

FORMATIONS® Curved Clouds with AXIOM® VECTOR® Trim and Suspension System

Assembly and Installation Instructions

1. DESCRIPTION

1.1 Formations® Curves is a ceiling cloud system designed to create ready-to-assemble circular, oval, and rounded square installations sized from 6' circles to 14' x 14' rounded squares. Formations are designed to work with Armstrong Ultima® Vector® panels and Prelude® 15/16" suspension system.

1.1.2 Included in the Kit are:

- Axiom® Vector® Trim, with factory curved and cut ends, detailed to form a cloud to the required size and shape
- Suspension system components cut-to-length to complete the installation
- Aircraft cable, cut to 10' length, in the amount required for the installation
- Support Hanger carrying channel, cut-to-length to accommodate installation of the aircraft cable 24" from the vertical face of the Axiom trim
- 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

NOTE: Pop-rivets, screws, and hardware required for attachment to the structure are not included.

Kits contain all of the components required to construct and hang a complete cloud except for the screws or pop-rivets needed to attach the clips to the suspension system members and the hardware needed for attachment to the structure.

1.1.3 Ceiling panels are ordered separately. The curved panels are provided as a kit for Ultima Vector. Full-size panels are standard #1920 Ultima Vector. Do not field cut curved panels. Call 1 877 276-7876 to order panels.

1.1.4 Most building codes require non-structural building components to be restrained. Armstrong 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.

1.1.5 Formations, 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 Formations Clouds must be limited to 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. INSTALLATION

IMPORTANT NOTE: The Axiom® Vector® trim is to be installed with the flange side down when being used with an Armstrong Vector panel (Fig 1).

3. PRE-ASSEMBLY

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

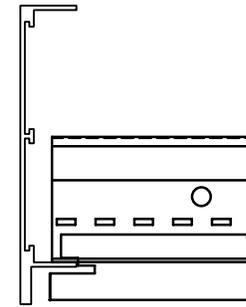
3.2 Review the location of the Support Hanger carrying channels. They will be located 2' from the longest side of the cloud and then 4' O.C. (Note that in some instances, this pattern will result in two Support Hangers being positioned 2' from one another at the center of the cloud.)

3.3 Locate the full-size plots for the curved sections of Axiom trim.

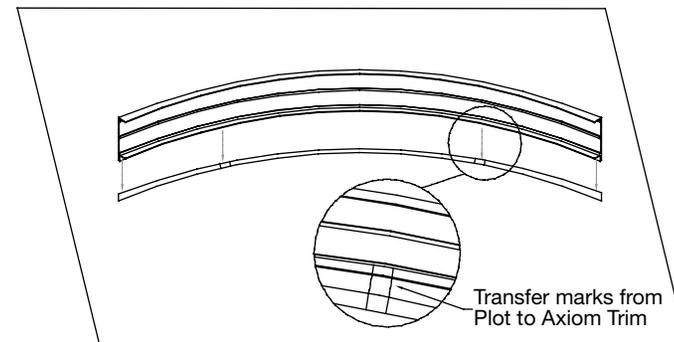
3.4 Lay each curved section onto the corresponding plot and transfer the suspension system location marks to the inside of the Axiom flange. Make sure that the "fin" side of the trim is facing the plot.

ProTip: Add a small mark on the lip of the Axiom so you can see the locations of the grid from below the Axiom, but do so with a pencil so you can then wipe away.

3.5 Some shapes will combine straight and curved sections of Axiom. Mark the suspension system locations on the straight sections by measuring in 12" from one end, and then 24" O.C. along the part. These marks will represent the center line of the suspension system. Measure and mark 1/2" on each side of these marks so that you will be able to accurately align the edge of the suspension system flange with your marks (Fig 2).



(Fig 1)

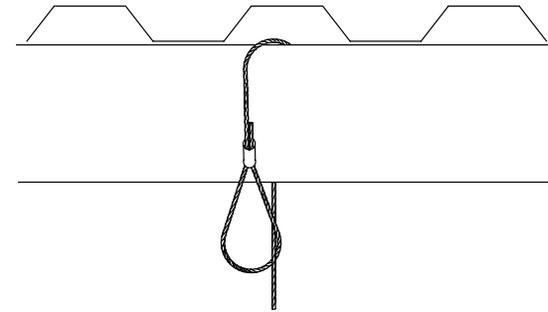


(Fig 2)

4. ATTACH HANGING CABLES TO STRUCTURE

4.1 Hanging cables (item AC1210) are located along the length of the Support Hanger starting 1' from the end (2' from the edges of the cloud) and then 4' O.C. (note that in some instances, this pattern will result in two hanging cables being positioned 2' from one another at the center of the cloud).

