installations should follow ASTM C636.
- All references to suspension component duty ratings are per ASTM C635

5.1 Layouts

The grid layout will be based on the Shapes design from the architectural ceiling plans/technical drawing layouts. However, all possible layouts work off of either 4' or 2' O.C. main beam spacing, or a combination of both. Additionally, the standard 6" O.C. rout holes will line up between rows of main beams as in a standard grid system. *(Fig 18)*

5.2 Squaring and Leveling the Grid

DESIGNFlex™ for Formations™ Acoustical Cloud installations cannot be squared by traditional means of measuring the diagonals of a grid opening. It is recommended to verify outside diagonal dimensions to the bill of materials drawing. Bracing may be required to hold these dimensions.



(Fig 18)

5.3 Suspension Rules

Based on the layout, this system may require additional suspension points when compared to the Axiom® trim instructions for a traditional grid system.

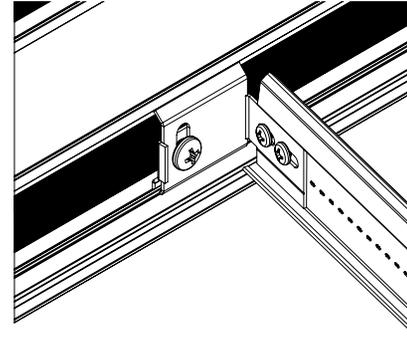
In consideration of the suspension rules below, the Axiom trim can be independently supported to facilitate proper layout.

When the Axiom trim is not independently supported the following suspension rules must be followed:

- All splices (including corners) must be supported by a connecting grid member within 24" on either side of the splice. Situations where there is no grid member that interfaces the trim within 24" of the splice will require supplemental support directly from the Axiom trim to structure.
- The Axiom trim must be connected to supporting grid members no more than 48" O.C. Layouts in which grid does not interface the Axiom trim within 48" require supplemental supports directly from the Axiom trim to structure.
- All grid supporting the trim must have a wire at a max distance from the trim that is not greater than half the length of the grid member, up to a max of 12" (up to 8" in seismic installations).
- Refer to Axiom® Classic trim installation instructions for additional installation requirements for Axiom trim 10" tall or greater.
- Verify the grid opening dimension for the primary cross tee running into the Axiom trim.

5.4 Grid Attachment

- All main beams are attached to Axiom trim by the standard AXTBC connection.
- Single cross tees are attached to Axiom trim by screw-attachment to an AXTBC that is field-modified to match the angle of the cross tee. (Fig 19)



(Fig 19)

5.4.1 Axiom® Perimeter Corner Clip (PCC)

The Perimeter Corner Clip (PCC) is required in layouts where the suspension system connects or where there is an angle change (corner) on the Axiom trim. This clip can be used with inside corners and outside corners not less than 90° when attached to an existing AX4SPLICEB. The PCC is only compatible with the AX4SPLICEB, and cannot be used in conjunction with corner posts. It is installed by the following steps:

- Install the AX4SPLICEB at the corner location.
- Remove the second from the left hex head set screw. *(Fig 20)*
- Place the PCC at the corner location with the slot aligning with the now empty screw hole. *(Fig 21)*
- Insert a screw from an AXTBC to secure the PCC in place. The slot allows for adjustment.
- Bend the arm of the PCC to match the angle of the grid.
- Clamp and attach the PCC to the grid with (2) screws. *(Fig 22)*

5.4.2 Perimeter Angle Clip (PAC)

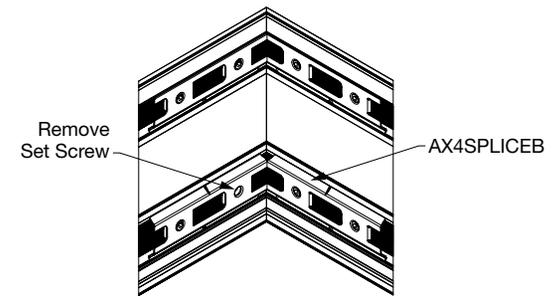
Conditions where grid intersections occur at the perimeter will require the Perimeter Angle Clip (PAC). This clip allows a grid intersection to occur at the perimeter by attaching to a grid component already attached to the perimeter.

It is installed by the following steps:

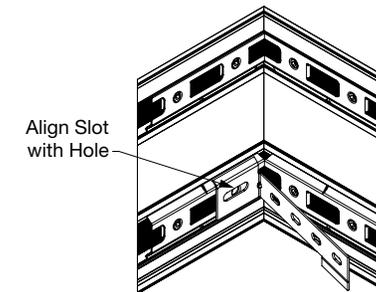
Intersections of XM Cross Tees at Main Beams or XL Cross Tees perpendicular to Axiom trim (trim 90 (degree symbol) to the grid):

- Place a PAC over the bulb of the existing grid with the base side closest to the trim. Place so that the pilot hole on the top of the base end is located at the correct 6" O.C. increment to match the full-size panel dimension.

