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Commercial Ceilings and Walls

Solutions Guide

Armstrong®

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This book contains drawings that show typical conditions in which the Armstrong product depicted is installed. They are not a substitute for an architect's or engineer's plan and do not reflect the unique requirements of local building codes, laws, statues, ordinances, rules and regulations (Legal Requirements) that may be applicable for a particular installation.

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Information contained in this Solutions Guide is supplemental to, and not intended as a replacement for, the basic installation requirements for suspended ceilings that are listed in ASTM C-636 and the installation practices outlined in the CISCA Ceiling Systems Handbook. Please refer to these sources for important additional information.

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CEILING & WALL SYSTEMS

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Basic Suspension Systems

Commercial Ceilings and Walls Solutions Guide

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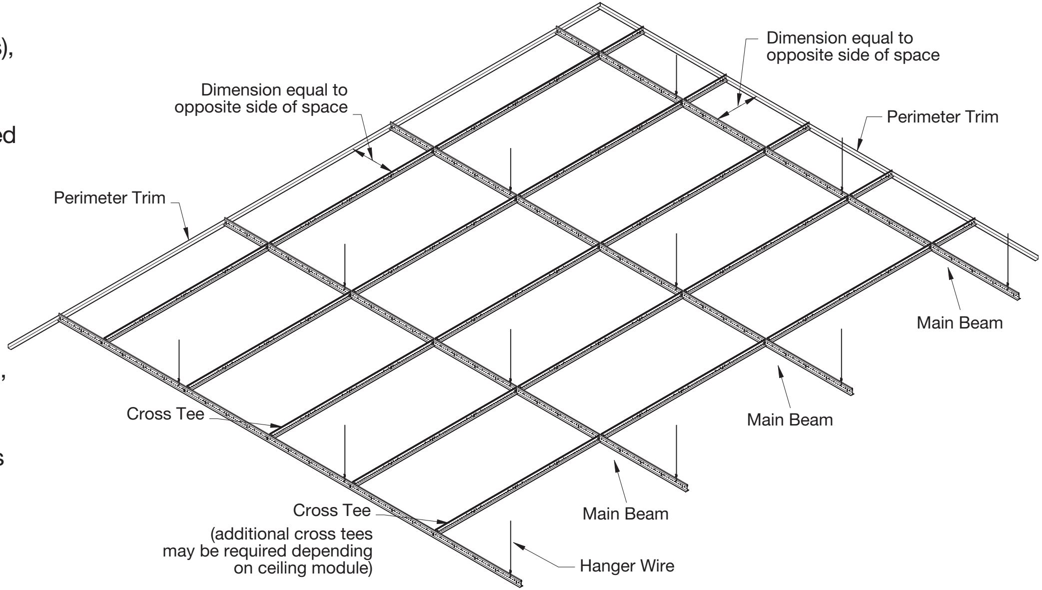
Installing Armstrong Suspended Ceilings

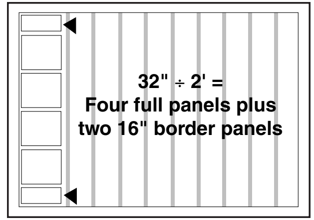
The ceiling system is made up of Armstrong panels which are supported by a suspension system (main beams, cross tees and hangers), and perimeter molding. The integrity of the entire suspended ceiling depends on the hangers — commonly wires — which are used to support the suspension system main beams. Sections of main beams are spliced together and are connected by cross tees. The ends of the main beams and cross tees rest on the wall molding which runs around the perimeter of the space.

An Armstrong suspended ceiling is functional, attractive and provides easy access to the plenum. This section provides a general application overview, covering essential steps of a basic suspended ceiling installation.

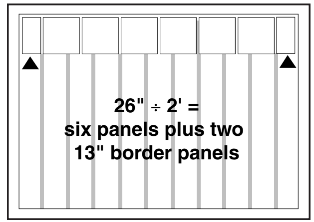


Determine Panel Direction

- Ceiling panels can run in the direction that yields the most pleasing finished appearance.
- In spaces with bar or wood joists, main beams must be oriented perpendicular to the joists.
- Install per reflected ceiling plan



Determine width of border panels (2′ x 2′ panels)



Determine width of border panels (2′ x 2′ panels)

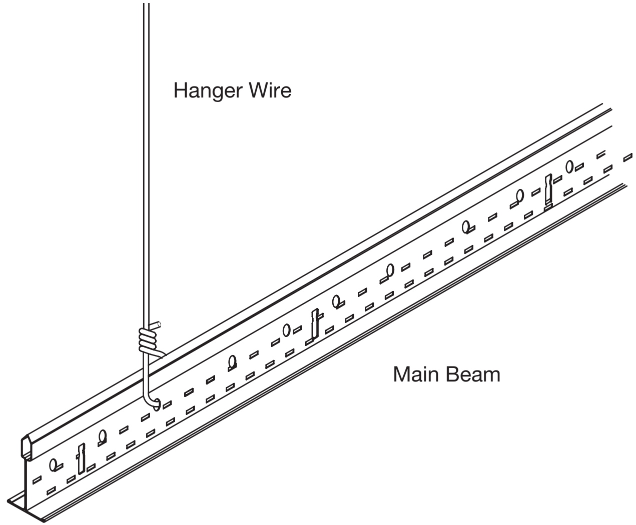
Determine Border Panel Sizes (2′ X 2′ panels)

- Border panels should be equal on opposite sides of space and as large as possible
- To determine the border panel sizes, divide one dimension of the space by 2′.
- This example shows a space that is 10′ 8″ by 14′ 2″ and the deck joists run in the 10′ 8″ direction. 10′ 8″ ÷ 2′ = five full panels + remaining 8″.
- You can’t start with a full panel against one wall and leave one 8″ border on the other side; it will look unbalanced (and two border panels of 4″ would be too small). So, add 24″ to the 8″ dimension which equals 32″. Divide that number by 2 to equal 16″.
- The room would be divided into four full panels, plus two 16″ border panels.
- In the other direction: 14′ 2″ ÷ 2′ = seven panels + remaining 2″.
- Add 24″ to the 2″ dimension which equals 26″. Divide that number by 2 to equal 13″.
- This side of the room would have six full panels and two 13″ border panels.

Install Hangers and Fasteners

- Hangers need to be installed above the main beams typically every four feet, along its length, or as required to carry imposed load.

- Insert wire of required length into hanger wire hole and wrap wire around itself a minimum of 3 times within 3″



ASTM Requirements for Fire Rated Main Beams

ASTM Standards Changed to Ensure Load Performance of Fire Rated Main Beams

Load performance and installation of fire rated main beams is now specifically addressed in ASTM C-635 and C-636, to ensure load performance along the entire length of a fire rated main beam.

ASTM C635 – 04

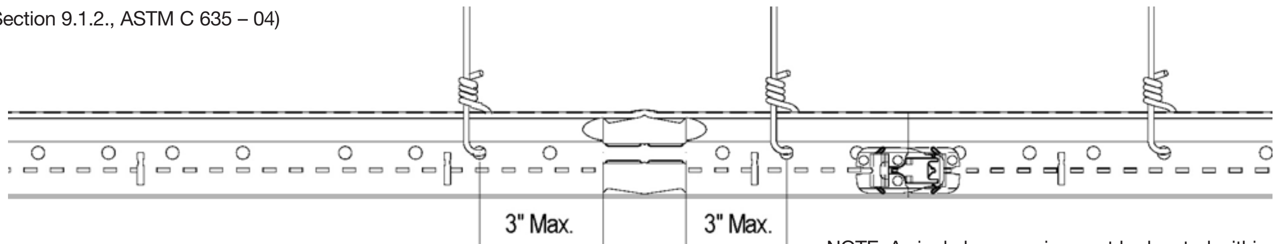
Now requires that the load performance of fire rated main beams be evaluated if a wire is installed greater than 3″ from the fire expansion relief notch. Typically, when the wire is located greater than 3″ from the relief notch, the load carrying capability of the main beam is reduced at that location.

(See Section 9.1.2., ASTM C 635 – 04)

ASTM C636 – 04

Now requires a wire to be located within 3″ of a fire expansion relief notch when a fire rated main beam is installed. This wire placement will maintain the load performance of the main beam along its entire length. If a wire is installed further than 3″ from the expansion relief notch, ASTM requires the load performance be evaluated.

(See Section 2.3.5., ASTM C 636 - 04)



NOTE: A single hanger wire must be located within 3″ of either side of the fire notch.

Install Perimeter Trim

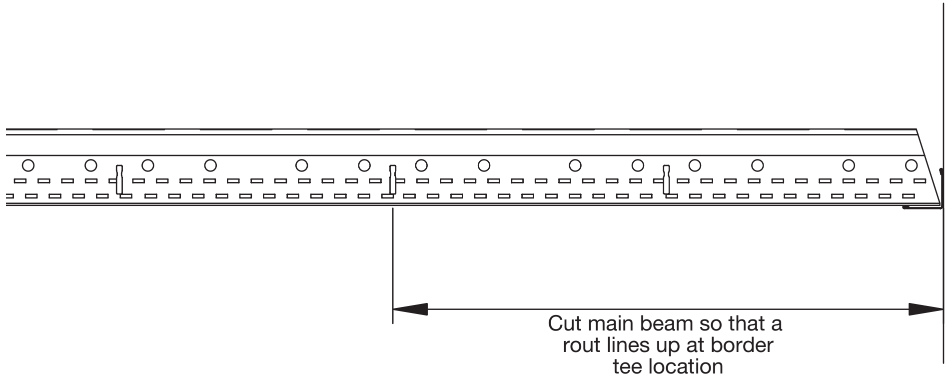
- Install perimeter trim at elevation indicated in construction documents.

- Attach the perimeter trim securely. Joints between straight sections, and inside and outside corners of molding must be tight.

Install the First Main Beam

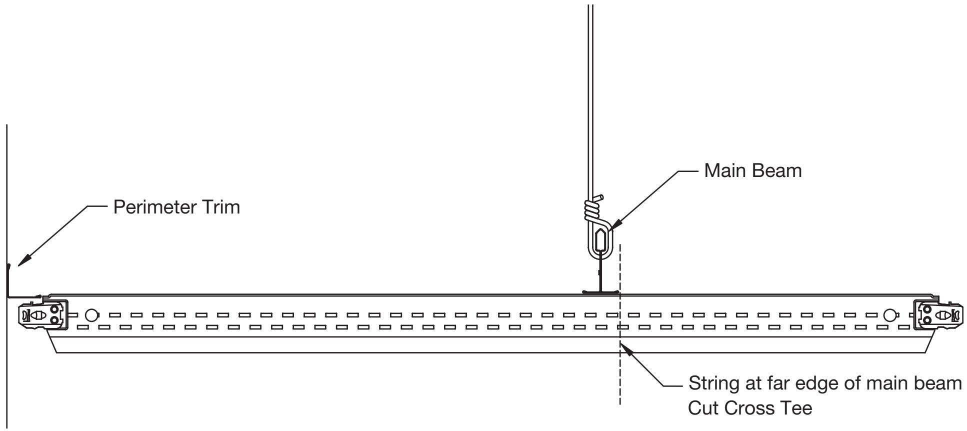
- Install the first section of main beam. (Cut the end so that a cross tee route hole is located the border panel distance in from the end wall.)

- Insert a hanger wire into a hanger wire hole near the other end of the main beam. Bend the wire up and wrap it around itself a minimum of three times within 3″. Continue to insert all other hanger wires as required.



Install Border Cross Tees

- Find the location of the first border cross tee.
- Stretch a guide string from one end of the room to the other, below the molding where the first main beam will hang.
- Place the end of the white face of the cross tee against the edge of the wall molding at the side, and cut at the guide string.
- Insert the uncut end of the cross tee into the main beam, and rest the cut end of the cross tee on the molding. (The far edge of the main beam should be directly above the string.)
- Repeat the process as required.
- Temporarily fasten the cross tees to the wall molding so they do not move.



For 15/16″ system:
flip cross tee over
(face side up)
so end of override
butts up to edge of angle

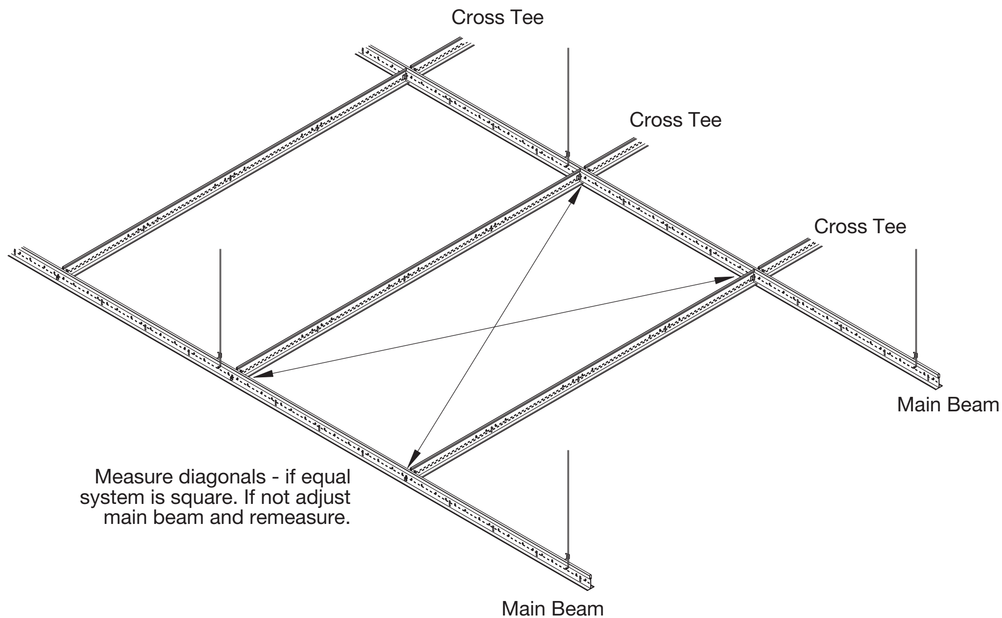
For 9/16″ system:
flip cross tee over
(face side up)
so end of clip is against wall

Square the Grid

- Join additional sections of main beam as required to reach the other end wall. Attach wires and check level as the installation proceeds.

- Install cross tees between the main beams, in line with the first cross tees.

- Measure across the diagonals of the grid opening. The measurements will be the same if the grid is square. If the grid is not square, shorten one of the main beams until the diagonals are equal.



Install Remaining Main Beams and Cross Tees

- Complete the installation of rows of main beams.
- Note: If you have additional rows of main beams to install, stretch a second string from one side of the room to the other, aligning it with the first cross tee location. This second string must be at 90° to the main beam string.
- This second string will be your guide for cutting the remaining rows of main beams.
- You must line up all routs for the grid to be square.

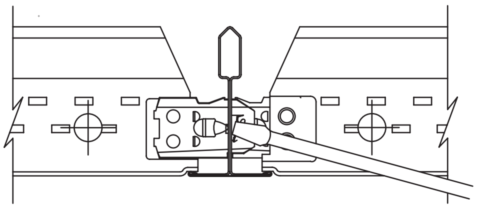
Install Panels

- **Lay-in and tegular panels:** slightly tilt panels, lift above suspension system, and gently rest on cross tee and main beam flanges.

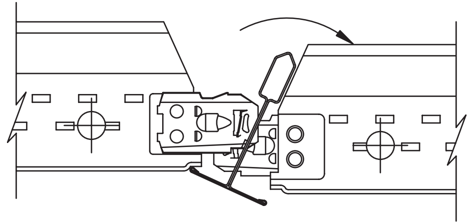
- **Vector™ panels:** refer to Vector Ceilings Section for details.

- Measure and cut border panels individually. Using a leftover cross tee or main beam section as a straight edge, cut panels face-up with a very sharp utility knife. Border panels may require field cutting of tegular edge details.

XL$^{2\text{™}}$ Cross Tee Removal



Use a screwdriver to flatten the locking lance or tab of the cross tee to be removed.



Rotate the top bulb of the grid away from the cross tee to be removed.

For the best results use two hands, one on either side of the connection, to roll the grid to the side.

NOTE: Cross tee removal for all XL^2 tees except Interlude® and Sonata™.

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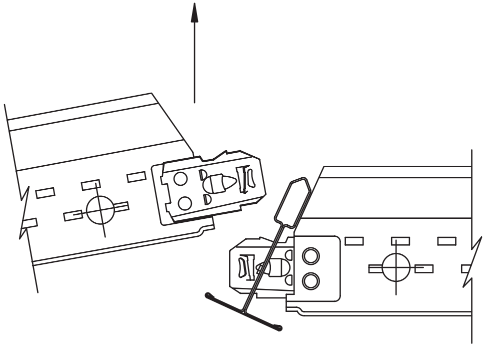
XL² Cross Tee Removal

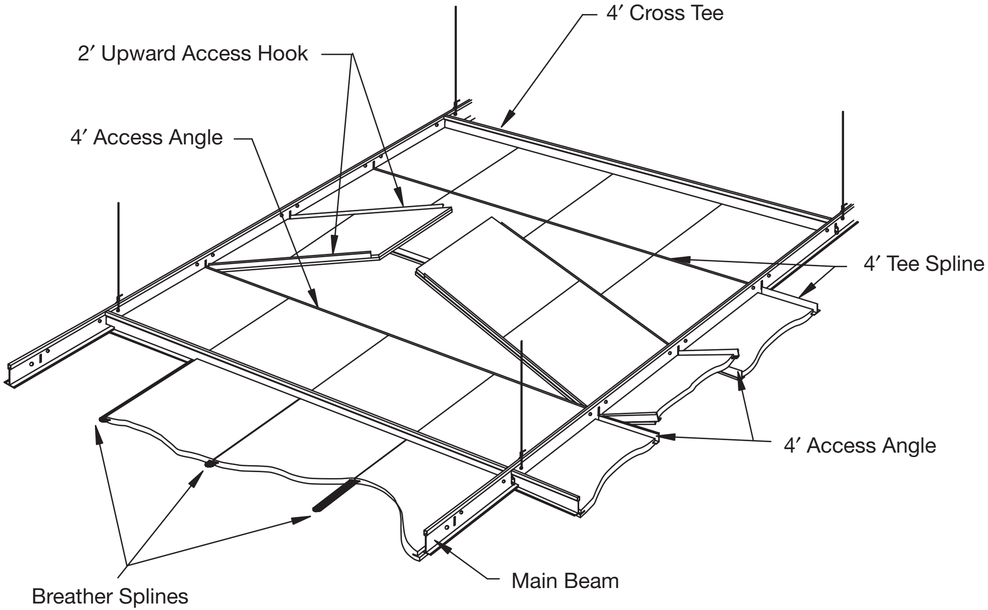


Raise the end of the cross tee to unlock the XL clips.

Note: XL Clips lock in tension and compression. If the cross tee does not easily lift, roll the grid to the vertical position and back away from the cross tee to unlock the XL clips.

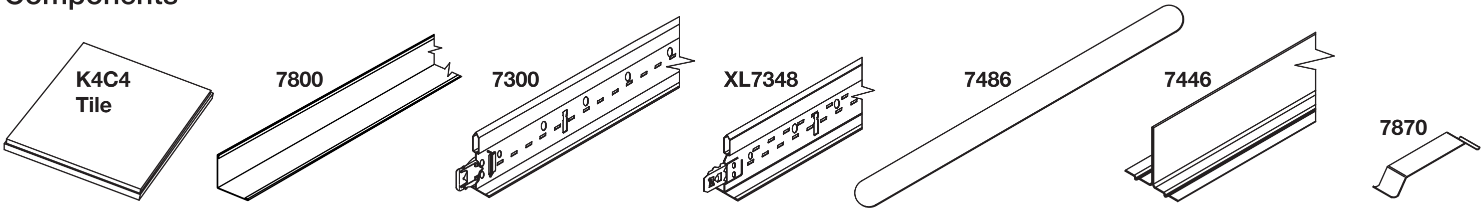
Repeat this process at the opposite end for easy cross tee removal.

K4C4 Tile System Installation Overview

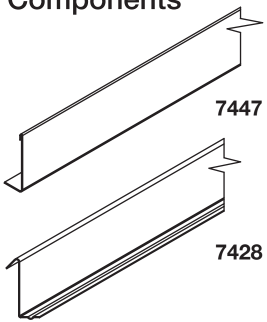


K4C4 Tile Components

Components



Additional Components



Item Number	Description	Material Estimates*
—	K4C4 12″ x 12″ Tile	SF + 10% (for waste)
7800	Wall Molding	Add perimeter of room, columns, partitions and divide by 12
7300	Main Beam	SF ÷ 48
XL7348	4′ Cross Tee	SF ÷ 16
7486	11″ Breather Splines	SF x .75
7446	4′ Concealed Tees	SF ÷ 5.3
7870	Spring Border Clips	1 per foot of total perimeter
7447	4′ Access Angle	For each 4′ x 4′ module, reduce concealed tees by two and add two 4′ access angles
7428	2′ Access Hook	For each 4′ x 4′ module, add four 2′ access hooks

***Results give number of pieces required.**

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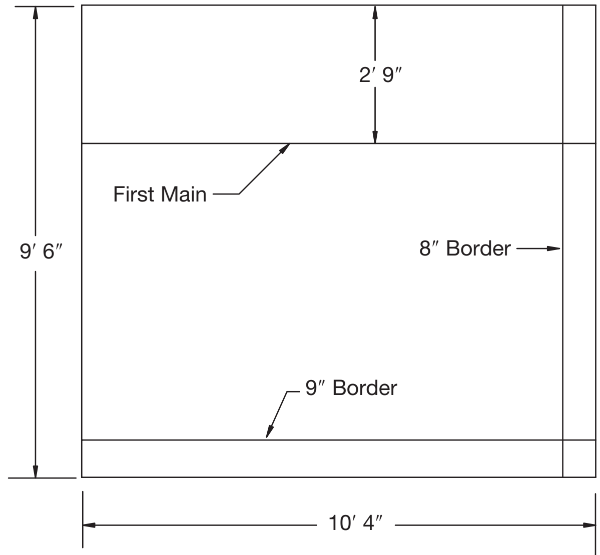
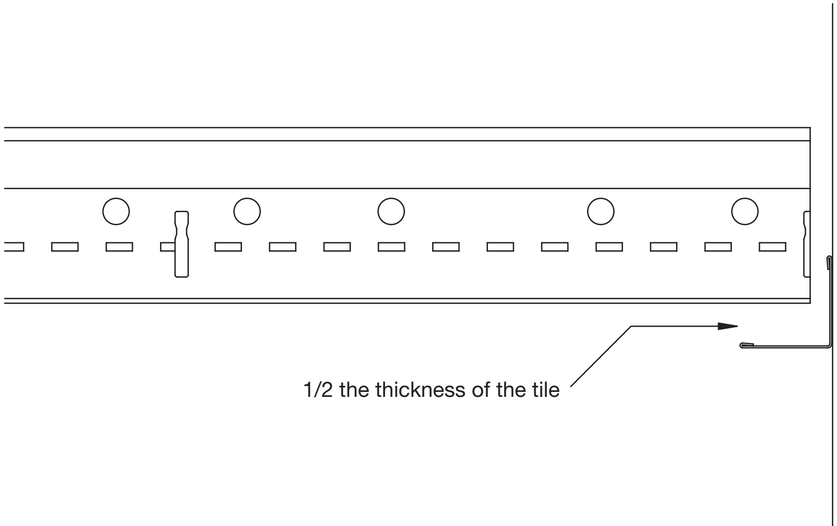
K4C4 Tile Primary Grid System

- Install wall molding.
- Calculate border tile sizes as you would for any 12″ x 12″ tile installation.
- Cut a main beam so a cross tee rout falls at the border distance from the end of the main beam.
- Hang the first main parallel to one sidewall at a distance of the border tile size plus 1, 2, or 3 feet.



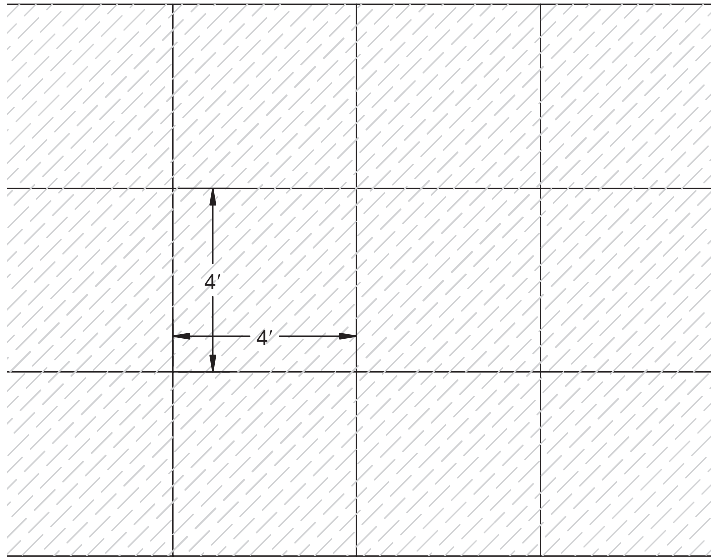
K4C4 Tile Primary Grid System

• Install main beams *half the thickness of the tile* above the wall molding.



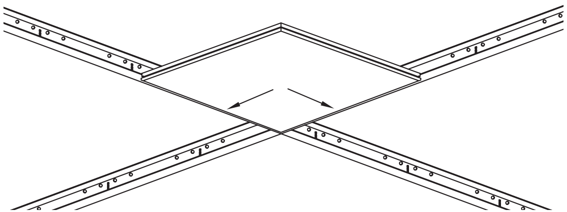
K4C4 Tile Primary Grid System

- Install the rest of the mains on 4′ centers.
- Install 4′ cross tees on 4′ centers to create 4′ x 4′ openings.
- Module diagonals must be equal (within 1/16″) to ensure that the grid is square. See page 1-7 on how to square the grid.
- The entire grid system must be level (within 1/4″ in 10 feet).

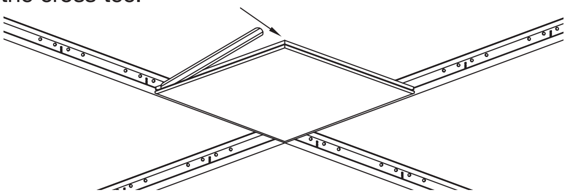


K4C4 Tile Non-Accessible Modules

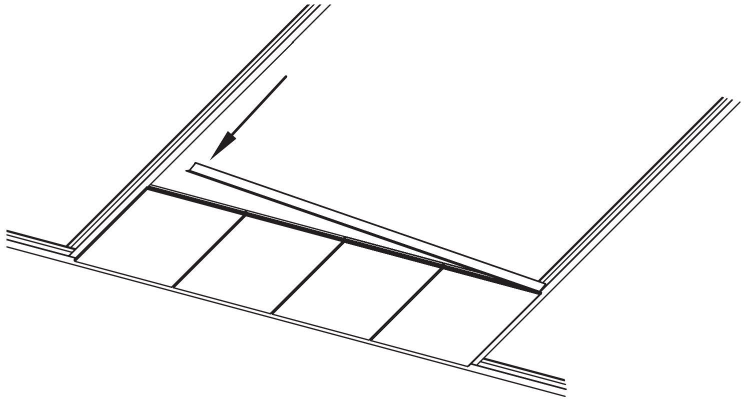
- Each 4′ x 4′ module will contain four rows of four tiles each. Start with a 4′ x 4′ module near a corner of the room.
- Install the first tile at the intersection of the main beam and a cross tee.



- Position tile so the flanges fit into the kerfs of the tile.
- Install the second tile by inserting a breather spline in the kerf between the tiles and engaging the flange of the cross tee.



- Install tiles 3 and 4 the same way.
- Finish the row with a concealed tee.



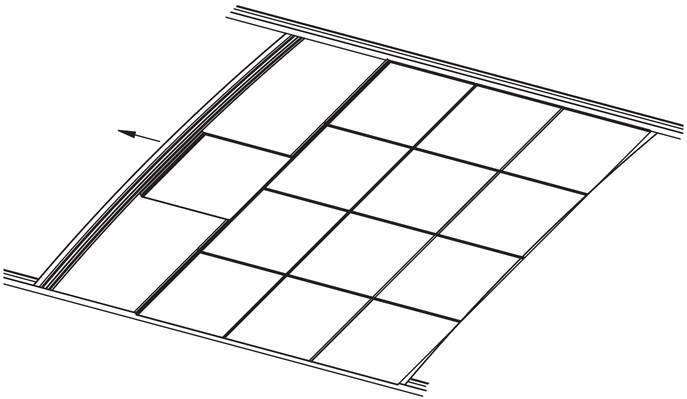
- Rest the ends of the concealed tee on the main beam flange.
- Install the second and third rows like the first, with breather splines between the tiles and a 4′ concealed tee between each row.

NOTE: Every kerf must be filled by spline or grid flange to keep air from passing through the tile joints and soiling the tile.

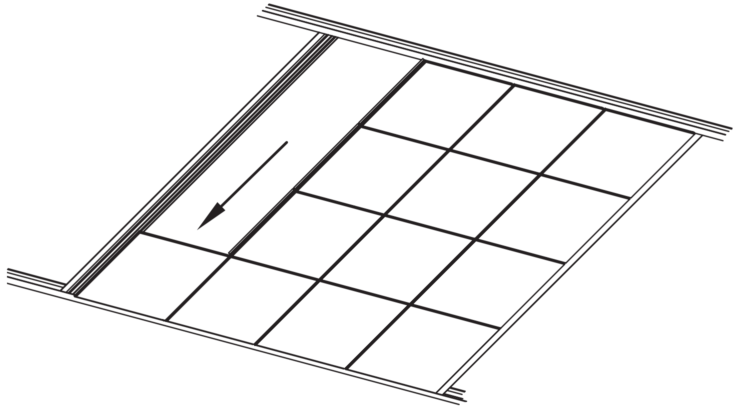
NOTE: K4C4 Tiles are directional – see indicator on back of tile.

K4C4 Tile Non-Accessible Modules

- Install the first tile in the fourth row by engaging a tile kerf on the flange of the last concealed tee near the midpoint of the span.
- Gently bow the grid away from the tile, elevate the other end of the tile, and let the grid flange engage the opposite kerf.

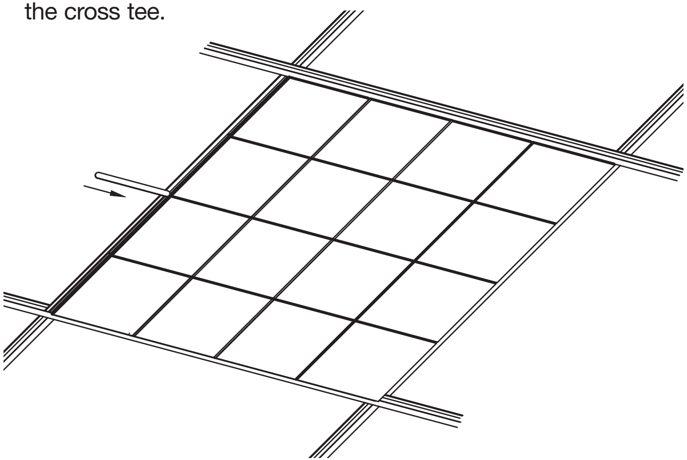


- Slide the tile to one side and engage the flange of the main into the kerf of the tile.

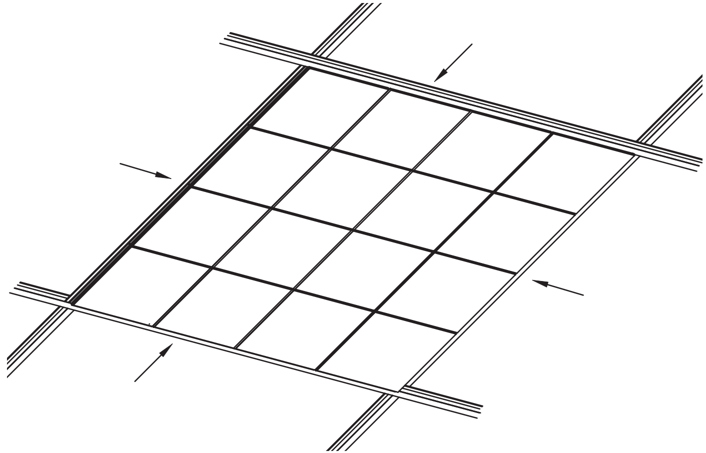


K4C4 Tile Non-Accessible Modules

- Install the next tile the same way, but slide the tile to the other side.
- Insert a breather spline in the kerf of one of the tiles and install the third tile.
- The last tile in the fourth row is installed the same way, but the last breather splines are inserted after the tile is in place. Slide them under the flange of the cross tee.

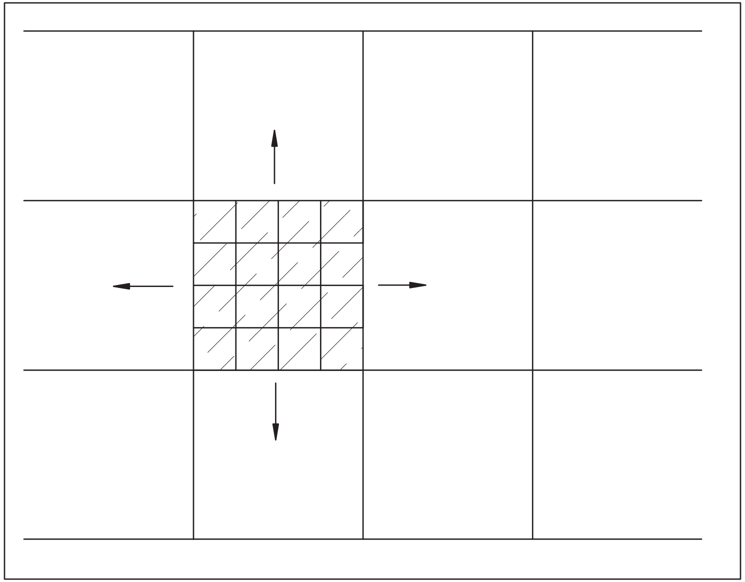


- After all 16 tiles are installed, adjust the module so the joints are lined up and tight.



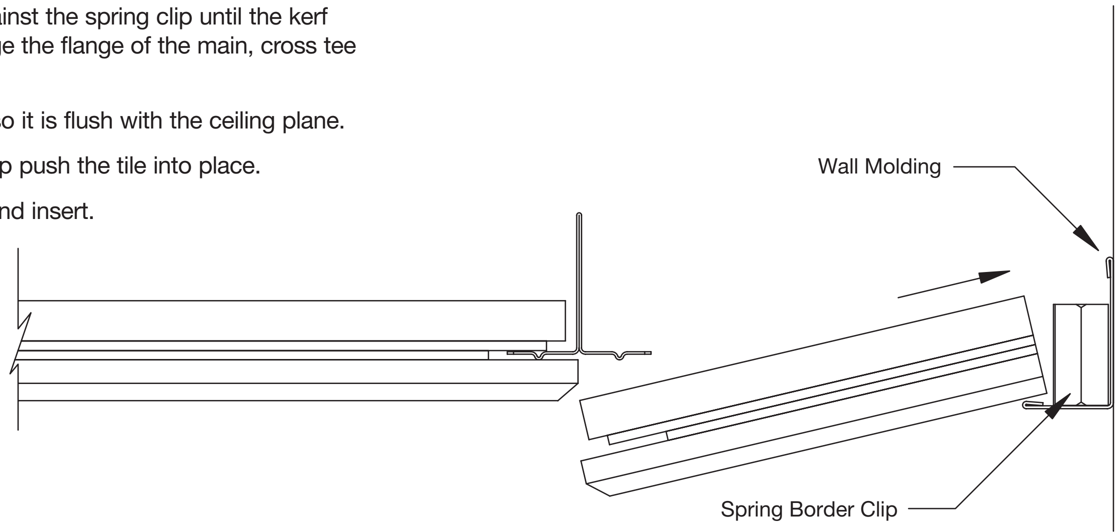
K4C4 Tile Non-Accessible Modules

- Once you have a starting point, work progressively outward from that module.



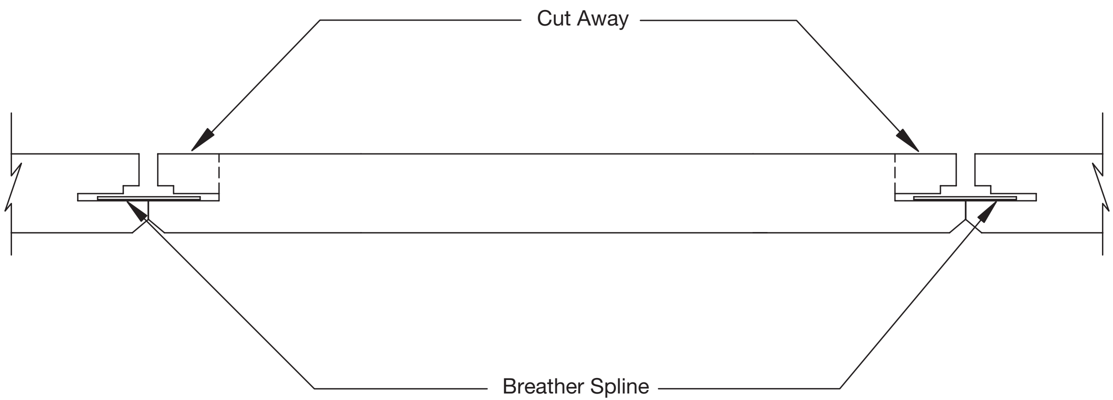
K4C4 Tile Border Installation

- Cut each border tile 1/2″ short.
- Place a spring clip on the wall molding with the "legs" of the clip against the molding at the wall.
- Push the cut edge of the tile against the spring clip until the kerf on the opposite edge can engage the flange of the main, cross tee or concealed tee.
- Raise the other edge of the tile so it is flush with the ceiling plane.
- Let the pressure of the spring clip push the tile into place.
- Cut a breather spline to length and insert.
- For a tighter perimeter fit, use a C-channel wall molding with spring border clips pushing the border tiles both out against the field *and* down against the flange of the wall molding.



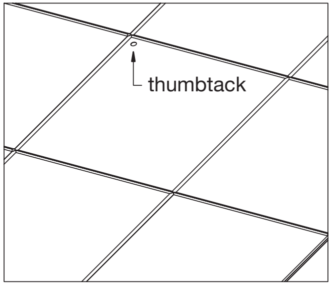
K4C4 Tile Border Installation

- When installing the last tile in a border module, cut away the back of the kerf on both sides to allow clearance for the breather splines already inserted.

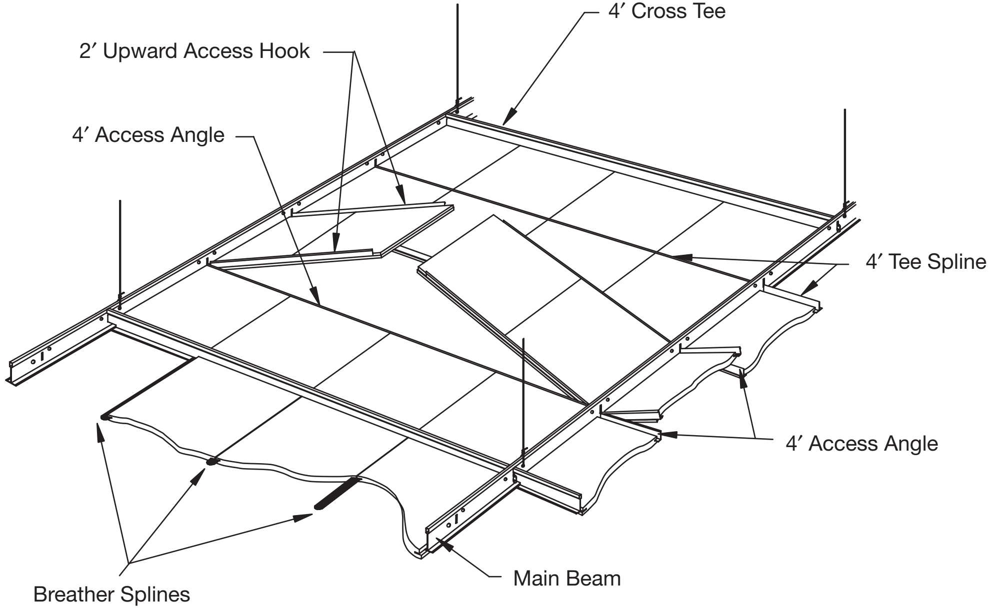


K4C4 Tile Access Modules

- For quick identification of access panels after the installation, push a white thumbtack into the corner of one of the tiles so the head is just visible above the surface when looking across the ceiling.

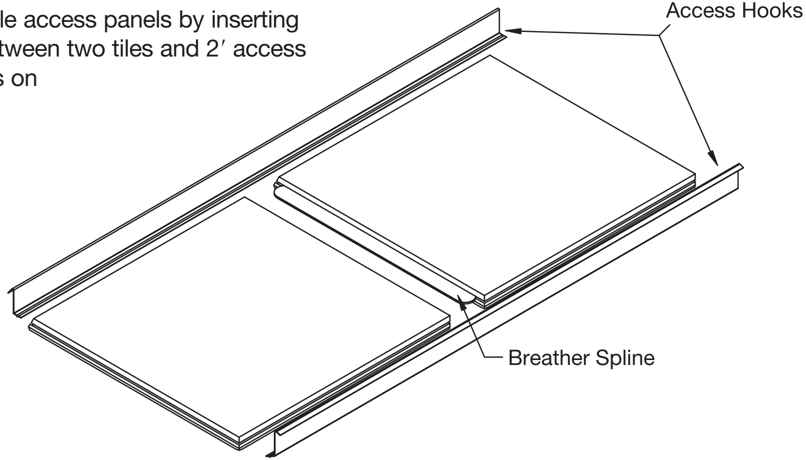


- For access to the plenum, replace concealed tees on both sides of either the second or third row with access angles.

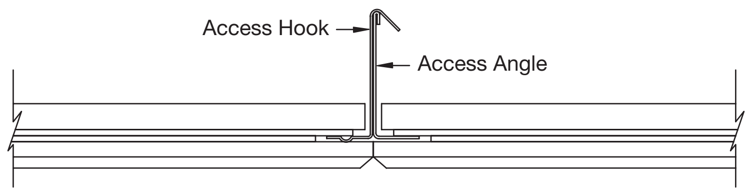


K4C4 Tile Access Modules

- Make two removable access panels by inserting breather splines between two tiles and 2′ access hooks into the kerfs on adjacent edges.

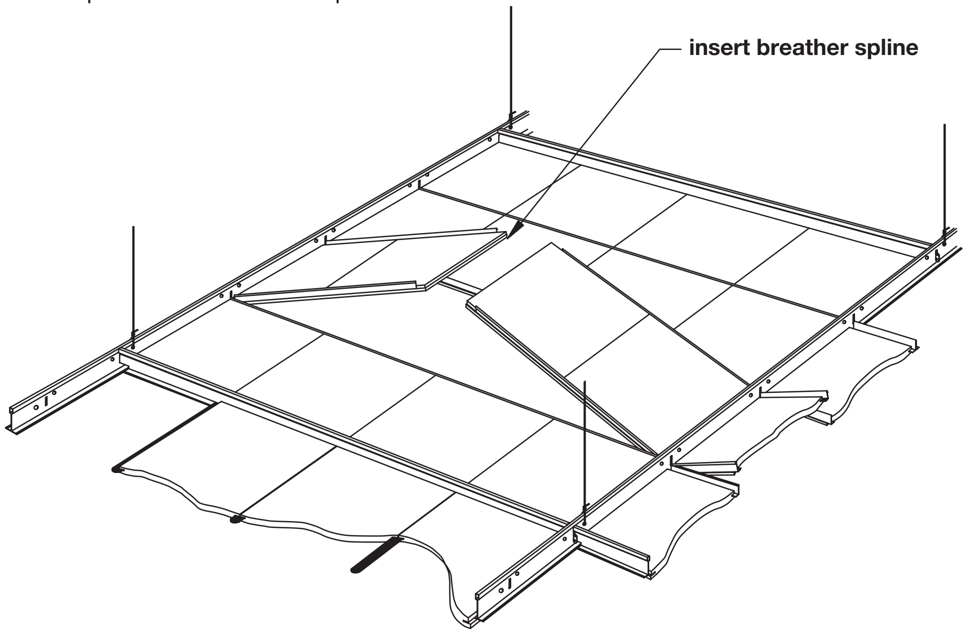


- The access hooks lay over the access angles. The kerfs at the outer edges of the tile engage the flange of the main and serve as a hinge.



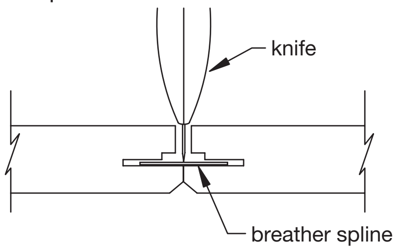
K4C4 Tile Access Modules

- Insert the final breather spline between the two access panels as the panels are lowered into place.



K4C4 Tile Installation Tips

- Consider including access panels in every other module in a checkerboard pattern in the initial installation. This could save your client time and money in the future.
- When inserting breather splines under cross tees, you may find it helpful to use your utility knife to position them. *From above*, place the point between two tiles and slide the spline into position.



- If you are installing light fixtures, air diffusers, or other components that have black cases, consider using black grid throughout the installation so that the exposed grid flanges will blend with the components.

Lighting and Other Fixtures

Lighting and other fixtures must be supported by the grid, not by the ceiling panels. Depending on the size and weight of the fixtures, extra hanger wires may be required.

Note: Ceilings requiring seismic restraint, or installation for fire resistance require additional components. Refer to local codes or UL directory for additional information.

TechZone™ Ceiling Systems Overview

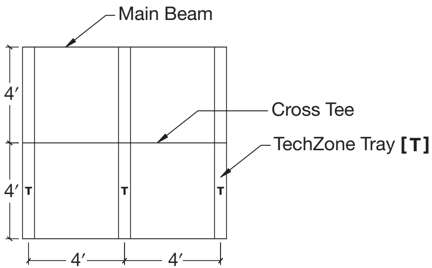
Standard metal and OPTIMA TechZone trays in 6″ widths serve as the “housing” for the primary service elements in the ceiling. Standard, off-the-shelf lay-in and tegular linear light fixtures, air diffusers, and sprinklers are installed in the “TechZone.” Pendant light fixtures also work very well. Various ceiling configurations are possible with standard panel sizes, such as 2′ x 2′, 1′ x 4′, 2′ x 4′, and 4′ x 4′. TechZone trays are removable, allowing easy access to the plenum.

TechZone Installation Recommendations

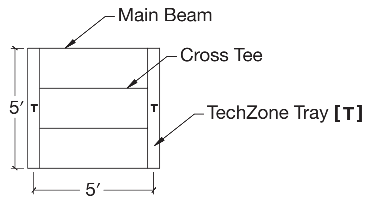
There are no special components required to install TechZone Ceiling Systems. The only installation requirement is that main beams must always be installed perpendicular to TechZone trays.

For perimeter solutions, refer to the Drywall Grid Systems section, pages 2-1 through 2-81.

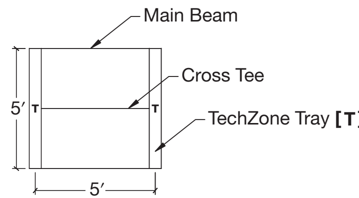
Surrounds and Transitions: 2-59
Soffits and Height Transitions: 2-64
Pockets: 2-78
Light Coves: 2-81



42″ x 48″ field panel



20″ x 54″ field panel



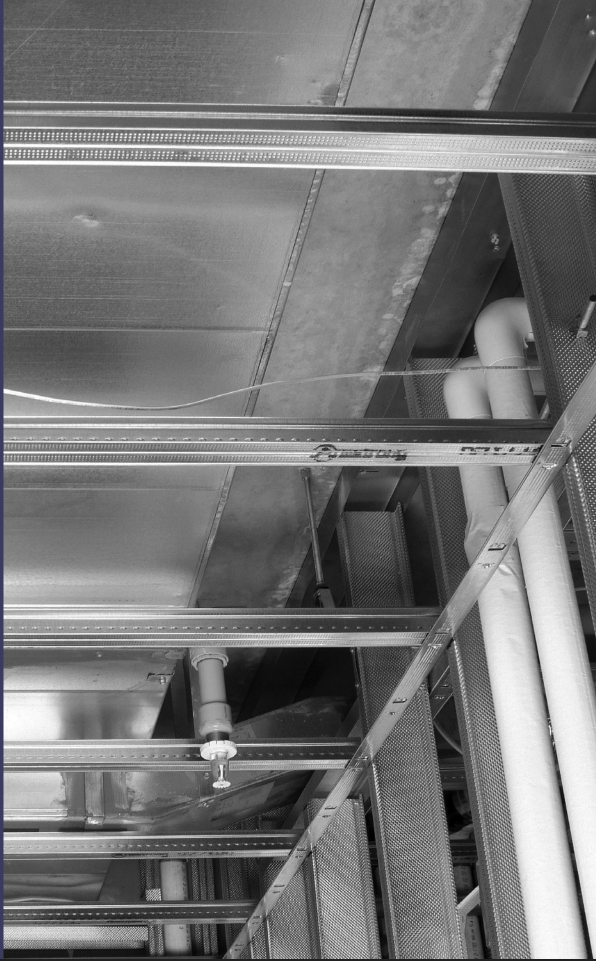
30″ x 54″ field panel

CEILING & WALL SYSTEMS

[Between us, ideas become reality.]®

Drywall Systems

Commercial Ceilings and Walls Solutions Guide



Armstrong®

Drywall Systems Overview

Design Flexibility

Armstrong Drywall Systems offer design flexibility and installation alternatives for:

- Flat and curved ceilings
- Surrounds
- Drop or return soffits
- Transitions to acoustical ceilings
- Project shop drawings available upon request

The purpose of this section is to provide economical alternatives to stud and track construction through the engineered design of a suspended grid system. Manufactured to meet or exceed ASTM standards and code requirements, Armstrong Drywall Systems are faster than traditional framing. You'll save time and money using an easy system that offers practical solutions to many interior and exterior installation conditions.