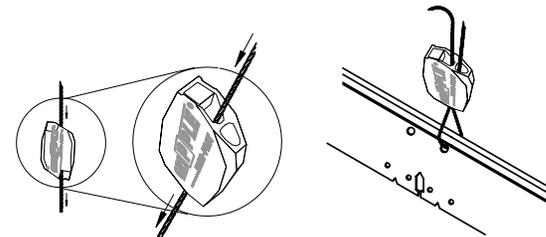
4.2 Hardware for the attachment of the cable to the building structure is not provided. Cables are fitted with a loop at one end that is to be cinched to mounting hardware appropriate for the surface to which it is attached (**Fig 3**). Select hardware that will be capable of supporting a minimum of 200 pounds.



(Fig 3)

5. HANG SUPPORT HANGER CHANNELS

5.1 Attach the Axiom® Support Hanger (Item numbers SHC:4, 6, 8, 10, 12) to hanging cables using the adjustable “Quick Loop” connectors (item ACHC) provided with the kit. Insert the cable through one end of the connector and then through the appropriate hanger wire hole on the support channel. Slide the cable back through the “Quick Loop” connector and adjust to the correct elevation. Follow the instructions provided with the connectors if it becomes necessary to release the cable from the connector (**Fig 4**).

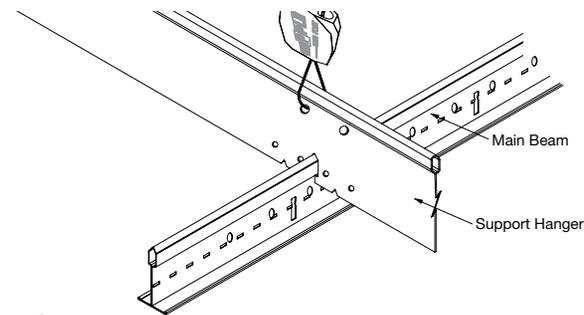


(Fig 4)

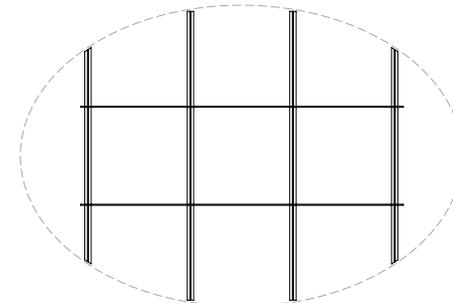
6. INSTALL MAIN BEAMS

6.1 Install main beams into the appropriate notches on the Support Hanger. The first main beam will be 1' from the end of the channel and the remainder will be placed at 2' centers. Slide the main beam through the notches or bend the tab on one side of the notch out of the way so that the main beam can be installed from below. Bend the tab back into position under the bulb of the main beam (**Fig 5**).

6.2 Main beams that fall on curved sections of trim have ends that are cut at an angle. Consult the layout drawing to make sure that main beams are correctly installed and that the long side of the angle is positioned toward the center of the cloud (**Fig 6**).



(Fig 5)



(Fig 6)

6.3 Attach Axiom® Cross Tee Clips (item AXCCCLT) to each end of each FULL LENGTH main beam by positioning as shown in the drawing. The top of the clip should touch the bottom of the bulb of the suspension system and the end of the main beam should contact the thumbnail stop on the clip (*Fig 7*). Secure each clip with two pop-rivets or #8 sheet metal screws (note that pop-rivets are preferred over screws because they will not interfere with the placement of the ceiling panels).

PRO TIP: when connecting an AXCCCLT to a grid member, only put one screw or pop rivet through the center of the elongated slot first so the clip can be adjusted slightly if needed to get the system square. Once the system is square, the second screw or pop rivet can be installed in one of the remaining holes.

NOTE: DO NOT ATTACH CLIPS TO THE ENDS OF MAIN BEAMS THAT ARE CUT AT AN ANGLE. These will be installed later.