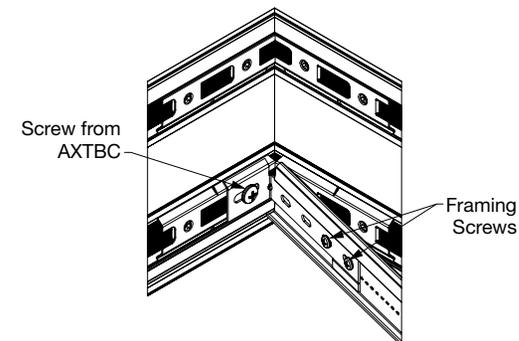
NOTE: With main beams, the top pilot hole on the base will align directly above a rout hole. The PAC will provide a location that acts as the connection point for the intersecting grid members *(Fig 23)*.



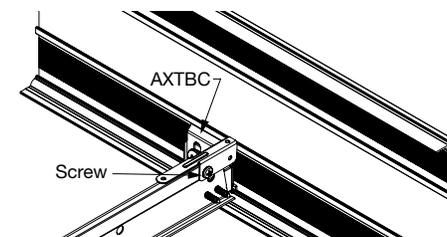
(Fig 20)



(Fig 21)



(Fig 22)

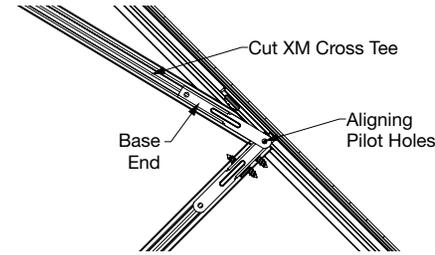


(Fig 23)

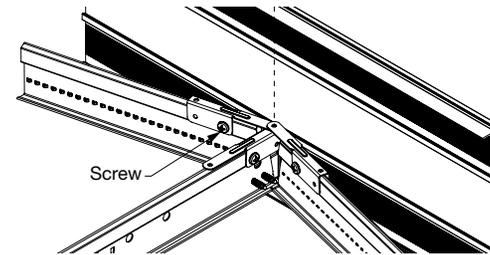
- Cut adjoining XM cross tees to length, ensuring that they will override the flange of the 90° grid and trim. Cut the face of the grid to match the angle that it interfaces with the 90° grid and trim.
- Place a PAC over the bulb of the cut XM cross tees so that the pilot hole on the flat side aligns over the top pilot hole on the base side of the previously installed PAC. **(Fig 24)**
- Once the position has been verified, clamp the PAC to the cut XM cross tee and attach with one screw through the side of the clip and into the bulb. **(Fig 25)**
- Once all PACs have been screw-attached to XM cross tees, connect them to the first installed PAC by inserting a screw through the aligning holes at the top. **(Fig 26)**

Intersections of XM Cross Tees Only (Axiom trim parallel to the main beams):

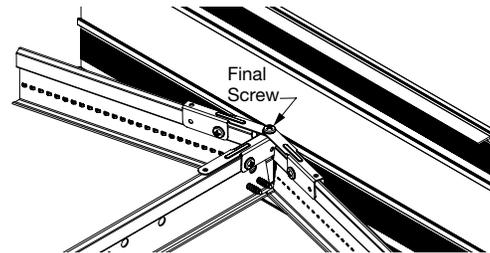
- Place a PAC over the bulb of the existing cross tee with the base side closest to the trim. Place so that the pilot hole on the top of the base end is located at the correct 24" or 48" O.C. spacing for full-size panels. The PAC will provide a location that acts as the connection point for the intersecting grid member.
- Cut the adjoining XM cross tee to length, ensuring that it will override the bottom flange of the existing grid and trim. Cut the face of the grid to match the angle that it interfaces with the existing XM cross tee.
- Place a PAC over the bulb of the cut XM cross tee so that the pilot hole on the flat side aligns over the pilot hole on the base side of the previously installed PAC.
- Once the position has been verified, clamp the PAC to the cut XM cross tee and attach with one screw through the side of the clip and into the bulb.
- Once the PAC has been screw-attached to the XM cross tee, connect it to the first installed PAC by inserting a screw through the aligning holes on the top.



(Fig 24)



(Fig 25)



(Fig 26)

6. PANELS

Mineral fiber and fiberglass DESIGNFlex™ Shapes panels are specifically designed for proper fit into DESIGNFlex Shapes grid openings. Proper panel fit is important to verify overall dimensions.