Suspension System Components

The framing system is made up of main beams and cross tees that are suspended by hanger wires attached to the structural deck. Sections of the main beam lock together end-to-end while cross tees span between the main beams. The ends of the main beams and cross tees attach to the molding that runs around the perimeter of the space.

A wide variety of drywall framing accessories are available and go hand-in-hand with the basic system to provide problem-solving solutions that save time, labor and money.

Whether you're installing drywall, stucco, plaster or exterior systems there are components engineered to meet the necessary construction methods and requirements for each application. This section will cover the following topics:

- system components
- system advantages
- cost and estimating templates
- codes and standards
- installation techniques
- wind uplift construction
- fire rated assemblies
- load and duty ratings

Drywall Systems Product Overview

Features	Benefits
QuikStix™ Locking Pocket Mains	• Low profile uptight installation • Locking pockets at 8″ o.c. on bottom flanges
QuikStix Soffits	• Knockouts at 6″ or 8″ o.c. simplifies cutting and bending • Alignment holes make screw installation simple and forms perfect 30, 45, 75 and 90-degree angles
Pre-Rock Locking Angle Mold	• Faster, more accurate solution for two-phase gypsum board application • Locking tabs at 8″ o.c. eliminates screws, pop rivets or crimpers needed to attach tees to molding
PeakForm™ Patented Profile	• increases strength and stability for improved performance during installation
SuperLock™ main beam clip	• engineered for a strong, secure connection and fast, accurate alignment confirmed with an audible click; easy to remove and relocate
Screw Stop™ reverse hem	• prevents screw “spin-off” on 1-1/2″ wide face items
Minimum .0179″ steel thickness	• meets ASTM C 645 requirement
Minimum G40 hot dipped galvanized coating	• meets ASTM C 645 requirement • superior corrosion resistance • faster construction schedules
Minimum G90 hot dipped galvanized coating available	• superior corrosion resistance for exterior applications • components available for construction in exterior applications
Additional routs and cross tee lengths	• no additional field work required to frame type “F” fixtures • SP135 - 13-1/2″ rout spacing to accommodate lath for stucco applications

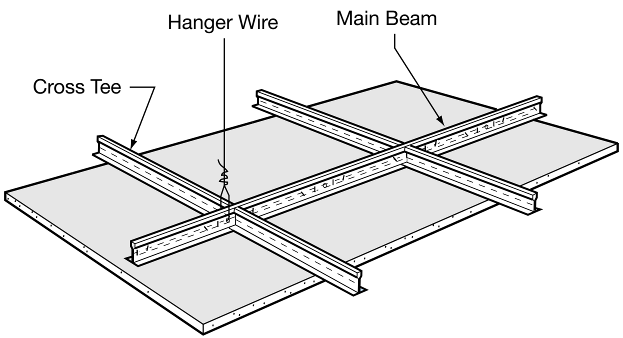
Drywall Systems Product Overview

Features	**Benefits**
1-1/2″ wide knurled face for main beams and cross tees	• easily accepts drywall screws • wide face for easy application of gypsum wall board • meets ASTM C 645 requirement
Rotary stitched	• increased torsional strength and extra stability during installation
Heavy-duty load capacity	• meets ASTM C 635 requirement
XL^2 staked-on clip end detail on cross tees	• provide secure locked connection • fast and easy to install
Fire Rated System	• meets a broad range of UL design assemblies D501, D502, G523, G524, G527, G528, G529, G531, G553, J502, L502, L508, L513, L515, L525, L526, L529, L564, P501, P506, P507, P508, P509, P510, P513, P514 (XL7936G90, XL7341, SP135, HD8906F08, HD8906F16, QSLPM12 and QSUTC are not fire rated)
Wind uplift	• complies with wind uplift requirements • construction details available • Dade/Broward County, Florida product approval – NOA# 04-0716.03 3/17/2010
System integration	• fast, easy transition to acoustical ceilings
10-year limited warranty	• suspension system backed with a 10-year limited warranty
A wide variety of accessories	• provide problem-solving installation solutions saving time, labor and money • packaged in buckets, easy to move around jobsite
Faceted main beam	• pre-notched main beam to simplify assembly of curved sections • all knockout locations along main beam require installation of RC2 clip

Drywall Framing System Advantages

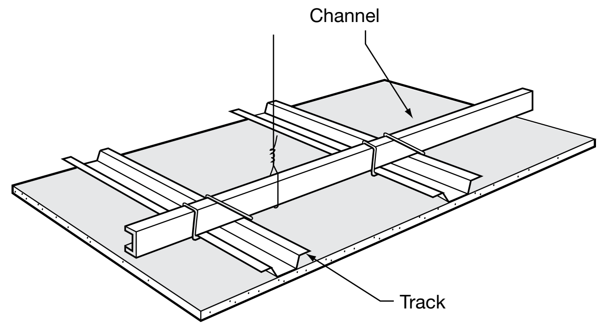
Armstrong Drywall Grid System

Fast and Easy



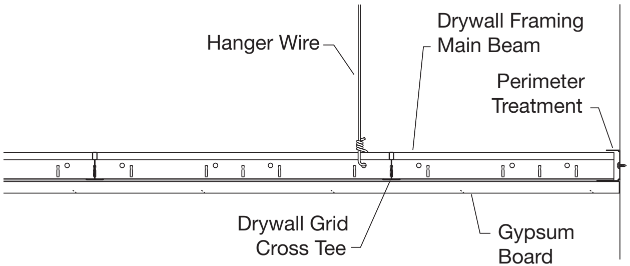
- Engineered to maintain precise module spacing through manufactured rout locations. This grid system saves time, labor and money.

Traditional framing system



- Track and channel construction requires labor-intensive cutting, tying and spacing.

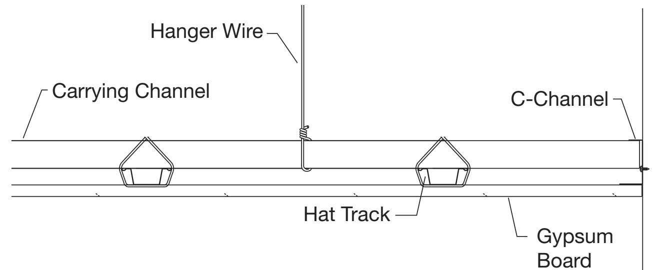
Armstrong Drywall Framing System



Single layer/plane

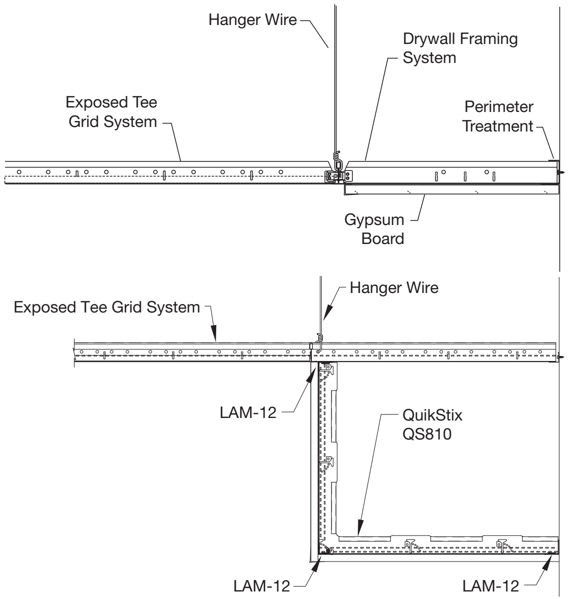
- Suspended drywall framing system eliminates the need for hat track and carrying channel
- Simple stab and click installation eliminates labor-intensive cutting and tying
- Drywall framing system installs in the same time it takes to install an acoustical grid system
- ScrewStop feature offers more consistent, positive screw attachment of gypsum board
- Manufactured rout locations eliminate the need to measure and ensures consistent module spacing
- 51 main beam routs and 7 cross tees engineered to eliminate time consuming field modifications for type “F” fixtures
- Maximize ceiling height with single layer framing — important in low clearance installations

Traditional Framing System



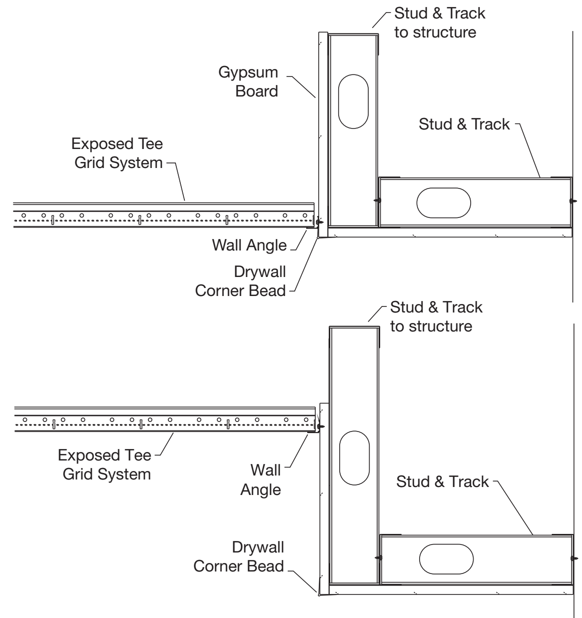
Layered suspension/components

Armstrong Drywall Framing System

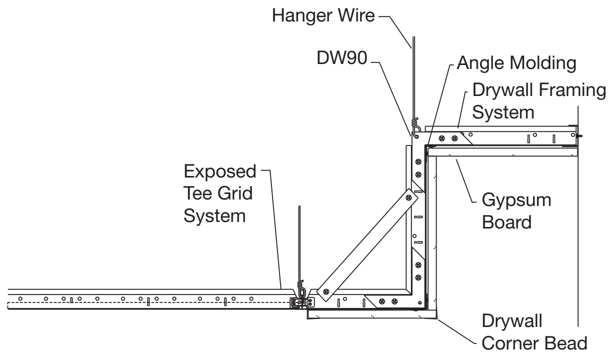


- Drywall and acoustical components interconnect for faster, easier ceiling transitions
- Suspended by hanger wire — eliminates additional stud and track framing in the plenum

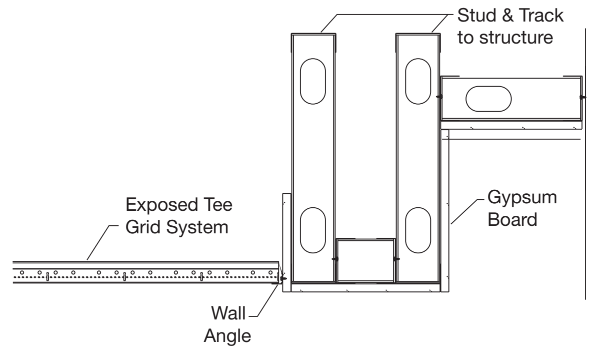
Traditional Framing System



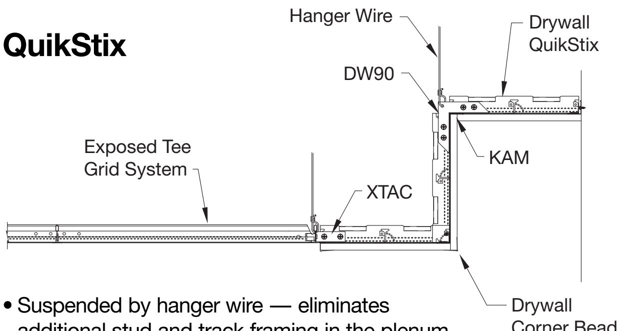
Armstrong Drywall Framing System



Traditional Framing System



QuikStix

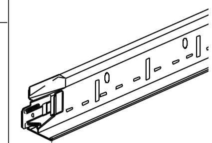
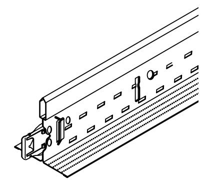
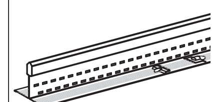


- Suspended by hanger wire — eliminates additional stud and track framing in the plenum

Main Beams

LOAD TEST DATA

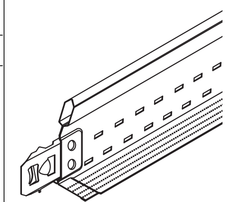
1. Load data shown is based on vertical deflection limits of L/360 and L/240. Allowable vertical deflection as a load is applied based on L/360 is less vs L/240. (Therefore listed loads are lower when reported as L/360.) Wire sizing and spacing for the suspension system should be based on the imposed load of the ceiling, ASTM standards, local codes and practices. See standards for additional information.
2. Hanger locations on both the main beams and cross tees are easily adjusted to handle increased weight loading. Consult your Armstrong representative or TechLine with specific job requirements (1 877 ARMSTRONG).

Item #	Length	Face Dim.	Profile Height	Duty Load	Fire Rated	Routs	Load Test Data (Lbs./LF) L/360 wires at 2′	L/360 wires at 3′	L/360 wires at 4′	L/240 wires at 2′	L/240 wires at 3′	L/240 wires at 4′	Isometric
HD8901	144″	15/16″	1-1/2″	HD	Yes	51 routs – starting 2-1/4″ from each end (type “F” fixture compatible)	81.9	30.6	16.5	122.9	45.9	24.75	
HD8906 HD8906**G90***	144″	1-1/2″	1-11/16″	HD	Yes	51 routs – starting 2-1/4″ from each end (type “F” fixture compatible)	95.5	35.8	18.76	139.85	52.24	28.14	
HD8906**F08****	144″	1-1/2″	1-11/16″	—	No	Faceted 8″ O.C. 51 routs – starting 2-1/4″ from each end (type “F” fixture compatible)			12.3			18.4	
HD8906**F16****	144″	1-1/2″	1-11/16″	—	No	Faceted 16″ O.C. 42 routs – starting 2-1/4″ from each end (type “F” fixture compatible)			12.3			18.4	
SP135*	135″	1-1/2″	1-11/16″	HD	No	13-1/2″ O.C. – starting 6-3/4″ from each end					52.59	28.71	
QSLPM12	144″	1-1/2″	1-1/2″	HD	No	Locking Tabs 8″ O.C. – starting 4″ from each end		33.8	14.43		40.6	21.6	

* G90 galvanized coating ** Tested flat per ASTM C 635 with RC2 clips at each knockout location.

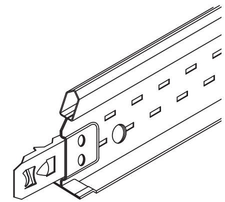
Armstrong

Cross Tees

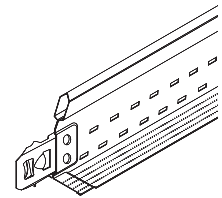
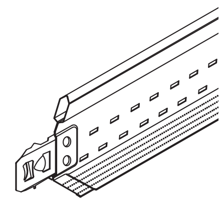
Item #	Length	Face Dim.	Profile Height	Fire Rated	Routs	Load Test Data (Lbs./LF)* L/360 wires at	Load Test Data (Lbs./LF)* L/240 wires at	Isometric
						72″	72″	
XL8965	72″	1-1/2″	1-1/2″	Yes	6 routs – starting 24″ from each end	4.27	6.4	
						50″	50″	
XL8947P XL8947P**G90**	50″ **	1-1/2″	1-1/2″	Yes	8 routs – starting 10″ from each end (type "F" fixture compatible)	13.0	19.5	
						2′ 3′ 4′	2′ 3′ 4′	
XL8945P XL8945P**G90**	48″	1-1/2″	1-1/2″	Yes	9 routs – center rout and starting 10″ from each end (type "F" fixture compatible)	15.0	22.5	

* Type F compatible.
** Dimension is nominal.

Cross Tees

Item #	Length	Face Dim.	Profile Height	Fire Rated	Routs	Load Test Data (Lbs./LF) L/360 wires at 2′	3′	4′	L/240 wires at 2′	3′	4′	Isometric
XL8341	48″	15/16″	1-11/16″	Yes	3 routs – starting 12″ from each end			16.59			24.89	
XL7341	48″	15/16″	1-11/16″	No	3 routs – starting 12″ from each end			16.59			24.89	

Cross Tees

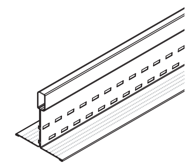
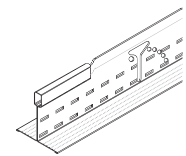
Item #	Length	Face Dim.	Profile Height	Fire Rated	Routs	Load Test Data (Lbs./LF) L/360 wires at 2′ 3′ 4′	Load Test Data (Lbs./LF) L/240 wires at 2′ 3′ 4′	Isometric
XL7936**G90**	36″	1-1/2″	1-1/2″	No	none	33.33	49.96	
XL8925 XL8925**G90**	26″ **	1-1/2″	1-1/2″	Yes	2 routs – 12″ from each end (type “F” fixture compatible)	98.0	117.0	
XL8926 XL8926**G90**	24″	1-1/2″	1-1/2″	Yes	3 routs – center rout and 10″ from each end (type “F” fixture compatible)	129.0	158.0	
XL7918	14″ **	1-1/2″	1-1/2″	Yes	none (type “F” fixture compatible)	71.5	107.0	

** Dimension is nominal.

Membrane Load Values for Drywall Systems

Component Combinations		Maximum Load in lbs./ft.^{2} at Hanger Wire/Cross Tee Spacing					
		48″/ 24″		48″/16″		36″/ 16″	
Main	Tee	L/240	L/360	L/240	L/360	L/240	L/360
HD8906 –	XL8965	3.20		4.66			
HD8906 –	XL8947P	6.78	4.52	6.78	4.52	13.41	8.95
HD8901 –	XL8947P	5.97	3.98	5.97	3.98	9.78	6.51
HD8906 –	XL8945P	7.03	4.69	7.03	4.69	14.39	9.95
HD8901 –	XL8945P	6.18	4.12	6.18	4.12	11.61	7.74
HD8906 –	XL7936**G90**					21.77	14.51
HD8901 –	XL7936**G90**					21.77	14.51
HD8906 –	XL8926					26.13	21.77

Framing Tees

Item #	Length	Face Dim.	Profile Height	Fire Rated	Routs	Load Test Data (Lbs./LF) L/360 wires at			L/240 wires at			Isometric
						2′	3′	4′	2′	3′	4′	
S7708	8′	1-1/2″	1-1/2″	Yes	N/A			16.3			24.4	
S7710	10′	1-1/2″	1-1/2″	Yes	N/A			16.3			24.4	
S7712	12′	1-1/2″	1-1/2″	Yes	N/A			16.3			24.4	
S7714	14′	1-1/2″	1-1/2″	Yes	N/A			16.3			24.4	
QS610	10′	1-1/2″	1-1/2″	No	Knockouts 6″ o.c.						3.79	
QS810	10′	1-1/2″	1-1/2″	No	Knockouts 8″ o.c.						4.41	

** Dimension is nominal.

Maximum Load in Lbs./SF (L/240 per ASTM C 645)

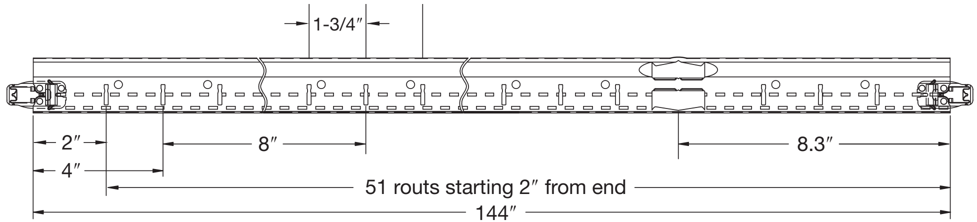
Item Number	Item Length	O.C. Spacing	3′ Span Lbs./SF	4′ Span Lbs./SF	5′ Span Lbs./SF	6′ Span Lbs./SF	7′ Span Lbs./SF	8′ Span Lbs./SF	10′ Span Lbs./SF	12′ Span Lbs./SF	14′ Span Lbs./SF
QSLPM12	12′	72″	4.87								
QSLPM12	12′	84″		2.80							
S7708	8′	16″		18.38				18.38*			
S7708	8′	24″		12.25				12.25*			
S7710	10′	16″			9.97				9.54*		
S7710	10′	24″			6.64				6.36*		
S7712	12′	16″				4.81				4.87*	
S7712	12′	24″				3.25				3.25*	
S7714	14′	16″					2.80				2.80*
S7714	14′	16″					24.70*				9.53**
S7714	14′	24″					16.50*				6.36**
QS610	10′	6″		3.79							
QS810	10′	8″		4.41							

* Requires mid-span vertical support
** Requires two vertical supports at 1/3 points

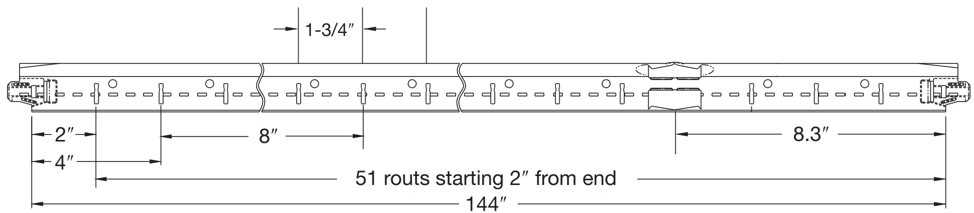
Note: 5/8″ drywall weighs 2.4 lbs./SF (tees installed 16″ or 24″ on center)
1/2″ drywall weighs 2.0 lbs/SF (tees installed 16″ on center only)

Rout Locations on main beams

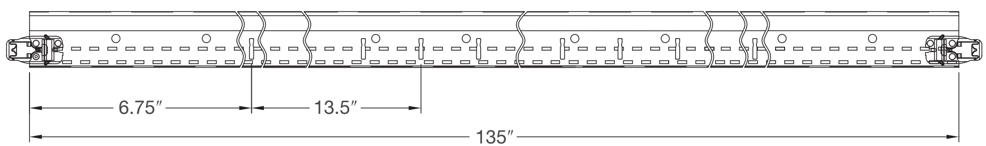
HD8906 —
1-1/2″ Face



HD8901 —
15/16″ Face



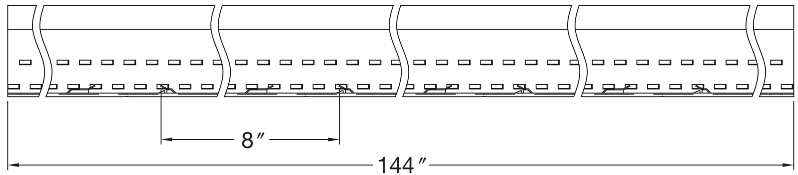
SP135 —
1-1/2″ Face



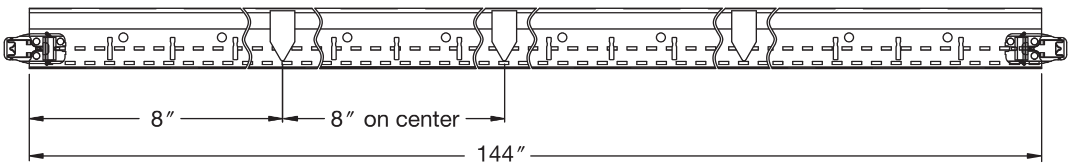
NOTE: All dimensions are nominal

Rout Locations on main beams

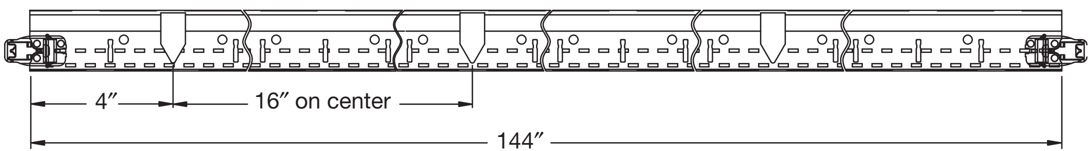
QSLPM12



HD8906F08 — Use for radius 15′ or less



HD8906F16 — Use for radius over 15′

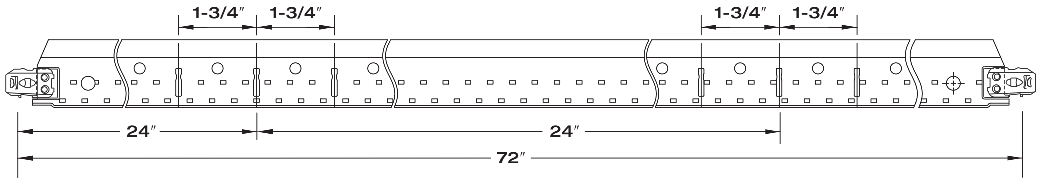


(Directional Main Beam)

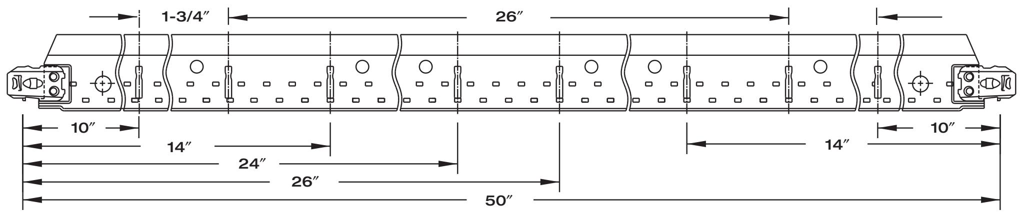
NOTE: All dimensions are nominal

Rout Locations on cross tees

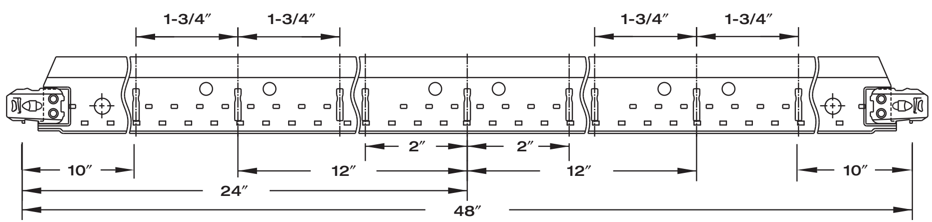
XL8965



XL8947P



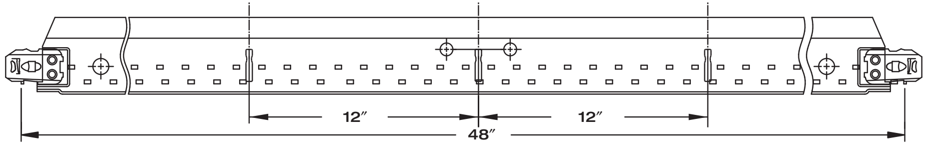
XL8945P



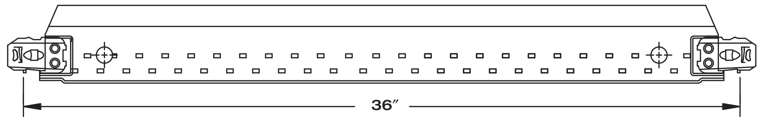
NOTE: All dimensions are nominal

Rout Locations on cross tees

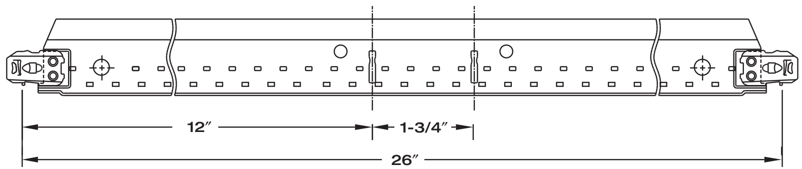
XL8341/XL7341



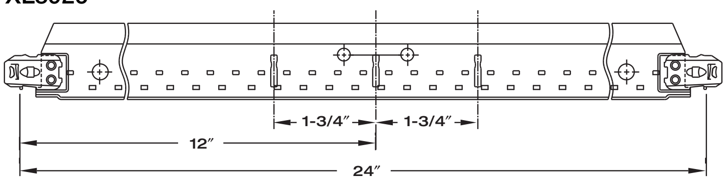
XL7936G90



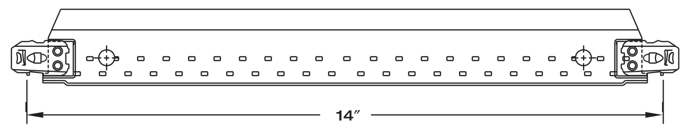
XL8925



XL8926

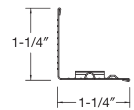
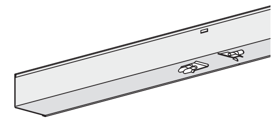
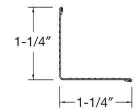
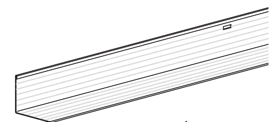
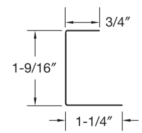
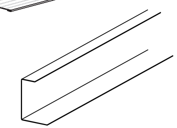
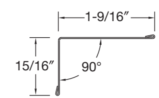
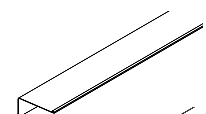
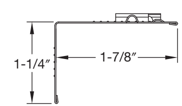
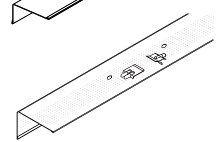


XL7918

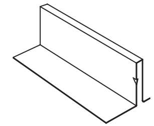
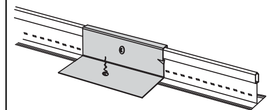
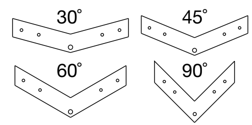
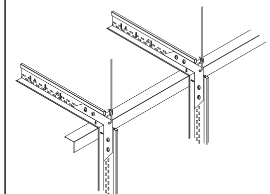
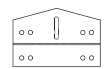
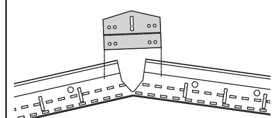


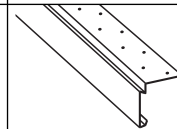
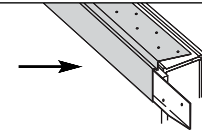
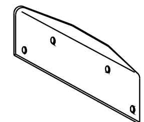
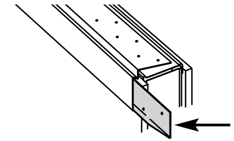
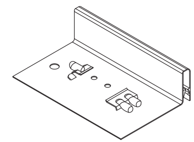
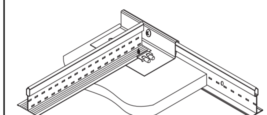
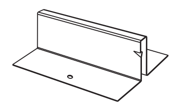
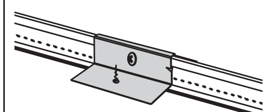
NOTE: All dimensions are nominal

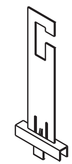
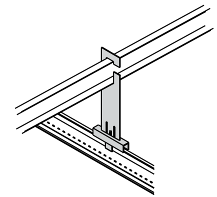
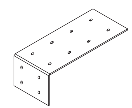
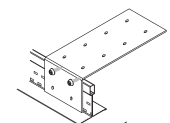
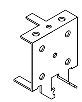
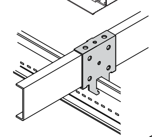
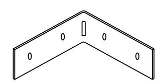
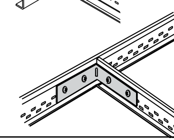
Wall Molding

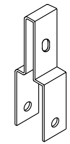
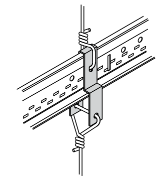
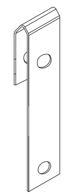
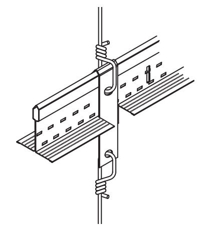
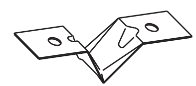
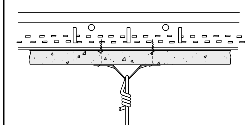
Item #	Length	Description	Profile	Isometric
LAM-12 LAM-12**G90**	144″	Locking Angle Molding nominal 1-1/4″ x 1-1/4″ (Locking tabs 8″ on center)		
KAM-12 KAM-12**G90**	144″	Knurled Angle Molding nominal 1-1/4″ x 1-1/4″		
KAM-10 KAM-10**G90**	120″	Knurled Angle Molding nominal 1-1/4″ x 1-1/4″		
7838	120″	Unhemmed Channel Molding nominal 3/4″ x 1-9/16″ x 1-1/4″		
7858	144″	Reverse Angle Molding nominal 1-9/16″ x 15/16″		
7857	144″	Reverse Angle Molding nominal 15/16″ x 15/16″		
PRLAM12	144″	Pre-Rock Locking Angle Molding 1-7/8″ x 1-1/4″ (Locking tabs 8″ on center)		

Drywall Grid System Accessories (for a complete list of accessories request submittal CS-3082)

Item #	Qty. Per Bucket	Description	Isometric	Application
DWACS	100	**Drywall Attachment Clip** facilitates transition from drywall to acoustical ceiling; locks under bulb of grid section to prevent upward movement and provide secure attachment surface on one side of exposed grid (For use with 15/16" Face dimension suspension system)		
DW30C DW45C DW60C DW90C	250 250 250 250	30, 45, 60 and 90 degree **Drywall Angle Clips** are used to create positive and secure angles for drywall and ceiling installations on either main beams or cross tees		
RC2	205	**Radius Clip** is used for drywall applications which form curved installations; attaches to the web of the main beam with four 7/16″ pan head screws; install at **all** knockout locations (Attach to side of web where rotary stitching is concave)		

Item #	Qty. Per Bucket	Description	Isometric	Application
TT10	30	**Partition Top Trim** used to finish the top of a drywall partition for a continuous drywall/acoustical ceiling interface; 10′ length		
RC1	300	**RC1 Radius Clip** is used as a main beam splice or partition top trim splice		
DW58LT	125	**DW58LT-Transition Clip for 5/8″ Drywall with Locking Tabs;** facilitates transition from drywall to acoustical ceiling; one-sided hold-down clip; eliminates need for drywall bead. Locking tabs provide secure location for DGS tees.		
DW50LT	125	**DW50LT-Transition Clip for 1/2″ Drywall with Locking Tabs;** facilitates transition from drywall to acoustical ceiling; one-sided hold-down clip; eliminates the need for a drywall bead. Locking tabs provide secure location for DGS tees.		
MBAC	70	**Main Beam Adapter Clip** attaches to web of grid section; provides larger surface for screw attachment; used as a hold-down clip for thin material (metal or plastic lay-in panels); fastens drywall track to underside of exposed grid with lay-in panels, leaving grid face free of screw holes		

Item #	Qty. Per Bucket	Description	Isometric	Application
CBS4 CBS6 CBS8 CBS10 CBS12	100 100 100 100 75	**Channel Beam Splice** CBS4-4″ Channel Beam Splice; CBS6-6″ Channel Beam Splice; CBS8-8″ Channel Beam Splice; CBS10-10″ Channel Beam Splice; CBS12-12″ Channel Beam Splice – Used to suspend main beams from 1-1/2″ cold rolled channels		
CBS2006 CBS2008	100 100	**Channel Beam Splice** CBS2006-6″ Channel Beam Splice; CBS2006-8″ Channel Beam Splice used to suspend main beams from 2″ black iron carrying channel		
QSUTC	150	**QuikStix Uptight Clip** allows for installation in confined plenums 1-1/2″ to 5-1/2″ depth		
UTC	250	**Uptight Clip** for tight grid attachment to 1-1/2″ channel; bridging under HVAC ducts; can be used to install grid tight to wood joists		
XTAC	100	**Cross Tee Adapter Clip** – Used to attach field cut cross tees to main beams or main beam to main beam		

Item #	Qty. Per Bucket	Description	Isometric	Application
DLCC	250	**Direct Load Ceiling Clip** to hang suspension system below existing 15/16″ grid face, transferring weight directly to hanger wire; may be used to preserve the fire rating of an existing ceiling and to support heavy accessories		
DDC	250	**Double Drywall Clip** to hang suspension system below existing 1-1/2″ grid face, transferring weight directly to hanger wire; may be used to preserve the fire rating of an existing ceiling and to support heavy accessories; allows for double layer of 5/8″ gypsum board		
DWC	250	**Drywall Clip** allows for a “second” ceiling to be installed below a drywall ceiling; attach through installed drywall to supporting structure		

Codes and Installation Standards

About Codes

- provide guidelines for the design and construction of residential and commercial space
- written and maintained by agencies that have no direct authority for enforcement
- generally revised every three years
- adopted, in full or in part, by municipalities that have enforcement powers

Implementation Standards

- define the materials and techniques to be used in complying to the Model Building Codes
- in some cases may be part of the code itself (IBC)
- typically referenced in the building specifications or drawings

Always Check with Local Building Codes

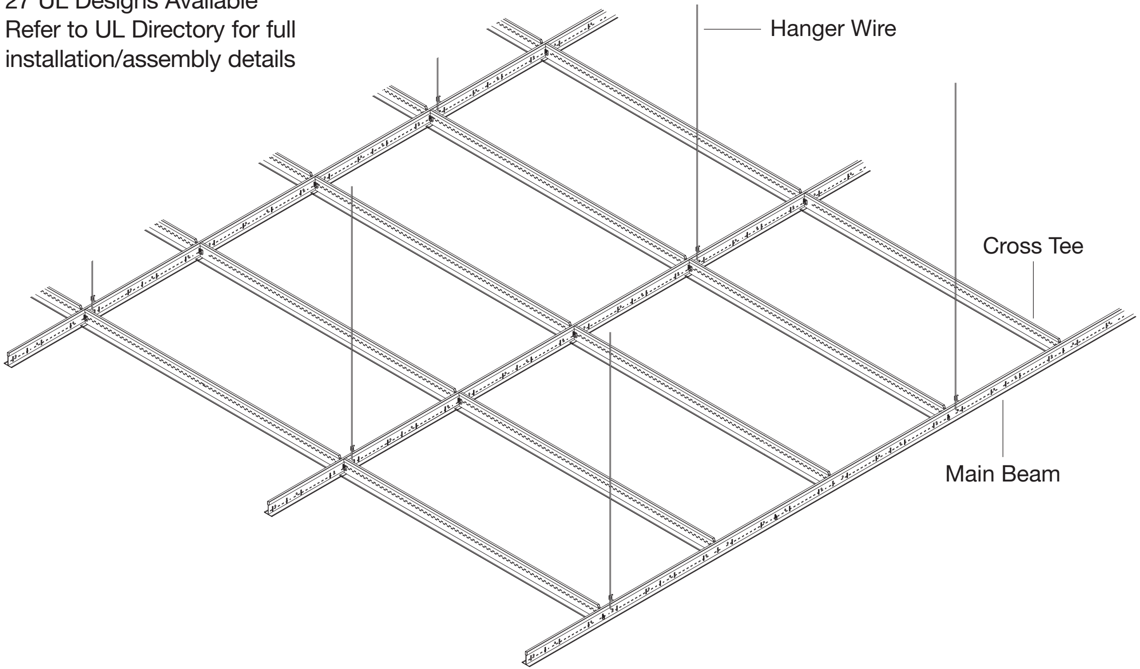
- municipalities do not necessarily adopt the latest version of a code
- enforcement authorities decide which portions of a code will be applied
- manufacturers and their agents do not have the authority to interpret codes
- local authorities resolve issues that may arise from conflicting codes

Drywall Grid System — Code and Installation Standards

ASTM	C635	Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings
ASTM	C636	Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels
ASTM	C645	Standard Specification for Nonstructural Steel Framing Members
ASTM	C754	Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products
ICC	ESR-1289	International Code Council Evaluation Service
IBC		International Building Code
	RR25348	City of Los Angeles Research Report
DSA	PA105	Division of the State Architect (California)
UL		Underwriters Laboratories Inc. Fire Resistance Directory
CISCA		Ceiling & Interior Systems Construction Association
NOA	03-0119.02 - 06/13/10	Dade/Broward County, Florida Product Approval

Drywall Fire Resistive Designs

- 27 UL Designs Available
- Refer to UL Directory for full installation/assembly details



UL Fire Resistive Drywall Grid System Assemblies

Deck Construction Type	UL Design Number	Concrete Thickness	# Drywall Layers	Minimum Drywall Thickness	Maximum Fixture Penetration ($Ft^2/100\ Ft^2$)	Maximum Duct Penetration ($In^2/100\ Ft^2$)	Drywall Grid System
Floor/Ceiling Drywall Assemblies							
CONCRETE ON COMPOSITE FLAT CELLULAR, FLUTED OR BLEND DECK							
2-Hour	**D501**	2 1/2″	1	5/8″	None	None	DFR 8000
	D502**	2 1/2″	1	5/8″	24	144	DFR 8000
CONCRETE ON METAL LATH, CORRUGATED AND RIBBED DECK							
3-Hour	**G523****	3	1	5/8″	24	144	DFR 8000
	G524***	3 1/2″, 3 3/4″	1	1/2″	None	113	DFR 8000
	G529	3 1/4″	1	1/2″	24	57	DFR 8000
	G529	2 3/4″	1	5/8″	24	57	DFR 8000
2-Hour	**G523**	2 1/2″	1	1/2″ or 5/8″ *	24	144	DFR 8000
	G524***	3 1/2″, 3 3/4″	1	1/2″	None	113	DFR 8000
	G527	2 1/2″	1	1/2″ or 5/8″ *	None	None	DFR 8000
	G529	2 1/2″	1	1/2″	24	57	DFR 8000
1 1/2-Hour	**G528**	2 1/2″	1	1/2″ or 5/8″ *	None	None	DFR 8000
	G524	2 3/4″ – 3″	1	1/2″ or 5/8″	***	***	DFR 8000
PRECAST CONCRETE SLAB							
3-Hour	**J502**	2 3/4″	1	5/8″	None	None	DFR 8000
2-Hour	**J502**	2″	1	5/8″	None	None	DFR 8000

* Depends On Rating, Manufacturer   ** Optional acoustical tile may be glue applied to gypsum board   *** Concrete thickness depends on joist depth used

Armstrong Drywall Furring Items XL7936G90, HD8906F08/F16, QSUTC, SP135, XL7341 and QSLPM12 cannot be used as part of a UL Fire Resistive Design.

DFR 8000 - UL Designation, Fire Guard Drywall Grid System

DFR 8000 SS - UL Designation, Fire Guard Drywall Framing System

UL Fire Resistive Drywall Grid System Assemblies

Deck Construction Type	UL Design Number	Concrete Thickness	# Drywall Layers	Minimum Drywall Thickness	Maximum Fixture Penetration ($Ft^2/100\ Ft^2$)	Maximum Duct Penetration ($In^2/100\ Ft^2$)	Drywall Grid System
Wood Deck/Ceiling Drywall Assemblies							
PLYWOOD 2 X 10 WOOD JOISTS							
1-Hour	**L502**	NA	1	1/2″	None	None	DFR 8000
	L513	NA	1	5/8″	None	None	DFR 8000
	L515	NA	1	1/2″	None	None	DFR 8000
	L525	NA	1	1/2″ or 5/8″ *	24	57	DFR 8000
	L526**	NA	1	5/8″	24	114	DFR 8000
PLYWOOD (2) 2 X 10 OR (1) 4 X 10 WOOD JOISTS							
1-Hour	**L508**	NA	1	5/8″	None	None	DFR 8000
PLYWOOD WITH WOOD TRUSSES							
1-Hour	**L529**	NA	1	5/8″	24	57	DFR 8000
DEITRICH TRADEREADY FLOOR SYSTEM/CEILING DRYWALL ASSEMBLIES							
1-Hour	**L564**	3/4″ Cement Fiber Units	1	5/8″	None	None	DFR 8000
1-Hour Corrugated Decking	**G553*****	3/4″	1	5/8″	None	None	DFR 8000

* Depends on rating, manufacturer
** Optional acoustical tile may be glue applied to gypsum board
*** Cannot use XL8965
Armstrong Drywall Items XL7936G90, HD8906F08/F16, QSUTC, SP135, XL7341 and QSLPM12 cannot be used as part of a UL Fire Resistive Design.
DFR 8000 - UL Designation, Fire Guard Drywall Grid System
DFR 8000 SS - UL Designation, Fire Guard Drywall Framing System

UL Fire Resistive Drywall Grid System Assemblies

Deck Construction Type	UL Design Number	Concrete Thickness	# Drywall Layers	Minimum Drywall Thickness	Maximum Fixture Penetration ($Ft^2/100\ Ft^2$)	Maximum Duct Penetration ($In^2/100\ Ft^2$)	Drywall Grid System
Roof/Ceiling Drywall Assemblies							
STANDING SEAM EXPOSED METAL ROOF WITH BATTS/BLANKETS							
1-Hour	**P516**	NA	2	5/8″	None	None	DFR 8000
MINERAL FIBER, FOAM ON CELLULAR, FLUTED, CORRUGATED METAL DECK							
2-Hour	**P501**	NA	1	5/8″	None	None	DFR 8000
	P514	NA	1	5/8″	24	255	DFR 8000
1 1/2-Hour	**P507**	NA	1	5/8″	24	57	DFR 8000
	P510	NA	1	5/8″	24	57	DFR 8000
	P513**	NA	1	5/8″	24	144	DFR 8000
1-Hour	**P508****	NA	1	5/8″	24	144	DFR 8000
	P509**	NA	1	5/8″	24	144	DFR 8000
	P510	NA	1	1/2″	24	57	DFR 8000
MINERAL FIBER/LAMINATED GYPSUM PLANKS							
1 1/2-Hour	**P506**	NA	1	5/8″	24	57	DFR 8000

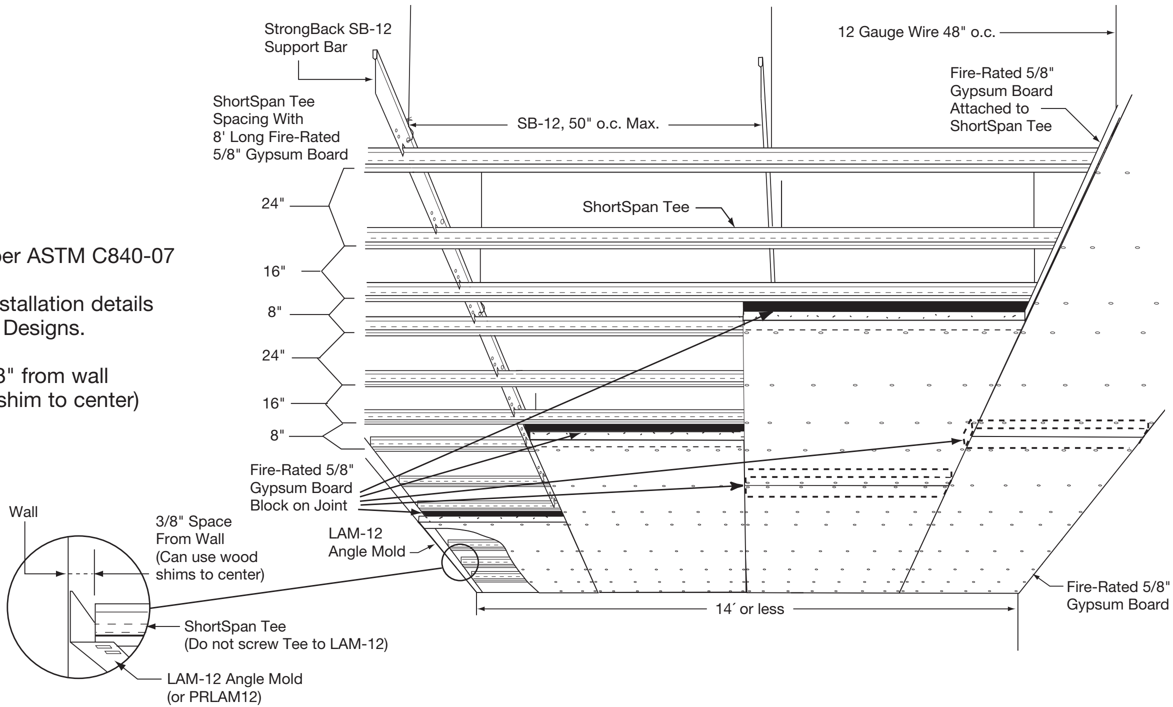
* Depends on rating, manufacturer
** Optional acoustical tile may be glue applied to gypsum board
Armstrong Drywall Grid Items XL7936G90, HD8906F08/F16, QSUT, SP135, XL7341C and QSLPM12 cannot be used as part of a UL Fire Resistive Design.
DFR 8000 - UL Designation, Fire Guard Drywall Grid System
DFR 8000 SS - UL Designation, Fire Guard Drywall Framing System

ShortSpan Fire Rated Assembly

NOTE: Control Joints per ASTM C840-07

For complete installation details see specific UL Designs.