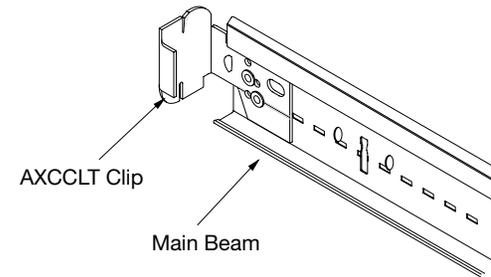
7. INSTALL TEES

7.1 Install 2' cross tees between main beams. Slide the Support Hanger along the main beams so that it rests against the cross tees. Screw the support channel to the tees by inserting a #8 x 9/16" sharp point sheet metal screw into the holes on each side of the main beam (*Fig 8*).

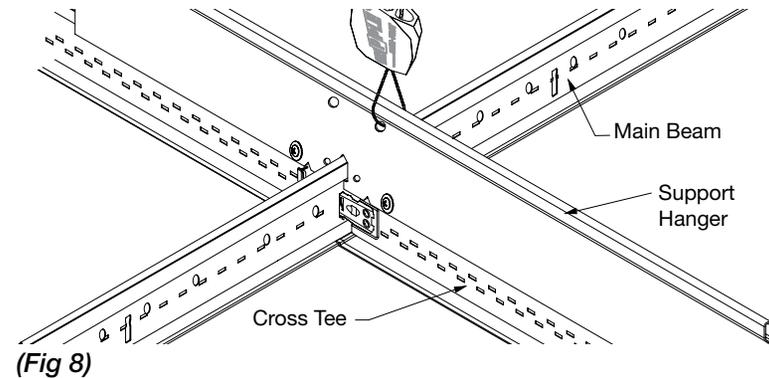
7.2 Install the perimeter tees. Pay particular attention to the assembly drawing to ensure that each tee is properly placed. There will be right-hand and left-hand tees that fall onto the curved trim sections.

7.3 Bend the tabs at the ends of the Support Hanger so that they will fit under the bottom of the bulb of the tees and secure with a #8 x 9/16" screw (*Fig 9*).

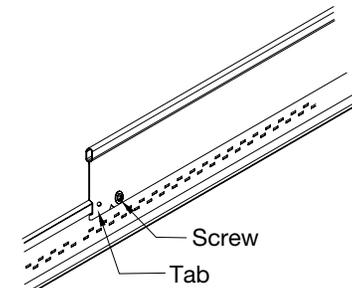
7.4 Cut away the end detail on the cross tees that will engage the straight Axiom trim sections (if not already done). Attach an Axiom Cross Tee Clip (item AXCCCLT) to the end of each tee that falls on a straight section of trim (*Fig 10*).



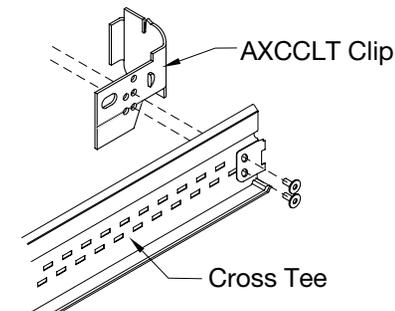
(Fig 7)



(Fig 8)



(Fig 9)



(Fig 10)

7.4.1 Note that pop-rivets are preferred over screws. Align the clip such that the lower two holes in the three-hole line match up with the holes in the end of the tee. Insert two fasteners through the tee and into the clip (*Fig 11*).

Pro Tip: when connecting an AXCCLT to a grid member, only put one screw or pop rivet through the center of the elongated slot first so the clip can be adjusted slightly if needed to get the system square. Once the system is square, the second screw or pop rivet can be installed in one of the remaining holes.

7.5 Insert AXCCLT clips into the curved sections of trim at the location of the marks made in step 3.4. Grasp the protruding leg of the clip with a pair of pliers and bend it to align with the suspension system marks (*Fig 12*).

7.5.1 Move each clip by tapping with a hammer (or similar tool) to position near the center of each pair of suspension system marks. Final position will be adjusted later.