Ensure that all suspension systems align with marks in both directions. Diagonal dimensions are to match drawings. If not, brace the cloud to hold to the drawing dimensions.

6.1 Edge Details/Interface

DESIGNFlex Shapes panels are available in the following edge details:

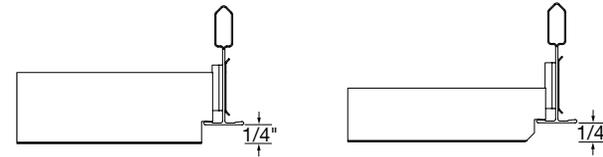
- Lyra® PB: Square Tegular for 9/16" Suprafine®
- Calla®: Square Tegular for 9/16" Suprafine
- Optima®: Square Tegular for 9/16" Suprafine, Square Lay-in for 15/16" Prelude® for Square and Rectangle patterns only
- Ultima®: Beveled Tegular for 9/16" Suprafine, Square Lay-in for 15/16" Prelude for Square and Rectangle patterns only

All tegular panels are for 9/16" Suprafine grid only. The finish face of the tegular panels extends 1/4" below the face of the grid. *(Fig 27)*

6.2 Directionality and Color/Finish Considerations

DESIGNFlex Shapes panels are available in the following edge details:

- Panel substrate types: All Lyra PB and Calla panels are 180-degree directional due to finish visual. Optima and Ultima panels are not directional.
- Panel shapes: All panels must be installed in a specific direction based on matching openings in the grid while following the specified layout. Panels have a “base” side that runs parallel with the main beams. All Shapes panels, except for Right Triangles, must be installed in 1 orientation in relation to the main beam direction. Right Triangle Shapes panels are the only panels for which layouts Triangle Shapes panels designed with the panels quarter-turned so that the “base” side is perpendicular to the main beams.



(Fig 27)

6.3 Cut Panels Within the Field

6.3.1 Only full-size panels are permitted within the field of the installation. Penetrations can be made in panels following instructions, but panels cannot be field-cut to sizes that are not full module within the field.

6.3.2 Perimeter Maximum Hold Down Clips (PMHDC) are required for perimeter panels. 1 PMHDC must be placed for every 2' of panel edges adjacent and opposite of the perimeter.

7. SPECIAL CONSIDERATIONS

7.1 Lights

7.1.1 Lighting Integrations

When installing JLC Tech T-bar lights, consider the placement of the drivers due to ceiling tile installation.

7.2 Slopes

Sloped installations of DESIGNFlex™ for Formations™ Acoustical Clouds are not recommended or warranted.

7.3 Exterior Applications

DESIGNFlex for Formations Acoustical Clouds cannot be installed in any exterior application.

8. ACTION RESTRAINT INSTALLATION/SEISMIC BRACING

8.1 Restraint for clouds installed in areas where anticipated seismic activity will be light (IBC seismic design categories A & B) can be accomplished by installing a pair of crossed cables 2' in from each edge of the assembly. These cables should attach to the support channels and be sloped no more than 45° horizontal.

8.2 In areas where anticipated seismic activity will be moderate to severe (IBC seismic design categories C, D, E, & F), the crossed cables should be replaced with a bracing system more appropriate for the forces that will be encountered.

8.2.1 Testing conducted at the Structural Engineering Earthquake Simulation Laboratory, located at the State University of New York – Buffalo campus, produced satisfactory results with rigid bracing fabricated from 1/2" EMT conduit.

8.2.2 The tested bracing system consisted of a vertical member extending from the support channel to the structure above near each corner of the cloud. These members were positioned at the main beam/support channel intersections closest to the corners of the assembly. Two additional members were fastened to the bottom of the vertical and extended to the structure at an angle not exceeding 45° horizontal. These members were parallel to the sides of the cloud.

8.2.3 Restraint/bracing systems should be approved by the project design team and reviewed with the local building department. Clean and align Axiom® trim and suspension system components.

8.3 Field Panels

Lyra® PB and Optima® panels with main beam spacing of 4' O.C. will require Maximum Hold Down Clips (PMHDC) over all field panels due to the weight of the panels. This will require a progressive installation as the clips must be placed over the panels after they are installed and will no longer be accessible. For these reasons, it is recommended that Calla® or Ultima® panels be used in seismic installations.

MORE INFORMATION

For more information, or for an Armstrong Ceilings representative, call 1 877 276 7876.

For complete technical information, detail drawings, CAD design assistance, installation information, and many other technical services, call TechLine customer support at 1 877 276 7876 or FAX 1 800 572 TECH.

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