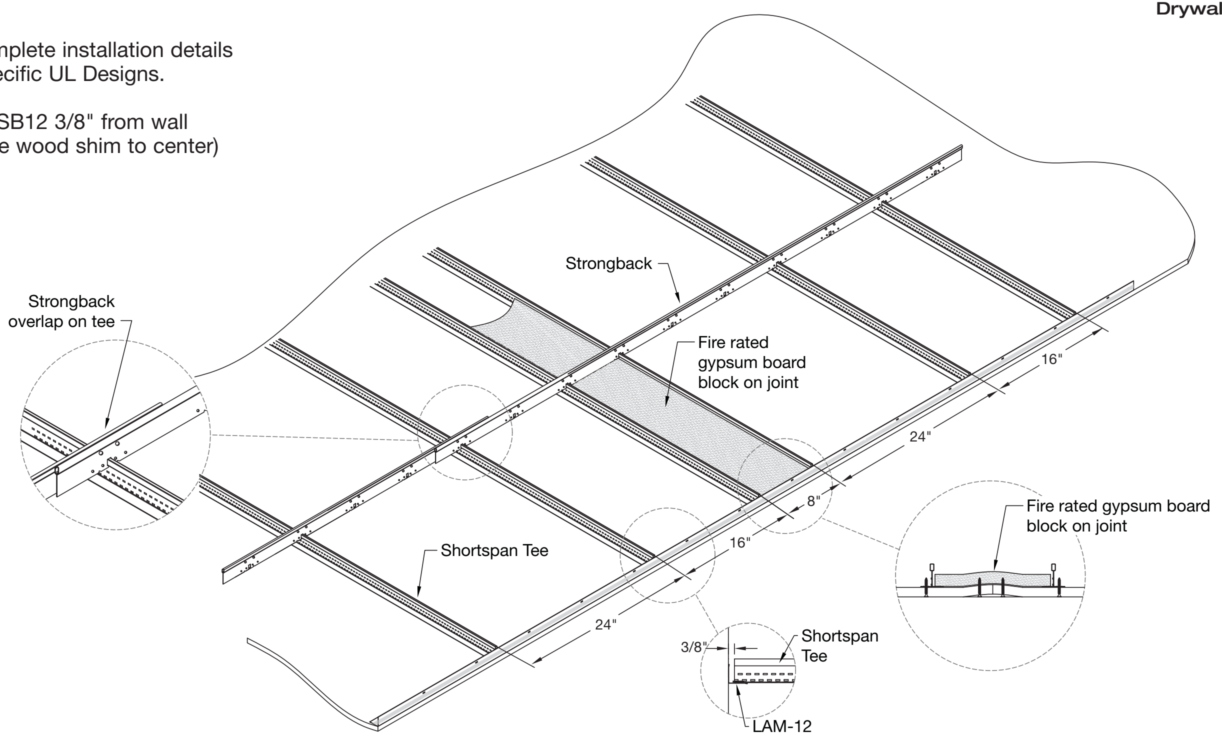
Space SB12 3/8" from wall (can use wood shim to center)



ShortSpan Fire Rated Assembly

NOTE: For complete installation details see specific UL Designs.

Space SB12 3/8" from wall (can use wood shim to center)

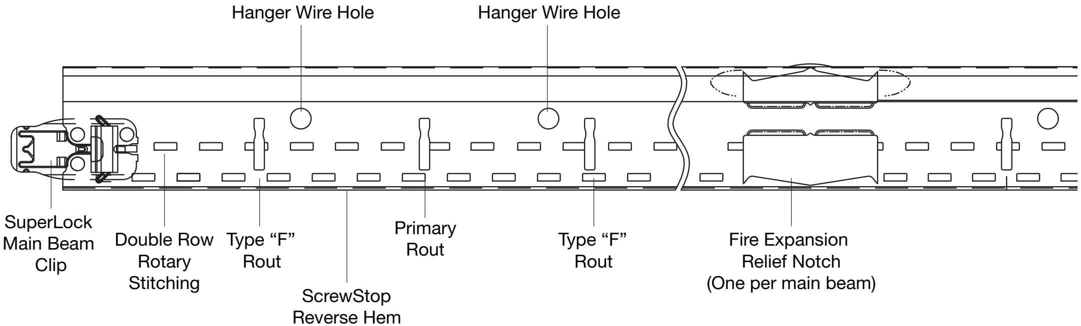


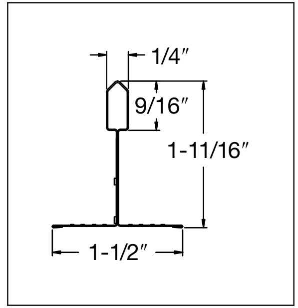
Basic Drywall Grid Details

The following pages provide some basic handling and installation techniques when using Armstrong Drywall Grid Systems. For specific component information, refer to the Drywall Grid System Overview section. For technical information, detail drawings, CAD design assistance, installation information or other technical services, contact TechLine at 1 877 ARMSTRONG (276-7876).

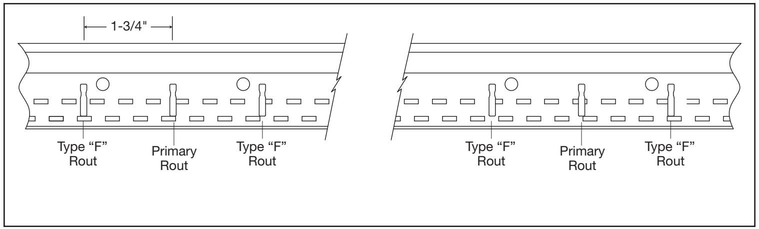
Armstrong Drywall Grid System HD8906

1-1/2″ face main beam features



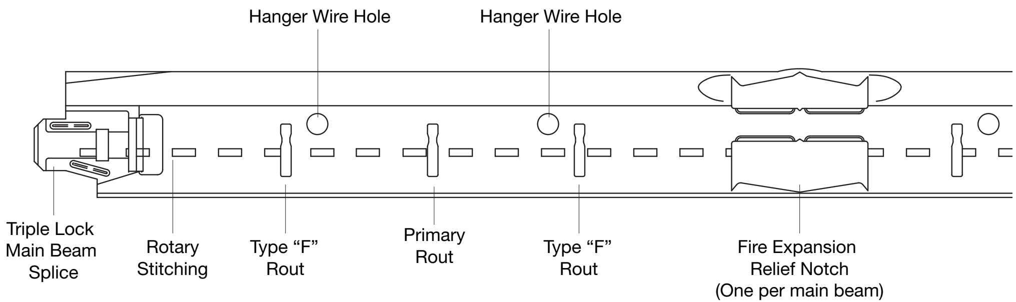


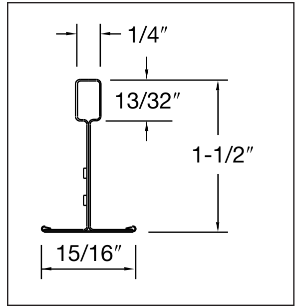
HD8906 Rout Spacing



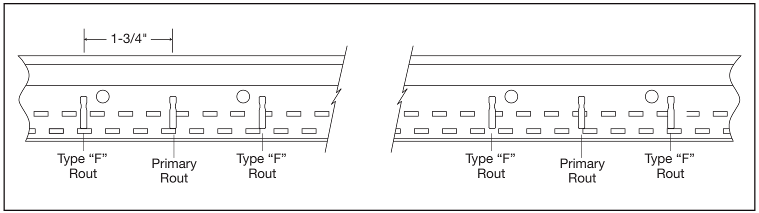
Armstrong Drywall Grid System HD8901

15/16″ face main beam features





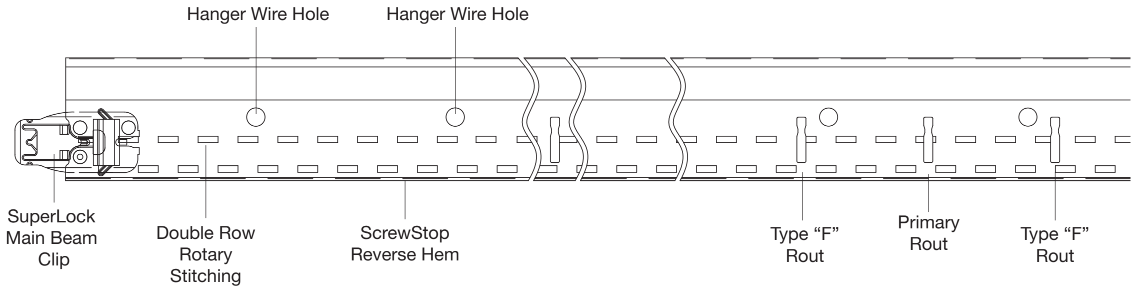
HD8901 Rout Spacing

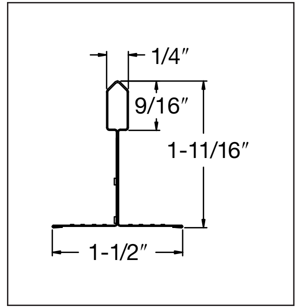


Armstrong®

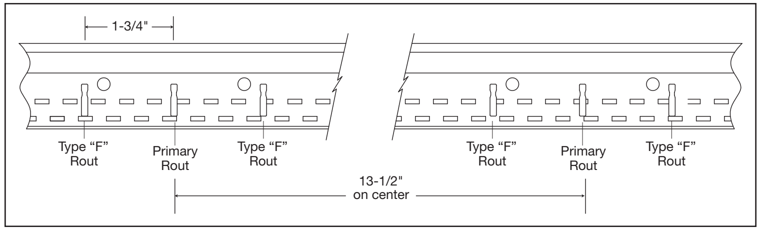
Armstrong Drywall Grid System SP135

1-1/2″ face stucco main beam features

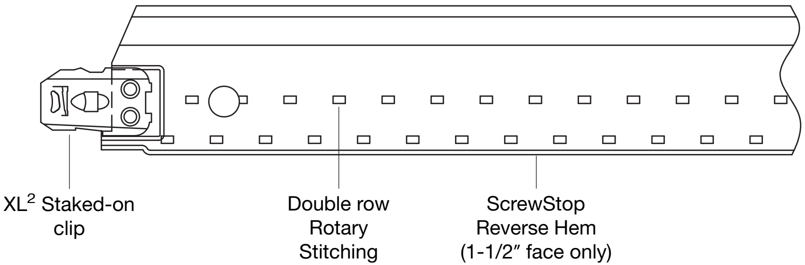


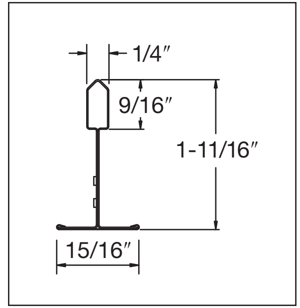


SP135 Rout Spacing

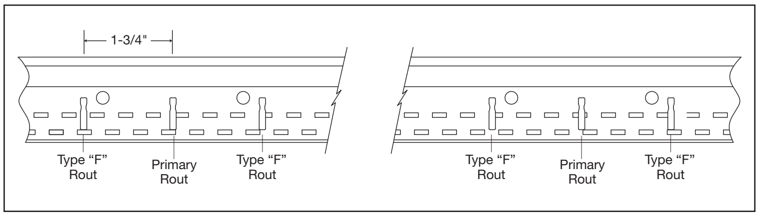


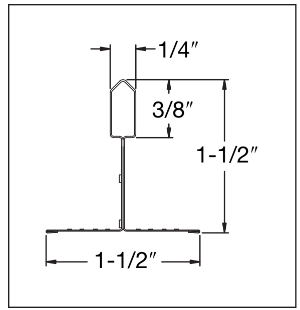
Armstrong Drywall Framing System cross tee features



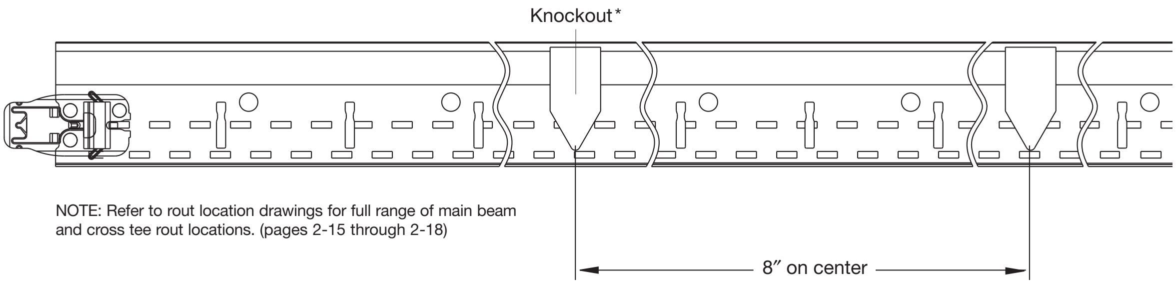


1-1/2″ Face Tees



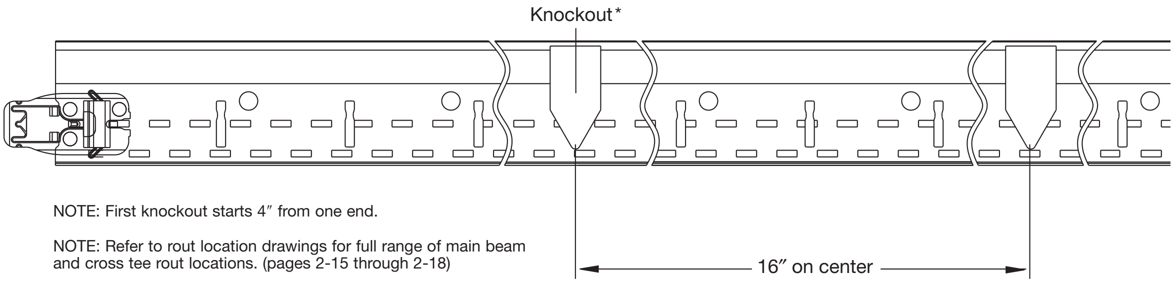


Faceted Main Beam HD8906F18 knockout spacing



NOTE: Refer to rout location drawings for full range of main beam and cross tee rout locations. (pages 2-15 through 2-18)

Faceted Main Beam HD8906F16 knockout spacing (Directional Main Beam)



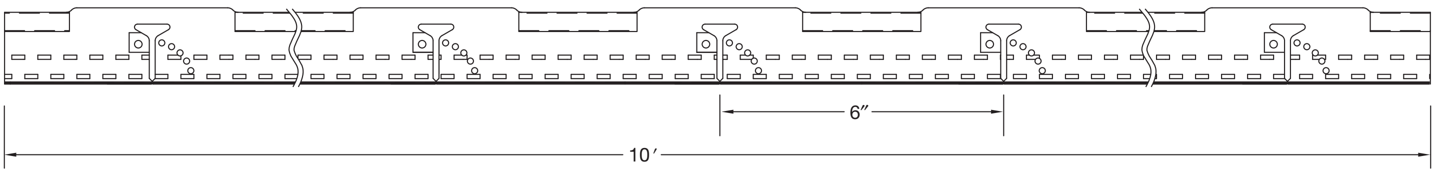
NOTE: First knockout starts 4″ from one end.

NOTE: Refer to rout location drawings for full range of main beam and cross tee rout locations. (pages 2-15 through 2-18)

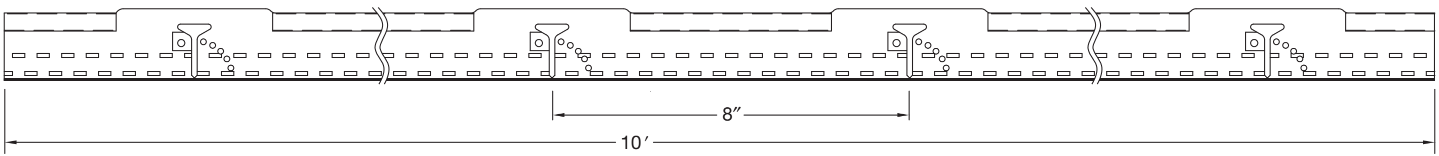
*RC2 clip must be installed at every knockout location

QS610 and QS810 Knockout Locations
QSLPM12 Locking Tab Locations

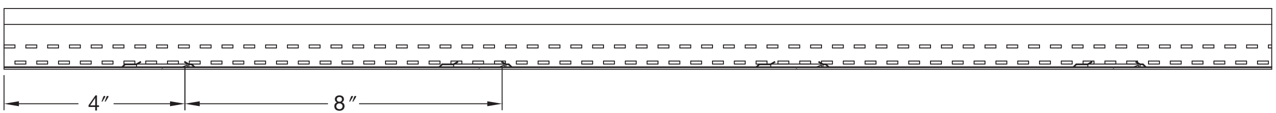
QS610



QS810

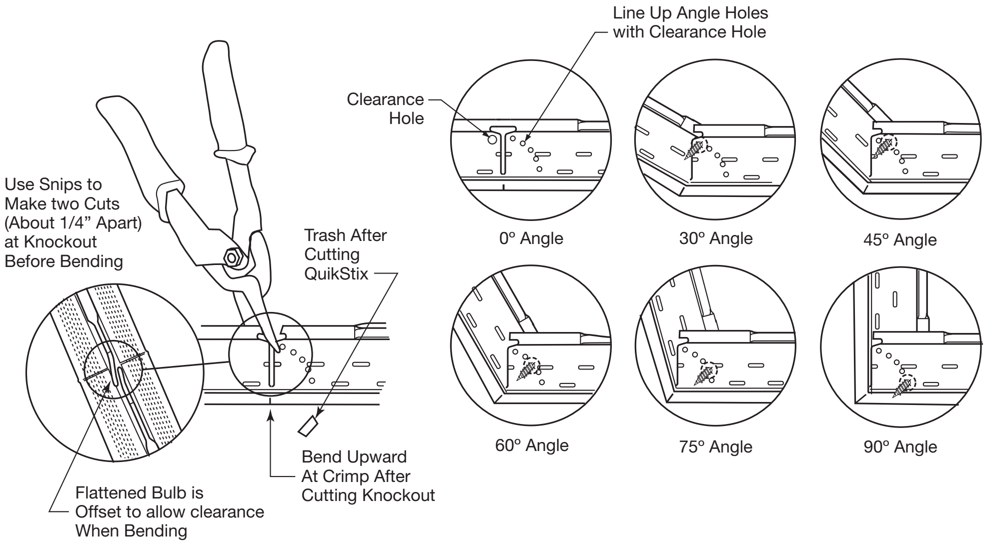


QSLPM12



QS610 and QS810 features

- Knockouts at 6″ and 8″ centers reduces cutting time
- Alignment holes makes screw installation simple, forms perfect 15, 30, 45, 60, and 90 degree angles



Note: Use #6 Framing Screw, screw through clearance hole, then through angle hole.

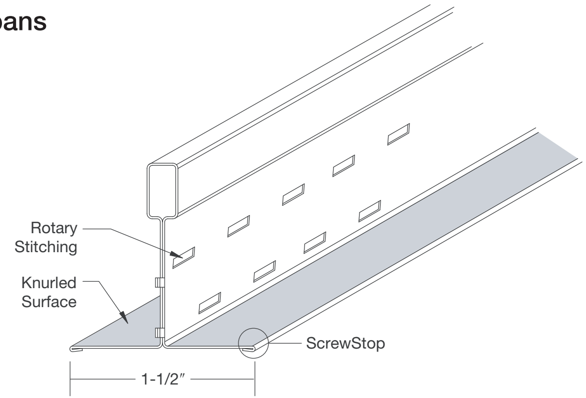
ShortSpan Component Details

ShortSpan Framing System: The best choice for framing short spans

Reduce Labor Cost: eliminates screws, cross tees, and hanger wires (in most applications)

Reduce Material Cost: economical price point on components

Reduce Waste: standard and custom lengths — and there's no cartons to throw away



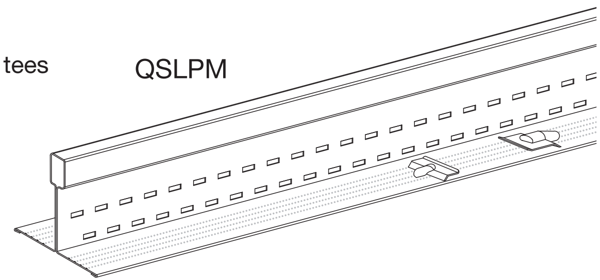
ShortSpan Tees: Engineered for faster, easier installation

- 1-1/2″ wide face exceeds the industry standard
- **ScrewStop**™ reverse hem prevents screw spin off
- Balanced profile stays flat during installation
- Rotary stitching on double web adds strength and stability
- Deep knurled surface for easy screw insertion
- G40, .018″ metal thickness meets ASTM C 645

QSLMP12: Engineered for faster, easier tight plenum installations

- Allows uptight installation because installed at same level as ShortSpan tees
- Locking Pocket Main has the same characteristics as a Strongback
- Allows fast, smooth 90-degree corridor transitions

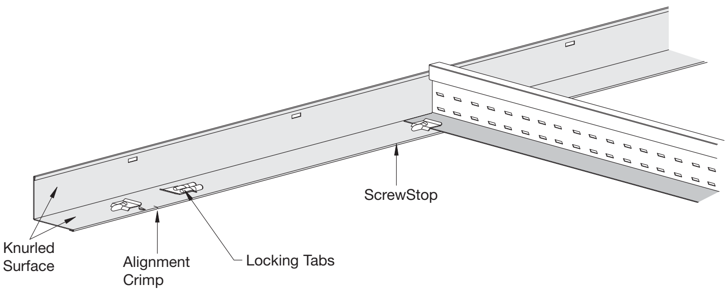
QSLPM



ShortSpan Overview

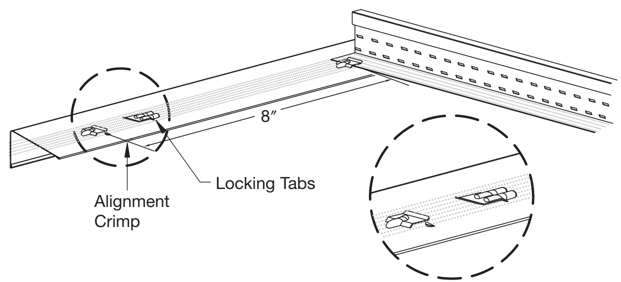
Locking Angle Molding is faster, more accurate solution (patent pending)

- Pre-engineered locking tabs punched 8″ on center:
  - Eliminate measuring 16″ or 24″
  - Locking tabs prevent lateral and upward movement
  - Eliminate screws, pop rivets, or crimpers needed to attach tees to molding
- Knurled surface on both flanges
- **ScrewStop** reverse hem prevents screw spin off and provides safer handling
- Alignment Crimp at locking tabs for fast, easy alignment

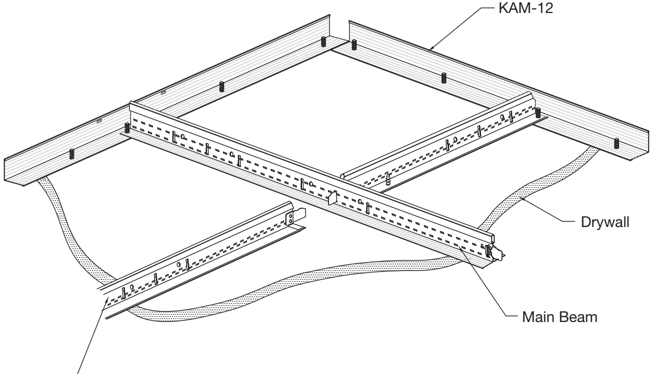


Pre-Rock Locking Angle Mold is faster, more accurate solution for two phase Gypsum Board application (patent pending)

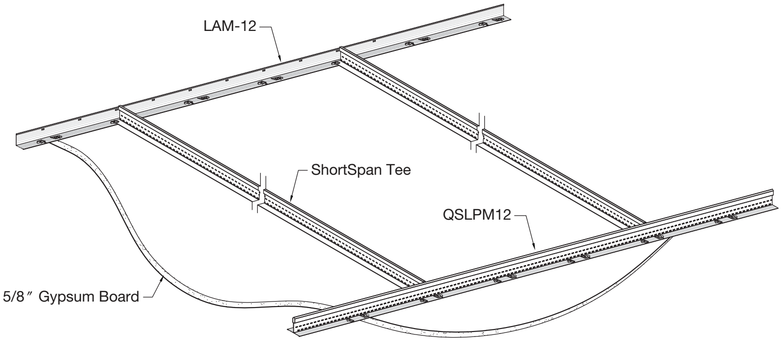
- Pre-engineered locking tabs punched 8″ on center:
  - Eliminate measuring 16″ or 24″
  - Locking tabs prevent lateral and upward movement
  - Eliminate screws, pop rivets, crimpers needed to attach tees to molding
- **ScrewStop** reverse hem prevents screw spin off and provides safer handling
- G40 or G90, .018″ metal thickness meets ASTM C645
- Fire Rated: Resistive when used in applicable UL fire resistive designs - D501, D502, G523, G524, G526, G527, G528, G529, G531, G553, J502, L502, L508, L513, L515, L525, L526, L529, L564, P501, P506, P507, P508, P509, P510, P513, P514.



Drywall Grid

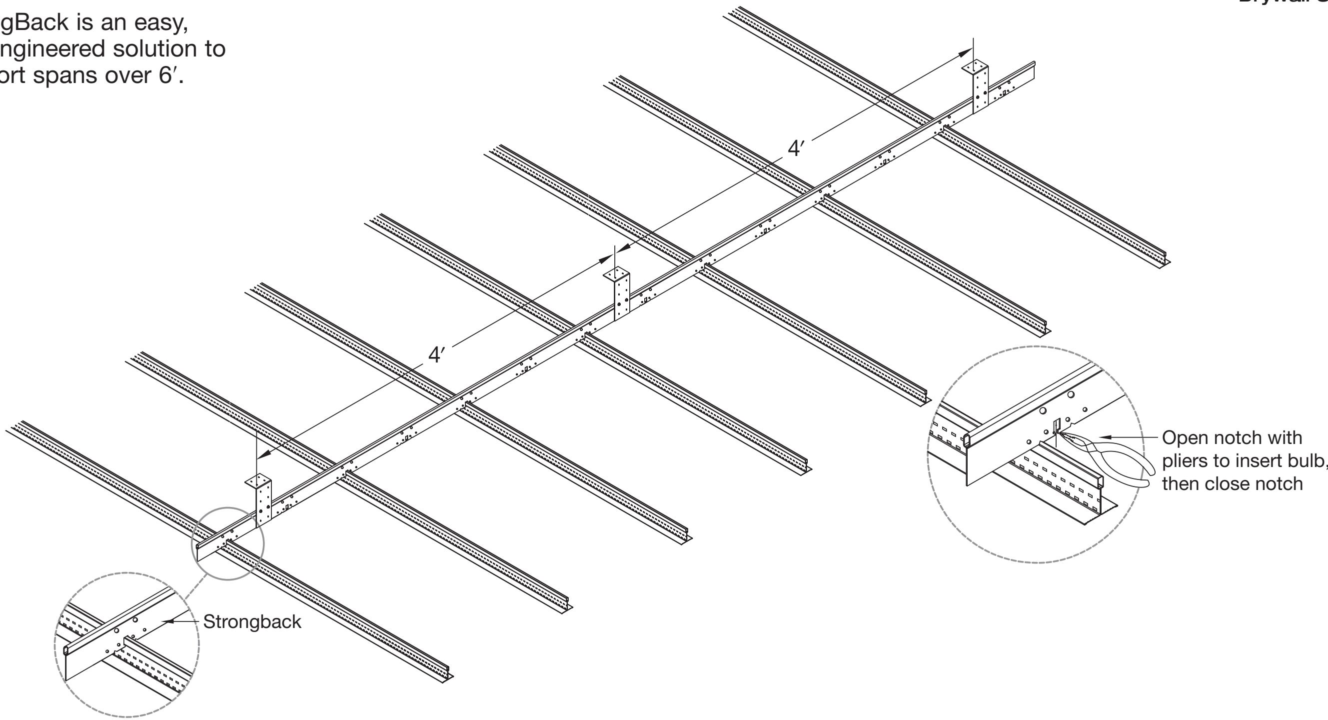


ShortSpan Drywall Framing

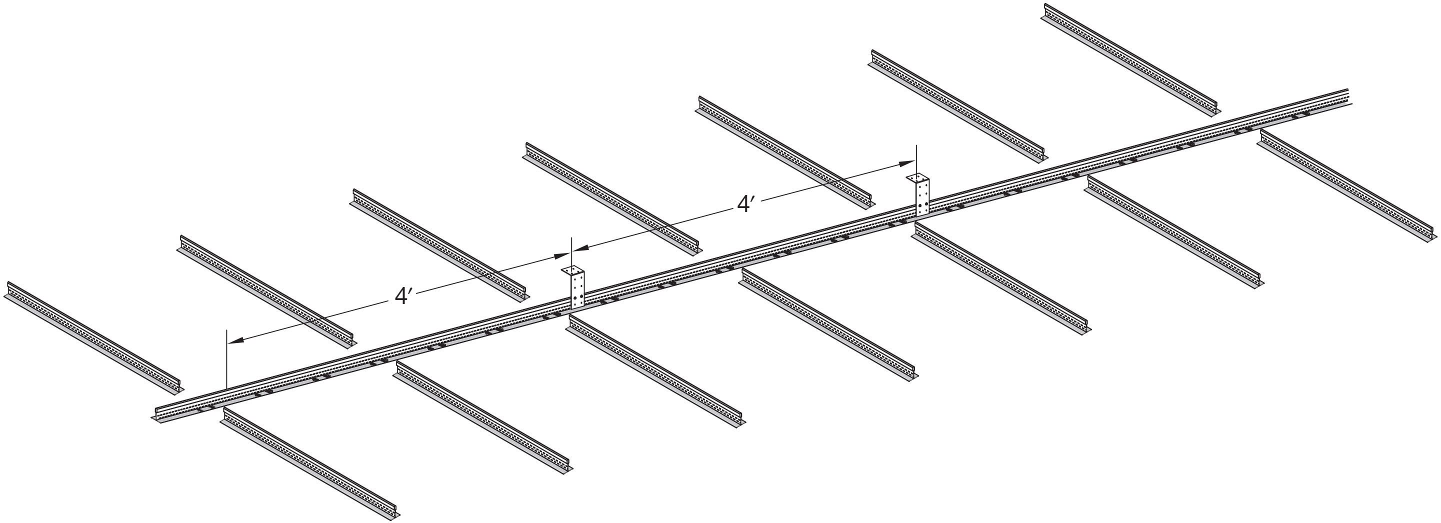


StrongBack

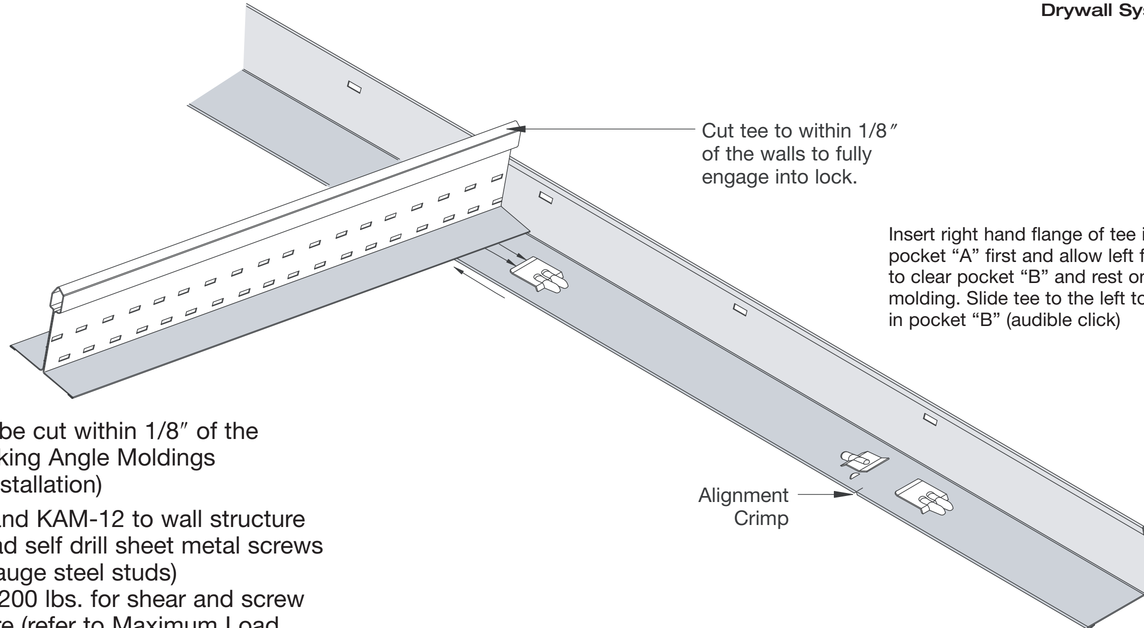
StrongBack is an easy, pre-engineered solution to support spans over 6′.



QuikStix Locking Pocket Main Support (with QSUTC)



Locking Angle Molding Details (LAM-12 patent pending)



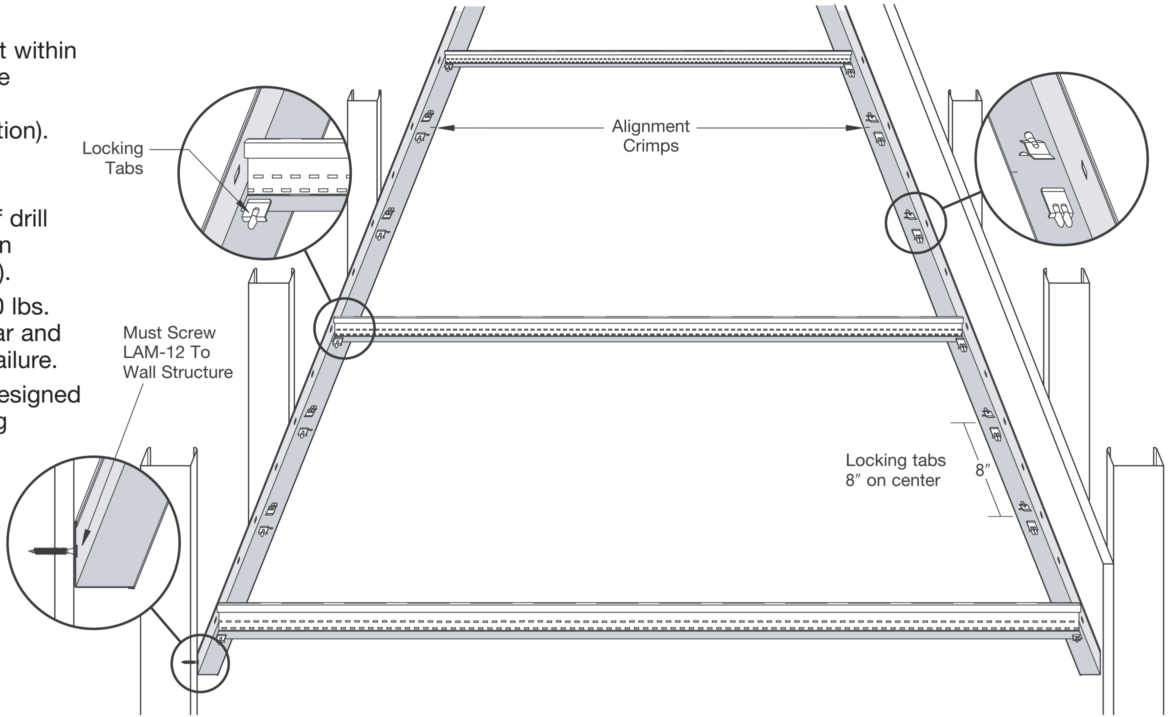
Installation Notes

- ShortSpan tees must be cut within 1/8″ of the vertical leg of the Locking Angle Moldings (For non-Fire Rated Installation)
- Must screw LAM-12 and KAM-12 to wall structure (#8 x 1-1/4″ wafer head self drill sheet metal screws tested in 25 and 20 gauge steel studs)
  – Assembly tested to 200 lbs. for shear and screw pullout without failure (refer to Maximum Load chart on page 2-14)
- Locking Angle Molding is designed to only work with Armstrong Drywall Grid products

Locking Angle Molding Details (LAM-12 patent pending)

Installation Notes

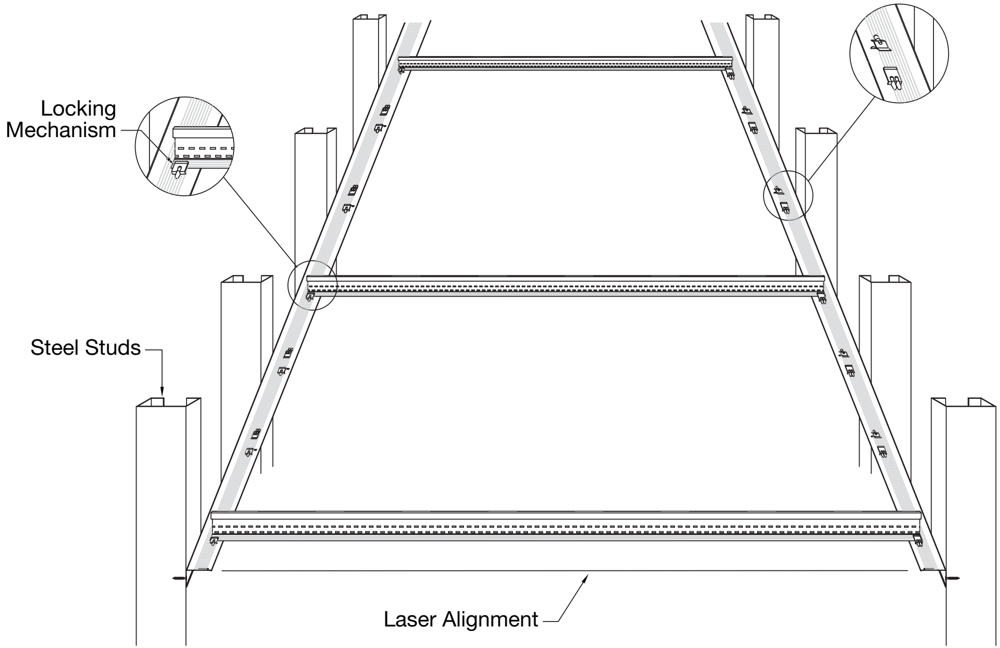
- ShortSpan tees must be cut within 1/8″ of the vertical leg of the Locking Angle Moldings (For non-Fire Rated Installation).
- Must screw LAM-12 and KAM-12 to wall structure (#8 x 1-1/4″ wafer head self drill sheet metal screws tested in 25 and 20 gauge steel stud).
  - Assembly tested to 200 lbs. per connection for shear and screw pullout without failure.
- Locking Angle Molding is designed to only work with Armstrong Drywall Grid products.



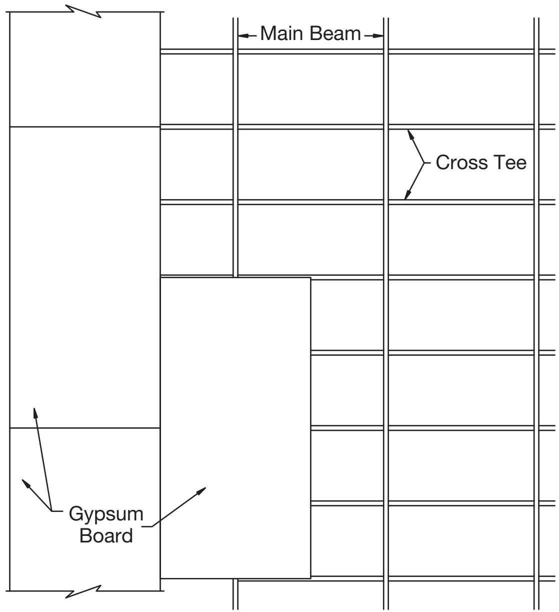
Pre-Rock Locking Angle Mold (PRLAM12 patent pending)

Installation Notes

- Must screw Pre-Rock LAM12 to wall structure (#8 wafer head self drill sheet metal screws tested in 25 and 20 gauge steel studs).
- ShortSpan tees must be cut within 1/8″ of Pre-Rock gypsum board or 3/8″ of board for fire rating.
- To engage ShortSpan tees into Locking Pockets: insert right hand flange of tee into long pocket first and allow left flange to clear short pockets and rest flat. Slide tee to the left to engage into short pocket (audible click).
- Pre-Rock Locking Angle Mold is designed to only work with Armstrong drywall grid products.



Basic Drywall Framing Installation



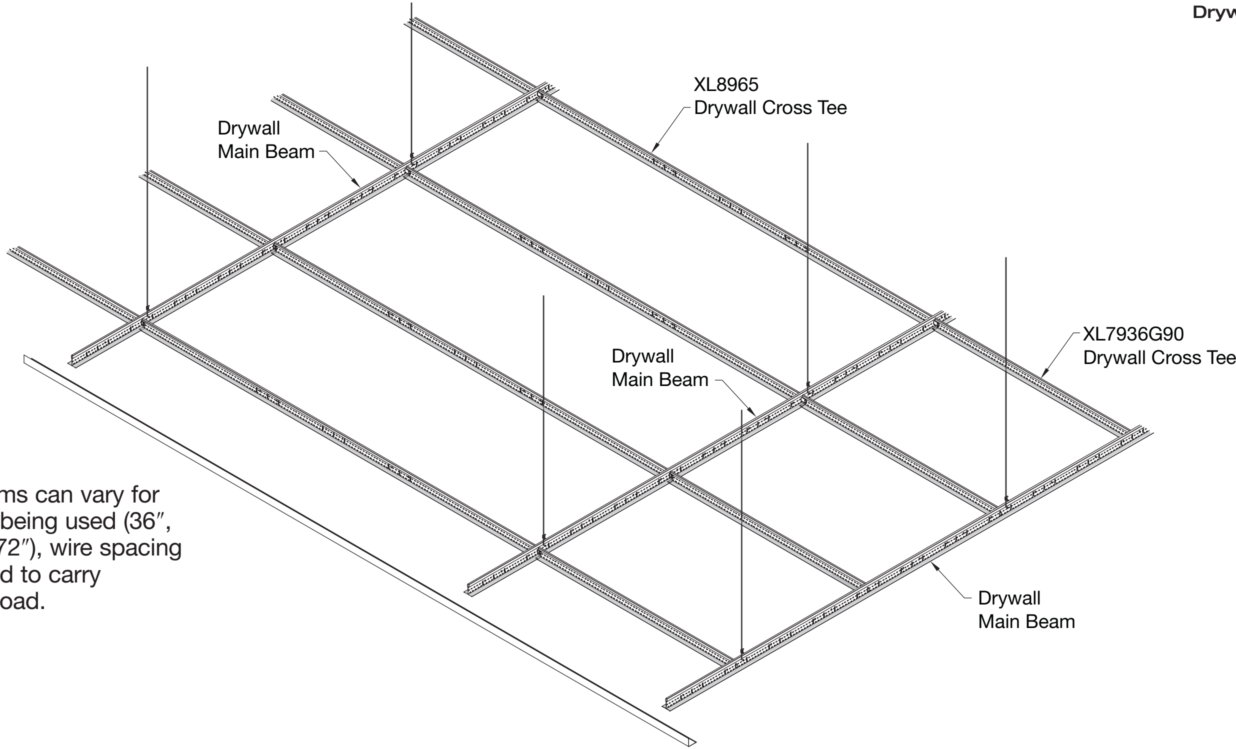
NOTE: Class A non-rated installation.

For Fire Resistive installations follow specific UL design requirements for board orientation.

Drywall Framing System

Gypsum board attaches to cross tees only (allows for 48″, 50″ or 72″ main beam spacing)

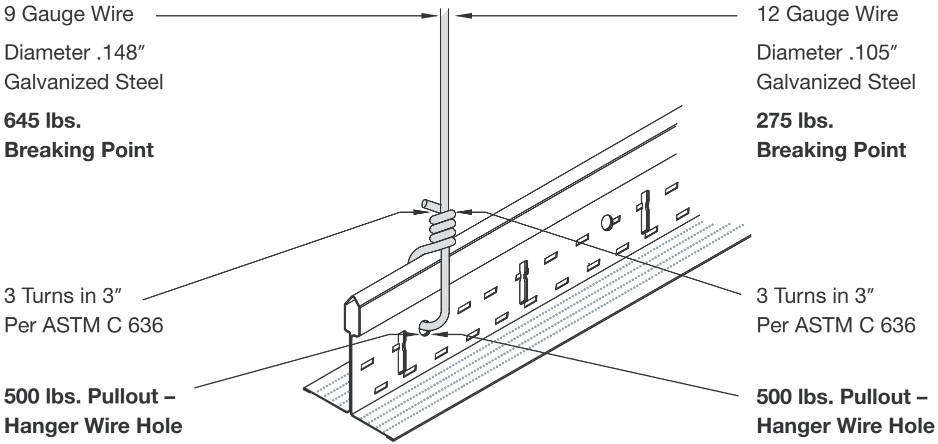
Typical Drywall Installation



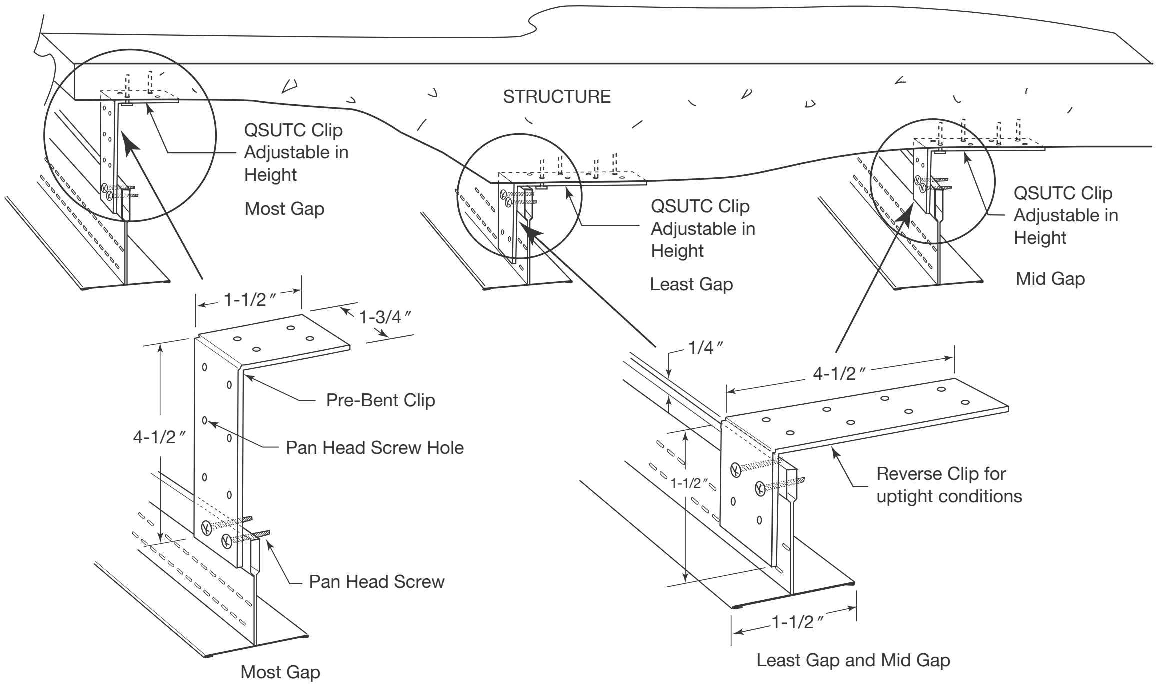
Main Beams can vary for cross tee being used (36″, 48″, 50″, 72″), wire spacing as required to carry imposed load.

9 Gauge Wire Breaking Strength and Technical Data

12 Gauge Wire Breaking Strength and Technical Data



Uptight Clip Installation



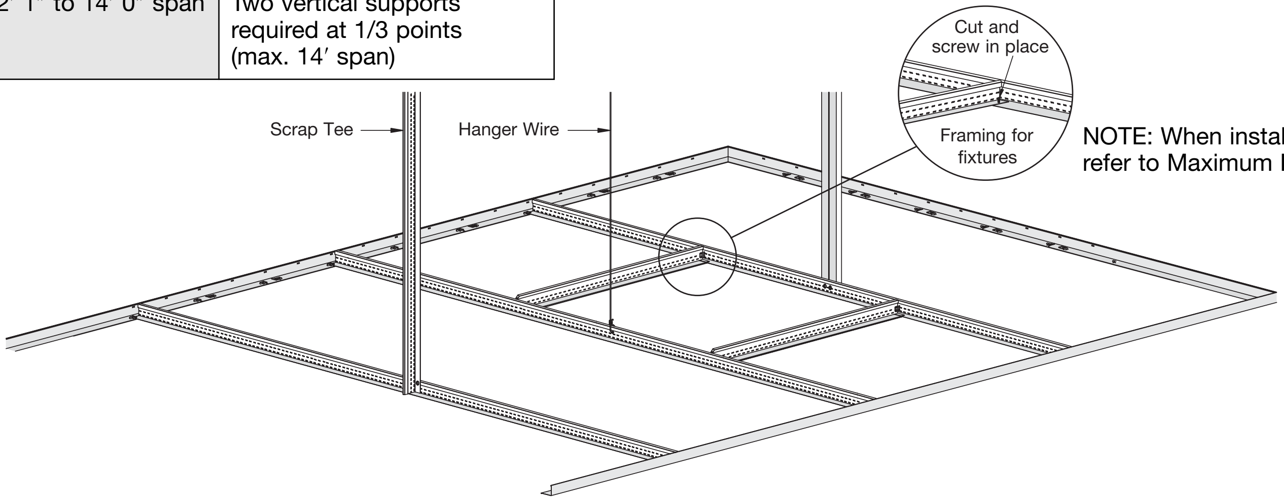
Vertical Support Options and Assembles to Structure (ShortSpan)

Tees installed 16″ or 24″ on center with 5/8″ drywall or only on 16″ centers with 1/2″ drywall (Seismic Design Categories D, E, F)

Up to 6′ 0″ span	No vertical support required
6′ 1″ to 12′ 0″ span	Mid-span vertical support required
12′ 1″ to 14′ 0″ span	Two vertical supports required at 1/3 points (max. 14′ span)

Tees installed 16″ on center only with 1/2″ drywall (Seismic Design Categories A, B, C)

Up to 7′ 0″ span	No vertical support required
7′ 1″ to 14′ 0″ span	Mid-span vertical support required



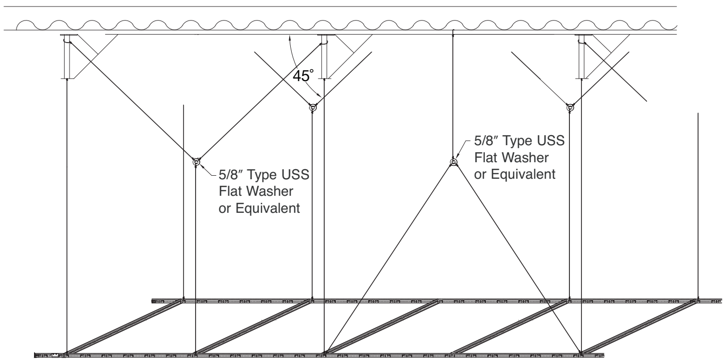
NOTE: When installing fixtures, refer to Maximum Load Chart

Yoke Wire Hung Ceilings

Another method to install hanger wires around an object in the plenum is to utilize a single or double yoke wire technique.