8. INSTALL AXIOM® TRIM

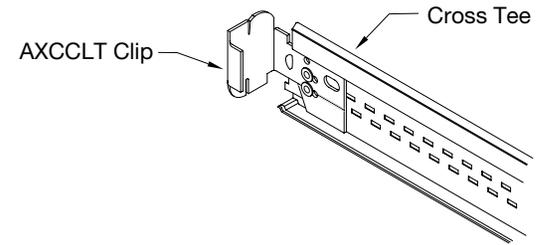
8.1 Use the assembly drawing provided to arrange the Axiom® trim sections in the proper sequence.

8.2 Install straight sections of trim.

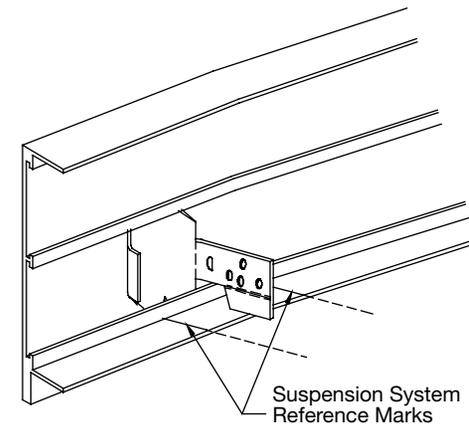
8.2.1 Twist the suspension system member, with Axiom Cross Tee Clip attached, and engage it into the bosses on the Axiom trim. Hold the tab on the clip in a pair of pliers and lock in place by twisting in the clockwise direction.

8.2.2 Repeat this process for all clips that fall on straight sections of trim. Adjust position of installed suspension system members by tapping to align with suspension system reference marks.

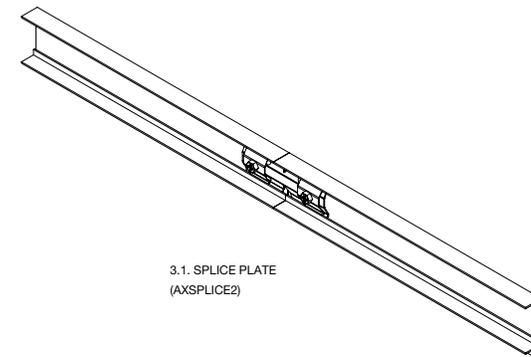
8.3 Connect sections of Axiom trim with splice plates as required (*Fig 13*). The supplied assembly drawing will show the correct quantity and location for splice plates.



(Fig 11)



(Fig 12)



(Fig 13)

8.4 Install curved trim sections.

8.4.1 Position each curved section of trim so that the clips will lie against the side of the suspension system members that will allow access for the screw gun. Clamp in place with the end of the suspension system touching the shoulder at the top of the clip (*Fig 14*).

8.4.2 Fasten each bent clip to the suspension system by inserting two pop-rivets or screws through the holes provided in the clip.

PRO TIP: when connecting an AXCCLT to a grid member, only put one screw or pop rivet through the center of the elongated slot first so the clip can be adjusted slightly if needed to get the system square. Once the system is square, the second screw or pop rivet can be installed in one of the remaining holes.

8.4.3 Adjust the location of the clips to align accurately with the suspension system reference marks made in step 3.4.

8.5 Finished Diameter Measurements

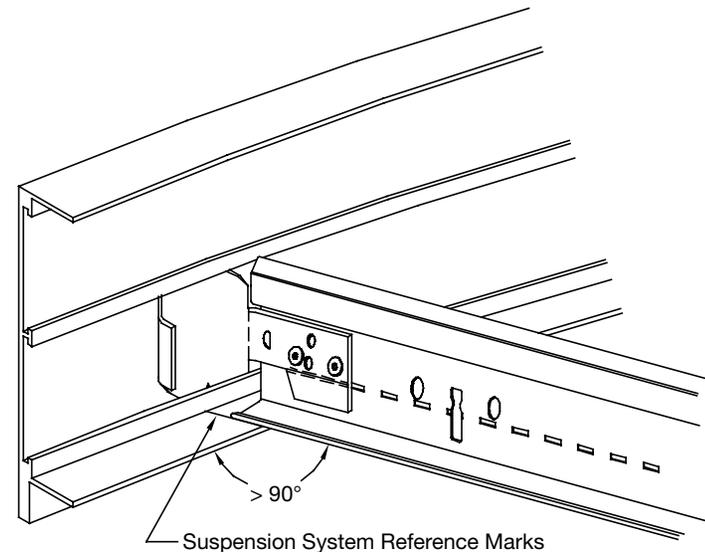
Once all of the Axiom trim sections are installed and fastened to the perimeter cross tees and main beams, check the finished diameter measurements to ensure the grid is centered in the cloud. If the measurements are off, detach and individually adjust each grid member by pulling away from or pushing towards the Axiom trim, and refastening it to the AXCCLT once positioned correctly. Also, make sure the cross tees are still aligned with the marks made in section 3.4.

Measurements:

- C2VES0606C: 6'-3/4" dia.
- C2VES0808C: 8'-11/16" dia.
- C2VES1010C: 10'-11/16" dia.
- C2VES1212C: 11'-4 5/8" dia.
- C2VES1414C: 14'-9/16" dia.

9. INSTALL RESTRAINT/SEISMIC BRACING

9.1 Restraint for clouds installed on projects 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° from horizontal.



(Fig 14)

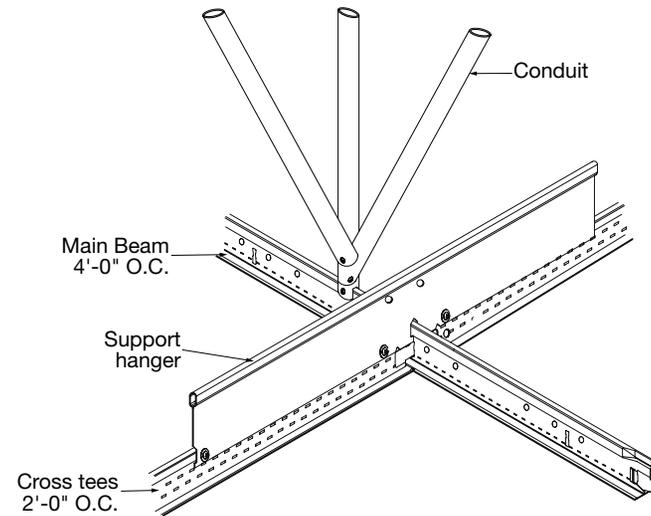
9.2 In areas where anticipated seismic activity will be moderate to severe, the crossed cables should be replaced with a bracing system more appropriate for the forces that will be encountered.

9.2.1 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.

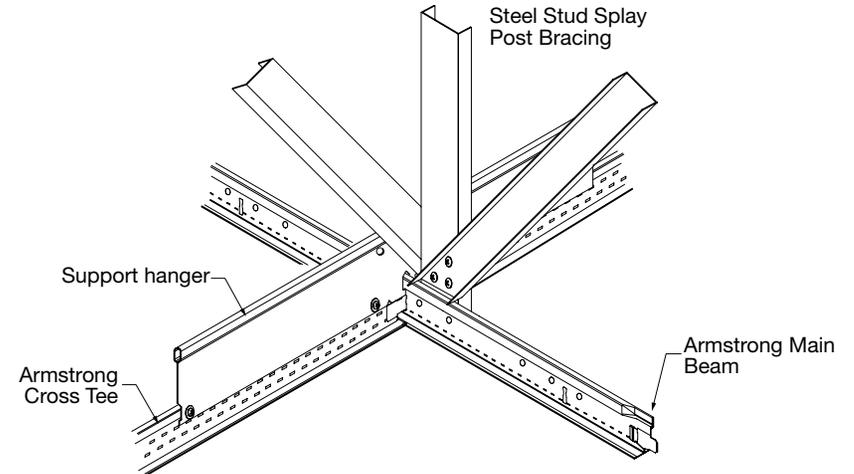
9.2.2 The tested bracing system consisted of a vertical member extending from the support channel to the structure above near each corner of the cloud. These members were positioned at the main beam/support channel intersections closest to the corners of the assembly. Two additional members were fastened to the bottom of the vertical and extended to the structure at an angle not exceeding 45° from horizontal. These members were parallel to the sides of the cloud (*Fig 15*).

9.2.3 In order to hide the bracing above the cloud, wire splay bracing can be replaced with rigid bracing. Rigid bracing only requires a post and two diagonals. This should be located at the suspension system intersection closest to each corner of the cloud and then not more than 12 feet in each direction. Depending on the height of the plenum, 1/2" EMT conduit can be used. The EMT ends are flattened and bent to facilitate attachment to the structure and the suspension system. Install the post first, and then connect the diagonals to the lower end of the strut just above the suspension system bulb (*Fig 16*).