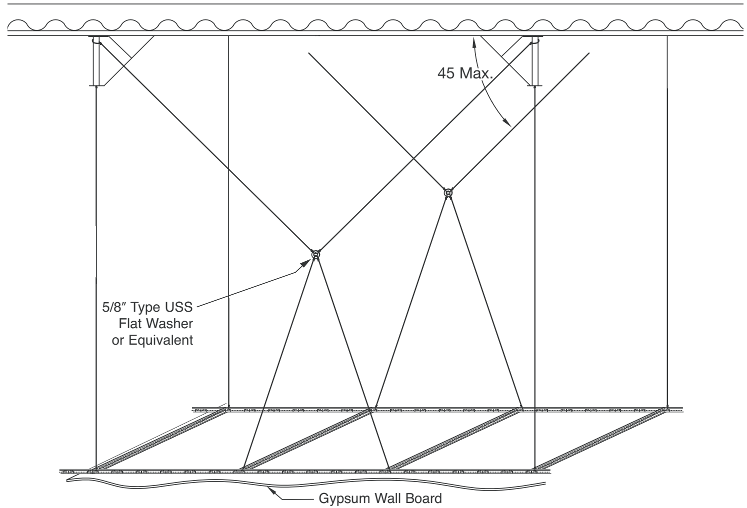
Rule: to form the 45 degree angle, the vertical location of the tension ring is always half the distance of the span at the structure.

Single Yoke



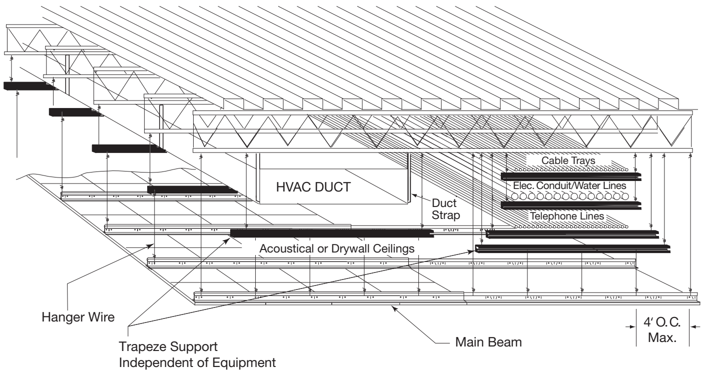
NOTE: Maintain wire spacing at a maximum 4′ on center.

Double Yoke



Trapeze Supported Loads

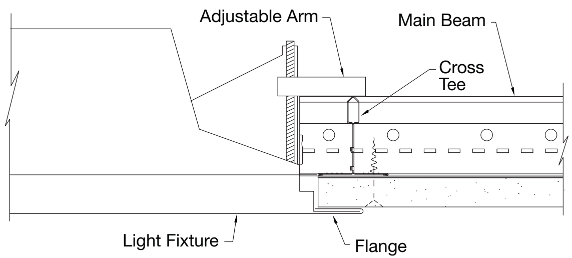
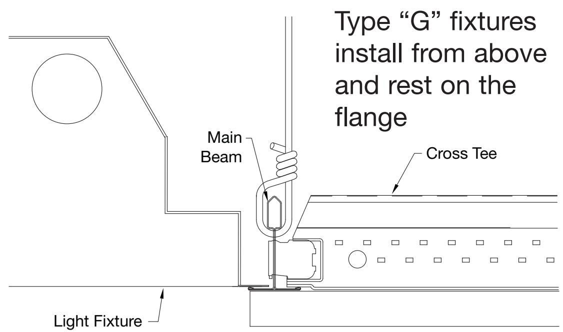
Installing a trapeze is a technique to support multiple hanger wires under obstructions, such as trunk lines, cable trays or other objects in the plenum. In some cases the trapeze may effect the ceiling height and must be kept small. In other cases steel studs may be used to span the distance required.



Members	Gauge	0′ - 4′	4′ - 8′	8′ - 12′	12′ - 16′	16′ - 20′
CRC 1-1/2″	16	1-1/2″ CRC	NA	NA	NA	NA
Unistrut 1-5/8″	16				P-2000	NA
	14					P-1100
	12					P-1000
Steel Stud 6″	20			6CSJ-20 Bridge Mid	NA	NA
	18				6CSJ-18 Bridge Mid	NA
	16					6CSJ-16 Bridge Mid

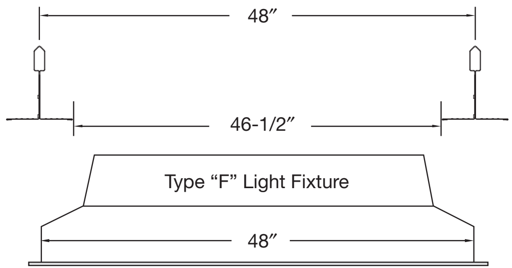
NOTE: Bridging is required at mid span when steel stud members are greater than 8′- 0″ in length. Bridging may be 1-1/2″ CRC or main runner screw attached to hold vertical and prevent cocking. No wire is required at mid span.

Fixture Comparison

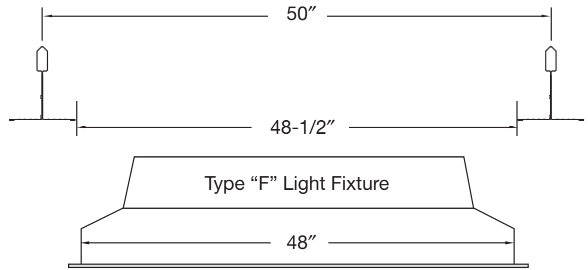
Type "F" Fixtures	Type "G" Fixtures
• Full 48″ opening required	• Nominal 48″ opening required
• Install from below the grid system	• Install and lay in from above the grid system
• Fixture rests on the bulb of the grid	• Fixture rests on the flange of the grid
• Type "F" is typical for drywall installation	• Type "G" is typical for acoustical installation and drywall celings
• Fixture has integral flange to finish the cut drywall	• Fixture requires trim in drywall installation
	

Type "F" Fixtures require a full 24″ or 48″ opening to install from below

Type "F" problem with 1-1/2″ face main beams 48″ OC

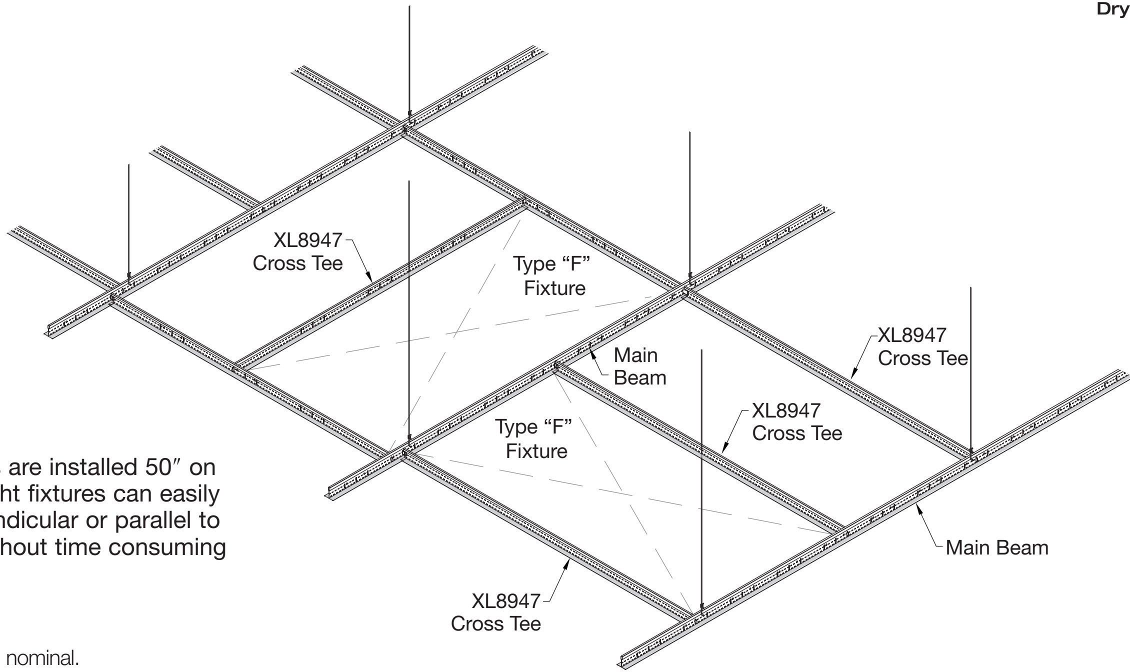


Problem solved with 50″ cross tees (XL8947P) and additional Type "F" routs on mains and tees (no field modification required)



Note: All dimensions are nominal.

Type “F” Fixtures



When main beams are installed 50″ on center, type “F” light fixtures can easily be installed perpendicular or parallel to the main beam without time consuming field modification

NOTE: Dimensions are nominal.

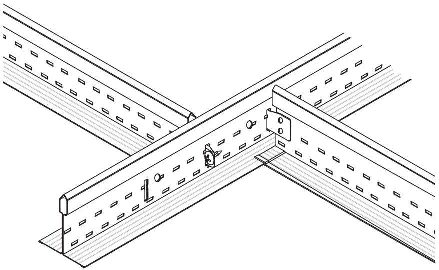
Type “F” Fixtures

Main beams and cross tees are manufactured with additional rout locations for type “F” fixture installations

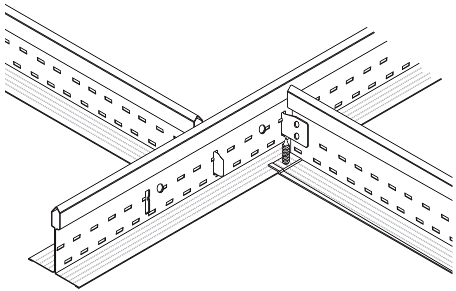
- use center rout for typical cross tee location
- use offsetting routs for type “F” fixtures

Cross Tee Offset

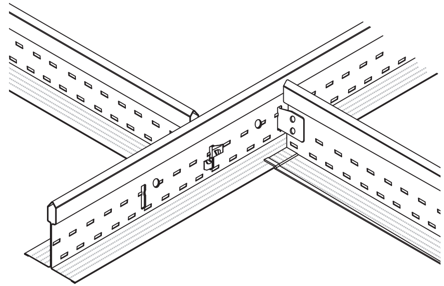
to allow for type “F” fixture



Screw in XL Clip

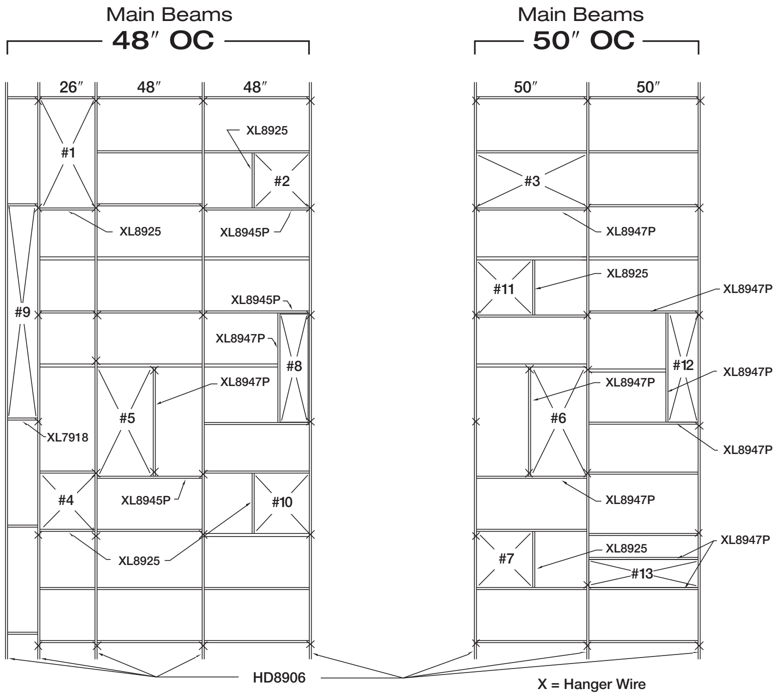


Screw in Face



Butterfly Clip

Installation Comparison between 48″ on center spacing and 50″ on center spacing

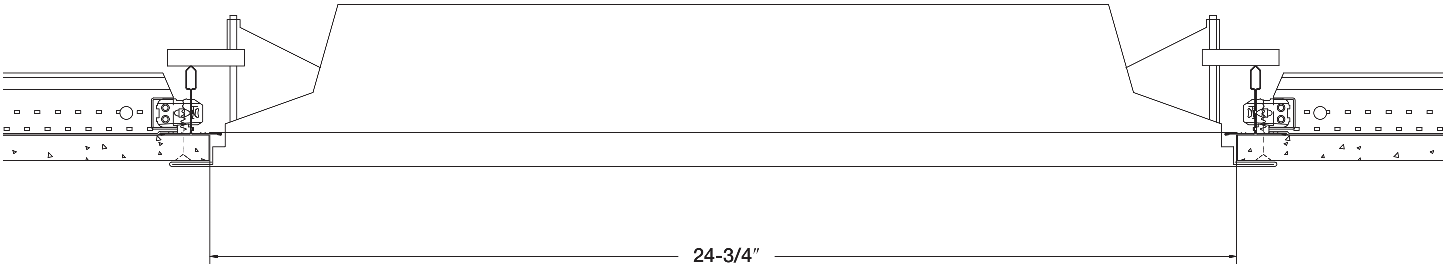


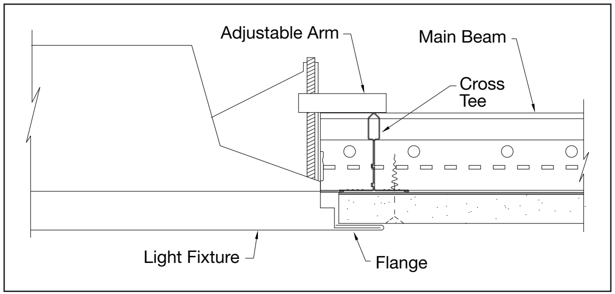
Examples of Type "F" fixture placement options

#1) 2′ x 4' Light using XL8925 Tees
#2) 2′ x 2′ Light using XL8945P & XL8925 Tees
#3) 2′ x 4′ Light using XL8947P Tees
#4) 2′ x 2′ Light using XL8925 Tees
#5) 2′ x 4′ Light using XL8945P & XL8947P Tees
#6) 2′ x 4′ Light using XL8947P Tees
#7) 2′ x 2′ Light using XL8947P & XL8925 Tees
#8) 1′ x 4′ Light using XL8945P & XL8947P Tees
#9) 1′ x 8′ Light using XL7918 Tees
#10) 2′ x 2′ Air grill using XL8925 Tees
#11) 2′ x 2′ Access panel using XL8925 Tees
#12) 1′ x 4′ Light using XL8947P Tees
#13) 1′ x 4′ Light using XL8947P Tees

NOTE: All dimensions are nominal.

Type "F" Fixture installed — no field modification required when using XL8965, XL8947P, XL8925, XL7918

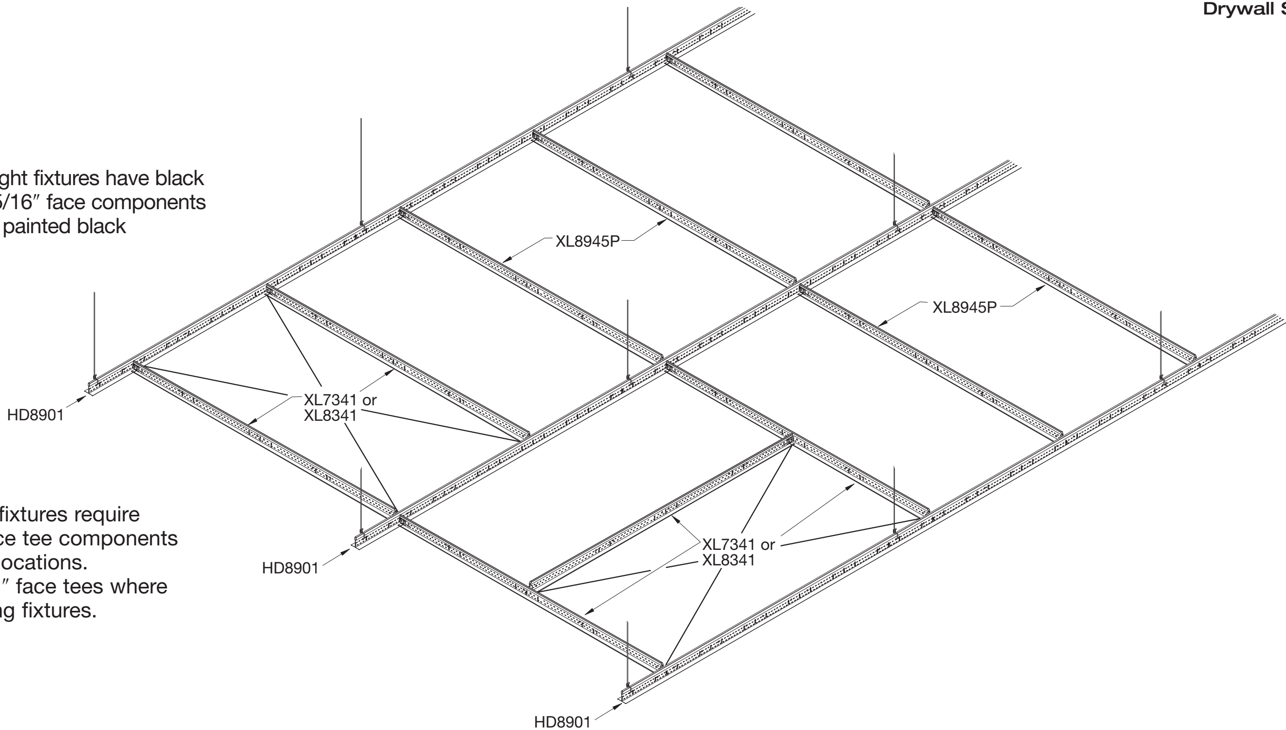




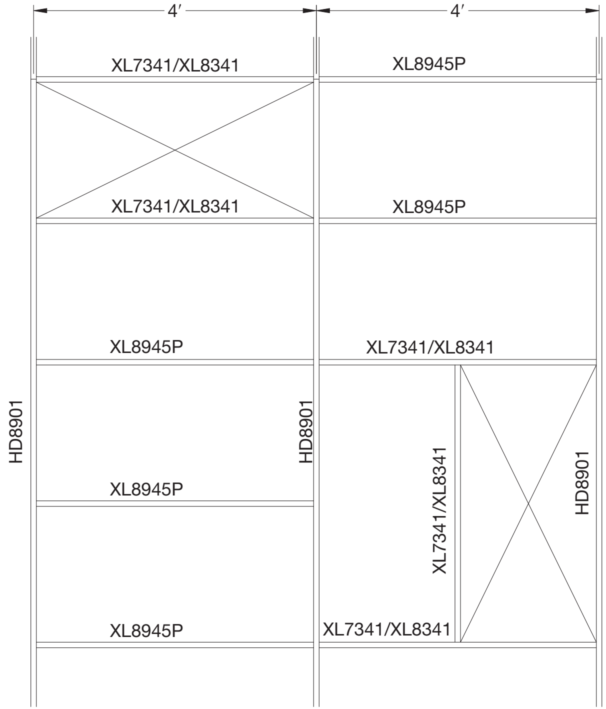
Type “G” Lay-in

NOTE: If light fixtures have black frames, 15/16″ face components should be painted black

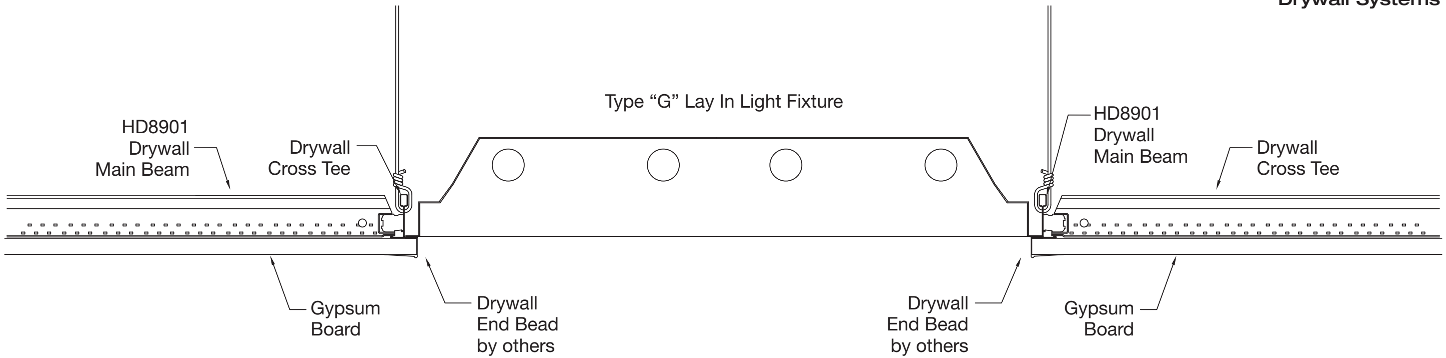
Type “G” fixtures require 15/16″ face tee components at fixture locations.
Use 1-1/2″ face tees where not framing fixtures.

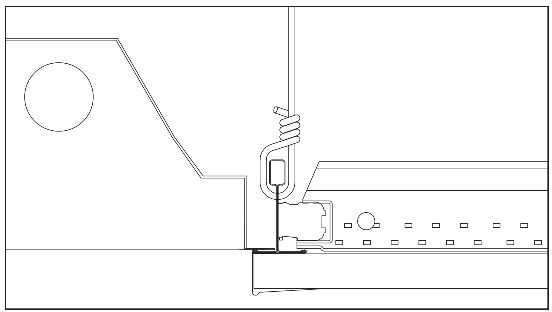


Type “G” Lay-in

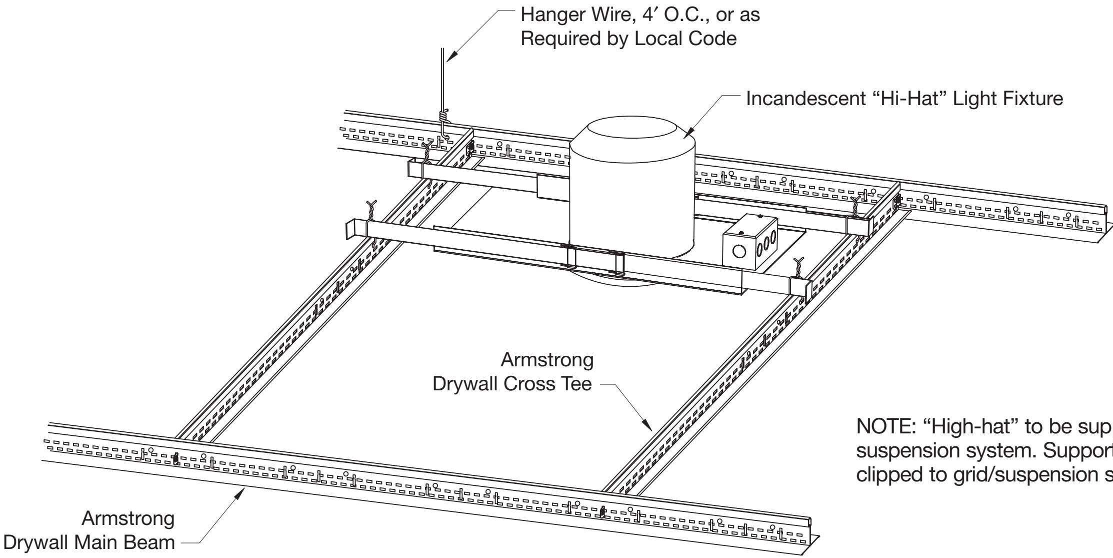

4′
4′
XL7341/XL8341
XL8945P
XL7341/XL8341
XL8945P
XL8945P
XL7341/XL8341
HD8901
HD8901
XL8945P
XL7341/XL8341
HD8901
XL8945P
XL7341/XL8341

Type "G" Fixture is installed from above and rests on the flange of the grid



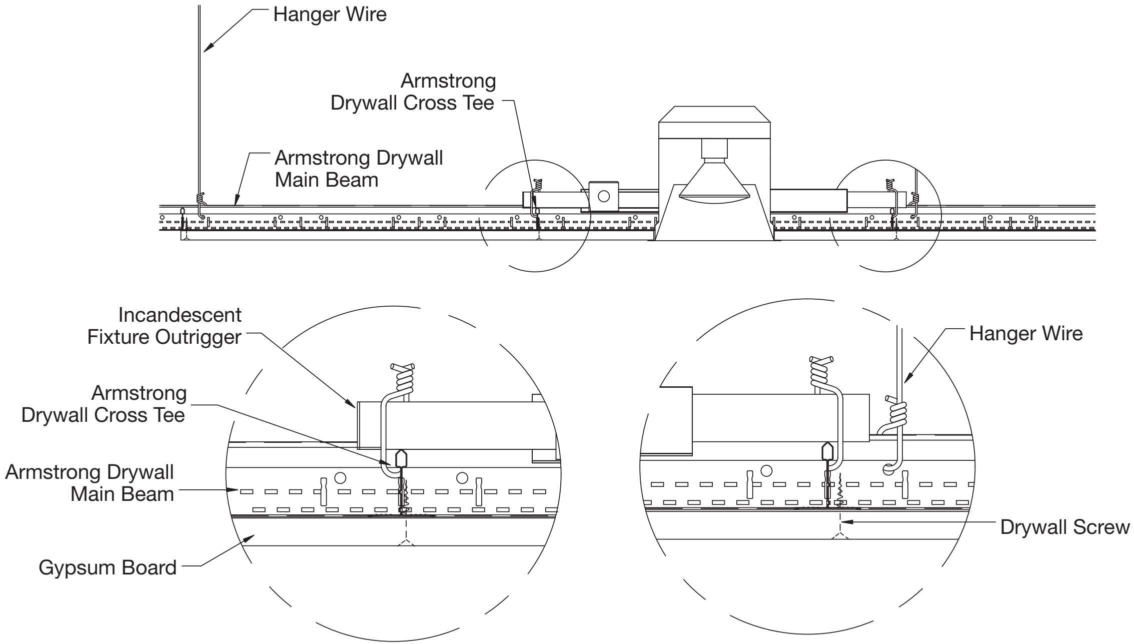


Incandescent "Hi-Hat" light fixture in drywall ceiling



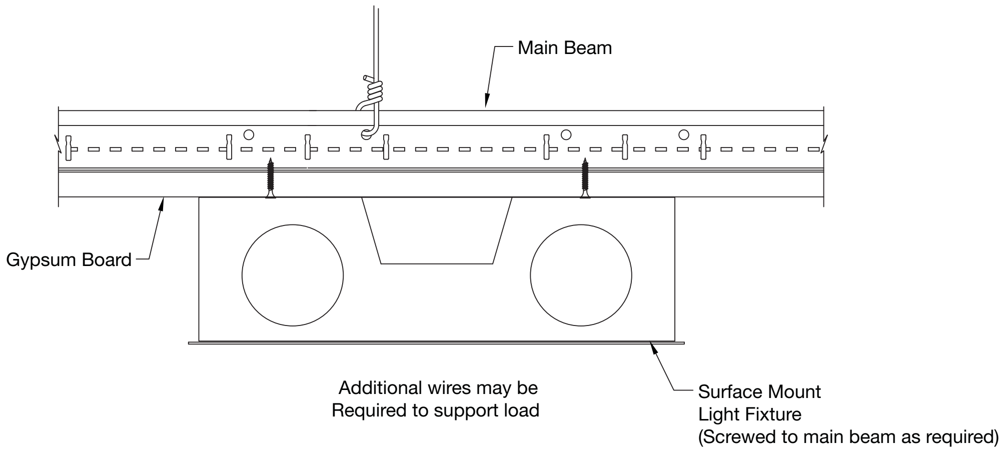
NOTE: "High-hat" to be supported by suspension system. Supports wired or clipped to grid/suspension system.

Incandescent "Hi-Hat" light fixture in drywall ceiling

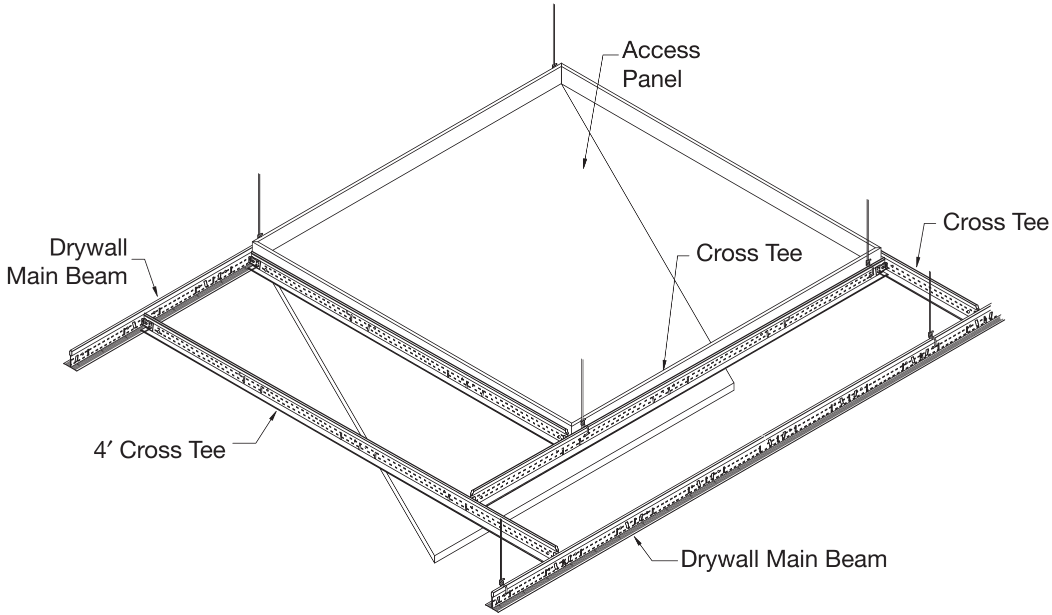


NOTE: "High-hat" to be supported by suspension system. Supports wired or clipped to grid/suspension system.

Surface Mount Light Fixture

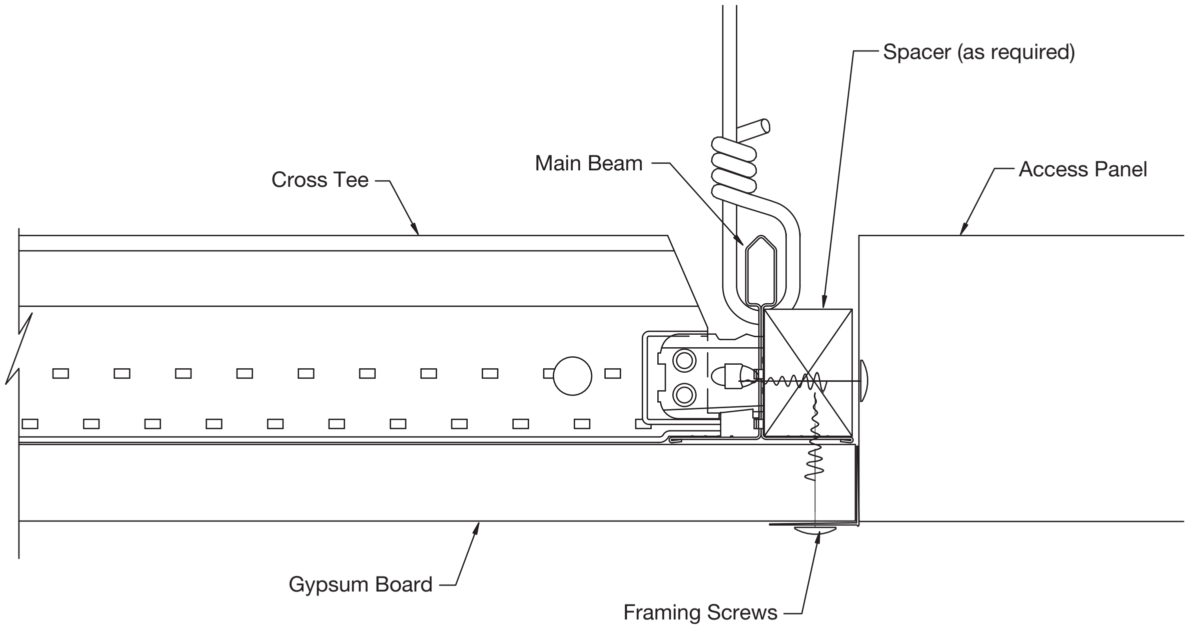


Access Door

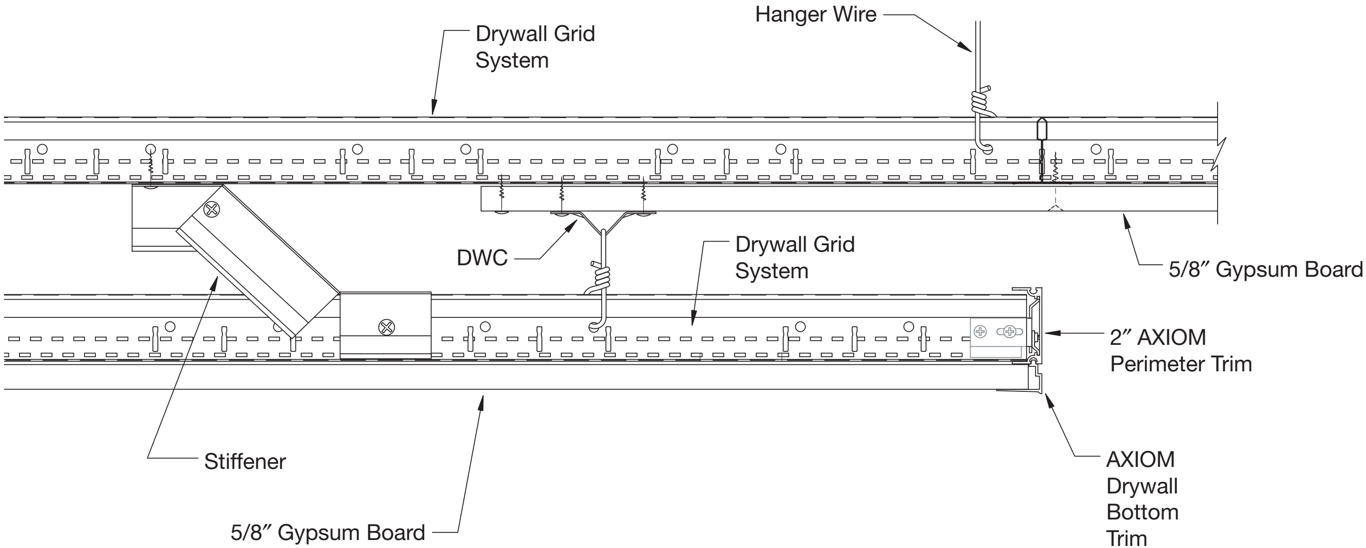


- Frame opening for access panel using cross tees to size required
- Attach and secure access panel frame to suspension system with sheet metal screws and following manufacturers instructions

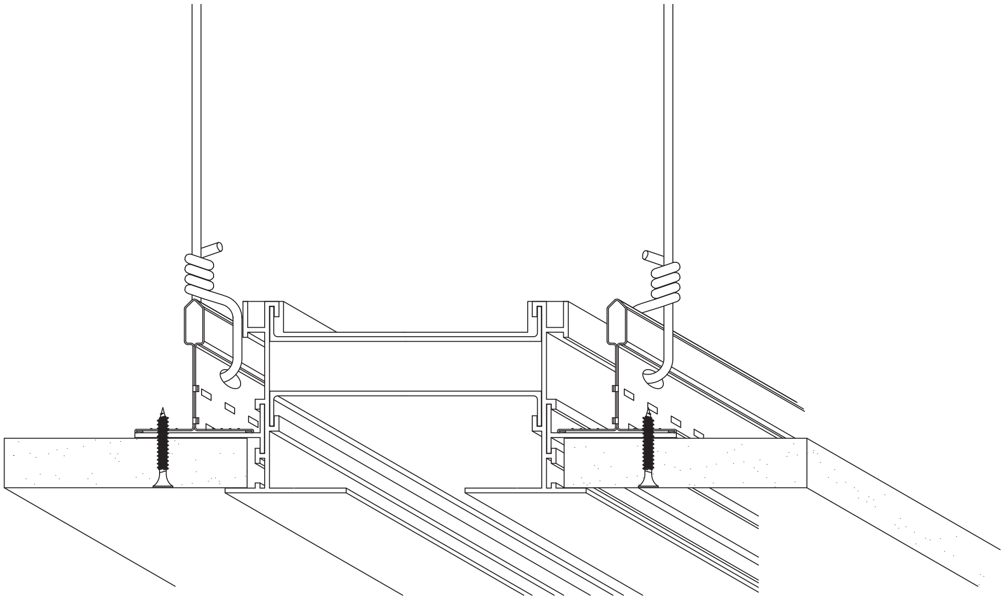
Access Door Detail



Return/Supply Air Slot



Linear Air Bar



Drywall Surrounds and Transitions

When creating full module acoustical panel installations:

• Plan layout so routs line up between drywall and acoustical main beam

• At the transition line use drywall main beams (HD8901) or an acoustical main beam to maintain exposed visual

• Ensure tee to tee connections at transition line (alternative means to secure single tees required)

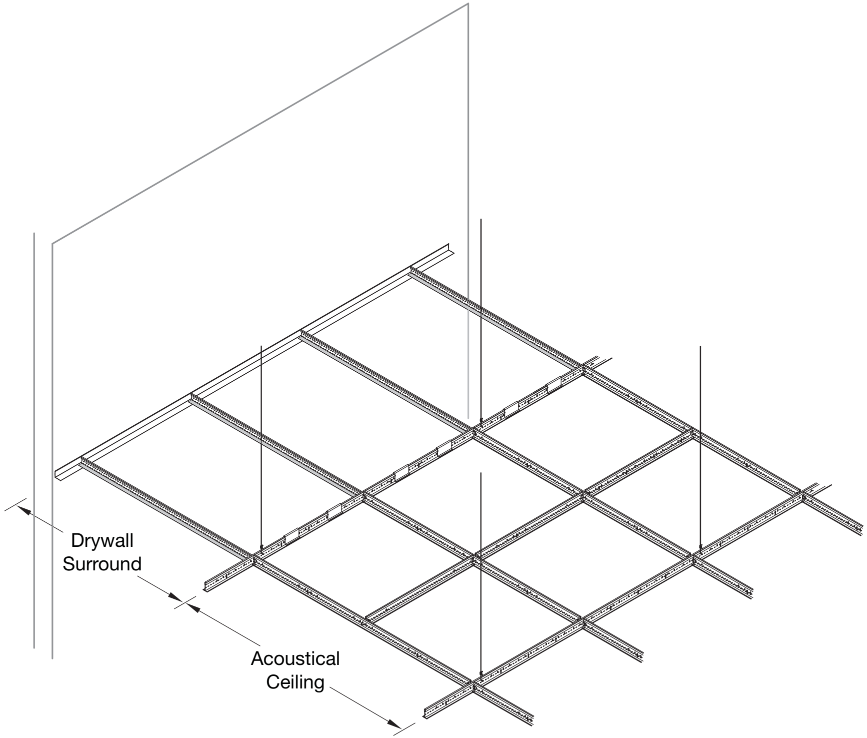
• Use drywall clips (DWACS) at transition to support drywall

• Use drywall clip DW58LT for flush transition for 5/8″ drywall

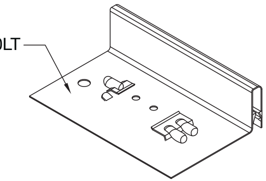
• Use drywall clip DW50LT for flush transitions for 1/2″ drywall

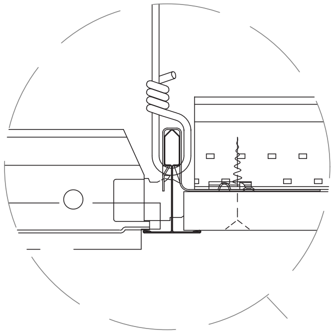
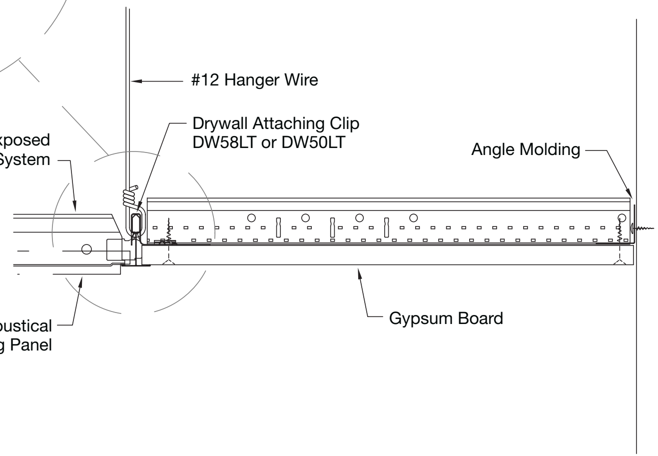
• Use AXIOM Transitions

Drywall Surround with full module acoustical ceiling system



Flush Drywall Transition



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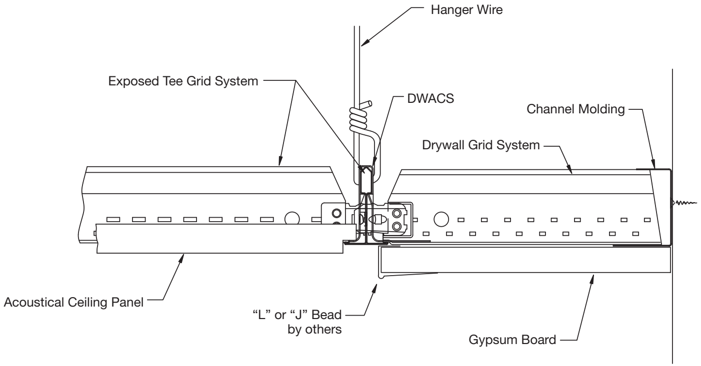
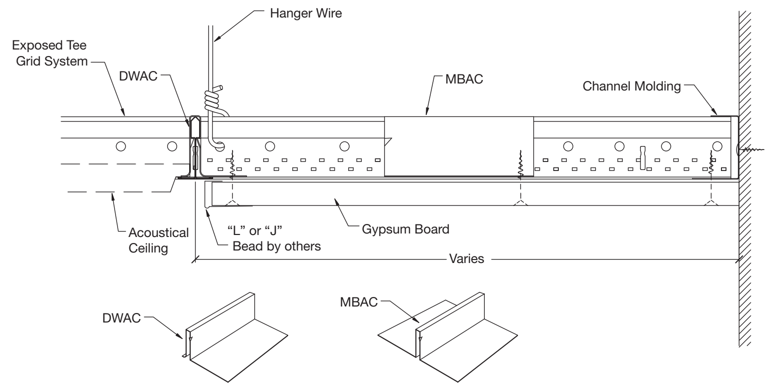
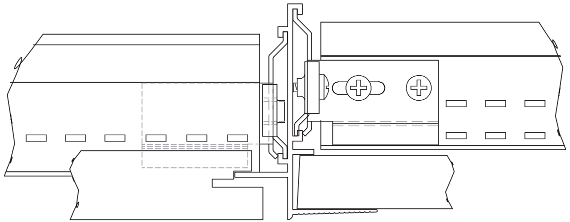
Acoustical to Drywall Ceiling Transition using drywall/acoustical cross tees

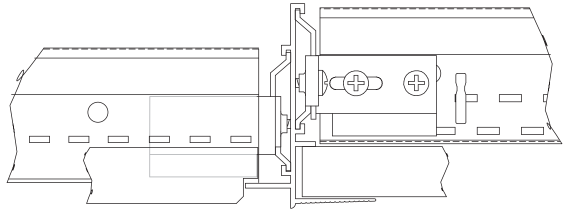




AXIOM Transition to Acoustical and Drywall using AXIOM Transitions

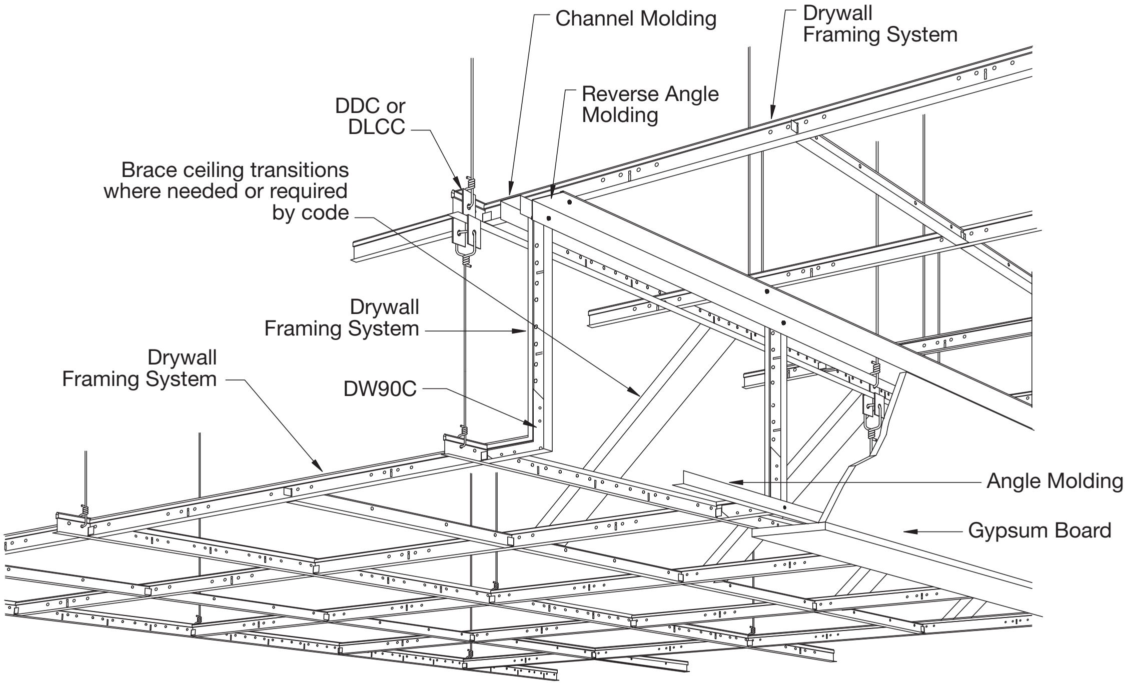


AXIOM – Transition from
Vector to drywall application

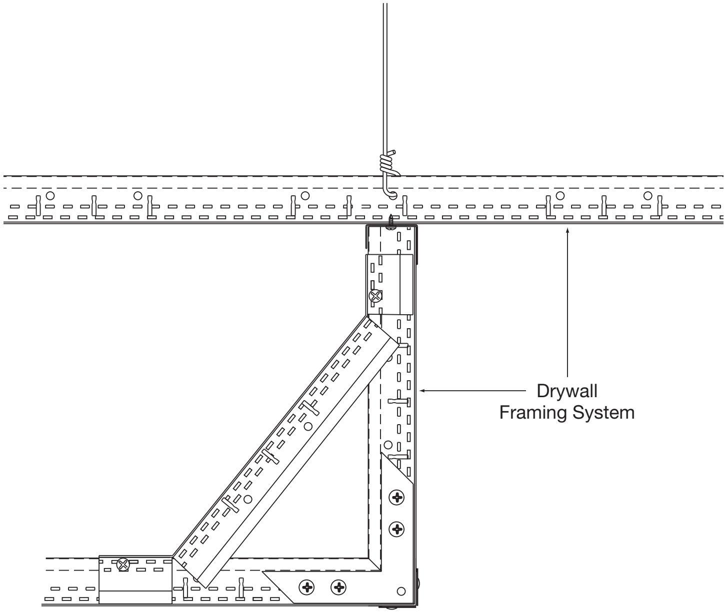


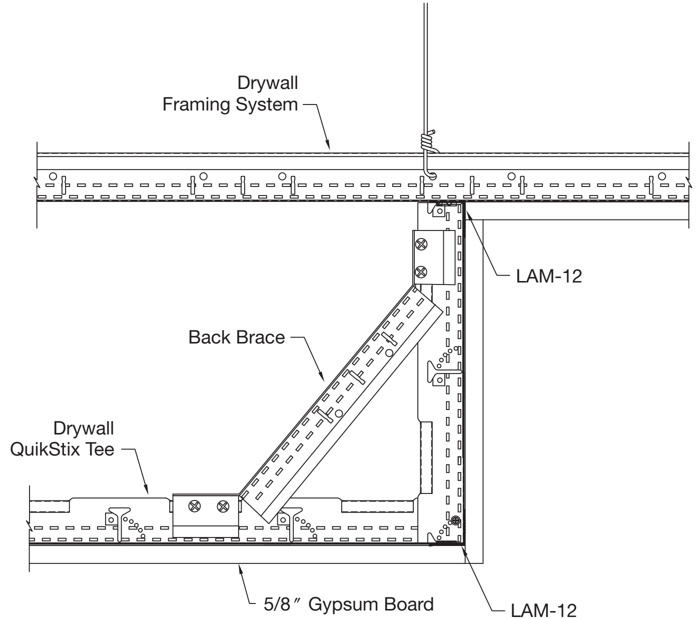
AXIOM – Transition from
Tegular to drywall application

Drywall Transition — drywall to drywall ceiling system



Drywall Transition — drywall to drywall ceiling system

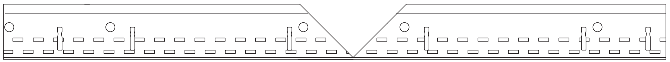




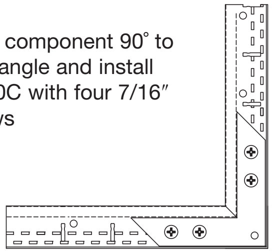
Creating an Outside 90º Drop

NOTE: Follow same process for creating 30˚, 45˚ and 60˚ angles

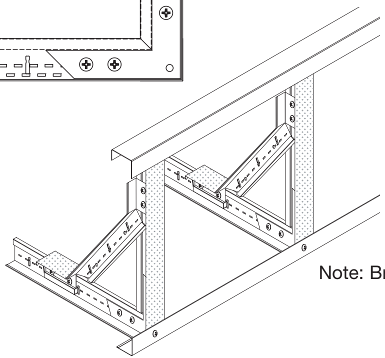
1. Notch main beam or cross tee at the required location and remove material



2. Bend component 90˚ to form angle and install DW90C with four 7/16″ screws



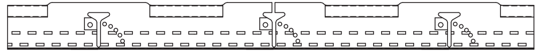
3. Installed



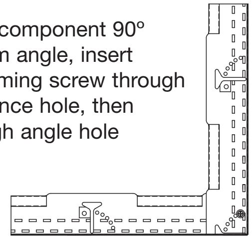
Note: Brace as required.