9.2.4 Restraint for a cloud is rigid diagonal bracing to the structure and since clouds are not attached to two walls, they must have restraints. In addition to building code requirements, there is a particular installation benefit for a contractor to restrain a ceiling that does not run wall-to-wall. A restrained ceiling is easier to keep straight and square. Some contractors will initially opt to skip this step in an attempt to save money. However, it is not advisable to do so because rework to fix alignment issues can add more labor costs than if the bracing would have been done at the onset. Typical restraint for a floating ceiling takes the form of rigid diagonal braces that extend from the suspension system members to the overhead structure. Sufficient restraint points must be used to meet the force values required by the code and to prevent movement in all directions. Additionally, the strength of the bracing members also must be matched to the anticipated applied forces.



(Fig 15)



(Fig 16)

9.2.5 Rigid bracing at all four corners meets the requirements of Seismic Design Categories D, E, and F for clouds up to 200 SF as long as:

- The bracing is based on the cloud area, weight, and plenum depth
- The bracing is designed by the project engineer

Keep in mind that hanger placement is determined by the length of the cantilevered component. It is not a line of sight issue. Also, a cloud will require the same bracing and restraint with or without sprinklers.

9.3 Distance between a Cloud and Wall or Adjacent Cloud

There is no minimum required as long as clouds are restrained to meet the Seismic Design Category.

10. INSTALL CEILING PANELS

10.1 IMPORTANT NOTE: Ultima® Vector® panels should be installed with Vector Hold Down Clip (item 442).

10.1.1 Depending on how the curved edge panels are cut, the A or B side may be cut off. The Vector Hold Down Clips can only be installed on the A/B side; if used on the C/D side they will force the panel out.

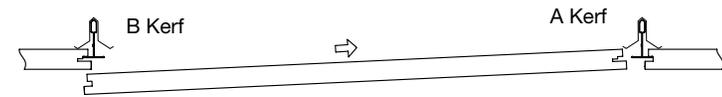
To avoid this, slightly bend the one leg that rests on the C/D side. Be sure not to bend too much though because pressure is still needed on the A/B side.

10.2 Begin panel installation with the smallest curved edge panels. Refer to the panel layout drawing packaged with the set of curved panels to verify correct location.

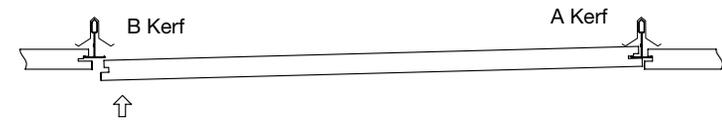
10.2.1 Insert the "A" edge of the panel, the one with the double cut kerf, onto the suspension system flange. Make sure that the flange is fully inserted into the kerf (*Fig 17*).

10.2.2 Raise the panel up into the plane of the ceiling and slide toward the trim to engage the "B" edge (*Fig 18*).

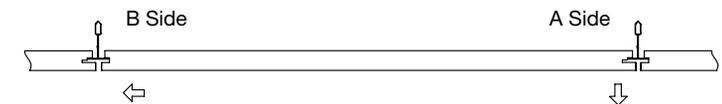
10.2.3 Make sure that the "A" edge drops down to the lower kerf position (*Fig 19*).



(Fig 17)



(Fig 18)



(Fig 19)

10.3 Install remaining panels that have curved edges. Work carefully to avoid damage or soiling of panels.

10.4 Complete installation of the remaining 2' x 2' panels to complete the assembly.

10.5 Use Border Spring Clips (item 7870) on border panels to pressure panels in away from the Axiom.

Letter	Ultima® Vector® Replacement
Replacement Panel Item Number	
A	1960A
B	1961A
C	1962A
D	1963A
E	1964A
F	1965A
G	1966A
H	2060A
I	2061A
J	2062A
K	2063A
L	2064A
M	2065A
N	2066A
O	2067A
P	2068A
Q	2069A
R	2070A
S	2071A
T	2072A
U	2073A

** Made-to-order panels that eliminate the need for field modification of standard panels are available via ASQuote@armstrongceilings.com*

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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