NOTE: Follow same process for creating 30, 45, 60, and 75 degree angles

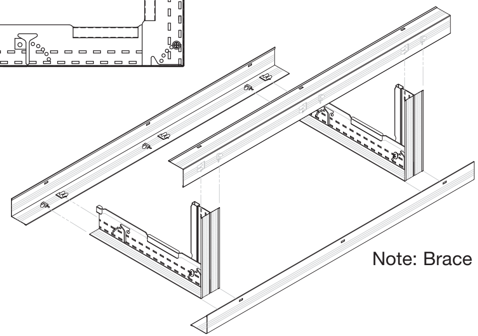
1. Snip bulb about 1/4″ apart at knockout, discard material



2. Bend component 90º to form angle, insert #6 framing screw through clearance hole, then through angle hole



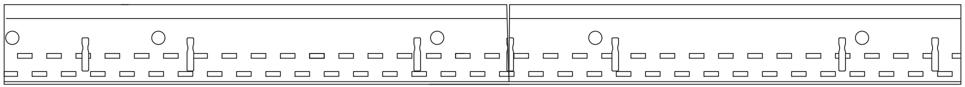
3. Installed



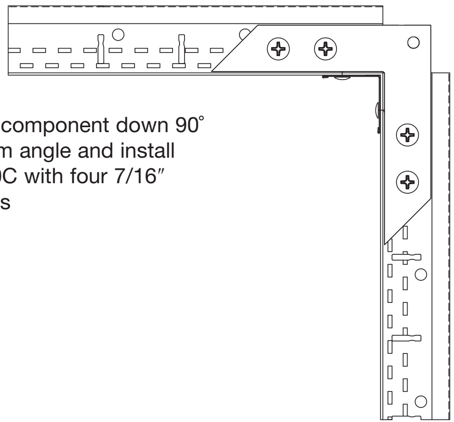
Note: Brace as required.

Creating an Inside 90º Drop

NOTE: Follow same process for creating 30˚, 45˚ and 60˚ angles

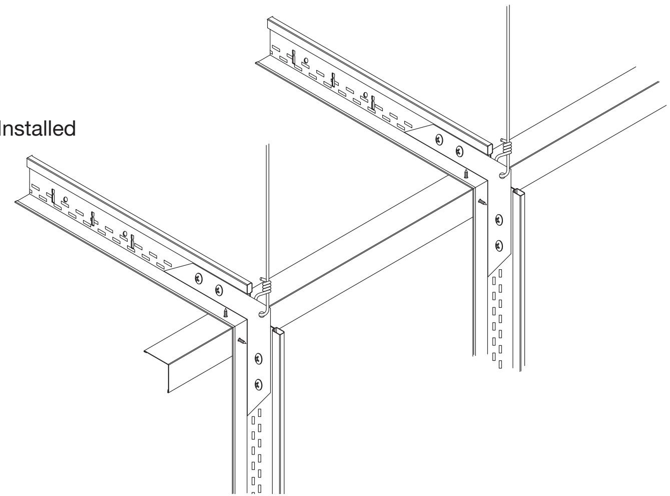


1 Cut main beam or cross tee at the required location

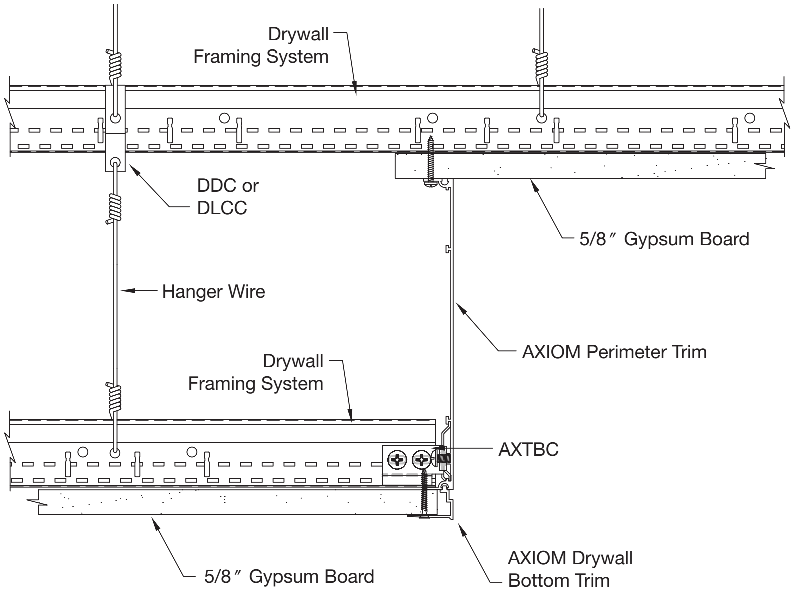


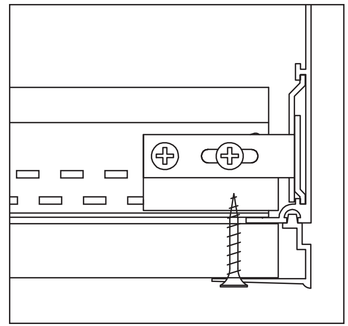
2 Bend component down 90˚ to form angle and install DW90C with four 7/16″ screws

3 Installed



AXIOM Transition — drywall to drywall ceiling system

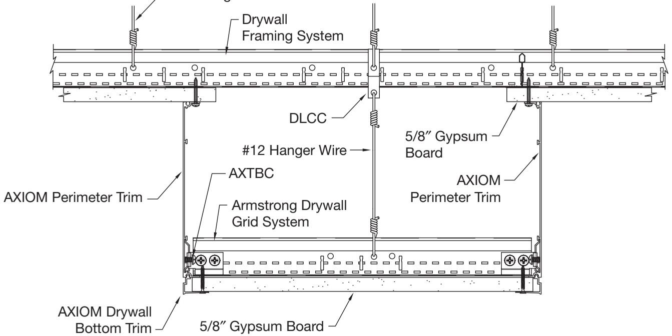




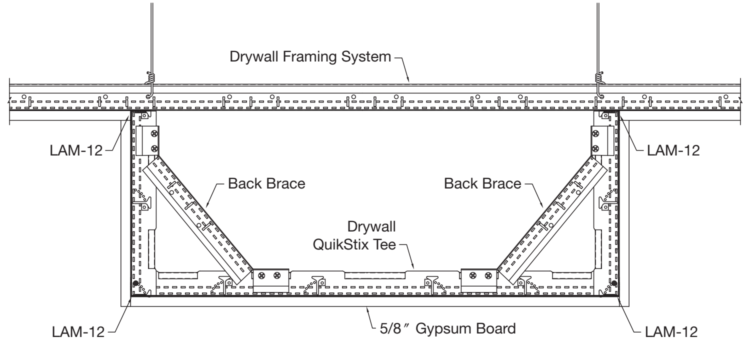
NOTE: Either AXIOM profile can be used

Drop-Drywall Ceiling System

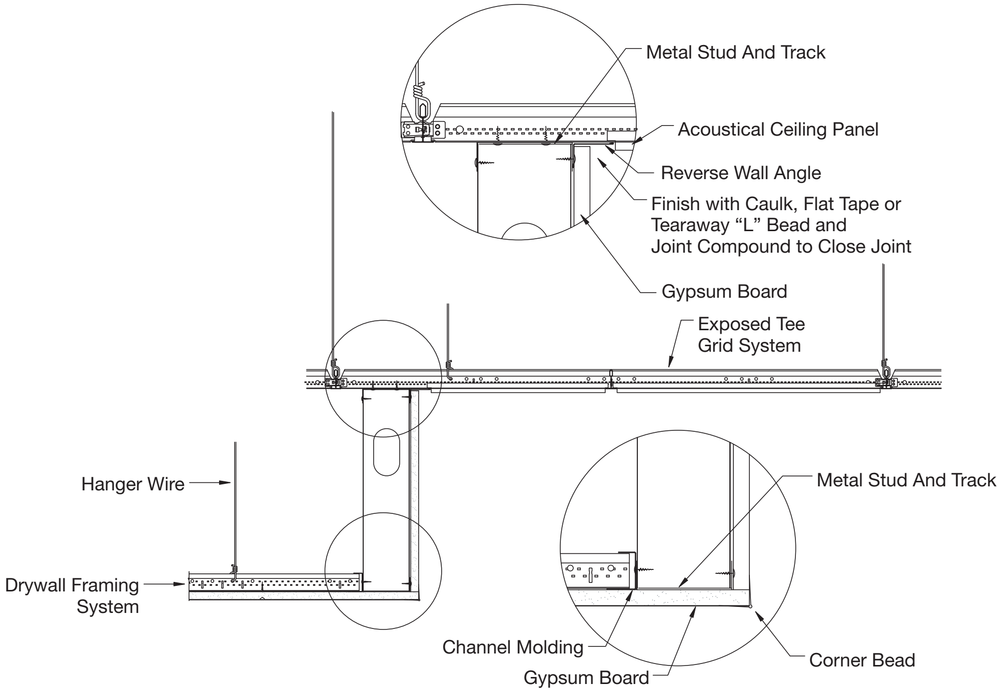
AXIOM



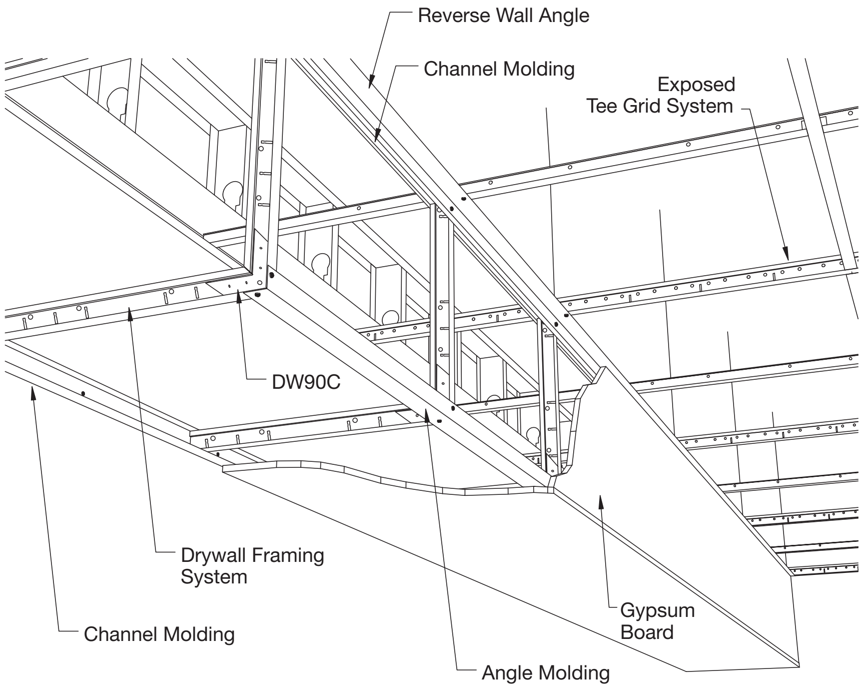
QuikStix



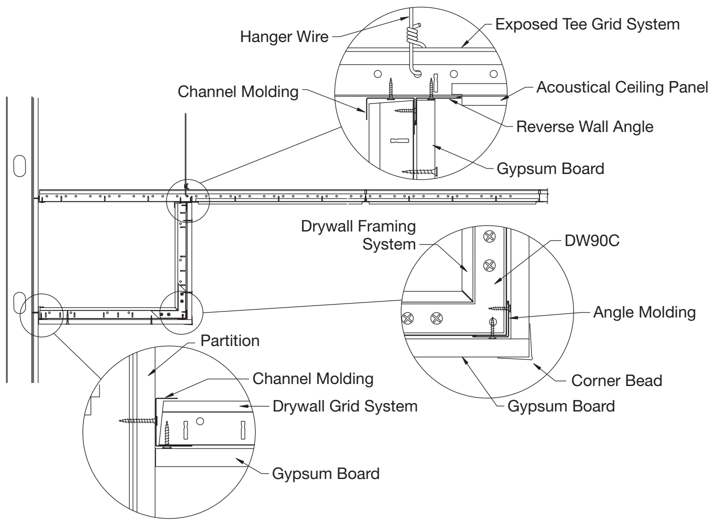
Drywall and Stud Transition at drywall ceiling system

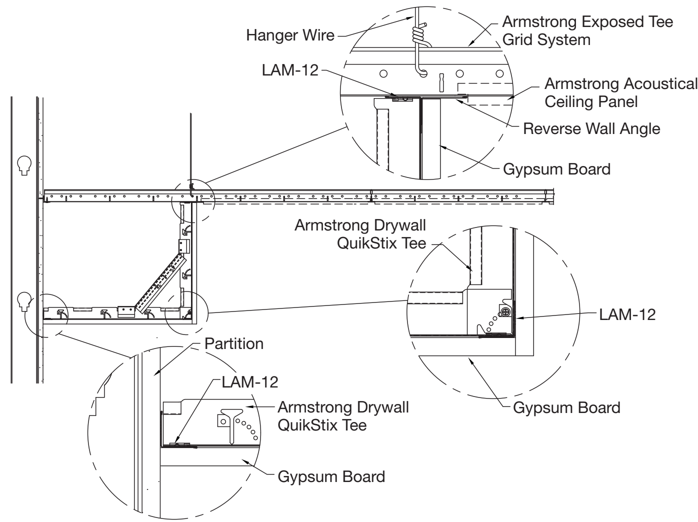


Drywall Soffit at acoustical ceiling system

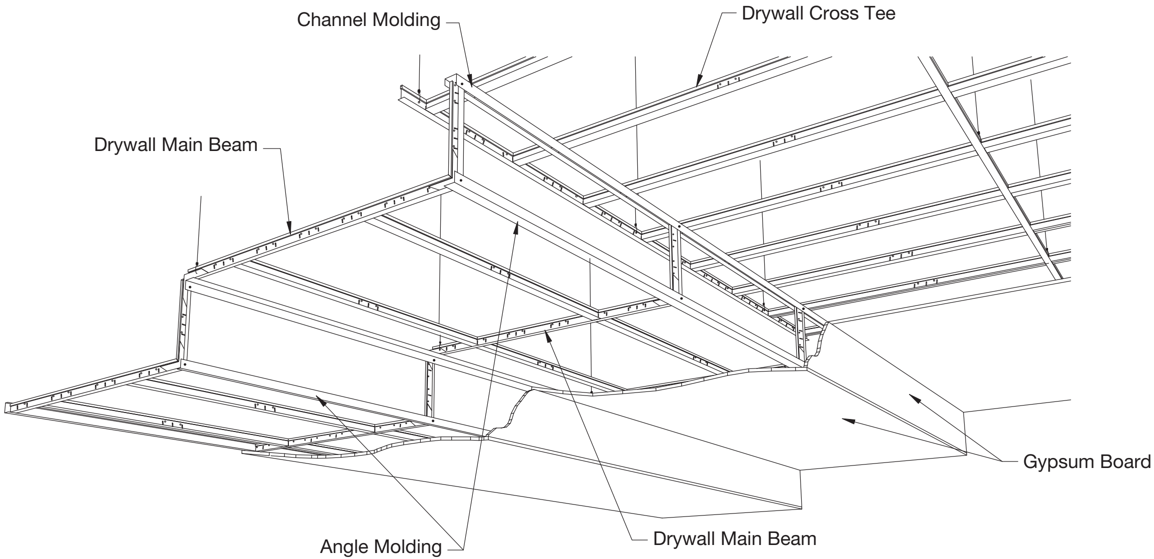


Drywall Soffit at acoustical ceiling system

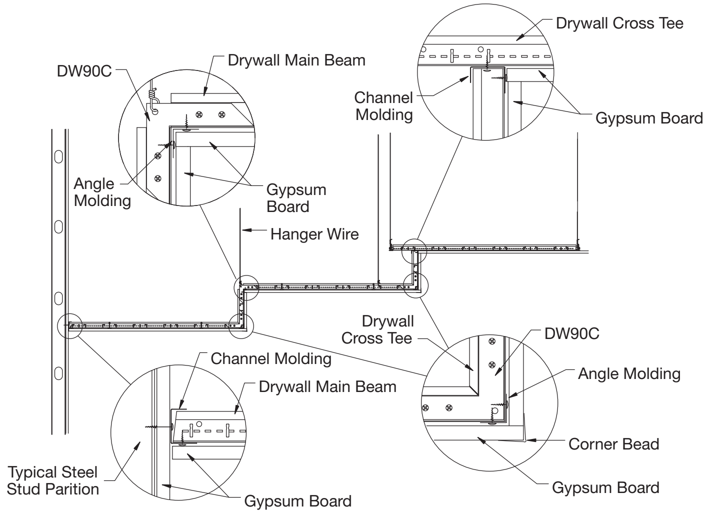


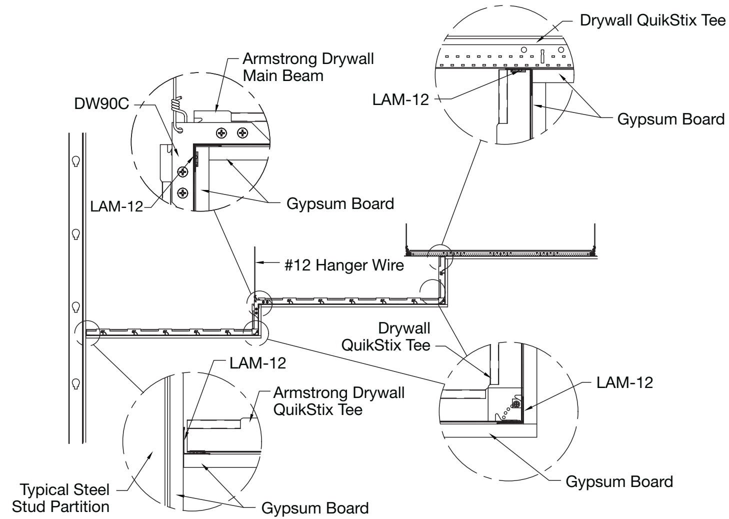


Stepped Drywall Soffit



Stepped Drywall Soffit





NOTE: Maximum horizontal span between vertical support is 4'
Add bracing as required

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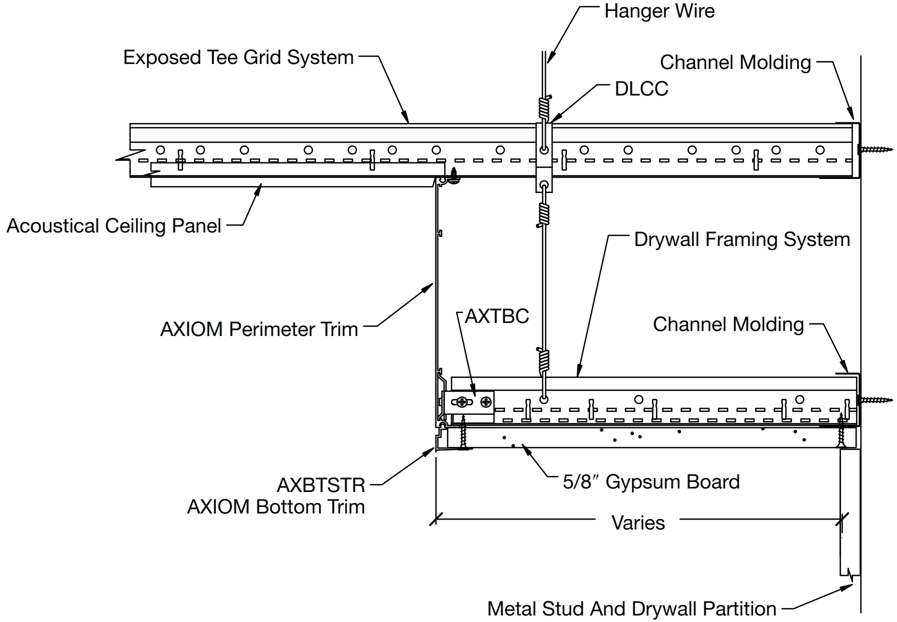
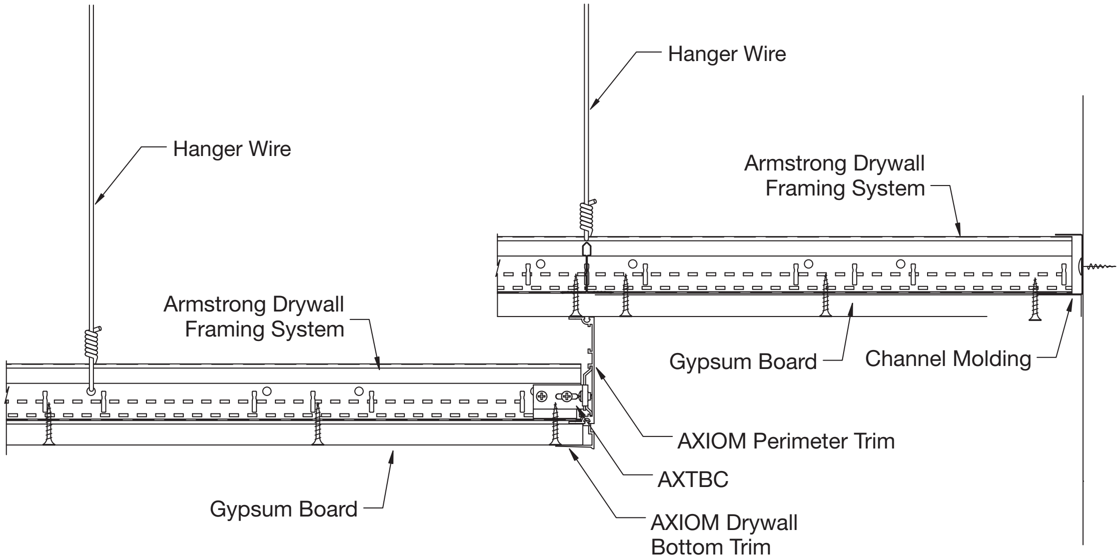
AXIOM Soffit — acoustical ceiling to drywall

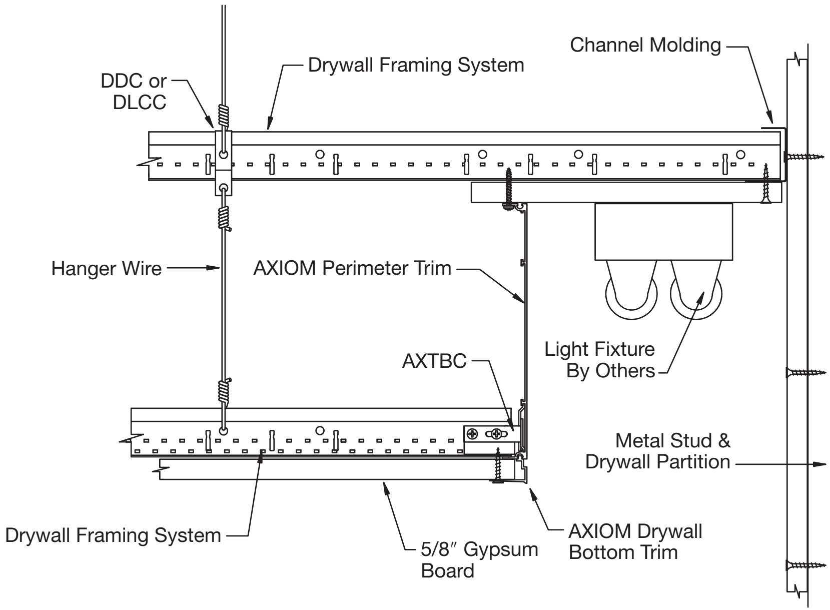


NOTE: Other AXIOM profiles can be used

Drywall Ceiling with AXIOM transition to drywall pocket

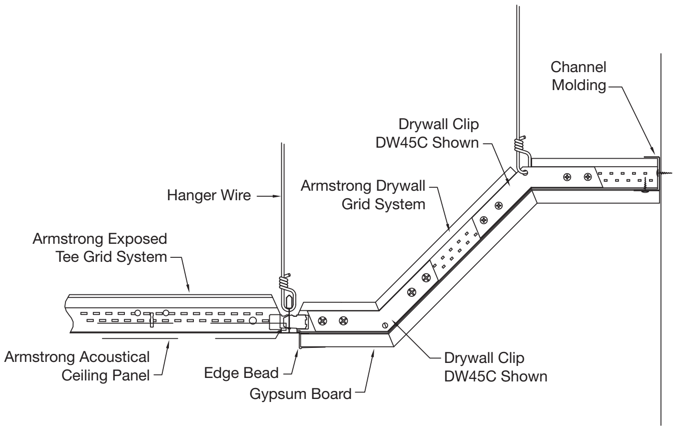


Drywall Ceiling with AXIOM transition to drywall light pocket

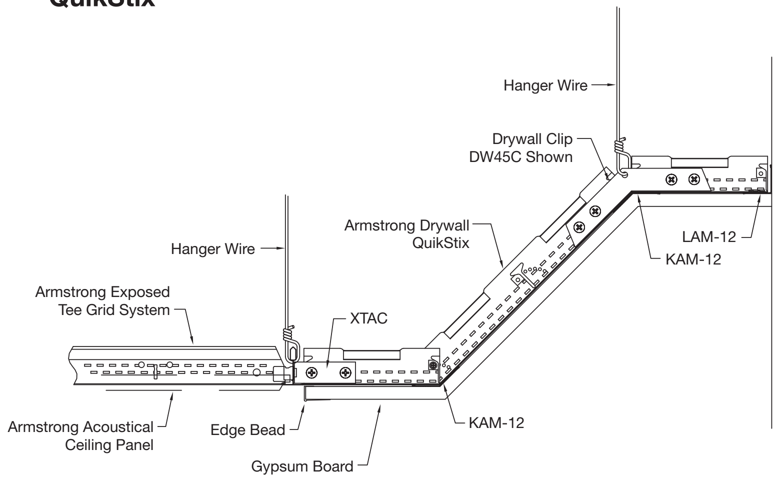


Acoustical Ceiling to angled drywall pocket

Drywall System

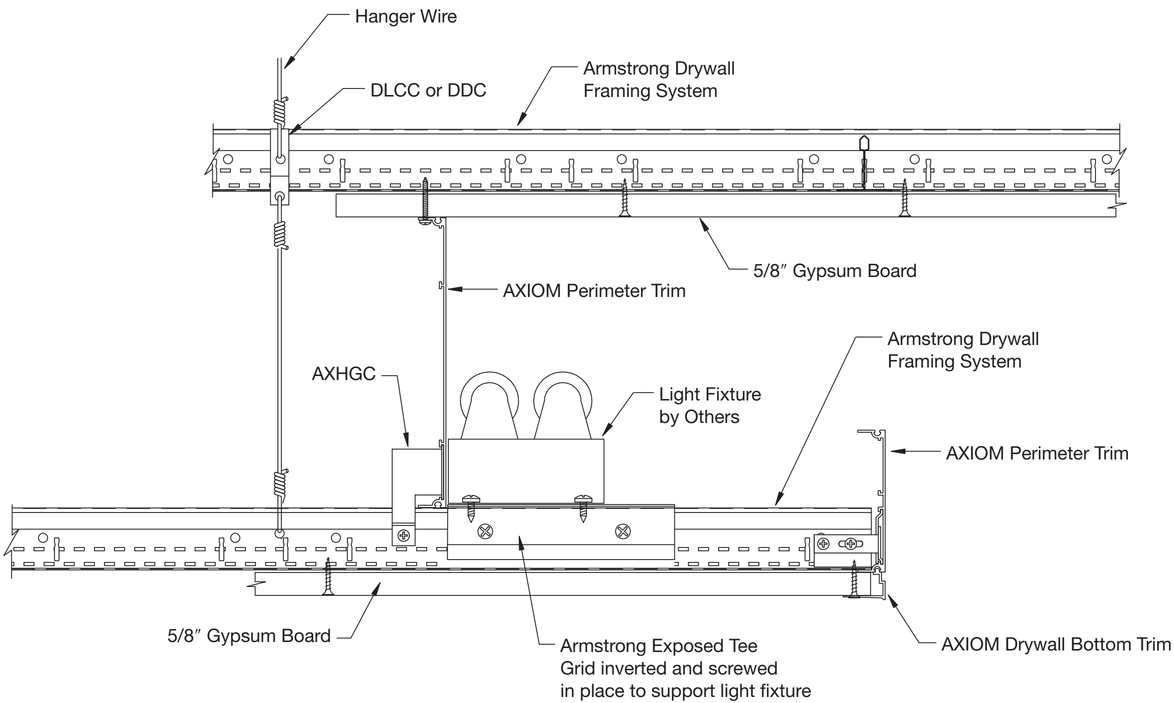


QuikStix



NOTE: Add bracing as required.

Drywall Ceiling with AXIOM transition to AXIOM light cove

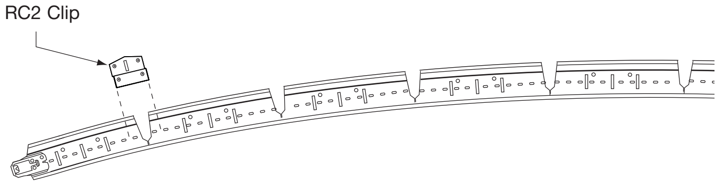


HILLS, VALLEYS, UNDULATING WAVES AND DOMES

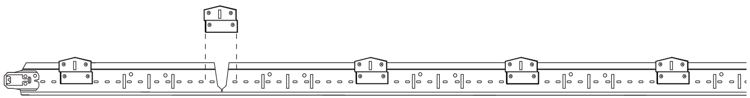
Creating curved framing for drywall is easy and offers unlimited possibilities:

- custom radii to suit any design installation
- you control the curve
- not limited to a pre-selected or pre-determined curved radius
- full range of clips and accessories make installation easier than bending stud and track
- shop drawings can be created to simplify curved installations

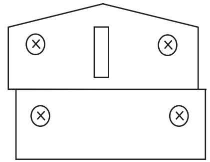
Creating a Curve



Radius will determine on center spacing of cuts. Refer to “Creating A Template” on pages 2-103 and 2-104 for creating a curved template.



RC2 Clip must be installed on all knockout locations when used to frame a flat or curved ceiling.



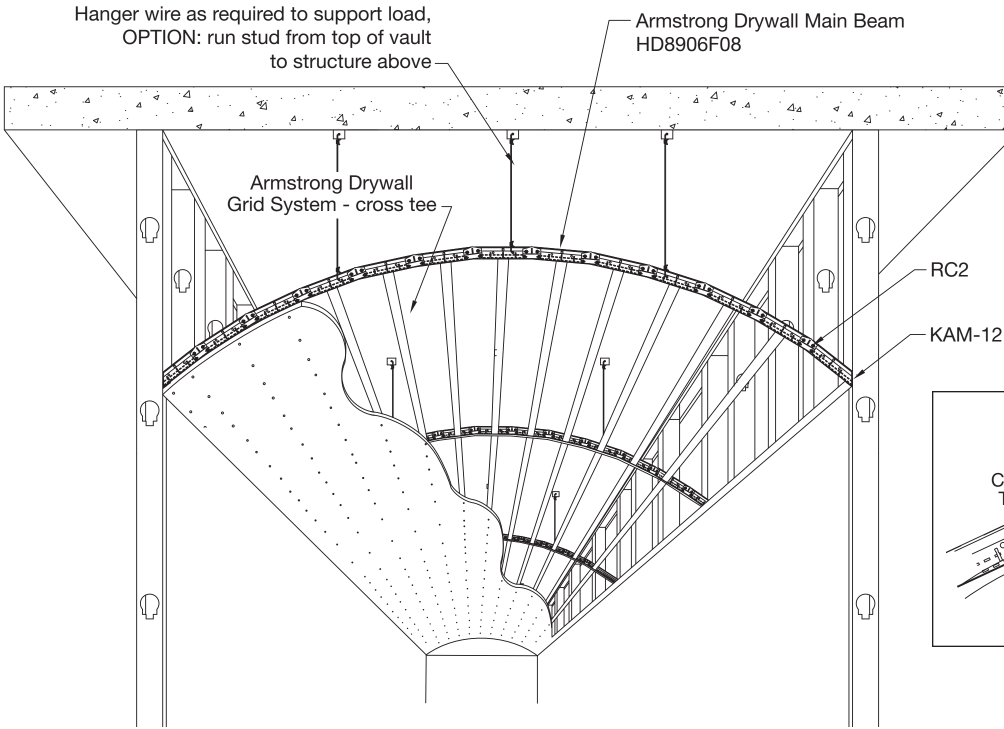
Install RC2 Clip using four #6 x 1/2″ pan head screws per clip.

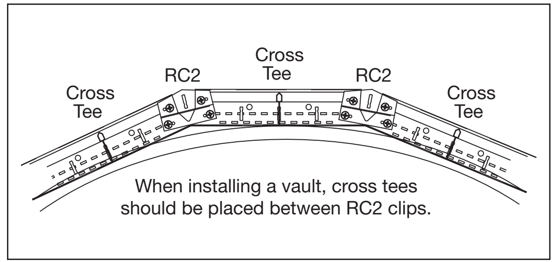
RC2 Clip is used to secure the main beam at the desired angle in curved ceiling with route for installing cross tees. Refer to “Creating a Template” on pages 2-103 and 2-104.

Note: Place RC2 clip on the side of the web where the rotary stitching forms a cavity. This allows the clip to be flush with the web.

- Gypsum wall board attaches to cross tees only
- Screw spacing as required
- Wire spacing as required to support ceiling load
- Splayed wires and stiffening braces as required

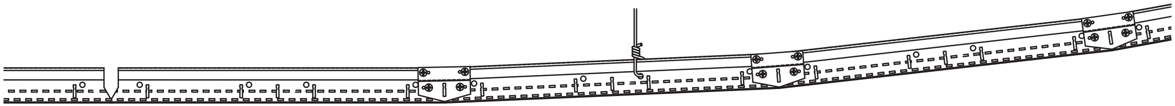
Typical Vaulted Ceiling





Creating a Valley

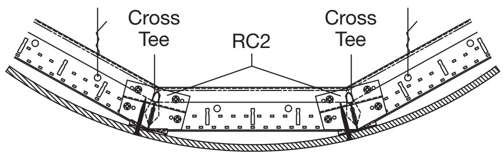
2 Bend the face of the main beam to match desired radius



1 Cut faceted main beam as required to create desired curve

3 Use RC2 to reinforce main beam at each knockout location (secure with four #6 x 1/2″ pan head screws)

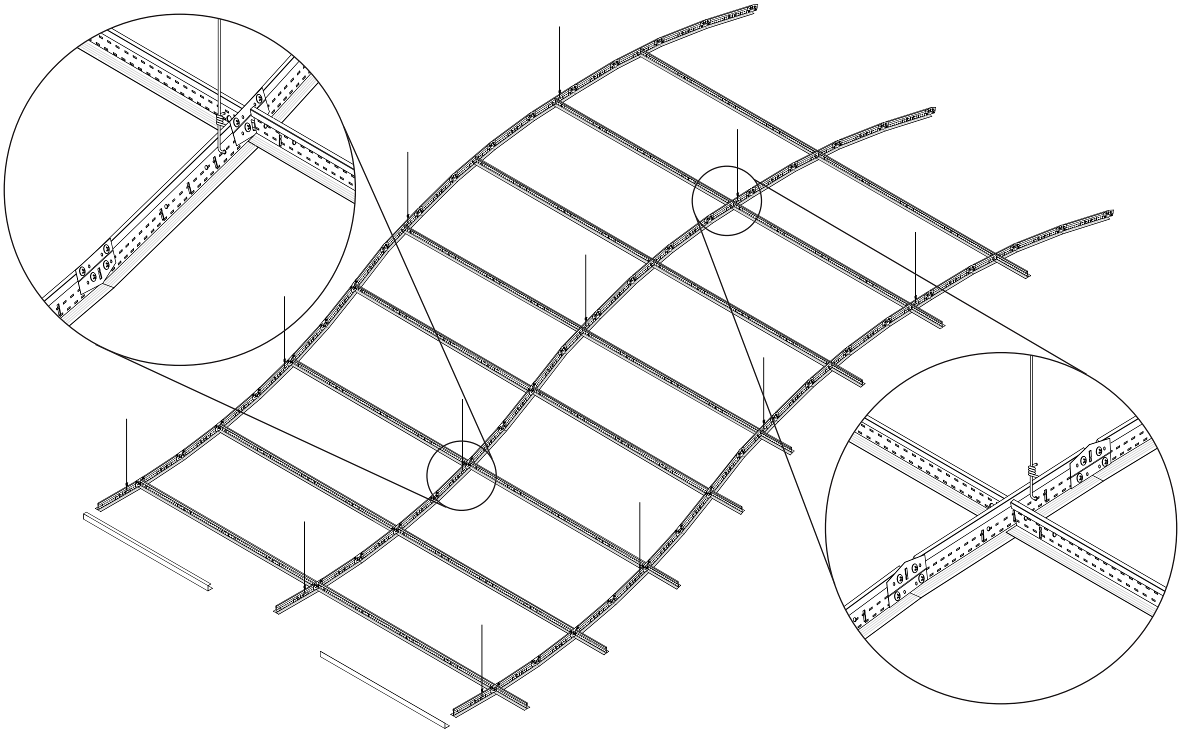
- Gypsum wall board attaches to cross tees only
- Screw spacing as required
- Wire spacing as required to support ceiling load
- Splayed wires and stiffening braces as required



When installing a valley, cross tees are placed at the RC2 clip.

Note: Place RC2 clip on the side of the web where the rotary stitching forms a cavity. This allows the clip to be flush with the web.

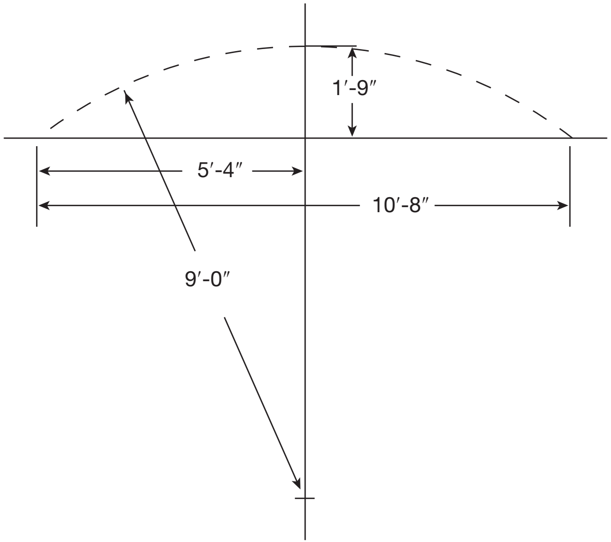
Creating Undulating Waves



- Combine valley and vault methods in a continuous ribbon
- Pre-form main beams with cross tees between (spacing as required for gypsum wall board used)
- Splayed wires and stiffening braces as required

Determining Radius From Rise and Run

$$\frac{((1/2 \text{ Span})^2 \div \text{Rise}) + \text{Rise}}{2} = \text{Radius of circle that segment is taken from}$$



1/2 of 10′- 8″ = 5′- 4″

5′- 4″ = 64″

1′- 9″ = 21″

$$\frac{(64^2 \div 21) + 21}{2} = \text{Radius}$$

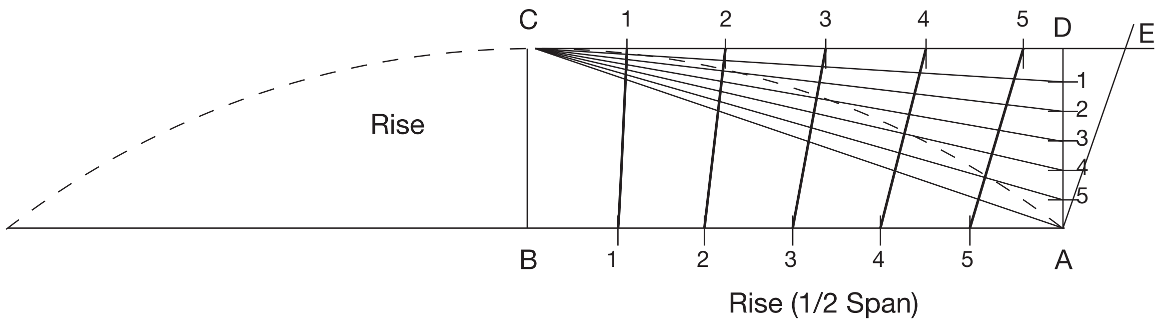
$$64^2 = 4096$$

$$\frac{(4096 \div 21) + 21}{2} =$$

$$\frac{216.04761}{2} =$$

108.0238 = 9′- 0″

Determining Radius Points of the Curve From Rise and Run



1. Layout the barrel vault run (1/2 span) A-B
2. Layout the barrel vault rise B-C
3. Layout line A-D equal to rise
4. Create line A-C (chord of rise & run)
5. Layout a perpendicular line from chord at point A
6. Layout a line from C parallel to B-A and extend it to intersect with the perpendicular line from point A
7. This will be point E
8. Divide line A-B, C-E and A-D into equal parts. The more parts will create more radius points
9. Connect corresponding points from line A-B to line C-E
10. Connect points from line A-D to point C
11. The intersection of line 1-1 and 1-C is the first radius point
12. The intersection of line 2-2 and 2-C is the second radius point
13. Continue intersecting corresponding lines for the remaining radius points

These intersections are true radius points along the barrel vault curve. Use something flexible like hanger wire or pvc pipe to draw a smooth curve through the radius points.

Radius in Feet

2′ INCREMENTS FROM CENTER LINE	RADIUS DIMENSION														
	10′0″	11′0″	12′0″	13′0″	14′0″	15′0″	16′0″	17′0″	18′0″	19′0″	20′0″	21′0″	22′0″	23′0″	24′0″
2′	2″	2 1/4″	2″	1 7/8″	1 3/4″	1 5/8″	1 1/2″	1 1/2″	1 3/8″	1 1/4″	1 1/4″	1 1/8″	1 1/8″	1 1/8″	1″
4′	10″	9 1/8″	8 1/4″	7 5/8″	7″	6 1/2″	6 1/8″	5 3/4″	5 3/8″	5 1/8″	4 7/8″	4 5/8″	4 3/8″	4 1/4″	4″
6′	2′0″	1′9 3/8″	1′7 3/8″	1′5 5/8″	1′4 1/4″	1′3″	1′2″	1′1 1/8″	1′0 3/8″	11 3/4″	11 1/8″	10 1/2″	10″	9 5/8″	9 1/8″
8′	4′0″	3′5 5/8″	3′0 3/4″	2′9 1/8″	2′6 1/8″	2′3 3/4″	2′1 3/4″	2′0″	1′10 1/2″	1′9 1/4″	1′8 1/8″	1′7″	1′6 1/8″	1′5 1/4″	1′4 1/2″
	25′0″	26′0″	27′0″	28′0″	29′0″	30′0″	31′0″	32′0″	33′0″	34′0″	35′0″	36′0″	37′0″	38′0″	39′0″
2′	1″	1″	7/8″	7/8″	7/8″	7/8″	3/4″	3/4″	3/4″	3/4″	3/4″	3/4″	5/8″	5/8″	5/8″
4′	3 7/8″	3 3/4″	3 5/8″	3 1/2″	3 3/8″	3 1/4″	3 1/8″	3″	3″	2 7/8″	2 3/4″	2 3/4″	2 5/8″	2 5/8″	2 1/2″
6′	8 3/4″	8 1/2″	8 1/2″	7 7/8″	7 1/2″	7 1/4″	7 1/8″	6 7/8″	6 5/8″	6 3/8″	6 1/4″	6 1/8″	5 7/8″	5 3/4″	5 5/8″
8′	1′3 3/4″	1′3 1/8″	1′2 5/8″	1′2″	1′2 1/2″	1′1 1/8″	1′0 5/8″	1′0 1/4″	11 1/2″	11 1/2″	11 1/8″	10 7/8″	10 1/2″	10 1/4″	10″
	40′0″	41′0″	42′0″	43′0″	44′0″	45′0″	46′0″	47′0″	48′0″	49′0″	50′0″	51′0″	52′0″	53′0″	54′0″
2′	5/8″	5/8″	5/8″	5/8″	5/8″	5/8″	1/2″	1/2″	1/2″	1/2″	1/2″	1/2″	1/2″	1/2″	1/2″
4′	2 3/8″	2 3/8″	2 3/8″	2 1/4″	2 1/8″	2 1/8″	2 1/8″	2 1/8″	2″	2″	2″	1 7/8″	1 7/8″	1 3/4″	1 3/4″
6′	5 1/2″	5 3/8″	5 1/4″	5 1/8″	5″	4 7/8″	4 3/4″	4 5/8″	4 1/2″	4 1/2″	4 3/8″	4 1/4″	4 1/4″	4 1/4″	4″
8′	9 3/4″	9 1/2″	9 1/4″	9″	8 7/8″	8 5/8″	8 1/2″	8 1/4″	8 1/8″	7 7/8″	7 3/4″	7 5/8″	7 1/2″	7 3/8″	7 1/8″

Radius in Feet

2′ INCREMENTS FROM CENTER LINE	RADIUS DIMENSION														
	55′0″	56′0″	57′0″	58′0″	59′0″	60′0″	61′0″	62′0″	63′0″	64′0″	65′0″	66′0″	67′0″	68′0″	69′0″
2′	1/2″	1/2″	1/2″	1/2″	1/2″	3/8″	3/8″	3/8″	3/8″	3/8″	3/8″	3/8″	3/8″	3/8″	3/8″
4′	1 3/4″	1 3/4″	1 3/4″	1 3/4″	1 5/8″	1 5/8″	1 5/8″	1 5/8″	1 1/2″	1 1/2″	1 1/2″	1 1/2″	1 1/2″	1 1/2″	1 3/8″
6′	4″	3 7/8″	3 7/8″	3 3/4″	3 3/4″	3 5/8″	3 5/8″	3 1/2″	3 1/2″	3 3/8″	3 3/8″	3 1/4″	3 1/4″	3 1/4″	3 1/8″
8′	7″	6 7/8″	6 3/4″	6 5/8″	6 5/8″	6 1/2″	6 3/8″	6 1/4″	6 1/8″	6″	6″	5 7/8″	5 3/4″	5 3/4″	5 5/8″
	70′0″	71′0″	72′0″	73′0″	74′0″	75′0″	76′0″	77′0″	78′0″	79′0″	80′0″	81′0″	82′0″	83′0″	84′0″
2′	3/8″	3/8″	3/8″	3/8″	3/8″	3/8″	3/8″	3/8″	3/8″	3/8″	3/8″	3/8″	3/8″	3/8″	3/8″
4′	1 3/8″	1 3/8″	1 3/8″	1 3/8″	1 3/8″	1 1/4″	1 1/4″	1 1/4″	1 1/4″	1 1/4″	1 1/4″	1 1/4″	1 1/4″	1 1/4″	1 1/8″
6′	3 1/8″	3 1/8″	3″	3″	3″	2 7/8″	2 7/8″	2 7/8″	2 3/4″	2 3/4″	2 3/4″	2 3/4″	2 5/8″	2 5/8″	2 5/8″
8′	5 1/2″	5 1/2″	5 3/8″	5 1/4″	5 1/4″	5 1/8″	5 1/8″	5 ″	5″	4 7/8″	4 7/8″	4 3/4″	4 3/4″	4 5/8″	4 5/8″
	85′0″	86′0″	87′0″	88′0″	89′0″	90′0″	91′0″	92′0″	93′0″	94′0″	95′0″	96′0″	97′0″	98′0″	99′0″
2′	3/8″	1/4″	1/4″	1/4″	1/4″	1/4″	1/4″	1/4″	1/4″	1/4″	1/4″	1/4″	1/4″	1/4″	1/4″
4′	1 1/8″	1 1/8″	1 1/8″	1 1/8″	1 1/8″	1 1/8″	1 1/8″	1 1/8″	1 1/8″	1″	1″	1″	1″	1″	1″
6′	2 5/8″	2 1/2″	2 1/2″	2 1/2″	2 1/2″	2 3/8″	2 3/8″	2 3/8″	2 3/8″	2 3/8″	2 1/4″	2 1/4″	2 1/4″	2 1/4″	2 1/4″
8′	4 1/2″	4 1/2″	4 1/2″	4 3/8″	4 3/8″	4 1/4″	4 1/4″	4 1/4″	4 1/8″	4 1/8″	4 1/8″	4″	4″	4″	3 7/8″

Radius in Feet

2′ INCREMENTS FROM CENTER LINE	RADIUS DIMENSION														
	100′0″	105′0″	110′0″	115′0″	120′0″	125′0″	130′0″	135′0″	140′0″	145′0″	150′0″	155′0″	160′0″	165′0″	170′0″
2′	1/4″	1/4″	1/4″	1/4″	1/4″	1/4″	1/4″	1/4″	1/4″	1/4″	1/4″	1/4″	1/8″	1/8″	1/8″
4′	1″	1″	7/8″	7/8″	7/8″	3/4″	3/4″	3/4″	3/4″	3/4″	5/8″	5/8″	5/8″	5/8″	5/8″
6′	2 1/4″	2 1/8″	2″	1 7/8″	1 7/8″	1 3/4″	1 3/4″	1 5/8″	1 5/8″	1 1/2″	1 1/2″	1 3/8″	1 3/8″	1 3/8″	1 1/4″
8′	3 7/8″	3 3/4″	3 1/2″	3 3/8″	3 1/4″	3 1/8″	3″	2 7/8″	2 3/4″	2 3/4″	2 5/8″	2 1/2″	2 3/8″	2 3/8″	2 1/4″
	175′0″	180′0″	185′0″	190′0″	195′0″	200′0″	210′0″	220′0″	230′0″	240′0″	250′0″				
2′	1/8″	1/8″	1/8″	1/8″	1/8″	1/8″	1/8″	1/8″	1/8″	1/8″	1/8″				
4′	5/8″	5/8″	1/2″	1/2″	1/2″	1/2″	1/2″	1/2″	3/8″	3/8″	3/8″				
6′	1 1/4″	1 1/4″	1 1/4″	1 1/8″	1 1/8″	1 1/8″	1″	1″	1″	7/8″	7/8″				
8′	2 1/4″	2 1/8″	2 1/8″	2″	2″	2″	1 7/8″	1 3/4″	1 5/8″	1 5/8″	1 1/2″				

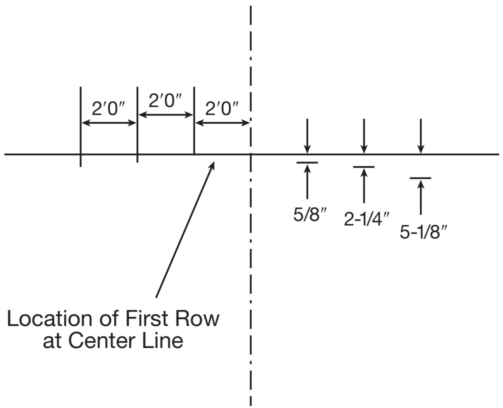
Radius Layout establishing an arc when you know the radius

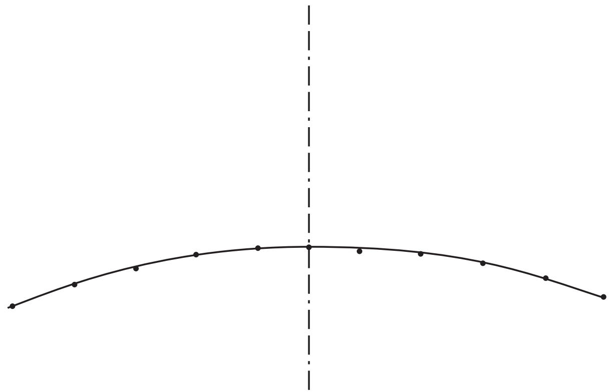
1. Establish a center line
2. Mark 2′ increments on line perpendicular to center line

   EXAMPLE: 43′ arc using chart on pages 2-99 to 2-101.

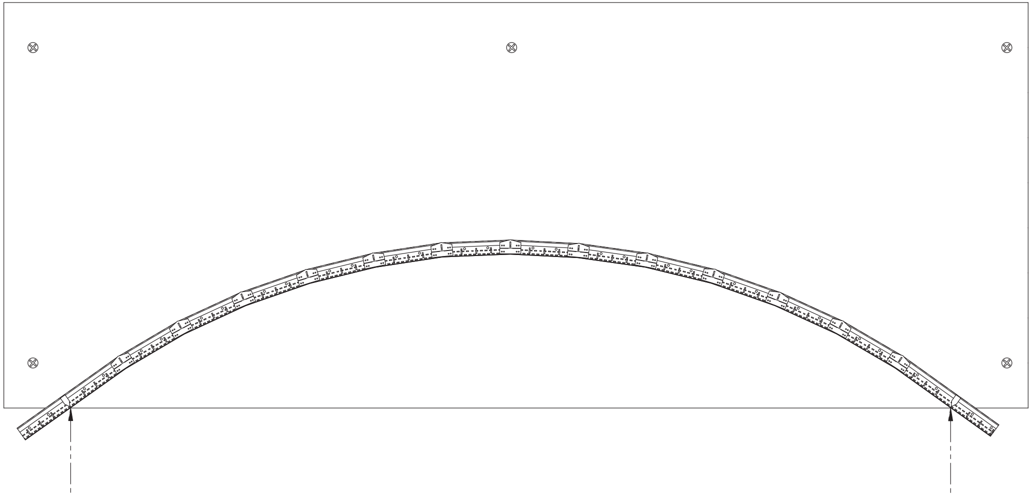
3. At 2′ marks, identify points of arc below perpendicular line (maintain consistent spacing of point)
4. Connect points to form a smooth arc

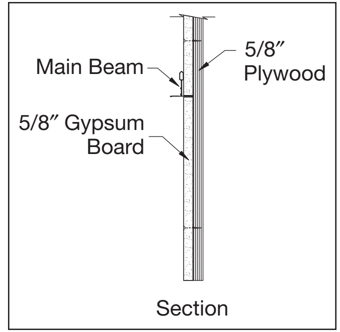
   NOTE: Refer to page 2-103 to create a template for curved main beams.





Creating a Template – Option 1



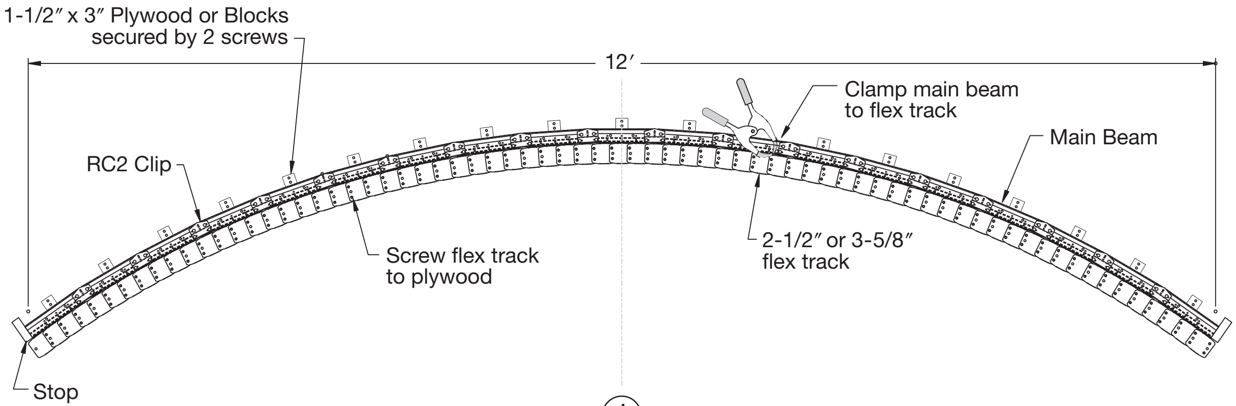


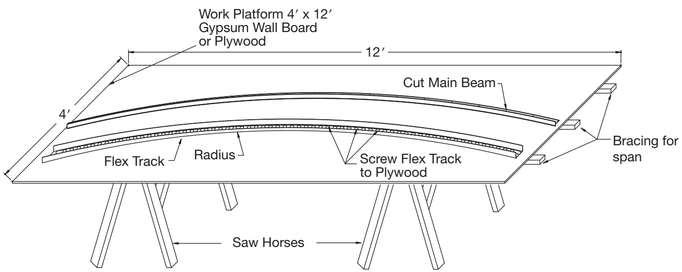
RADIUS	MAIN BEAM CUTS
Up to 15′	8″ or use HD8906F08
15′ +	16″ or use HD8906F16

1. Draw radius on template
2. Cut along radius and remove section
3. Cut main beam as required and position along cut radius on template; use the chart in the upper right corner
4. Screw RC2 clips to faceted main beam on concave side of web
5. On the template, mark a rout location reference point to maintain consistent rout loction

Note: Place RC2 clip on the side of the web where the rotary stitching forms a cavity. This allows the clip to be flush with the web.

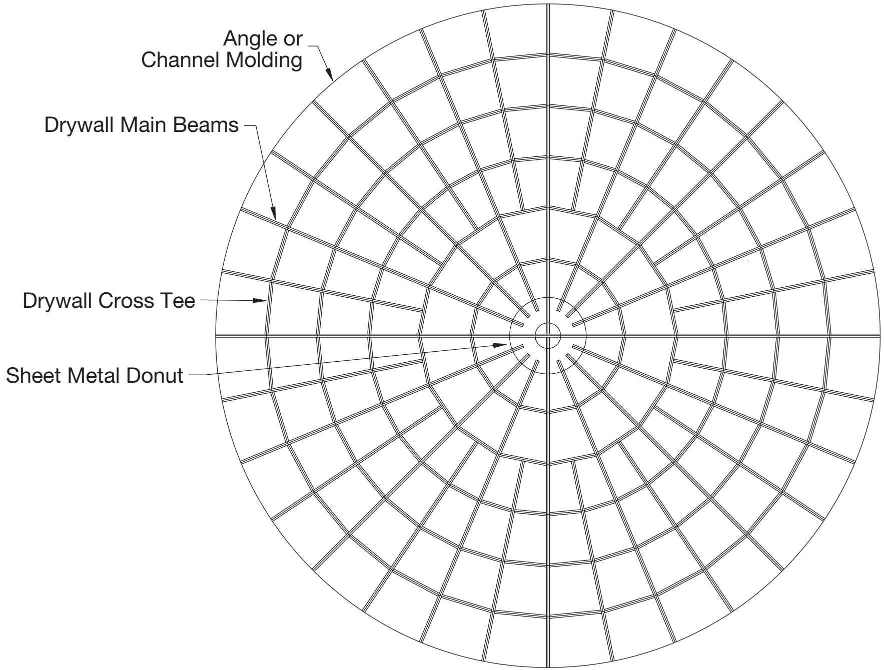
Creating a Template – Option 2

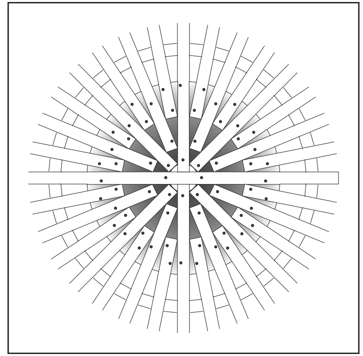




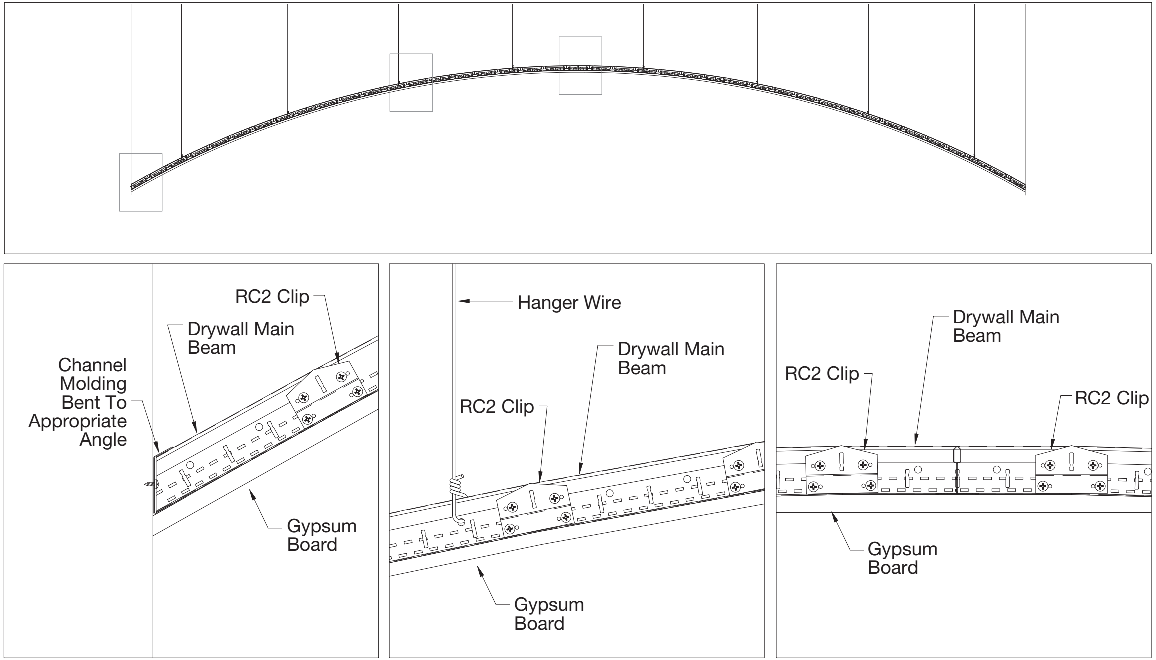
1. Draw radius on board
2. Screw flex track to board along radius
3. Cut main beams as required and position along the flex track on the template
4. Screw RC2 clips to faceted main beam at all knockout locations to concave side of web
5. On the template, mark a rout location reference point to maintain consistent rout location

Creating a Dome

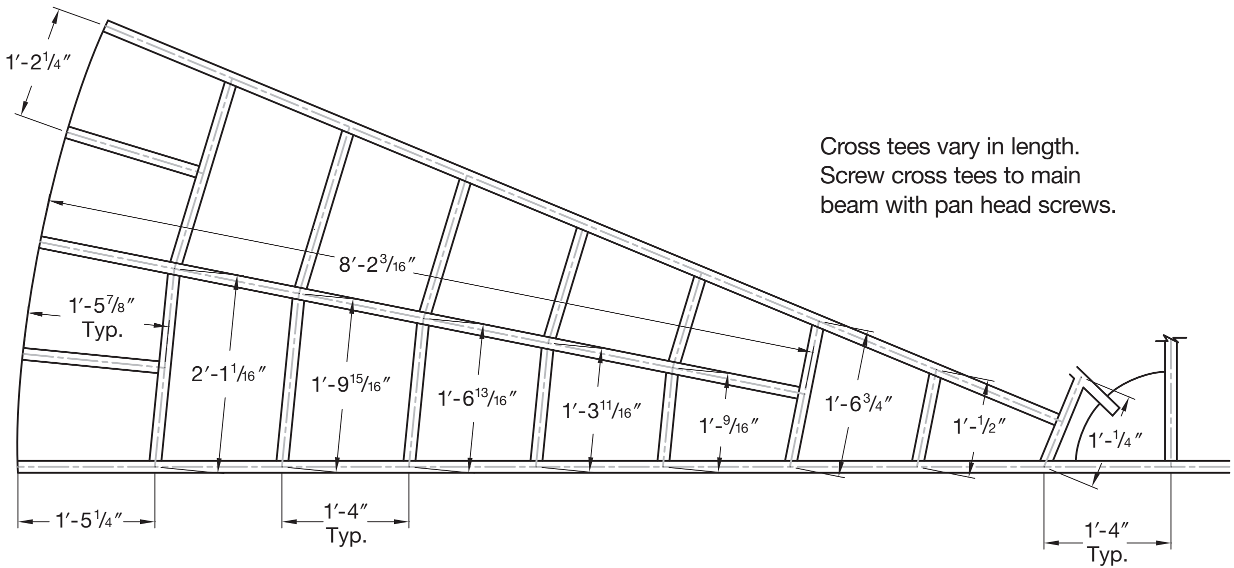




All domes require a sheet metal disk at the top of the ceiling which must be screw-attached to each main beam


RC2 Clip
Drywall Main Beam
Channel Molding Bent To Appropriate Angle
Gypsum Board
Hanger Wire
Drywall Main Beam
RC2 Clip
Gypsum Board
Drywall Main Beam
RC2 Clip
RC2 Clip
Gypsum Board

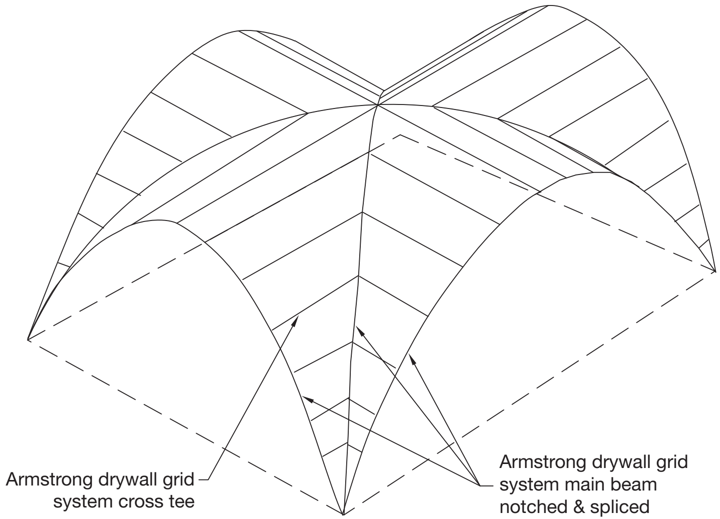
Cross Tee Lengths in typical drywall dome

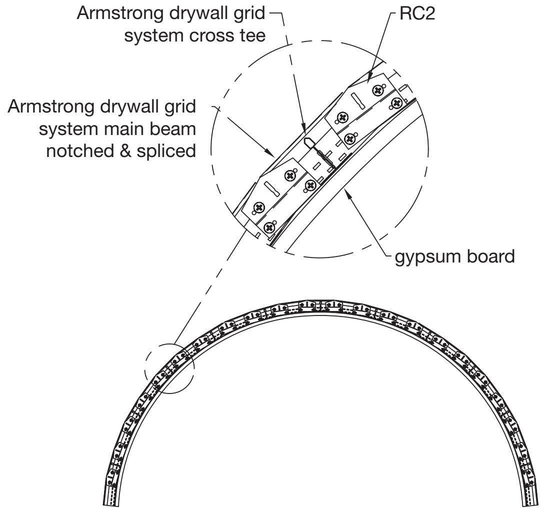


NOTE: Dimensions shown are for example only.

Groin Vault

A Groin Vault is formed by intersecting two barrel vaults, or curved ceilings. A groin is the curved intersection of the two vaults. Vault intersections can be an inside or outside groin, both use the same process to create a template.

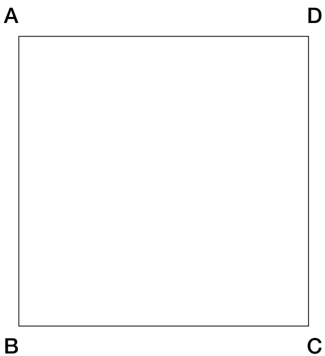




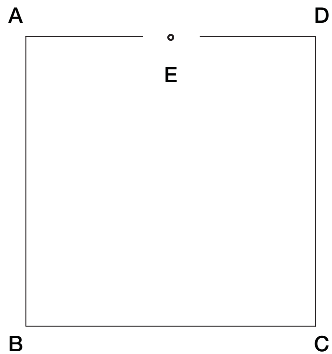
Groin Vault square room layout

This is the simplest type of groin ceiling to layout and install. The four primary vaults are the same, and the groin will be an elliptical vault running diagonally corner-to-corner.

This will require two templates – one for the primary vault and one for the groin. Groin template must be to scale, full size, best done on the floor directly below the vaults to use as an installation reference.

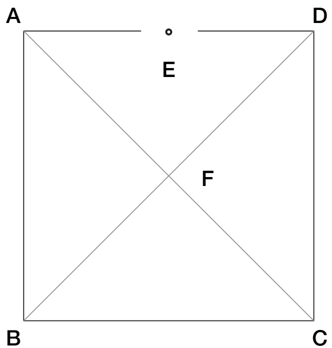


Step 1: Lay out the square A, B, C and D to represent the dimensions of the room.

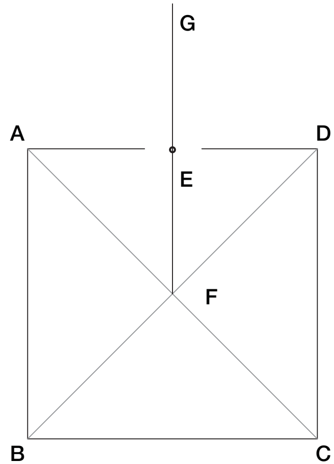


Step 2: Determine the midpoint of line A - D and label E. This is the radius point for the primary vaults.

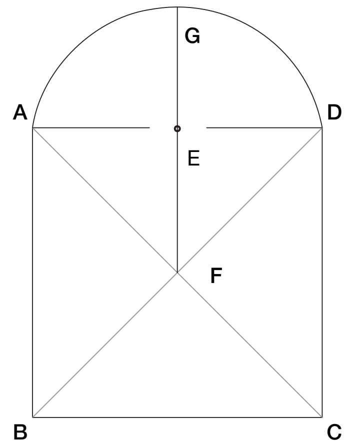
Groin Vault square room layout



Step 3: Layout diagonal lines A - C and B - D – these are the groin lines. Label the intersection of these lines F.

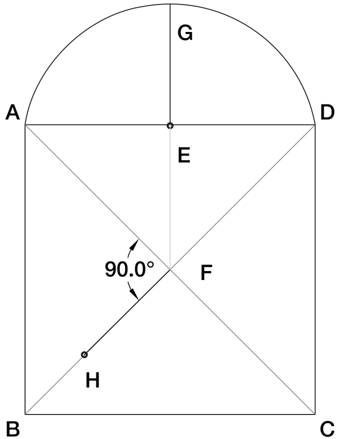


Step 4: Layout line F - G beginning at point F, running through point E, equal in length to side A - B. Point G represents the top of the vault, and line F - G represents the centerline of the vault.

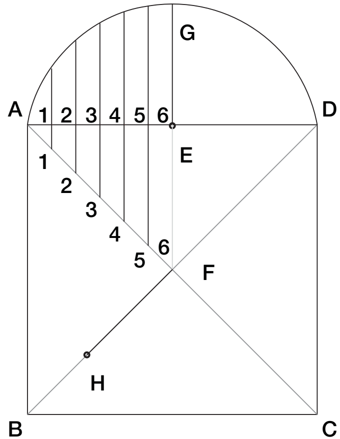


Step 5: Using point E as the center point, and dimension E - A as the radius, form the primary vault from points A to D.

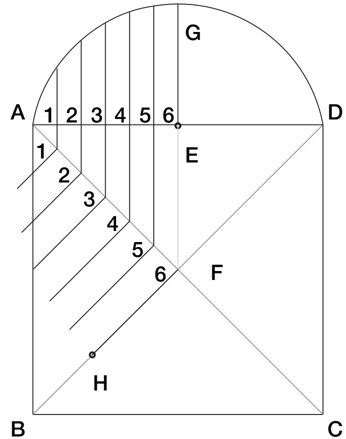
Groin Vault square room layout



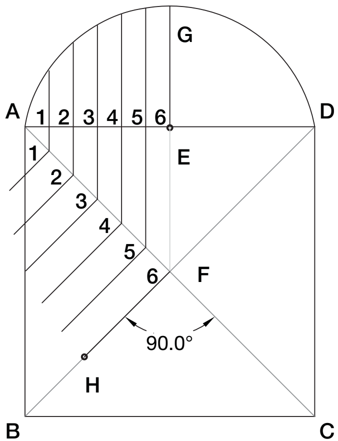
Step 6: Use the rise of the primary vault (E - G) and locate the rise of the groin vault (F - H).



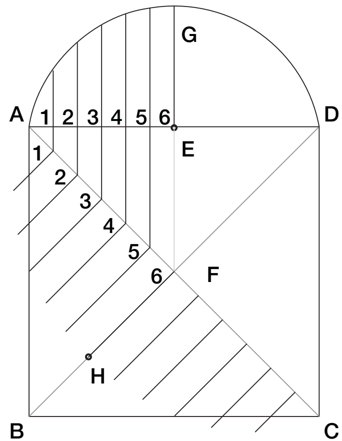
Step 7: Run lines parallel to line F - G at one foot intervals beginning at point E and moving towards point A. Number the points where these lines intersect the diagonal (A - C) beginning at point A.



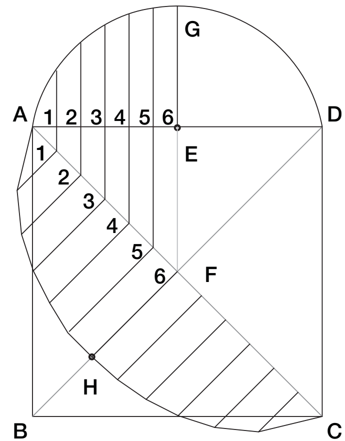
Step 8: Mark and run lines perpendicular to line A - C at each of the points created in Step 7.



Step 9: Transfer length of each line created in Step 7 to corresponding lines created in Step 8. This will create curve points of the groin vault.



Step 10: Mirror points created in Step 8 along line F - C.



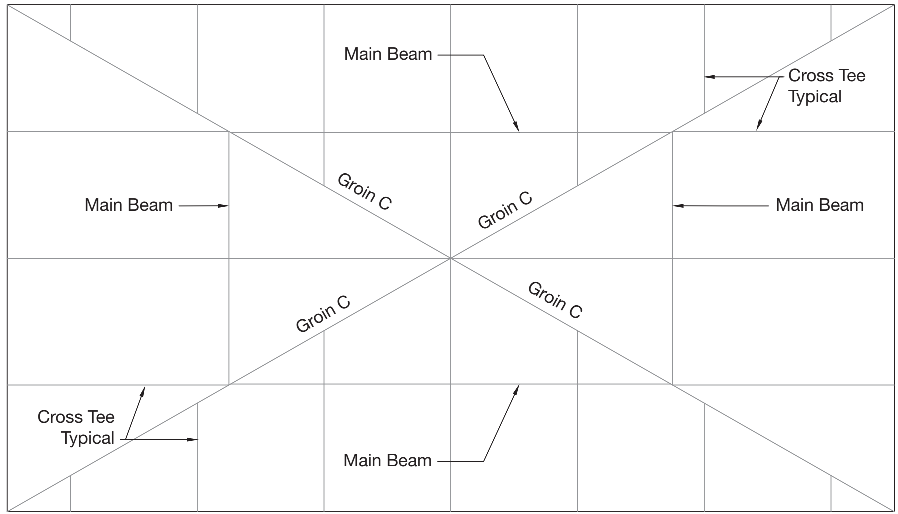
Step 11: Form the groin vault by connecting the points created in Steps 9 and 10.

Step 12: Curves A, G, D and A, H, C can be used to create templates to construct faceted main beams.

Armstrong®

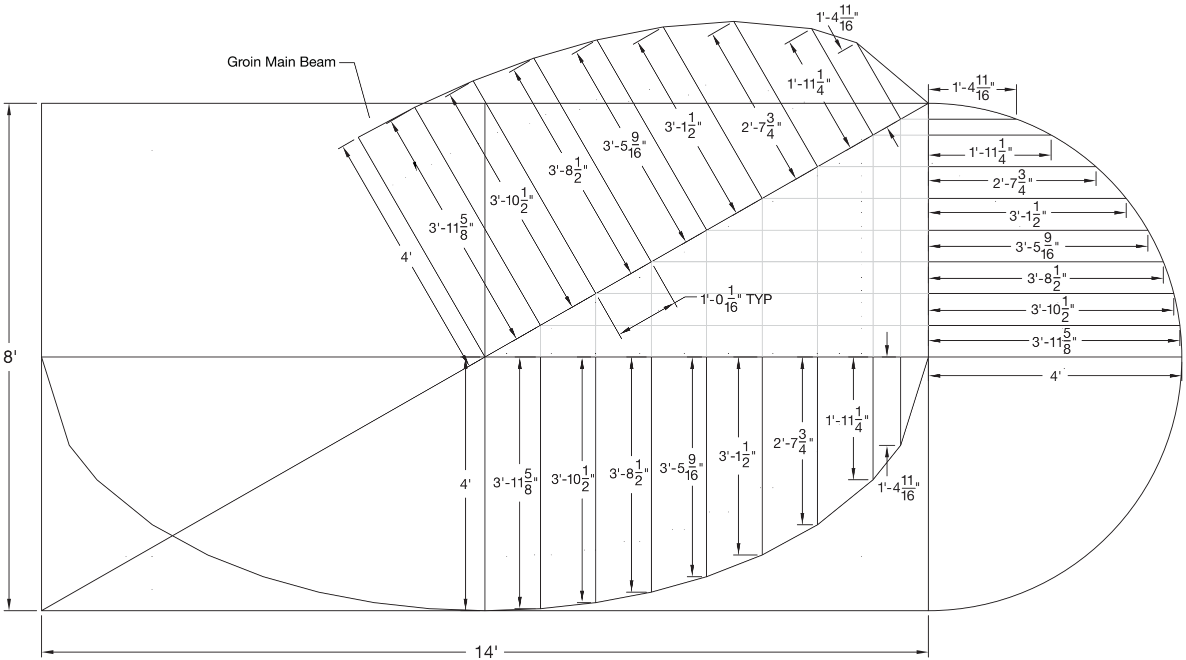
Groin Vault rectangle room layout

Rectangular Rooms:
Layout for rectangular rooms is similar to that for square rooms, except that three templates will be required: the primary vault for the short walls, a true radius vault, the secondary vault for the long walls, this will be an elliptical arch, and the groin vault running diagonally corner to corner. The rise for each vault will be the same dimension.



Armstrong®

Groin Vault rectangle room template example



Plaster, Stucco, Exterior Systems

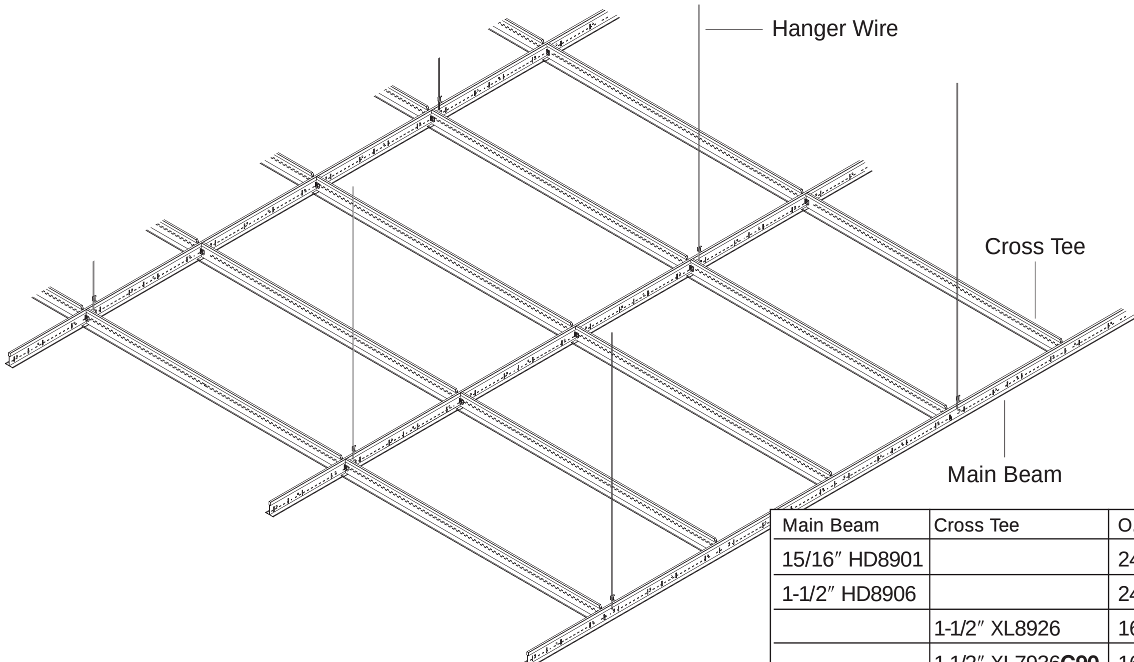
- **G90** hot dipped galvanized coating is available for exterior applications, plaster and stucco (HD8906**G90**, XL8945P**G90**, XL8947P**G90**, XL8925**G90**, XL8926**G90**, XL7936**G90,** SP135).

- SP135 stucco main spaces cross tees 13-1/2″ o.c. which complies with ASTM C1063 table 4.

- Main beams and cross tees are pre-engineered with additional rout locations to allow for easy installation of Type “F” light fixtures, access panels and air diffusers.

- Security Lath can also be used for prisons and other demanding applications.

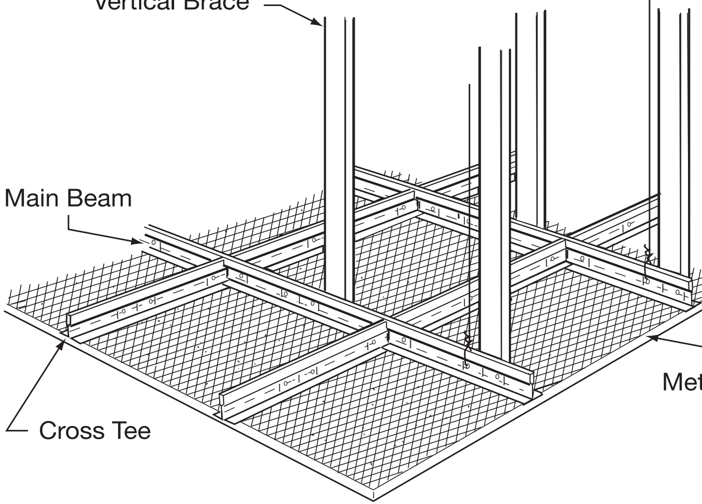
Plaster Framing (Interior)



- Wire spacing as required to carry imposed load
- Bracing, as required

Main Beam	Cross Tee	O.C. Spacing
15/16″ HD8901		24″/36″
1-1/2″ HD8906		24″/36″
	1-1/2″ XL8926	16″
	1-1/2″ XL7936**G90**	16″

Stucco Framing



- Wire spacing as required to carry imposed load
- Vertical bracing as required to prevent wind uplift

* Use the chart on page 2-118 for installation specifics (main beam spacing, cross tee spacing, wire and compression stud spacing)

Main Beam	Cross Tee	O.C. Spacing
15/16″ HD8901		24″/36″
	1-1/2″ XL8926**G90**	16″
	1-1/2″ XL7936**G90**	16″

Main Beam	Cross Tee	O.C. Spacing
1-1/2″ HD8906**G90**		24″/36″
	1-1/2″ XL8926**G90**	16″
	1-1/2″ XL7936**G90**	16″

Main Beam	Cross Tee	O.C. Spacing
1-1/2″ SP135		36″″
	1-1/2″ XL7936**G90**	13-1/2″

Stucco System Exterior Wind Load Ceiling Design for North America

Plenum Height (Ft - In)	Up Lift Load (MPH)	Up Lift Load (Lbs./Ft.^{2})	Stud Thickness (Inch)	Stud Gauge (Ga. No.)	Membrane Substrate 3/8″ Ribbed Sheet Lath 3.4 Lbs/SQ. YD., Per ASTM C-847	Main Runner Spacing (Inch)	Cross Tee Spacing (Inch)	Hanger Wire Spacing (Feet)	Cross Tee Length (Feet)	Compression Post Spacing (Feet)	Compression Post Load (Lbs.)
0 → 6′	15	0.576	2 1/2″ STH	22	3/8″ 3.4 Lb Lathing & 3/4″-1″ Stucco	36″	16″	4′ O.C.	3′	4′	6.9
	30	2.304	2 1/2″ STH	22	3/8″ 3.4 Lb Lathing & 3/4″-1″ Stucco	36″	16″	4′ O.C.	3′	4′	28
	45	5.18	2 1/2″ STH	22	3/8″ 3.4 Lb Lathing & 3/4″-1″ Stucco	36″	16″	4′ O.C.	3′	4′	63
	60	9.22	2 1/2″ STH	22	3/8″ 3.4 Lb Lathing & 3/4″-1″ Stucco	36″	16″	4′ O.C.	3′	4′	111
	90	20.7	2 1/2″ STH	22	3/8″ 3.4 Lb Lathing & 3/4″-1″ Stucco	36″	16″	3′ O.C.	3′	3′	187
	120	36.8	2 1/2″ STH	22	3/8″ 3.4 Lb Lathing & 3/4″-1″ Stucco	36″	16″	2.5′ O.C.	3′	2.5′	276
	140	50.09	2 1/2″ STH	22	3/8″ 3.4 Lb Lathing & 3/4″-1″ Stucco	36″	16″	2.′ O.C.	3′	2.′	301
	172	75	2 1/2″ STH	22	3/8″ 3.4 Lb Lathing & 3/4″-1″ Stucco	36″	16″	2′ O.C.	3′	2′	300
6′ 1″ → 10′ 3″	15	0.576	2 1/2″ CSJ	18	3/8″ 3.4 Lb Lathing & 3/4″-1″ Stucco	36″	16″	4′ O.C.	3′	4′	6.9
	30	2.304	2 1/2″ CSJ	18	3/8″ 3.4 Lb Lathing & 3/4″-1″ Stucco	36″	16″	4′ O.C.	3′	4′	28
	45	5.18	2 1/2″ CSJ	18	3/8″ 3.4 Lb Lathing & 3/4″-1″ Stucco	36″	16″	4′ O.C.	3′	4′	63
	60	9.22	2 1/2″ CSJ	18	3/8″ 3.4 Lb Lathing & 3/4″-1″ Stucco	36″	16″	4′ O.C.	3′	4′	111
	90	20.7	2 1/2″ CSJ	18	3/8″ 3.4 Lb Lathing & 3/4″-1″ Stucco	36″	16″	3′ O.C.	3′	3′	187
	120	36.8	2 1/2″ CSJ	18	3/8″ 3.4 Lb Lathing & 3/4″-1″ Stucco	36″	16″	2.5′ O.C.	3′	2.5′	276
	140	50.09	2 1/2″ CSJ	18	3/8″ 3.4 Lb Lathing & 3/4″-1″ Stucco	36″	16″	2.′ O.C.	3′	2.′	301
	172	75	2 1/2″ CSJ	18	3/8″ 3.4 Lb Lathing & 3/4″-1″ Stucco	36″	16″	2′ O.C.	3′	2′	300
10′ 4″ → 15′ 0″	*15	0.576	3 5/8″ CSW	18	3/8″ 3.4 Lb Lathing & 3/4″-1″ Stucco	36″	16″	4′ O.C.	3′	4′	6.9
	*30	2.304	3 5/8″ CSW	18	3/8″ 3.4 Lb Lathing & 3/4″-1″ Stucco	36″	16″	4′ O.C.	3′	4′	28
	*45	5.18	3 5/8″ CSW	18	3/8″ 3.4 Lb Lathing & 3/4″-1″ Stucco	36″	16″	4′ O.C.	3′	4′	63
	*60	9.22	3 5/8″ CSW	18	3/8″ 3.4 Lb Lathing & 3/4″-1″ Stucco	36″	16″	4′ O.C.	3′	4′	111
	*90	20.7	3 5/8″ CSW	18	3/8″ 3.4 Lb Lathing & 3/4″-1″ Stucco	36″	16″	3′ O.C.	3′	3′	187
	*120	36.8	3 5/8″ CSW	18	3/8″ 3.4 Lb Lathing & 3/4″-1″ Stucco	36″	16″	2.5′ O.C.	3′	2.5′	276
	*140	50.09	3 5/8″ CSW	18	3/8″ 3.4 Lb Lathing & 3/4″-1″ Stucco	36″	16″	2.′ O.C.	3′	2.′	301
	*172	75	3 5/8″ CSW	18	3/8″ 3.4 Lb Lathing & 3/4″-1″ Stucco	36″	16″	2′ O.C.	3′	2′	300
15′ 1″ → 20′ 0″	**15	0.576	3 1/2″ CSJ	16	3/8″ 3.4 Lb Lathing & 3/4″-1″ Stucco	36″	16″	4′ O.C.	3′	4′	6.9
	**30	2.304	3 1/2″ CSJ	16	3/8″ 3.4 Lb Lathing & 3/4″-1″ Stucco	36″	16″	4′ O.C.	3′	4′	28
	**45	5.18	3 1/2″ CSJ	16	3/8″ 3.4 Lb Lathing & 3/4″-1″ Stucco	36″	16″	4′ O.C.	3′	4′	63
	**60	9.22	3 1/2″ CSJ	16	3/8″ 3.4 Lb Lathing & 3/4″-1″ Stucco	36″	16″	4′ O.C.	3′	4′	111
	**90	20.7	3 1/2″ CSJ	16	3/8″ 3.4 Lb Lathing & 3/4″-1″ Stucco	36″	16″	3′ O.C.	3′	3′	187
	**120	36.8	3 1/2″ CSJ	16	3/8″ 3.4 Lb Lathing & 3/4″-1″ Stucco	36″	16″	2.5′ O.C.	3′	2.5′	276
	**140	50.09	3 1/2″ CSJ	16	3/8″ 3.4 Lb Lathing & 3/4″-1″ Stucco	36″	16″	2.′ O.C.	3′	2.′	301
	**172	75	3 1/2″ CSJ	16	3/8″ 3.4 Lb Lathing & 3/4″-1″ Stucco	36″	16″	2′ O.C.	3′	2′	300

Ceiling System = HD8906G90 Main Beam 12 ft. / XL8945PG90 Cross Tee 4 ft. / XL7936G90 Cross Tee 3 ft. / XL8926G90 Cross Tee 2 ft. / # 9 Ga. H.D.G. Hanger Wire

* Note 1-1/2″ 16ga. U-Channel Bridging required at Mid Span for 10′ 4″ up to 15′ 0″

** Note 1-1/2″ 16ga. U-Channel Bridging required at 1/3rd Points for 15′ 1″ up to 20′ 0″

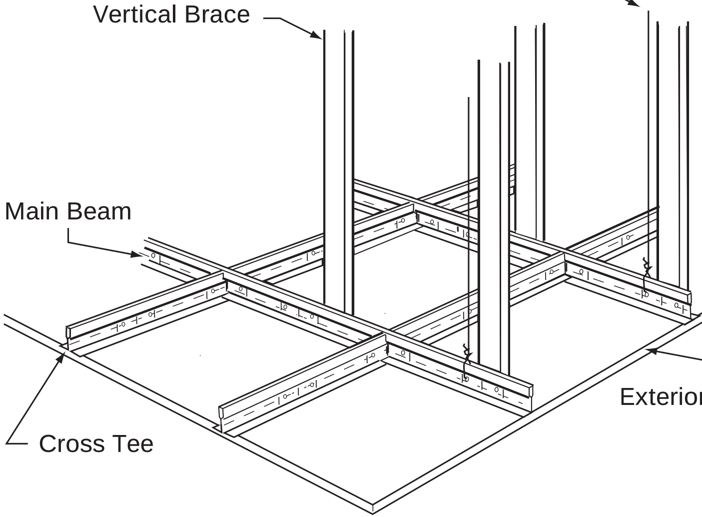
Compression Post and Ceiling system Tested at the Plenum design depth shown here for Positive and Negative Wind Speed Pressure Loads as listed.

Compression Post Assemblies at this Plenum design depth Calculated by Dietrich Design Group

For Heights over 33 feet above ground level, use (Table 16-G) in 1997 Uniform Building Code Exposure and Gust Factor Coefficient

Stud Products & Properties Based on Dietrich Industries Inc.

EIFS Framing



- Wire spacing as required to carry imposed load
- Vertical bracing as required to prevent wind uplift

* Use the charts on page 2-120 for installation specifics (main beam spacing, cross tee spacing, wire and compression stud spacing)

Main Beam	Cross Tee	O.C. Spacing
1-1/2″ HD8906**G90**		24″/48″
	1-1/2″ XL8926**G90**	16″/24″
	1-1/2″ XL8945P	16″/24″

EIFS System Exterior Wind Load Ceiling Design For North America

Plenum Height (Ft - In)	Up Lift Load (MPH)	Up Lift Load (Lbs./Ft.^{2})	Stud Thickness (Inch)	Stud Gauge (Ga. No.)	Sheathing 5/8″ Drywall Sheet Densglass Gold G-P	Main Runner Spacing (Inch)	Cross Tee Spacing (Inch)	Hanger Wire Spacing (Feet)	Cross Tee Length (Feet)	Compression Post Spacing (Feet)	Compression Post Load (Lbs.)
	15	0.576	2 1/2″ STH	22	5/8″ G.P. Densglass & 1/4″-3/8″ EIFS	48″	16″	4′ O.C.	4′	4′	9.3
0	30	2.304	2 1/2″ STH	22	5/8″ G.P. Densglass & 1/4″-3/8″ EIFS	48″	16″	4′ O.C.	4′	4′	37
↓	45	5.18	2 1/2″ STH	22	5/8″ G.P. Densglass & 1/4″-3/8″ EIFS	48″	16″	4′ O.C.	4′	4′	83
	60	9.22	2 1/2″ STH	22	5/8″ G.P. Densglass & 1/4″-3/8″ EIFS	36″	16″	3′ O.C.	3′	3′	83
	90	20.7	2 1/2″ STH	22	5/8″ G.P. Densglass & 1/4″-3/8″ EIFS	36″	16″	3′ O.C.	3′	3′	187
	120	36.8	2 1/2″ STH	22	5/8″ G.P. Densglass & 1/4″-3/8″ EIFS	36″	16″	2.5′ O.C.	3′	2.5′	276
6′	140	50.09	2 1/2″ STH	22	5/8″ G.P. Densglass & 1/4″-3/8″ EIFS	24″	16″	2.5′ O.C.	2′	2.5′	251
	172	75	2 1/2″ STH	22	5/8″ G.P. Densglass & 1/4″-3/8″ EIFS	24″	16″	2′ O.C.	2′	2′	300
	15	0.576	2 1/2″ CSJ	18	5/8″ G.P. Densglass & 1/4″-3/8″ EIFS	48″	16″	4′ O.C.	4′	4′	9.3
6′ 1″	30	2.304	2 1/2″ CSJ	18	5/8″ G.P. Densglass & 1/4″-3/8″ EIFS	48″	16″	4′ O.C.	4′	4′	37
↓	45	5.18	2 1/2″ CSJ	18	5/8″ G.P. Densglass & 1/4″-3/8″ EIFS	48″	16″	4′ O.C.	4′	4′	83
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	120	36.8	2 1/2″ CSJ	18	5/8″ G.P. Densglass & 1/4″-3/8″ EIFS	36″	16″	2.5′ O.C.	3′	2.5′	276
10′ 3″	140	50.09	2 1/2″ CSJ	18	5/8″ G.P. Densglass & 1/4″-3/8″ EIFS	24″	16″	2.5′ O.C.	2′	2.5′	251
	172	75	2 1/2″ CSJ	18	5/8″ G.P. Densglass & 1/4″-3/8″ EIFS	24″	16″	2′ O.C.	2′	2′	300
	*15	0.576	3 5/8″ CSW	18	5/8″ G.P. Densglass & 1/4″-3/8″ EIFS	48″	16″	4′ O.C.	4′	4′	9.3
10′ 4″	*30	2.304	3 5/8″ CSW	18	5/8″ G.P. Densglass & 1/4″-3/8″ EIFS	48″	16″	4′ O.C.	4′	4′	37
↓	*45	5.18	3 5/8″ CSW	18	5/8″ G.P. Densglass & 1/4″-3/8″ EIFS	48″	16″	4′ O.C.	4′	4′	83
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	*90	20.7	3 5/8″ CSW	18	5/8″ G.P. Densglass & 1/4″-3/8″ EIFS	36″	16″	3′ O.C.	3′	3′	187
	*120	36.8	3 5/8″ CSW	18	5/8″ G.P. Densglass & 1/4″-3/8″ EIFS	36″	16″	2.5′ O.C.	3′	2.5′	276
15′ 0″	*140	50.09	3 5/8″ CSW	18	5/8″ G.P. Densglass & 1/4″-3/8″ EIFS	24″	16″	2.5′ O.C.	2′	2.5′	251
	*172	75	3 5/8″ CSW	18	5/8″ G.P. Densglass & 1/4″-3/8″ EIFS	24″	16″	2′ O.C.	2′	2′	300
	**15	0.576	3 1/2″ CSJ	16	5/8″G.P. Densglass & 1/4″-3/8″ EIFS	48″	16″	4′ O.C.	4′	4′	9.3
15′ 1″	**30	2.304	3 1/2″ CSJ	16	5/8″G.P. Densglass & 1/4″-3/8″ EIFS	48″	16″	4′ O.C.	4′	4′	37
↓	**45	5.18	3 1/2″ CSJ	16	5/8″G.P. Densglass & 1/4″-3/8″ EIFS	48″	16″	4′ O.C.	4′	4′	83
	**60	9.22	3 1/2″ CSJ	16	5/8″G.P. Densglass & 1/4″-3/8″ EIFS	36″	16″	3′ O.C.	3′	3′	83
	**90	20.7	3 1/2″ CSJ	16	5/8″G.P. Densglass & 1/4″-3/8″ EIFS	36″	16″	3′ O.C.	3′	3′	187
	**120	36.8	3 1/2″ CSJ	16	5/8″G.P. Densglass & 1/4″-3/8″ EIFS	36″	16″	2.5′ O.C.	3′	2.5′	276
20′ 0″	**140	50.09	3 1/2″ CSJ	16	5/8″G.P. Densglass & 1/4″-3/8″ EIFS	24″	16″	2.5′ O.C.	2′	2.5′	251
	**172	75	3 1/2″ CSJ	16	5/8″G.P. Densglass & 1/4″-3/8″ EIFS	24″	16″	2′ O.C.	2′	2′	300

Ceiling System = HD8906G90 Main Beam 12 ft. / XL8945PG90 Cross Tee 4 ft. / XL7936G90 Cross Tee 3 ft. / XL8926G90 Cross Tee 2 ft. / #12 Ga. H.D.G. Hanger Wire

* Note 1-1/2″ 16ga. U-Channel Bridging required at Mid Span for 10′ 4″ up to 15′ 0″

** Note 1-1/2″ 16ga. U-Channel Bridging required at 1/3rd Points for 15′ 1″ up to 20′ 0″

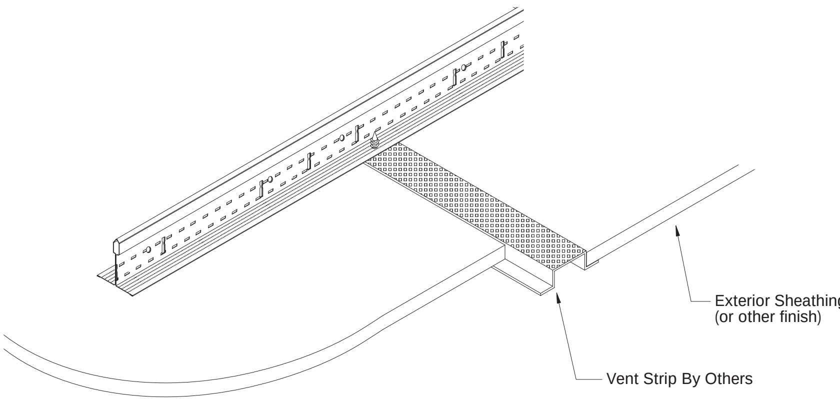
Compression Post and Ceiling system Tested at the Plenum design depth shown here for Positive and Negative Wind Speed Pressure Loads as listed.

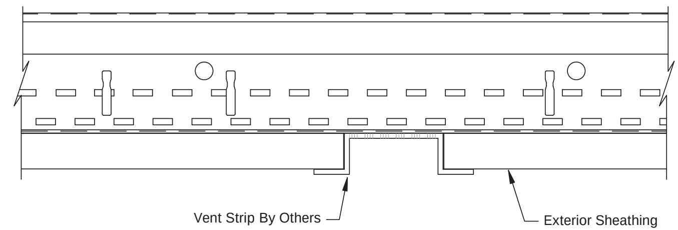
Compression Post Assemblies at this Plenum design depth Calculated by Dietrich Design Group

For Heights over 33 feet above ground level, use (Table 16-G) in 1997 Uniform Building Code Exposure and Gust Factor Coefficient

Stud Products & Properties Based on Dietrich Industries Inc.

Soffit Ventilation Application

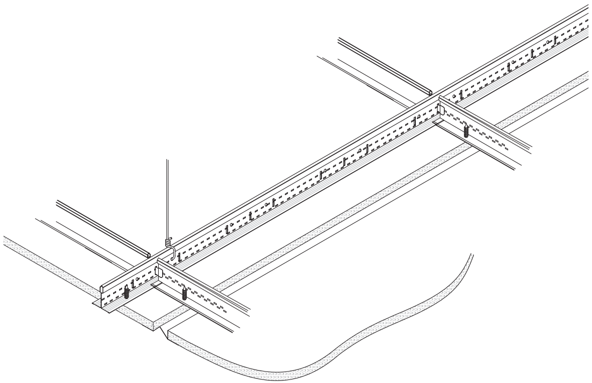


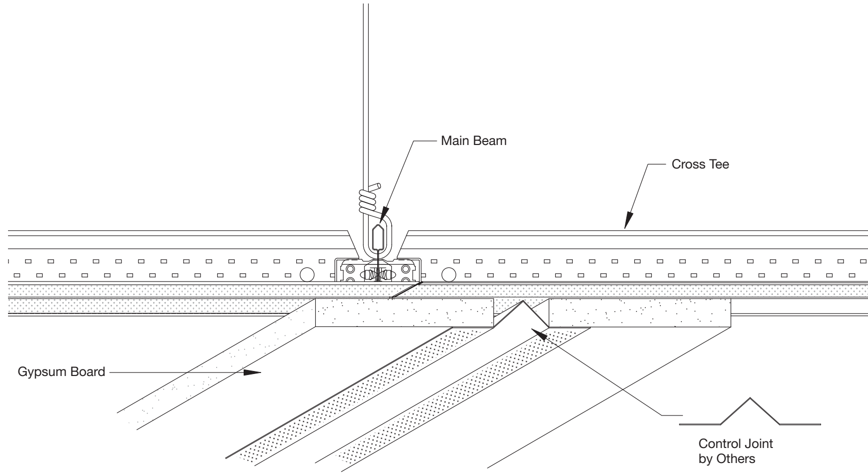


NOTE: Ventilation must be provided for exterior soffits.

Control Joint Application

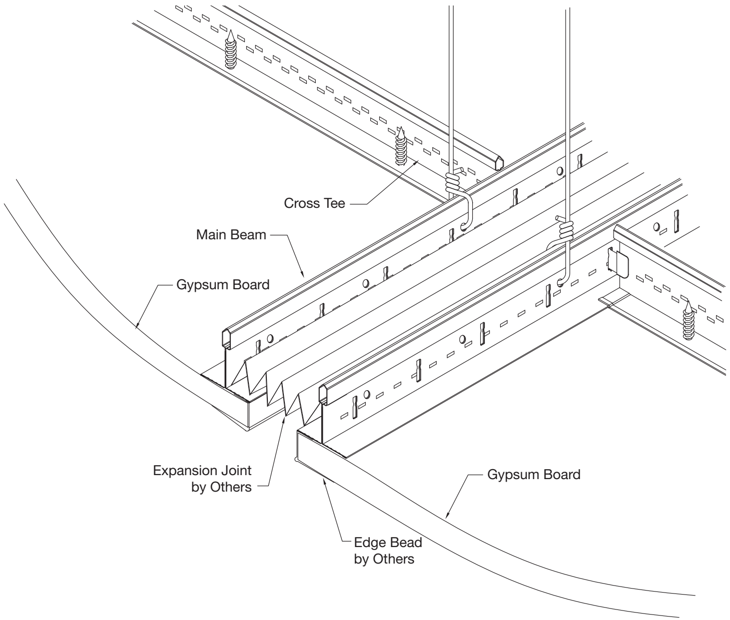
- Dimension and spacing of control joint as required based on finish material or building construction.

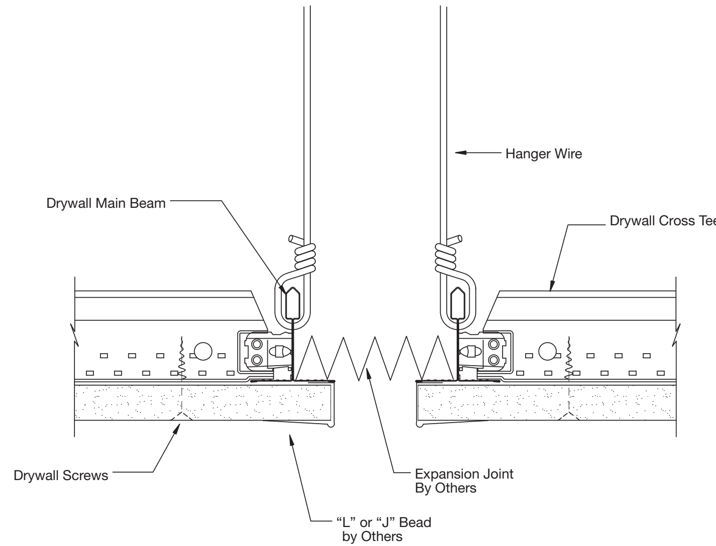




Expansion Joint Application

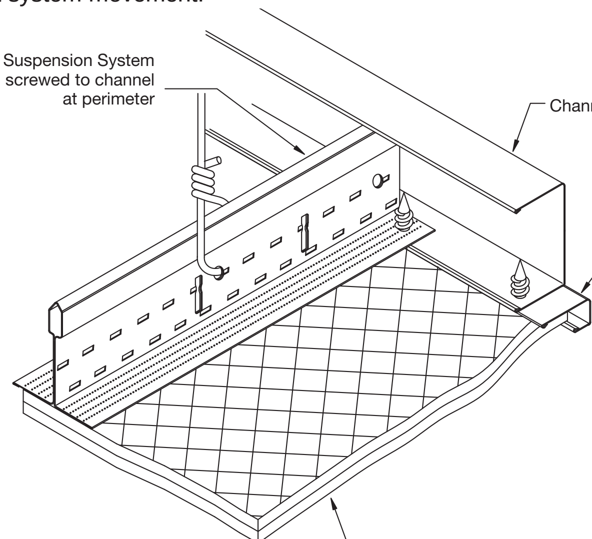
• Dimension and spacing of expansion joint as required based on finish material or building construction.

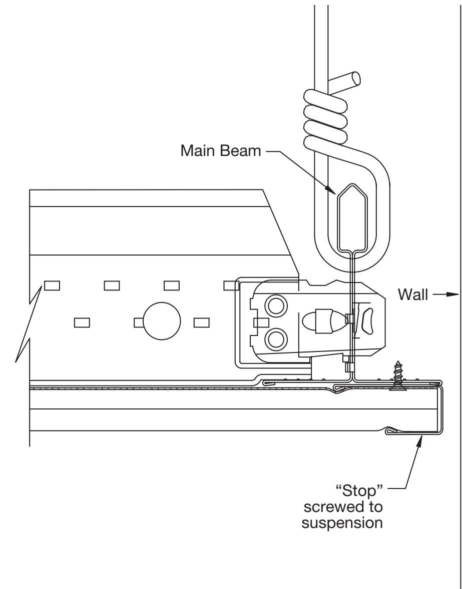




Perimeter Isolation Application

- Brace as required to prevent system movement.





NOTE: This can be for Stucco, EIFS or Direct Applied

Must hold ceiling away from wall

Item number	Length	Pcs/Ctn.	LF/Ctn.	Lbs./Ctn.	Area of ceiling at on center spacing							
DRYWALL/STUCCO GRID MAIN BEAM						**16″**	**24″**	**36″**	**48″**	**50″**	**72″**	
HD8901	144″	20	240	71			480	720	960	1000	1440	sq.ft.
HD8906/HD8906**G90**	144″	12	144	53			288	432	576	600	864	sq.ft.
HD8906**F08**/HD8906**F16**	144″	12	144	53	varies with radius							sq.ft.
SP135	135″	12	135	50			270	405				
SB12	144″	12	144	46	varies with room dimension							sq.ft.
QSLPM12	144″	12	144	44					576	600	864	sq.ft.
QS610	120″	12	120	37	varies with room dimension							sq.ft.
QS810	120″	12	120	37	varies with room dimension							sq.ft.
SHORTSPAN												
SS7708	96″	12	96	29	varies with room dimension							sq.ft.
SS7710	120″	12	120	37	varies with room dimension							sq.ft.
SS7712	144″	12	144	44	varies with room dimension							sq.ft.
SS7714	168″	12	168	51	varies with room dimension							sq.ft.
DRYWALL/STUCCO GRID 1-1/2″ FACE CROSS TEES					**8″**	**16″**	**24″**					
XL8965	72″	36	216	67	144	288	432					sq.ft.
XL8947P/XL8947P**G90****	50″	36	150	56	100	200	300					sq.ft.
XL8945P/XL8945P**G90**	48″	36	144	52	96	192	288					sq.ft.
XL7936**G90**	36″	36	108	39	72	144	216					sq.ft.
XL8925/XL8925**G90****	26″	36	78	28								sq.ft.
XL8926/XL8926**G90**	24″	36	72	26	48							sq.ft.
XL7918**	14″	36	42	14								sq.ft.
DRYWALL/STUCCO GRID 15/16″ FACE CROSS TEES						**16″**	**24″**					
XL7341/XL8341	48″	60	240	71		320	480					sq.ft.

** Dimensions are nominal.

For clips and accessories, see pages 2-19 through 2-23.

Item number	Length	Pcs/Ctn.	LF/Ctn.	Lbs./Ctn.
REVERSE MOLDINGS				
7857	120″	30	360	51
7858	120″	20	240	67
DRYWALL UNHEMMED CHANNEL MOLDING				
7838	120″	20	200	36
DRYWALL ANGLE MOLDING				
KAM-12	144″	20	240	39
KAM-10	120″	20	200	33
LAM-12	144″	20	240	39
PRLAM-12	144″	20	240	33

Estimating Lineal Feet of Grid Based on Square Footage of Ceiling

On Center Spacing of Component	Percent of Square Footage
8″	108%
12″	100%
16″	76%
20″	60%
24″	50%
30″	40%
36″	33%
48″	25%
60″	20%

Example calculation based on 5,100 SF ceiling:

Main beam at 48″ O.C.

5,100 SF x .25 = 1,275 LF

1,275 LF ÷ 144 LF/Ctn = 9 cartons needed

Cross tee at 16″ O.C.

5,100 SF x .76 = 3,876 LF

3,876 LF ÷ 144 LF/Ctn = 27 cartons needed

Installation Cost Comparison

The following chart compares installed costs of an Armstrong Framing System versus traditional cold rolled channel installation. To obtain an electronic copy of the cost comparison, or visit the web at armstrong.com/contractorsonly

Drywall Installed Cost Comparison

Edit the outlined entries as required

Area (SF)
Plenum Depth (in.)
Cross Furring Spacing (in.)

Carrying Channel (16 gauge Black Iron) & Metal Furring (Hat Channel)	Armstrong Drywall Framing System
Black Iron LF @ /LF =	Main Tee LF @ /LF =
Hat Channel LF @ /LF =	Cross Tee LF @ /LF =
9 Gauge Wire LF @ /LF =	12 Gauge Wire LF @ /LF =
18 Gauge Wire LF @ /LF =	
TOTAL MATERIAL COST =	TOTAL MATERIAL COST =
Labor sf / day @	Labor sf / day @
Total Days	Total Days
Total Labor Cost =	Total Labor Cost =
Total Job Cost* =	Total Job Cost* =
COST PER SQUARE FOOT =	COST PER SQUARE FOOT =

SAVINGS OF $ = % USING ARMSTRONG DRYWALL GRID SYSTEM

*Does not include wall angle.

ShortSpanCalculator.xls

Armstrong ShortSpan Tee Calculator

Area of Ceiling (SF) 1000

Item Number	Item Length	O.C. Spacing	4' Span Pcs of Tee	5' Span Pcs of Tee	6' Span Pcs of Tee	7' Span Pcs of Tee	8' Span Pcs of Tee	10' Span Pcs of Tee	12' Span Pcs of Tee	14' Span Pcs of Tee
S7708	8'	16"	188				94			
S7708	8'	24"	125				63			
S7710	10'	16"		150				75		
S7710	10'	24"		100				50		
S7712	12'	16"			125				63	
S7712	12'	24"			83				42	
S7714	14'	16"				107				54
S7714	14'	24"				71				36

APPROX. RATIO TABLE - ShortSpan Tees to Locking Angle Molding (LAM12)		
Small Size Rooms	(Spans of 4'-6')	**4:1**
Medium Size Rooms	(Spans of 7'-9')	**6:1**
Large Size Rooms	(Spans of 10'-14')	**8:1**

Ex. In small size rooms with spans of 4-6 feet you will use 4 bundles of ShortSpan Tees to 1 bundle of LAM12

Sheet1 Sheet2 Sheet3

Ready Sum=0 SCRL CAPS NUM

Go to armstrong.com/drywallgrid for a copy of the ShortSpan Material Estimate Calculator.

Armstrong®

CEILING & WALL SYSTEMS

[Between us, ideas become reality.]®

Canopies & Exposed Structure Areas

Commercial Ceilings and Walls Solutions Guide

Armstrong®

SOUNDSCAPES® Acoustical Canopies

Product Description
SoundScapes are pre-formed acoustical canopies available in either Hill or Valley configurations and suspended with cables.

The panels consist of pre-formed and pre-curved layers of mineral fiber with DuraBrite acoustically transparent membrane on all exposed surfaces. (U.S. patents pending)

NOTE:
These pages are in addition to the step-by-step instructions provided in the in-carton instructions, which are also available online.

Fire Performance
SoundScapes Canopies, as with other architectural features located at the ceiling, may obstruct or skew the planned fire sprinkler water distribution pattern, or possibly delay or accelerate the activation of the sprinkler or fire detection systems by channeling heat from a fire either toward or away from the device. Designers and installers are advised to consult a fire protection engineer, NFPA 13, and local codes for guidance where automatic fire detection and suppression systems are present.

Seismic Restraint*
The International Building Code allows architectural components to swing freely as long as they will not be damaged or cause damage. Canopies suspended will swing no more than 18″ in any direction for each panel. Restraint of canopies is not recommended.*

**Pendulum reaction information is based on full scale testing and computer modeling conducted at the Structural Engineering Earthquake Simulation Lab located at the State University of New York at Buffalo.*

Contact Techline at (877) 276-7876, option 1, then 2, then 3 for specific US and Canadian fire performance data.

General

After opening the product carton, and before installation, be sure to locate, remove, and set aside the hardware kit before proceeding.

SoundScapes canopies require two people to handle each panel safely, minimize damage and provide panel support during installation. DO NOT REMOVE THE CANOPIES FROM THE CARTON until steps noted on page 3-6 of the installation process. Since the canopies are pre-assembled, locate the suspension hardware and make all the connections while the product is still in the carton. Do not remove the plastic film or canopy edge protectors until the panel is installed.

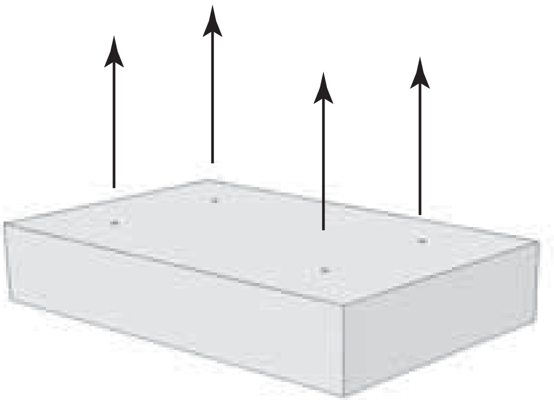
SoundScapes panels cannot be cut, drilled or altered in any way. The canopy must not be used to support any other material. The cable suspension system must be fastened to the structure and cannot be hung from any commercial ceiling system. SoundScapes panels are not approved for exterior application.

Suspension Cables

Canopies must be installed with four suspension cables.

Cable attachment to structure

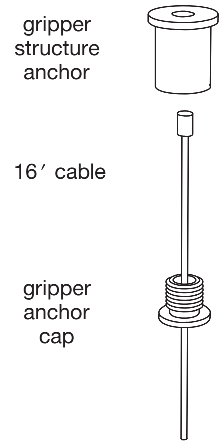
1. Use the suspension cable targets on the top of the package to locate cable anchor points at the structure. Additional structural support may be required if cable anchor points are obstructed by HVAC, piping or other components in the plenum.



2. Attach the gripper structure anchor to the structure with a fastener that will carry the full weight of the 50 lb canopy. The top of the gripper anchor has a 1/4″-20 threaded hole for use with a 1/4″-20 bolt, or you can use a standard wood or sheet metal screw through this hole for proper attachment to structure.

3. Insert the end of the cable into the gripper anchor cap.

4. Screw the gripper anchor cap completely into the gripper structure anchor.



Cable Attachment to Canopy

All cable attachments should be made while the product is in the carton.

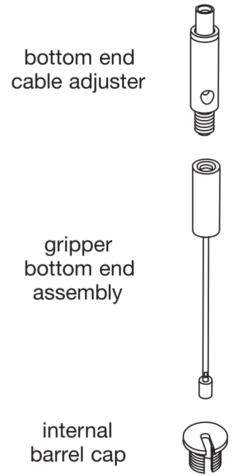
1. Remove cardboard packaging from top of canopy.

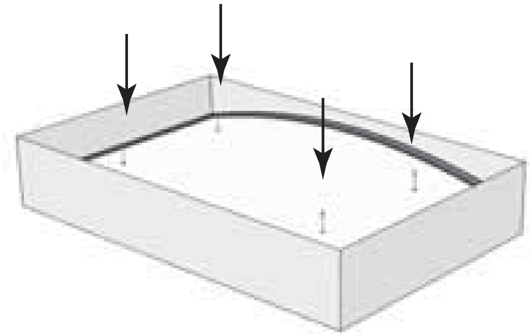
2. Pull back the plastic film to expose the four anchor points. This will ease final removal after the panel is installed.

3. Insert the end of the cable into the internal barrel cap and completely screw this into the embedded canopy plate.

4. Screw the bottom end cable adjuster into the gripper bottom end assembly.

5. Repeat until all four bottom end assemblies are attached to the canopy.





Install the Canopy

Insert Suspension Cables

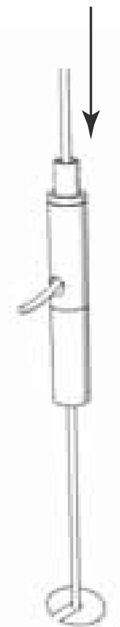
1. Move the carton to the approximate location of the installation.

2. Keep the boxed canopy on a flat surface to support the carton.

3. Insert a suspension cable into the top of the cable adjuster at all four corners (see right).

4. Gently pull the cable through the cable adjuster until all the slack is removed.

5. Do not remove the canopy corner protectors.



Suspend the Canopy

Canopies must be installed so the lowest point is a minimum of 7′ 6″ above the finished floor.

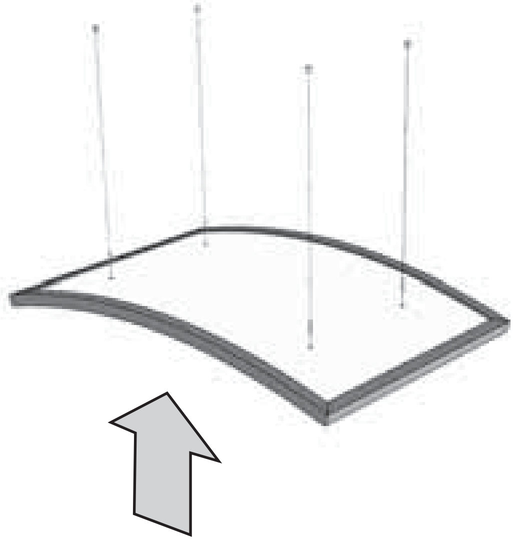
1. Suspending the canopy requires two people.

2. Make sure your hands are clean or wear white cotton gloves.

3. Raise the panel and gently pull the cable(s) to take up the slack.

4. Trim excess cable.

5. Remove edge protectors and plastic film when all work in space is complete.



Cleaning
Use a clean, dry, soft white cloth to wipe off any dirt or fingerprints. Regular light dusting of the back side of the canopy is recommended.

SOUNDSCAPES® Shapes Acoustical Clouds

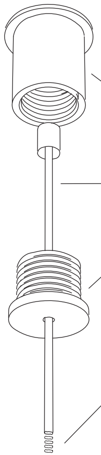
SoundScapes Shapes Acoustical Clouds are flat fiberglass panels designed to be installed in one of three suspension systems. There are 10 panel options that come in a variety of shapes and three nominal sizes: 4′ x 4′, 4′ x 6′ and 4′ x 8′.

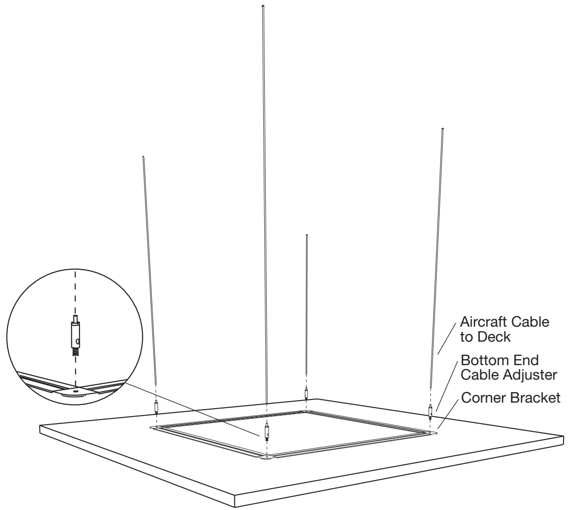
SoundScapes Shapes are designed to be suspended with Armstrong accessory kits and are engineered for use in seismic areas only when indicated components are used and installed in accordance with installation instructions LA-297302 (Patent Pending).

NOTE:
These pages are in addition to the step-by-step instructions provided in the in-carton instructions, which are also available online.

Installation – Suspended Individually

NOTE:
There are three types of suspension system options for use with SoundScapes Shapes Acoustical Clouds. Panels can be suspended individually from the deck with aircraft cable, individually direct attached to drywall with clips or suspended as a group from the deck with a combination of frames, hooks and cables.

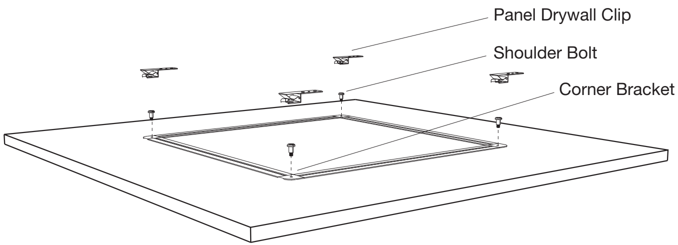


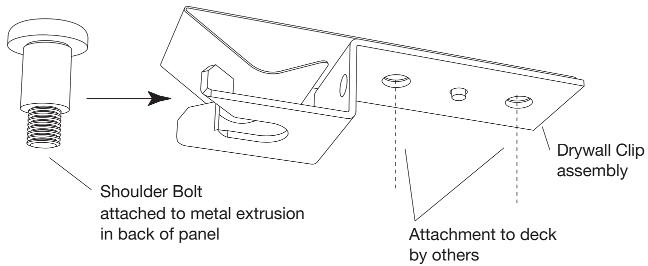


NOTE:
An 8′ Aircraft Cable length is included in the standard Deck Hanging Kit. If additional cable length is needed for high ceiling applications, order the additional accessory kit for (4) 30′ Extended Hanging Cables (Item 625530).

Installation – Direct to Drywall Ceilings

NOTE:
With drywall attachment, the panels can be installed singly or grouped in any arrangement that allows at least 2″ of space between panels. The panel drywall clip drops the face of the panel approximately 1″ from the face of the drywall.



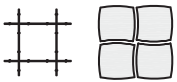


NOTE:
Aligning the bolts to the clips can be somewhat difficult because you cannot see the exact locations once the panel is raised. Be sure to handle the panel and edges carefully during the process. It is helpful to have a second person who can see where the bolts are to help guide the panel placement on the clips.

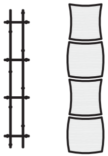
Installation – Suspending Groups

NOTE:
When you suspend panels in a group configuration, it is more efficient to use grouping frames and suspension hooks for support. This also provides a group ceiling system designed for use in all seismic areas.

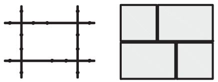
Shown in the installation instructions are a number of group configuration options with the frame arrangement needed to support them. These arrangements all have the minimum 2″ clearance between panels.



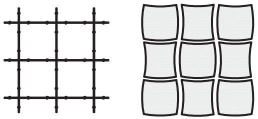
Group Option 1



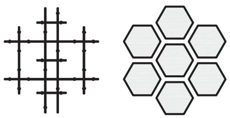
Group Option 2



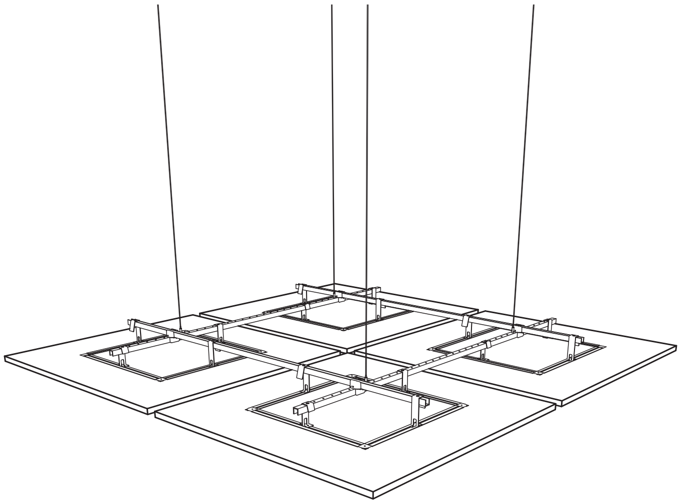
Group Option 3



Group Option 4



Group Option 5



INFUSIONS® Accent Canopies

Infusions Accent Canopies feature a wide selection of finishes. Infusions are available in three sizes; 2′ x 5′, 2′ x 6′ and 4′ x 10′. Canopies can be formed to create hills or valleys with different arcs for 2′ wide and 4′ wide panels. Infusions can be suspended individually or they may be linked together. They may be suspended from the building structure or one end may be attached to a wall. (U.S. patents pending, including US Publication No. 2004/0182022)

NOTE:
These pages are in addition to the step-by-step instructions provided in the in-carton instructions and the drawings and typical applications available in the technical guide. Both resources are also available online.

Design Limitations

Infusions panels should always be installed in accordance with all applicable building codes and regulations.

Do not cut holes in or drill through Infusions panels. Doing so may cause the panel to bend in an irregular fashion.

The lowest point of a suspended Infusions panel should be at least 7′-6″ above the finished floor surface.

Infusions panels are not approved for exterior application.

Plastic panels can be damaged by exposure to high temperatures. Panel temperature should not be permitted to exceed 100° F after the tensioning cables have been installed. Follow these guidelines for minimum distance from standard light sources:

Lamp Type	Label Wattage	Minimum distance
Halogen FL XL PAR 30	60	14″
Incandescent Bulb	120	15″
Quartz Halogen Work Light	500	23″

Panels are susceptible to “wicking.” If the panel is placed in a damp or wet area, water may “wick” up through the panel.

Canopies must be suspended with the extrusions level and the tension cables no more than 30° off horizontal.

Fire Performance

Infusions Canopies, as with other architectural features located at the ceiling, may obstruct or skew the planned fire sprinkler water distribution pattern, or possibly delay or accelerate the activation of the sprinkler or fire detection systems by channeling heat from a fire either toward or away from the device. Designers and installers are advised to consult a fire protection engineer, NFPA 13, and local codes for guidance where automatic fire detection and suppression systems are present.

Infusions Canopies have been tested according to NFPA 286 and are equivalent to Class A Interior Finish as defined in Chapter 8 of the International Building Code. For proper fire performance, do not install Polycarbonate panels so that any portion of the panel is suspended directly above any portion of an aluminum panel.

Aluminum panels are noncombustible.

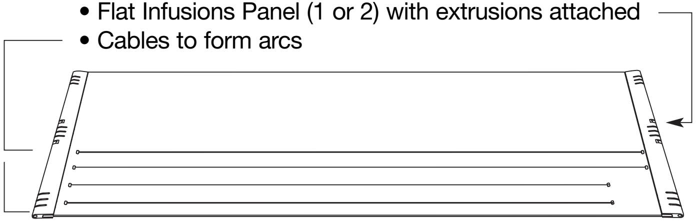
Contact TechLine at (877) 276-7876 for specific US and Canadian fire performance data.

Panel Kit Contents

Infusions Canopy Panel Kit

Kit Contents:

- Flat Infusions Panel (1 or 2) with extrusions attached
- Cables to form arcs

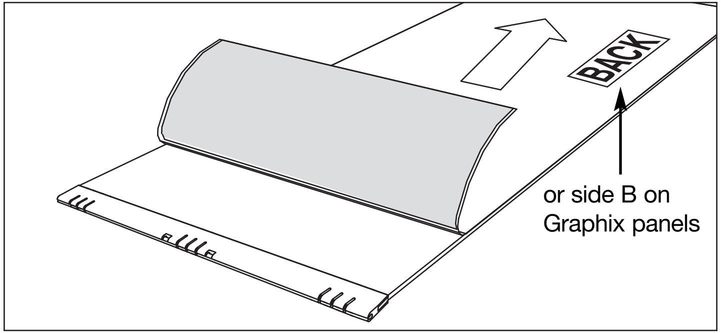


Arc	Tension Cable Length	
	2′ x 5′	**2′ x 6′**
60°	58″	69-3/4″
90°	55″	65-3/4″
Arc	**4′ x 10′**	
30°	120″	
50°	117-3/10″	

NOTE: Panel extrusions for nominal 4′ x 10′ panels are 48-1/2″ long. Suspension points for those panels are 44-1/2″ apart.

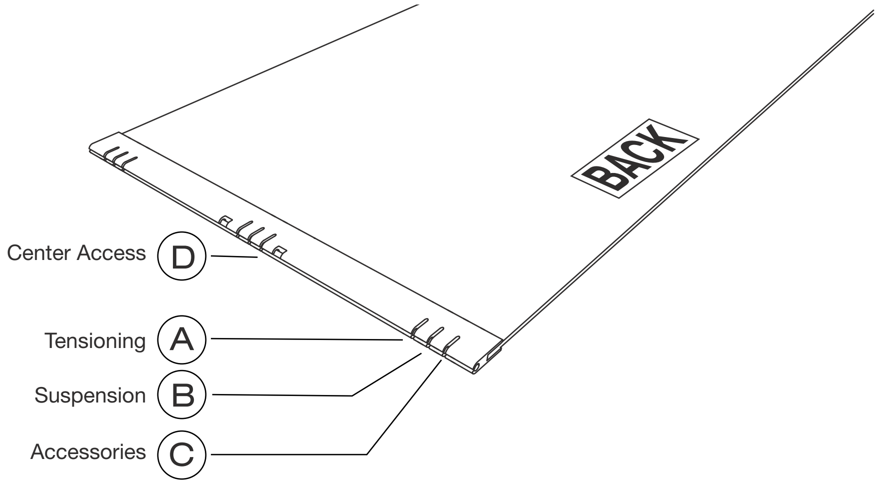
Panel Preparation

Peel back and remove protective film covering the back of the panel.



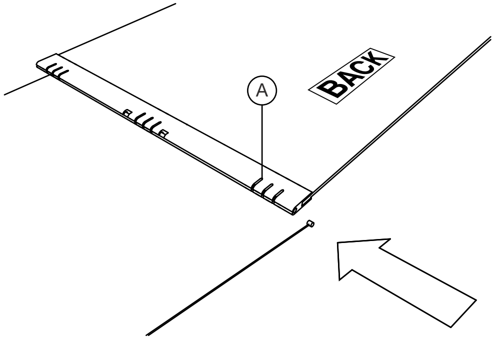
NOTE:
Infusions Graphix panels have a different covering protecting the face and back. This covering is not a film, but a plastic sleeve enclosing the panel. Remove the panel from the sleeve very carefully. The sleeve can be removed at the ends or sides by carefully cutting with scissors or tearing.

Attachment Positions on Extrusions

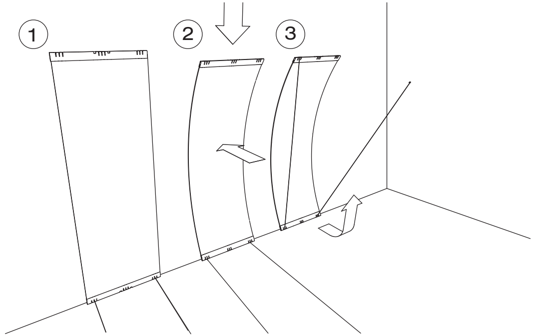


Creating Arcs

Insert ends of cables into extrusions at ends of the panel, sliding it into the slot “A” of the three end slots.



IMPORTANT: When large and small Canopies are to be linked together end-to-end, some parts of the hinge assembly must be inserted into the large panel extrusions before tension cables are installed. Please refer to the installation instructions for information on proper placement of these parts.



CAUTION: Be careful when tensioning panels. Use a wall to support the bottom of the panel when tensioning.

1. Place one end of the panel on the floor, on a protected surface, and butt against a wall or building column.
2. Flex the panel by pulling straight down toward the floor and insert ends of cables into tension position A.

Avoid extending body parts over the flexed panel until both tensioning cables are installed. Two people are required for this operation with larger panels.

CAUTION: Only use cables from Panel Kits for tensioning panels. (Cables from Kit 7004, 7005 and 7010, shown on page 3-20 are only for hanging panels).

Graphix Panel Visual Considerations

The Infusions Graphix printed panels have different “Side A” and “Side B” visuals based on different colors and extrusion differences on each side.

PLEASE NOTE: The extrusions on Sides A and B are not symmetrical. Side B has small but visible screw holes for factory-installed extrusion attachment as well as two small center notches.

Installers should be aware of which visual is desired to face upward and downward and install the product accordingly.

Installers should **never** remove or change the attached end extrusions in order to change this installed view. This would void product warranty and could create safety concerns.

Panel Suspension

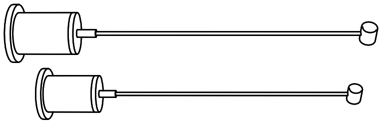
The International Building Code requires the attachment of free floating architectural components to be sized for three times the design load. Use the assembled canopy weights provided in this table to select mounting hardware that will meet this requirement:

Material	**2′ x 5′**	**2′ x 6′**	**4′ x 10′**
Polycarbonate (Solid plastic)	21.0 lb	25.0 lb	26.0 lb
Polycarbonate (Channeled plastic)	6.0 lb	7.0 lb	N/A
Aluminum	21.0 lb	25.0 lb	N/A

Standard 8′ Hanging Kit – BP7004

Kit Contents:

- (2) Gripper Structure Anchors
- (2) Gripper Adjusters
- (2) Suspension Cables (8′)



NOTE: Cables must not exit the Gripper Adjusters at an angle. The maximum allowable deflection is 5 degrees.

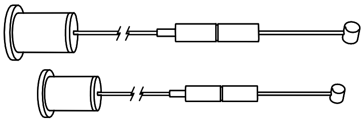
NOTE: Substitute Kit 7005 or 7010 when cables meet the structure at an angle.

Extended 16′ Hanging Kit – BP7005

Allows for extended drops from deck and bottom end adjustment of height at panel.

Kit Contents:

- (2) Gripper Structure Anchors
- (2) Gripper Anchor Caps
- (2) Upper Cables (16′)
- (2) Gripper Bottom End Assemblies
- (2) Bottom End Cable Adjusters



NOTE: Gripper Structure Anchors have 1/4″-20NC internal threads that may be used for attachment to structure.

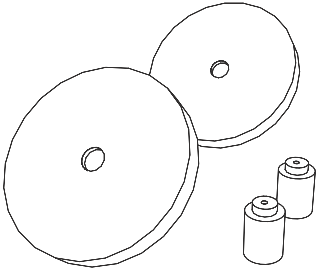
Extended 30′ Hanging Kit – BP7010

Same as Kit C, but with two (2) 30′ upper cables.

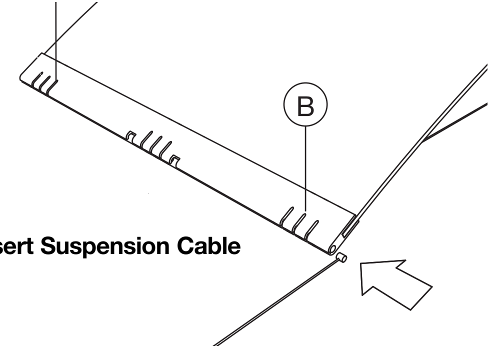
Escutcheon Kit – BP7006

Kit Contents:

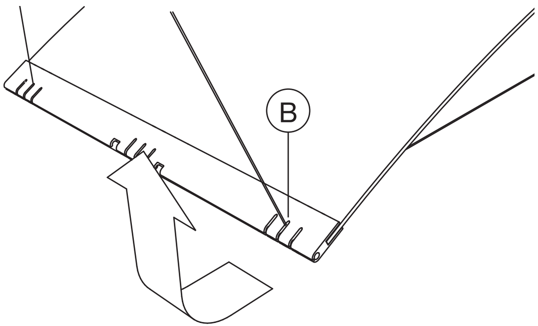
- (2) Collars with Set Screws
- (2) Escutcheons (2″)



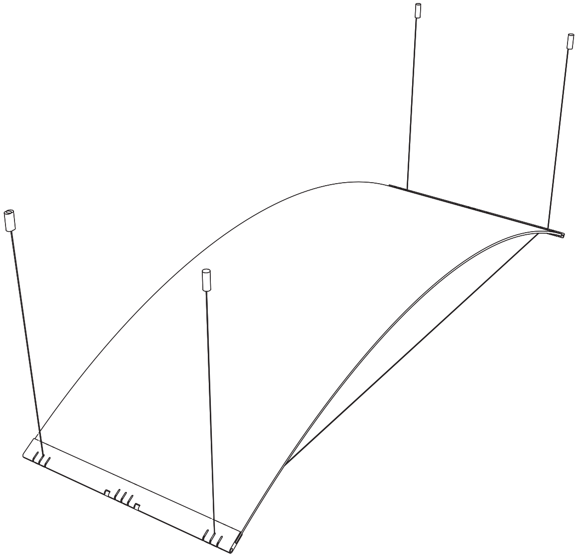
Inserting Suspension Cables



Insert Suspension Cable



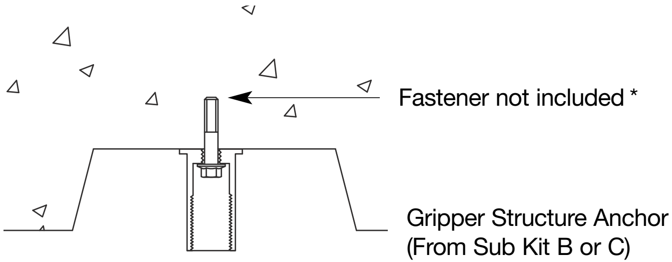
Engage Suspension Cable



Standard Suspension

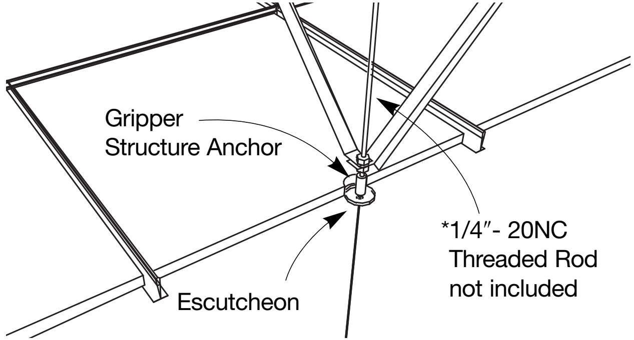
Attaching Canopies to the Structure – Two Methods

1. Direct to Structure



* NOTE: Components required for attachment to structure are not included in installation hardware kits since they vary by building structure.

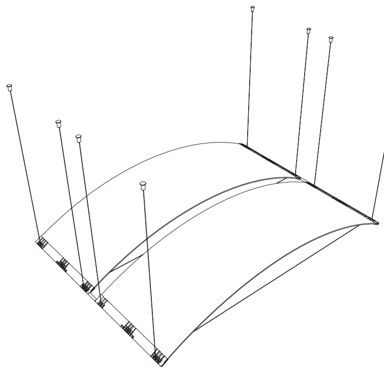
2. Below or through an existing ceiling.

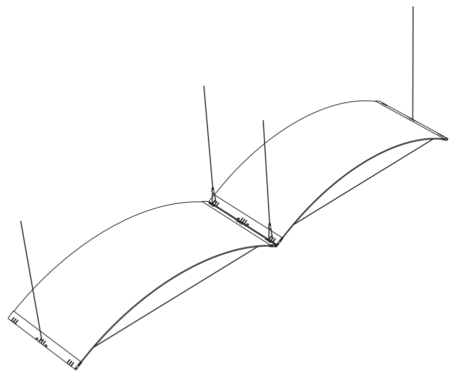


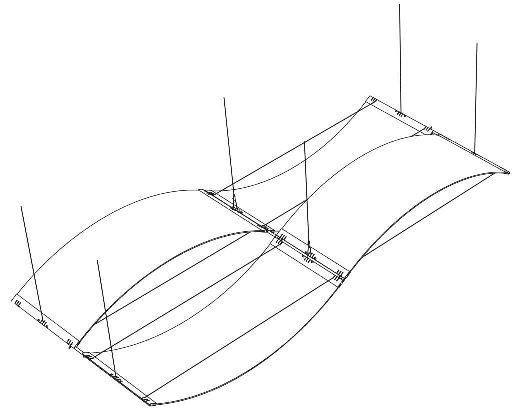
NOTE: Utilize Kit D – Escutcheon Kit 7006.
This can also be used with SoundScapes Acoustical Canopies and Shapes.

Linked Canopies

There are a wide variety of linked kits available to link canopies side-by-side and/or end-to-end. Please refer to the installation instructions and the technical guide for detailed guidelines and typical linking applications.



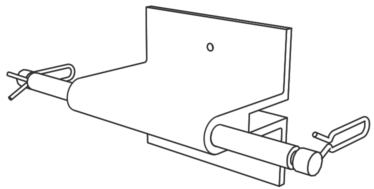




Wall Mounting of Canopies

Use these hardware kits when one end of the canopy will be attached to the wall.

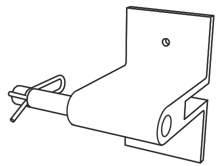
Wall Attachment Kit – BP7008
Anchors canopies side-by-side to wall.



Kit Contents:

- (2) Locking Clips
- (2) Linking Rods (2-1/4″)
- (1) Wall Bracket (3″)

Wall End Attachment Kit – BP7009
Used at ends when linking single or multiple canopies.

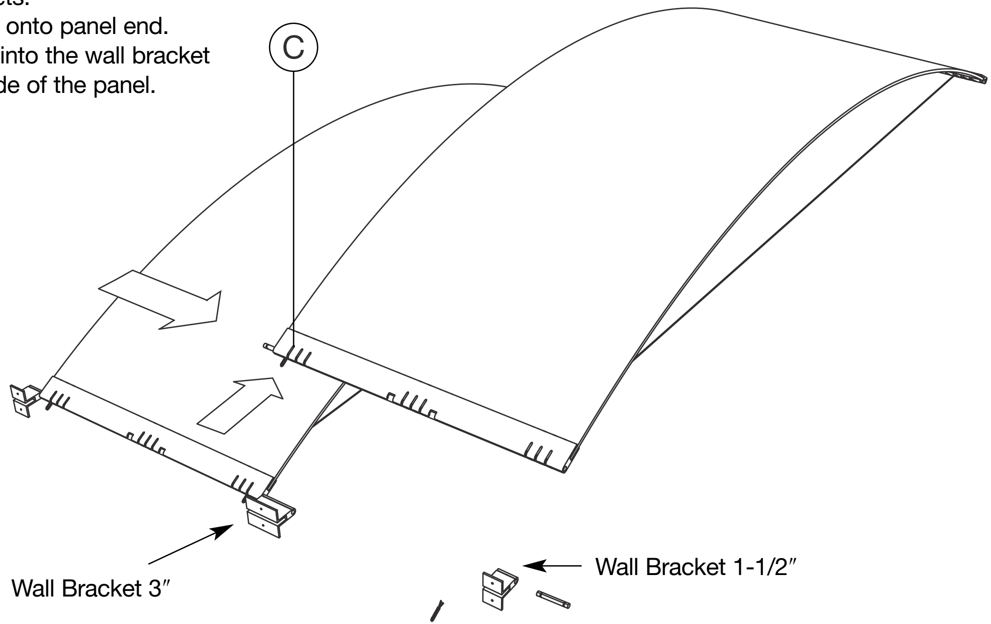


Kit Contents:

- (1) Locking Clip
- (1) Linking Rod (2-1/4″)
- (1) Wall Bracket (1-1/2″)

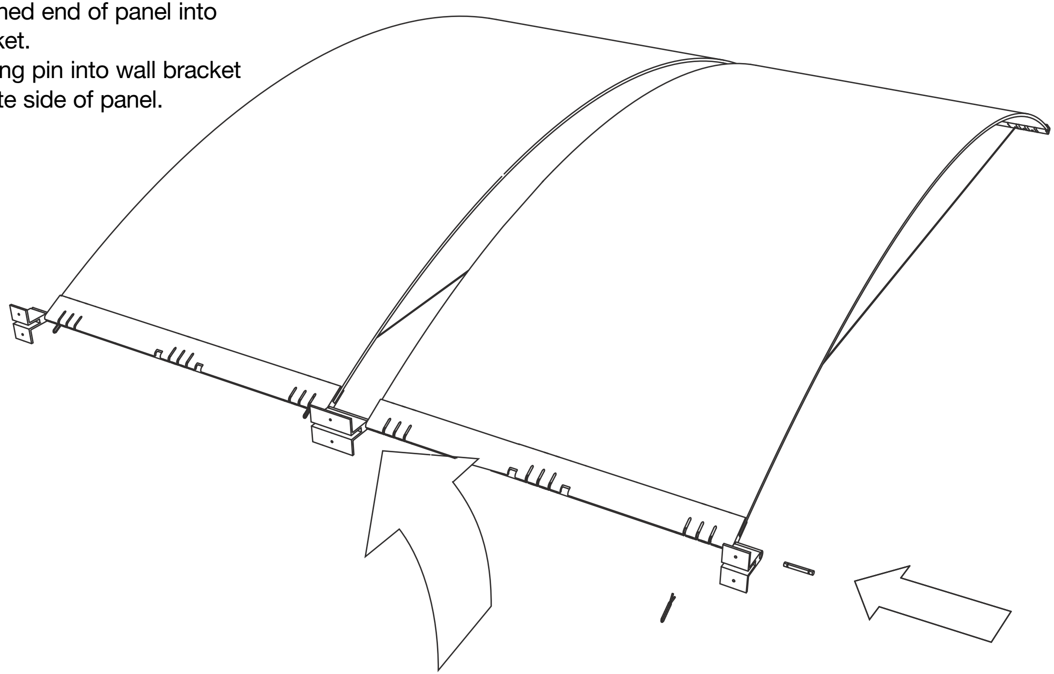
Wall Mounting of Canopies

1. Mount wall brackets.
2. Install linking rods onto panel end.
3. Insert second pin into the wall bracket at the opposite side of the panel.



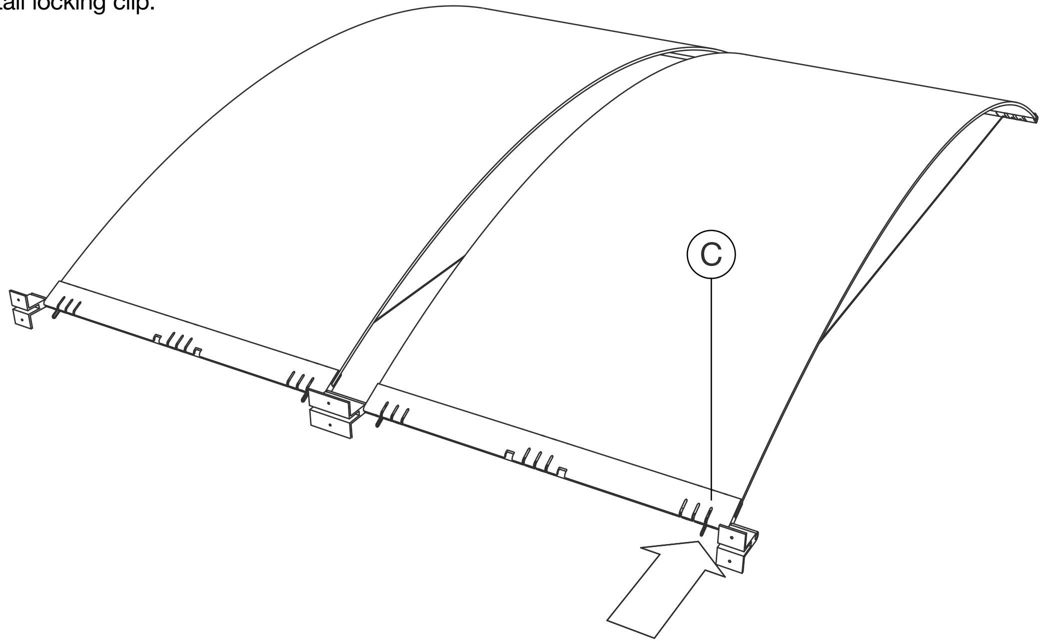
Wall Mounting of Canopies

4. Insert pinned end of panel into wall bracket.
5. Push linking pin into wall bracket at opposite side of panel.



Wall Mounting of Canopies

6. Install locking clip.



Seismic Restraint[1]

- The International Building Code allows architectural components to swing freely as long as they will not be damaged or cause damage. Cable lengths less than 20 inches will generate the greatest amount of pendulum reaction during a seismic event, and should therefore be avoided. When it is not practical to use cables greater than 20 inches long, allow lateral clearance around the canopies equal to, or greater than, the length of the cable.
- Canopies suspended from cables greater than 20 inches long will swing no more than 8 inches. Restraint of canopies has proven to be ineffective and is not recommended.

[1]Pendulum reaction information is based on full scale testing and computer modeling conducted at the Structural Engineering Earthquake Simulation Lab located at the State University of New York at Buffalo.

Cleaning Recommendations

General Recommendations

- Avoid wiping the panel surfaces with abrasive compounds of any type.
- Panels should be handled with clean gloves/hands to avoid fingerprints. This is especially important with Graphix panels.
- Static charges that may build up after removing protective masking can be removed by wiping the sheet with a cloth dampened with water.
- Lightly dust with a duster or soft, clean cloth first. Keep the cleaning cloth free of grit.
- CAUTION: Do not allow panel edges to get wet when cleaning the panel surface. This would damage the panel and void the product warranty.

METALWORKS™ Canopies

Product Description
MetalWorks Canopies are pre-formed acoustical canopies available in Hill, Valley or Flat configurations and are suspended with cables.

Seismic Installations
The International Building Code allows architectural components to swing freely as long as they will not be damaged or cause damage. Canopies suspended will swing no more than 18" in any direction for each panel. Restraint of canopies is not recommended.

Pendulum reaction information is based on full scale testing and computer modeling conducted at the Structural Engineering Earthquake Simulation Lab located at the State University of New York at Buffalo.

International Building Code
The IBC requires the attachment of free floating architectural components to be sized for three times the design load. Flat canopies weigh 58 pounds, curved canopies weigh 62.4 pounds. Select hardware that will satisfy these requirements and is appropriate for the structure to which they will be attached. The structure anchor is fabricated with 1/4"– 20 NC internal

Fire Performance
MetalWorks Canopies, 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.

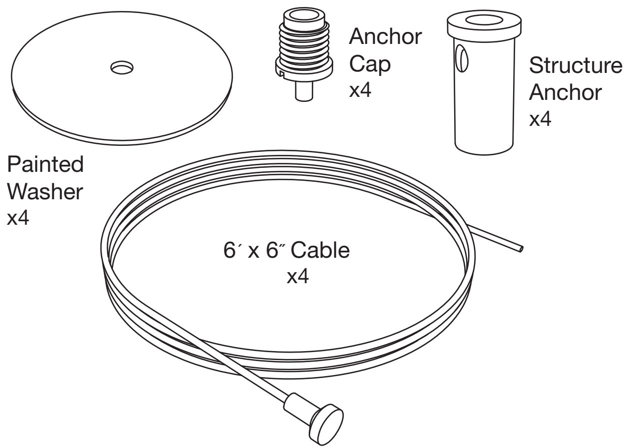
Contact Techline at 1-877-276-7876, option 1, then 2, then 3 for specific US and Canadian fire performance data.

METALWORKS™ Canopies - Installation

General
After opening the product carton, and before installation, be sure to locate, remove and set aside the hardware kit before proceeding.

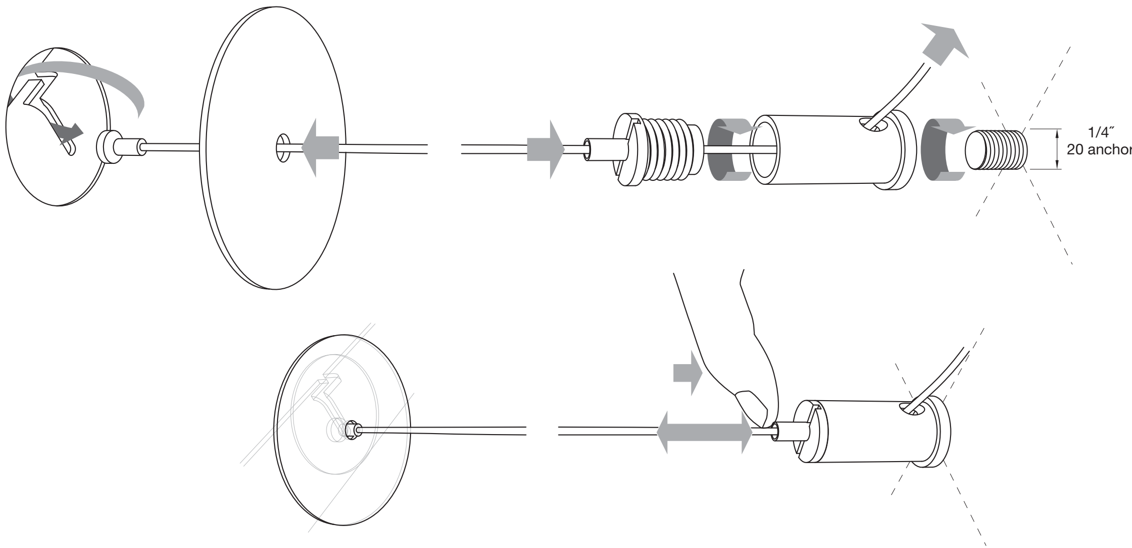
Two people required to handle each panel safely, minimize damage and provide panel support during installation. DO NOT REMOVE THE CANOPIES FROM THE CARTON until the suspension cables are attached to the building structure and ready to receive the panel.

MetalWorks panels cannot be cut, drilled or altered in any way. The canopy must not be used to support any other material. The cable suspension system must be fastened to the structure and cannot be hung from any commercial ceiling system. MetalWorks panels are not approved for exterior application.



Hardware Installation to Suspension Cables

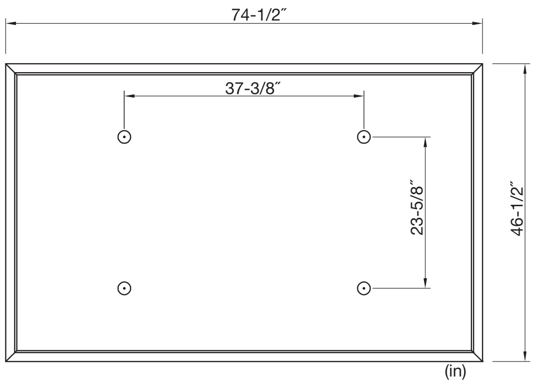
Note: Canopies must be installed with four suspension cables.



Attaching Cables to Structure

1. Lay out the attachment points for the structure anchors.

2. Make sure the pattern for the placement of these anchors when the canopy is installed level is 23-5/8" x 37-3/8".



* All measurements are nominal.

NOTE: The structure anchor is fabricated with 1/4"– 20 NC internal threads. The anchor may be turned onto a matching stud, or fastened with a screw through the hole in the anchor and into the supporting structure.

Additional structural support may be required if cable anchor points are obstructed by HVAC, piping or other components in the plenum.

Cables must have 6" clearance from all plenum obstructions.

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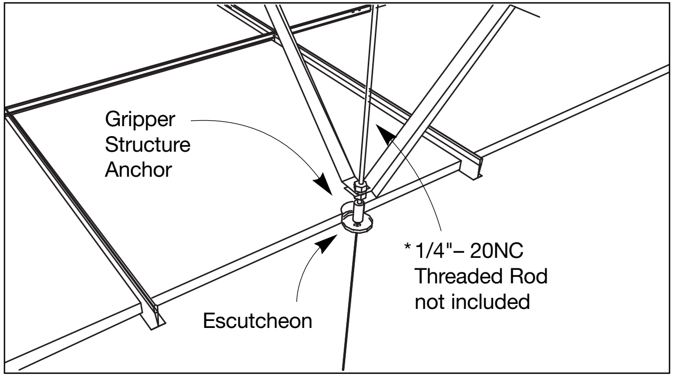
Canopy Installation Below an Existing Ceiling

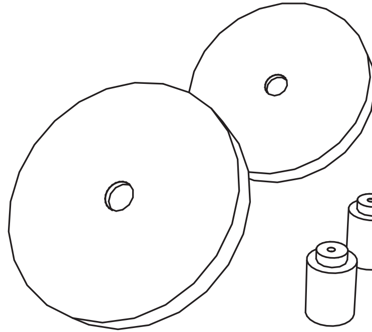
NOTE: Canopy suspension cables should not impose any lateral force on an existing ceiling.

1. The structure gripper anchor must be mounted to a support at or above the existing ceiling.

2. Use 1/4" – 20 threaded rod attached to structure to secure the structure gripper anchor at the correct height.* Install diagonal bracing to structure to provide lateral support.



Note: Use the optional escutcheon kit accessory to conceal the structure gripper anchor when installed above the ceiling level.



Escutcheon Kit
(BP7006)
(2) Collars with set screws (2) Escutcheons (2")

Two kits are required for each canopy.

Attaching Cable to Structure Anchor

1. Install one of the large painted washers over the free end of each cable. Insert the cable from the unfinished side of the washer. (See page 3-33)

2. Push the plain end of the cables through the narrow barrel on the gripper adjuster.

3. Feed the end of the cable through the hole located in the side of the gripper structure anchor and thread the adjuster into the structure anchor.

4. Repeat for the remaining three cables.

METALWORKS™ Wings Accent and Acoustical Clouds

Product Description
MetalWorks Wings is a decorative ceiling element consisting of a 10 foot long extruded aluminum spine which is supported from the building structure by Electrical Metallic Tubing (EMT) and restrained from swaying by 1/16" diameter aircraft cables. Nominal 24" x 45" aluminum panels extend from the extrusion to complete the “wing” configuration.

Seismic Installations
Full scale dynamic shake table testing was successfully completed with Wings assemblies installed as described in this document. Documentation to support this installation is available if required. Review details with the local Authority Having Jurisdiction (AHJ) prior to installation.

Fire Performance
MetalWorks Wings, 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 local codes for guidance on the proper installation techniques where fire detection or suppression systems are present.

For sprinkler installation through center spine, Armstrong recommends a system offered through FlexHead Industries. Please see installation instructions on website for details.

Contact Techline at (877) 276-7876, option 1, then 2, then 3 for specific US and Canadian fire performance data.

General
Installation of this system requires the attachment of the three upper bracket assemblies to the building structure. The two end brackets must be located not more than two feet from the ends of the spine and the center bracket must be not more than one foot from the center. Where obstructions in the plenum prevent placing the upper brackets as required, a sub-structure capable of withstanding the applied loads must be constructed to provide attachment for the upper brackets.

NOTE: The minimum distance from the face of the spine to overhead structure is 14". This represents the amount of space required to install and remove the panels. A complete assembly weighs 65 pounds. Fasteners used to attach the upper brackets and splay wires to the structure must be capable of supporting this load with a design safety factor of 5.

Any additional weight applied to the spine must be included in the calculation for fastener strength. The maximum amount of additional load that may be applied to the spine is 56lb.
In all cases, the spine must be installed level to within 1/4" in 10' and must be at least 7'– 6" above the finish floor. Wings panels may not be used to support any applied load.

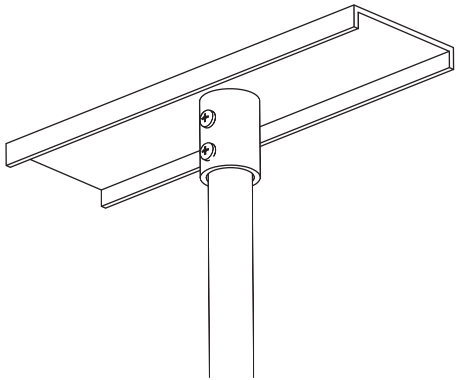
WARNING: Do not use the spine to support data or power cables or wires. Lighting fixtures may be attached to or through the center of the spine, but not to the panels. Holes bored to accommodate lighting or sprinkler installation shall be drilled from the back side of the extrusion and shall not extend more than 3/4" beyond the centerline of the spine.

FlexHead Industries sprinkler head item M#CRAW0072 (72" hose) or M#CRAW0036 (36" hose) work well with Wings. These heads require boring a 1-1/16" diameter hole through the center of the spine. See armstrong.com/wings for more details.

Upper Bracket Assembly

1. Determine the location for the spine and layout the drop points for the three upper brackets. Plumb these locations to the building structure and carefully mark the location for the fasteners.

2. Attach the upper brackets to the building structure. Fully insert a length of 3/4" diameter thin wall EMT into the socket of each bracket and secure with two #10 x 5/8" lg. self drilling screws (provided).



WARNING: This system and the supplied cables are designed around a maximum conduit length of 10'. Consult an engineer for guidance when greater drops lengths are desired.

When the structure to which the bracket is attached is not level, it will be necessary to bend the tubing so that it will be plumb when it connects to the spine. This is best done with a conduit bender. Work carefully to ensure that each tube is bent at the same location. Small corrections can be made by hand.

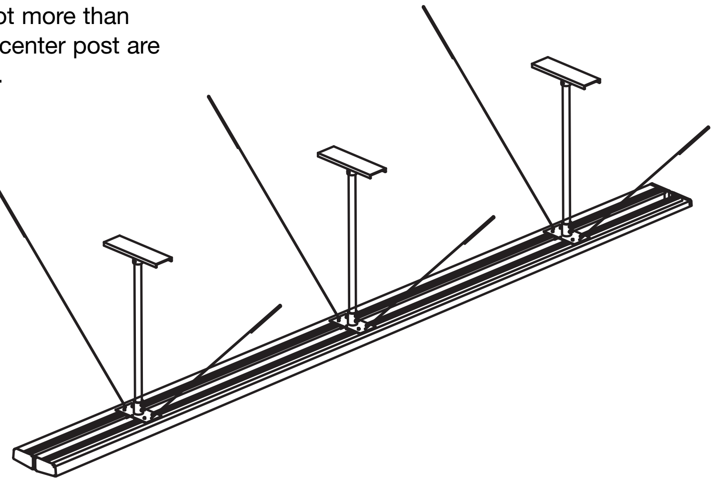
Establish a laser or level line at an elevation 2" higher than the required finish height of the spine and mark each tube. Use a tubing cutter or a sawzall to carefully cut the EMT to the desired length. Carefully remove all burrs on the outside of the tubes.

Cable Anchors

1. Attach the six fasteners to the building structure to receive the upper end of the splay wire restraint cables.

2. Extend two cables upward and away from the lower end of each EMT post. The cables at the end posts are to be arrayed perpendicular to the length of the spine and not more than 45° from horizontal. The cables located at the center post are to be placed parallel to the length of the spine.

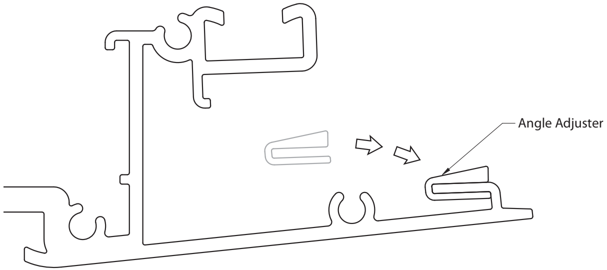
WARNING: Make sure that the cable path provides at least 6" of clearance from all obstructions in the plenum.



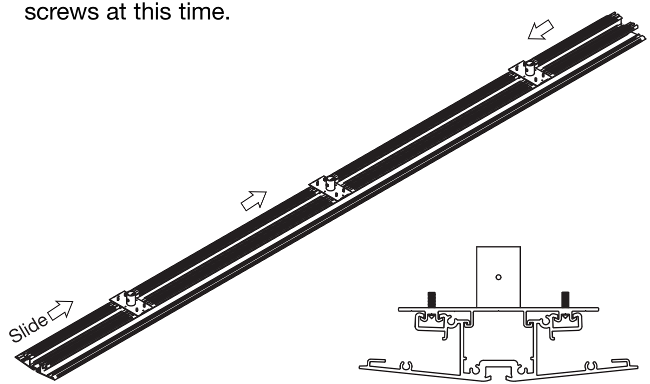
Spine Preparation

1. Bore sprinklers or light fixtures holes through the spine (if necessary), working from the back side. Up to four (4) 1-3/8" holes may be located not less than 2' apart. Dress cut edges and paint to match spine finish if these holes will be exposed to view.

2. (Optional) Install Angle Adjusters now if a more pronounced V (panel pitch) is desired. Place the angle adjuster inside the spine and press into place on the flange located at the lower outside edge of the extrusion.



3. Loosely insert four set screws (provided) into each of the three lower bracket assemblies. Slide the lower brackets into the spine and place in the approximate locations where they will mate up with the EMT. Do not tighten the set screws at this time.



Spine Installation

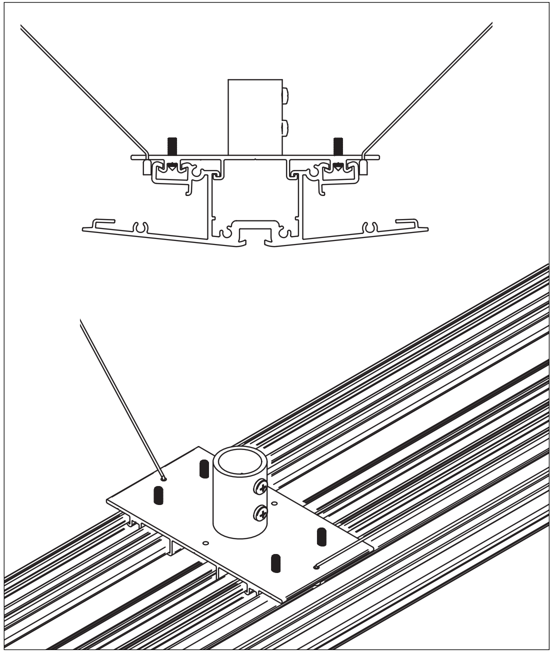
NOTE: Requires Two People

1. Raise the spine into position. Make sure that the EMT posts are fully seated into the sockets on the lower brackets and secure each with two #10 x 5/8" lg. self drilling screws (provided).

2. Slide the spine on the lower brackets as required to align with the construction plan. Make sure the EMT posts are plumb.

3. Securely tighten the set screws installed during Spine Preparation (page 3-39).

4. Install the splay wire cables by inserting the plain end up through the holes provided in the lower bracket.



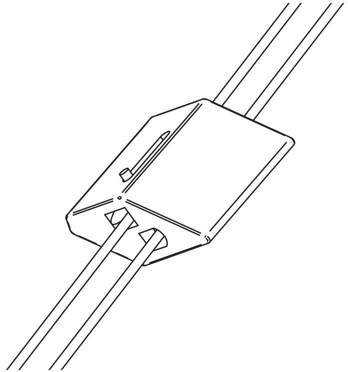
Spine Installation (continued)

5. Extend the cable to the installed structure fastener.

6. Slide the end of the cable through the larger of the two openings located on the end of the Kwik Lock cable adjuster. Loop the cable through the structure anchor and then back through the other end of the adjuster.

7. Securely tighten the cables by pulling on the free end. Make sure that the spine remains level in both directions and that all slack is removed as the cables are secured.

8. Trim off excess cable only after double checking for correct position and level.



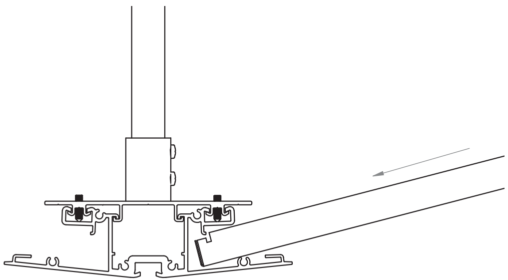
WARNING: All six cables must be installed; they must not be used to support any load other than the Wings assembly. (See drawing on page 3-38)

Panel Installation

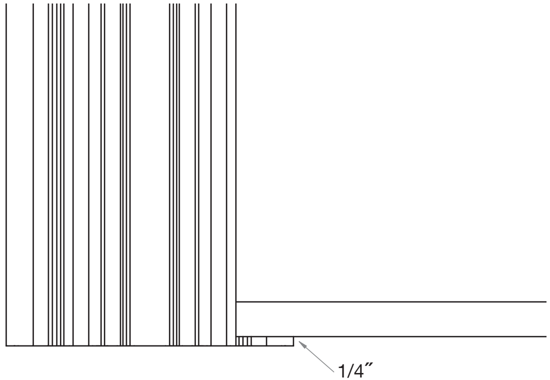
NOTE: Panels must be installed as shipped and are not approved for exterior applications Panels may NOT support any other material, may not be cut or drilled.

1. Locate the two end panels and set aside. These are the ones that DO NOT have a gasket adhered to one long side.

2. Install the first field panel by inserting the notched end into the spine. Raise the outer end of the panel to allow the notch to engage the rib at the top, back of the panel channel.

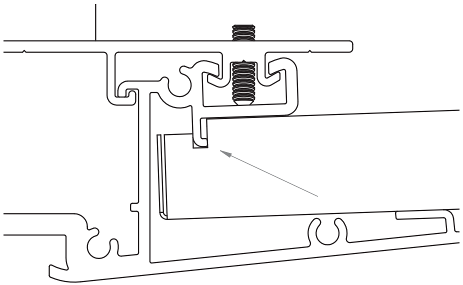


3. Position the plain edge of the panel 1/4" from the end of the spine. Lower the outer end of the panel to lock it in place.



Panel Installation (continued)

WARNING: Check to ensure that the panel notch has engaged the vertical rib located at the back of the channel.

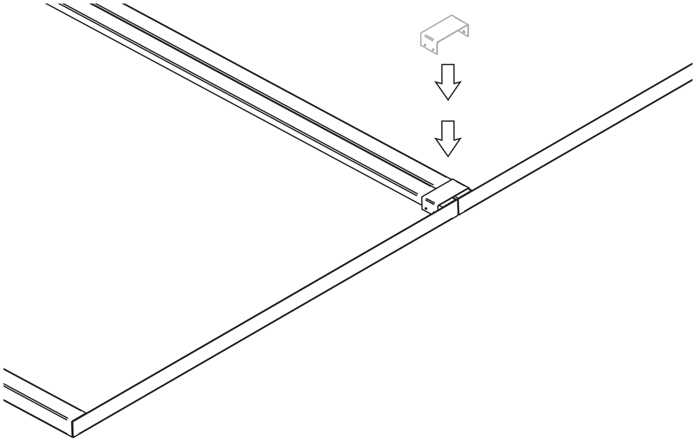


4. Now, install one of the end panels opposite the first panel installed.

5. Continue to install the remaining panels alternating from one side of the spine to the other.

6. Once all panels are in place install a panel alignment bracket near the outer edge of each panel-to-panel joint.

7. Engage the bracket over the top edge of the panels to secure the connection.

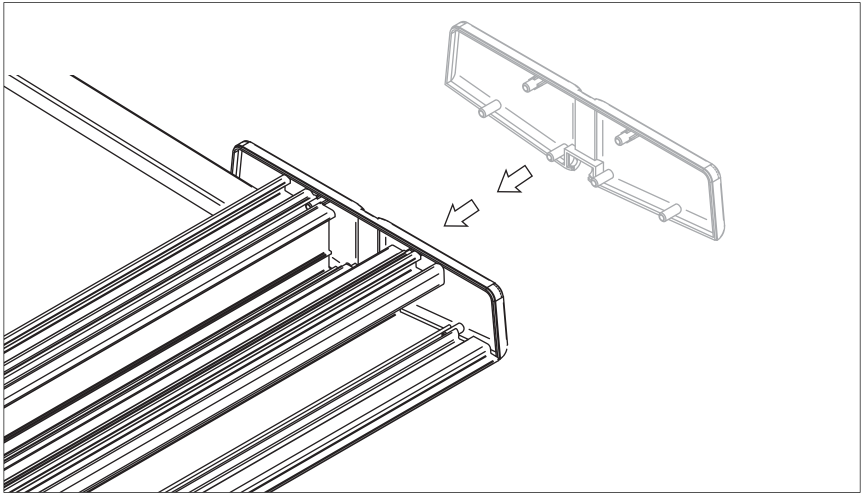


NOTE: Each panel-to-panel joint MUST have an alignment clip installed.

End Caps Installation

1. Complete the assembly by installing a plastic cap at each end of the spine.

2. Align the pegs on the cap with the channels formed in the spine extrusion and press into place.



CEILING & WALL SYSTEMS

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Seismic Applications

Commercial Ceilings and Walls Solutions Guide

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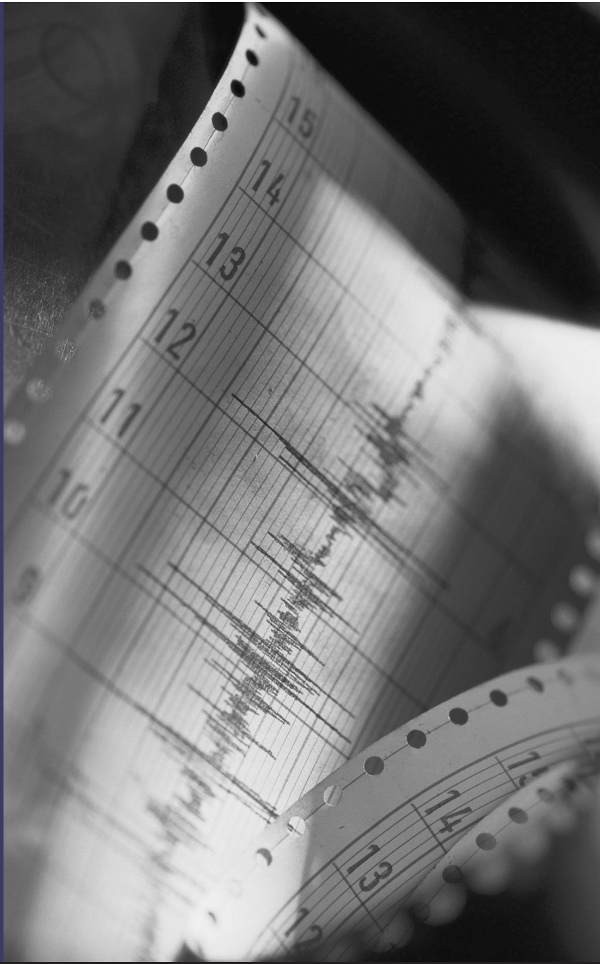


Seismic Applications

Current Seismic Code Development and Adoption

Purpose of Installation Requirements for Suspended Ceilings

For the latest seismic ceiling installation information, visit: armstrong.com/seismic

- Provide a suspension system strong enough to resist lateral forces imposed upon it without failing
- Prevent border panels from falling from the ceiling plane

Federal Emergency Management Agency (FEMA)

Seismic performance during recent large California earthquakes prompted FEMA to address several concerns including suspended ceiling performance during a seismic event. Research and tests demonstrated that current industry seismic standards (UBC Standard 25-2) were not adequate. To support individual panels around the perimeter, FEMA determined that the key to good seismic performance is a wider wall molding on all sides. This led to the International Building Code requirement for 2″ wall molding on all sides.

Source: FEMA 302 NEHRP Recommended Provisions for Seismic Regulations for New Buildings and Other Structures

Building Code Installation Requirements

IBC Category	Installation Requirement
A, B	Ceiling installation should conform to basic minimums established in ASTM C 636.
C	To be installed to CISCA recommendations for areas subject to light to moderate seismic activity. • Minimum **7/8″** wall molding • Grid **must not be attached** to the wall molding • 3/8″ clearance on all sides • 3/8″ overlap of the grid on the wall molding • Ends of main beams and cross tees must be tied together to prevent their spreading • No perimeter wires
D, E, F	Installation must conform to CISCA recommendations for areas subject to severe seismic activity. IBC categories D, E and F must also meet these additional requirements: • Minimum **2″** wall molding • Grid **must be attached** to two adjacent walls — opposite walls must have a 3/4″ clearance • Ends of main beams and cross tees must be tied together to prevent their spreading • Perimeter support wires • Heavy-duty grid system • Ceiling areas over 1,000 SF must have horizontal restraint wire or rigid bracing • Ceiling areas over 2,500 SF must have seismic separation joints or full height partitions • Ceilings without rigid bracing must have 2″ oversized trim rings for sprinklers and other penetrations • Changes in ceiling plane must have positive bracing • Cable trays and electrical conduits must be independently supported and braced • Suspended ceilings will be subject to special inspection

NOTE: Consult your local code professional for information specific to your region.

International Building Code Allowance For Alternative Designs And Construction Methods

Code officials may approve other installation designs based upon the following:

Section 104.11 Alternative materials, design and methods of construction and equipment.
The provisions of this code **are not intended to prevent** the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been approved.

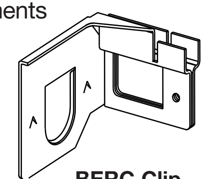
Section 104.11.1 Research reports.
Supporting data, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall consist of valid research reports from approved sources.

Section 104.11.2 Tests.
Whenever there is insufficient evidence of compliance with the provisions of this code, or evidence that a material or method does not conform to the requirements of this code, or in order to substantiate claims for alternative materials or methods, the building official shall have the authority to **require tests as evidence of compliance** to be made at no expense to the jurisdiction.

Source: International Building Code 2006

Alternative Installation Using BERC Category C

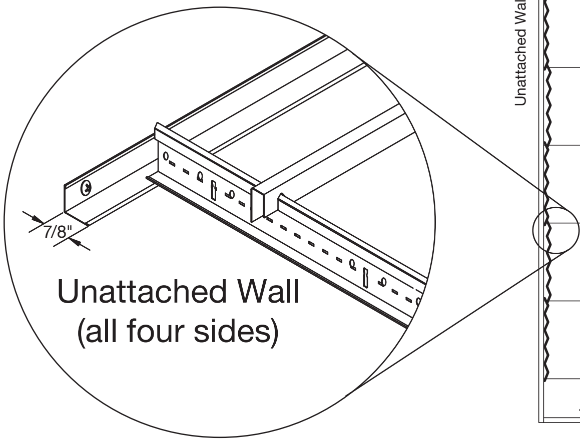
IBC Requirements	Armstrong BERC Solution	Solution Benefits
• Minimum 7/8″ wall molding	• Minimum 7/8″ wall molding	• Meets code requirements
• Grid must not be attached to the wall molding • Minimum 3/8″ clearance on all sides • Minimum 3/8″ overlap of grid on the wall molding • Ends of main beams and cross tees must be tied together to prevent spreading	• Grid may be cut tight on two adjoining walls • Minimum 3/8″ clearance on two unattached walls • BERC2 on all runners	• Easy to square up the system • Faster, tighter grid installation • Better overall visual • Eliminates stabilizer bars • Lower cost solution • Better access to the plenum
• Perimeter wires are not needed • Intermediate-duty grid	• Perimeter wires are not needed • Intermediate-duty grid	• Meets code requirements

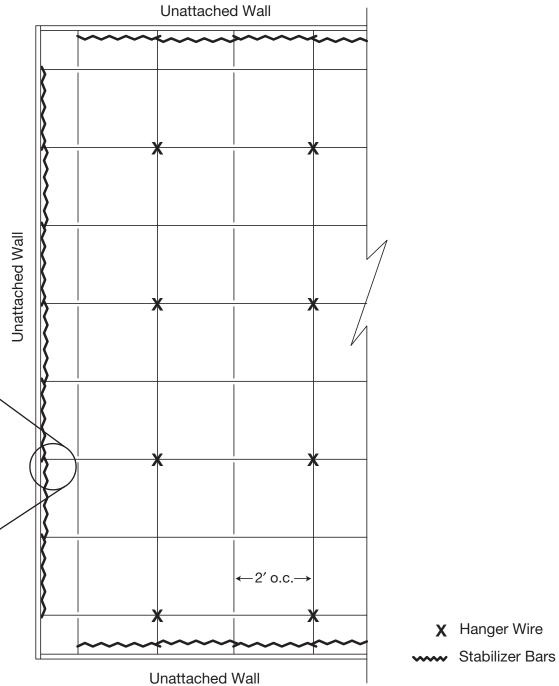


BERC Clip

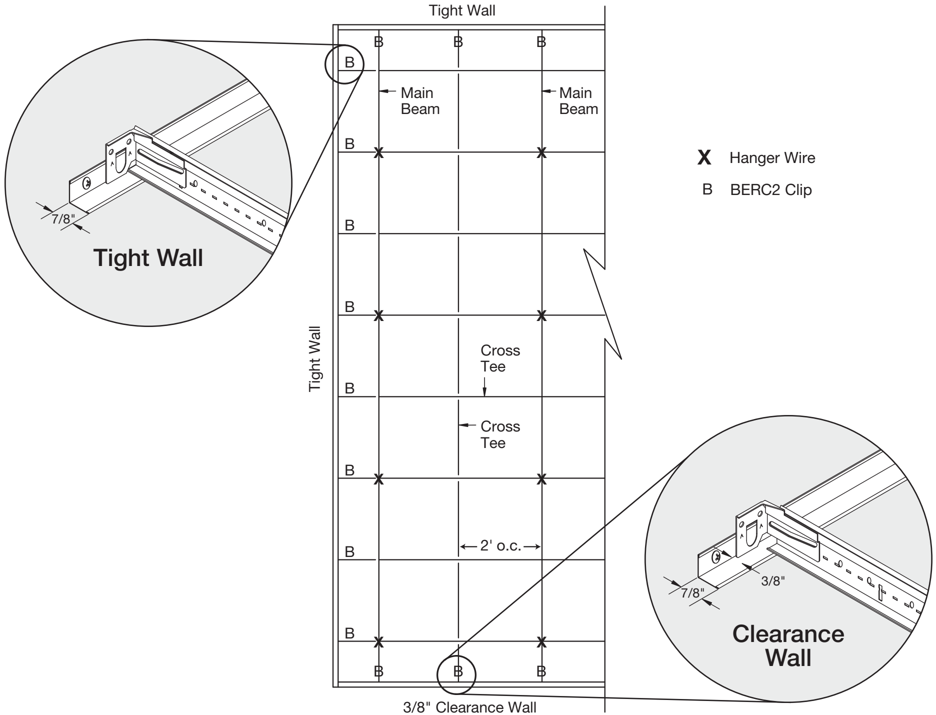
NOTE: Requirements for essential use facilities may be different.
Contact TechLine for details.

IBC Requirements Category C





Alternative Installation Using BERC Category C



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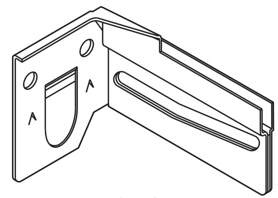
Alternative Installation Using BERC2 Category D, E, F

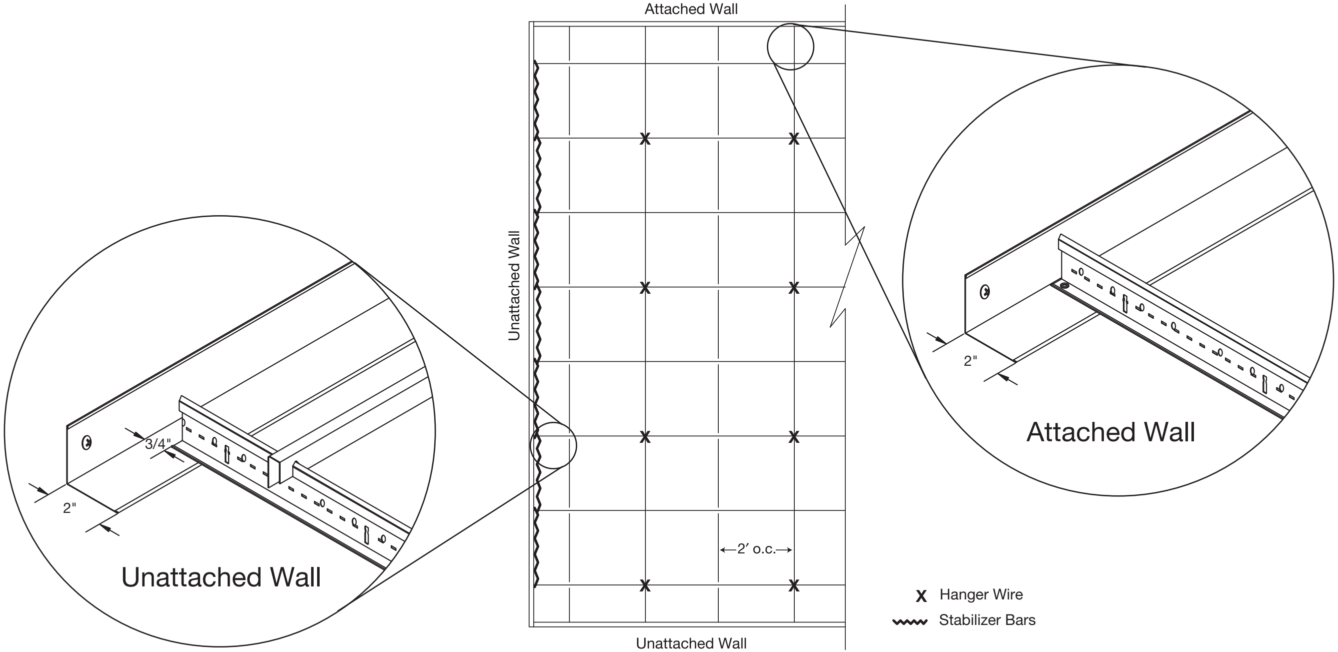
IBC Requirements	Armstrong BERC2 Solution	Solution Benefits
• Minimum 2″ wall molding	• Minimum 7/8″ wall molding	• Narrow, sleek aesthetic with standard 7/8″ wall molding
• Grid must be attached to two adjacent walls (Pop rivets acceptable)	• Grid must be attached on two adjacent walls – opposite walls require BERC2 with 3/4″ clearance (Eliminates the need for pop rivets through the visible part of the wall molding)[1]	• Eliminates installation and aesthetic problems associated with 2″ wall molding
• Opposite walls must have a 3/4″ clearance	• BERC2 clip with 3/4″ clearance on unattached ends	• BERC2 eliminates visible pop rivets through the wall angle
• Stabilizer bars to prevent the spread of main beams and cross tees	• BERC2 maintains main beam and cross tee spacing; no other components required[1]	• Eliminates stabilizer bars • Lower cost solution • Better access to the plenum
• Heavy-duty grid	• Heavy-duty systems as identified in ICC-ESR-1308 (refer to Suspension Systems)	• Meets code requirement

[1] Pop rivets optional on attached walls

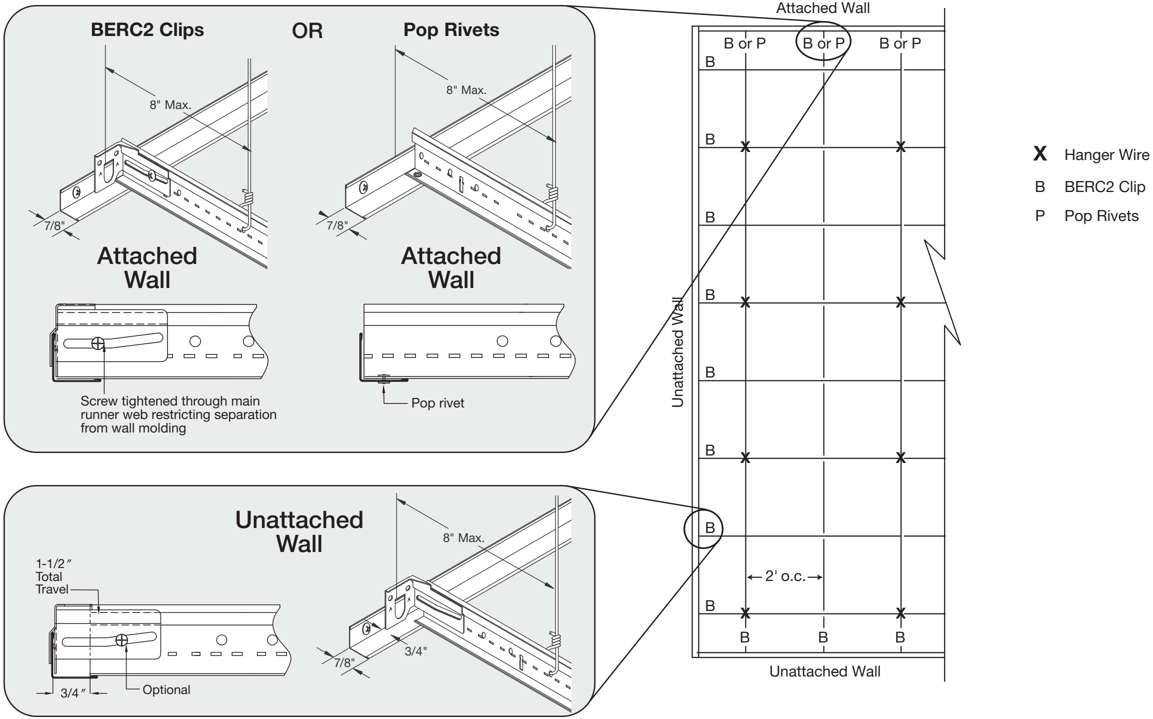


BERC2 Clip

IBC Requirements Category D, E, F



Alternative Installation Using BERC2 Category D, E, F



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Wall Systems

Commercial Ceilings and Walls Solutions Guide

Armstrong®

Wall Systems Overview

Armstrong offers a wide variety of standard and custom wall systems. From Soundsoak® to WoodWorks®, our walls portfolio can provide acoustical and design solutions for your next project.

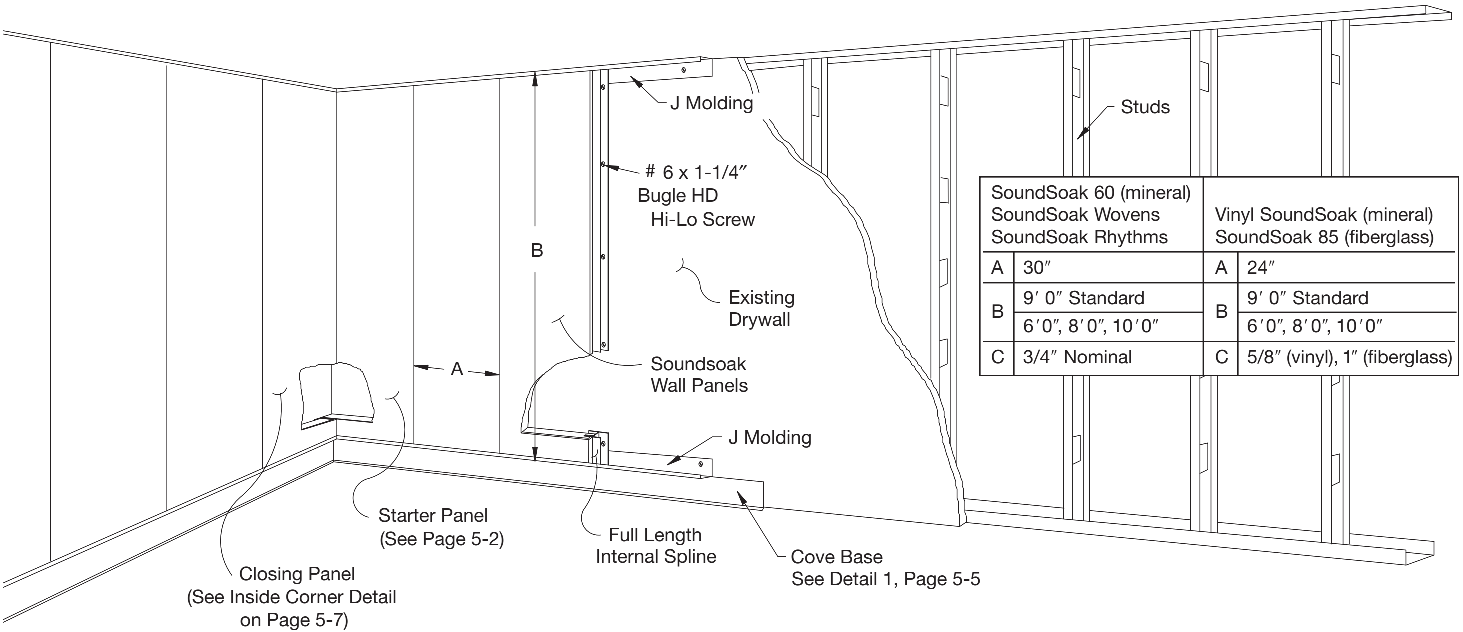
Standard Soundsoak Acoustical Wall Systems are available in two substrates and 53 fabric/vinyl colors. Custom Soundsoak offers enhanced capabilities, including 2″ thick panels for increased sound absorption, impact resistant panels for improved durability, impaling clips for easy installation, made-to-order sizes from 4′ wide up to 10′ high and customer-specific fabric options.

Available in four rich finishes, WoodWorks® Ekos™ Wall Systems, enhance acoustical performance, fulfill sustainable design requirements and install similarly to Standard Soundsoak. WoodWorks Custom Wall Systems are available in a wide variety of finishes, sizes and perforations that can be quoted and ordered through Architectural Specialties.

- Standard Soundsoak – Visit armstrong.com/soundsoak for details or view LA-295818 for installation information
- Custom Soundsoak – Visit armstrong.com/walls for details or view LA-297301 for installation information
- WoodWorks Ekos – Visit armstrong.com/ekos for details or view LA-297244 for installation information
- Custom WoodWorks – Visit armstrong.com/walls for details or contact Architectural Specialties at 1 877 ARMSTRONG and select 1-1-4.

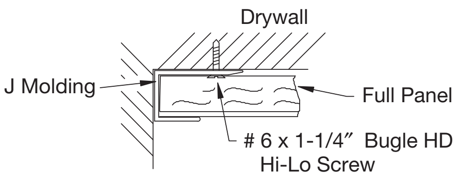
The information included in the following section will focus on Standard Soundsoak Acoustical Wall Systems.

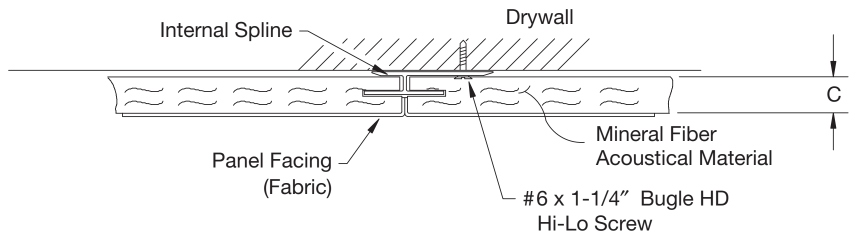
Installation to Drywall

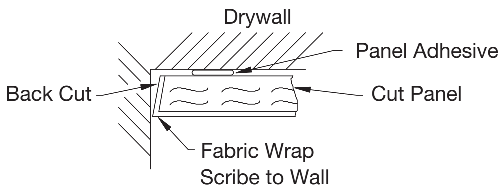


SoundSoak 60 (mineral) SoundSoak Wovens SoundSoak Rhythms		Vinyl SoundSoak (mineral) SoundSoak 85 (fiberglass)	
A	30″	A	24″
B	9′ 0″ Standard	B	9′ 0″ Standard
	6′0″, 8′0″, 10′0″		6′0″, 8′0″, 10′0″
C	3/4″ Nominal	C	5/8″ (vinyl), 1″ (fiberglass)

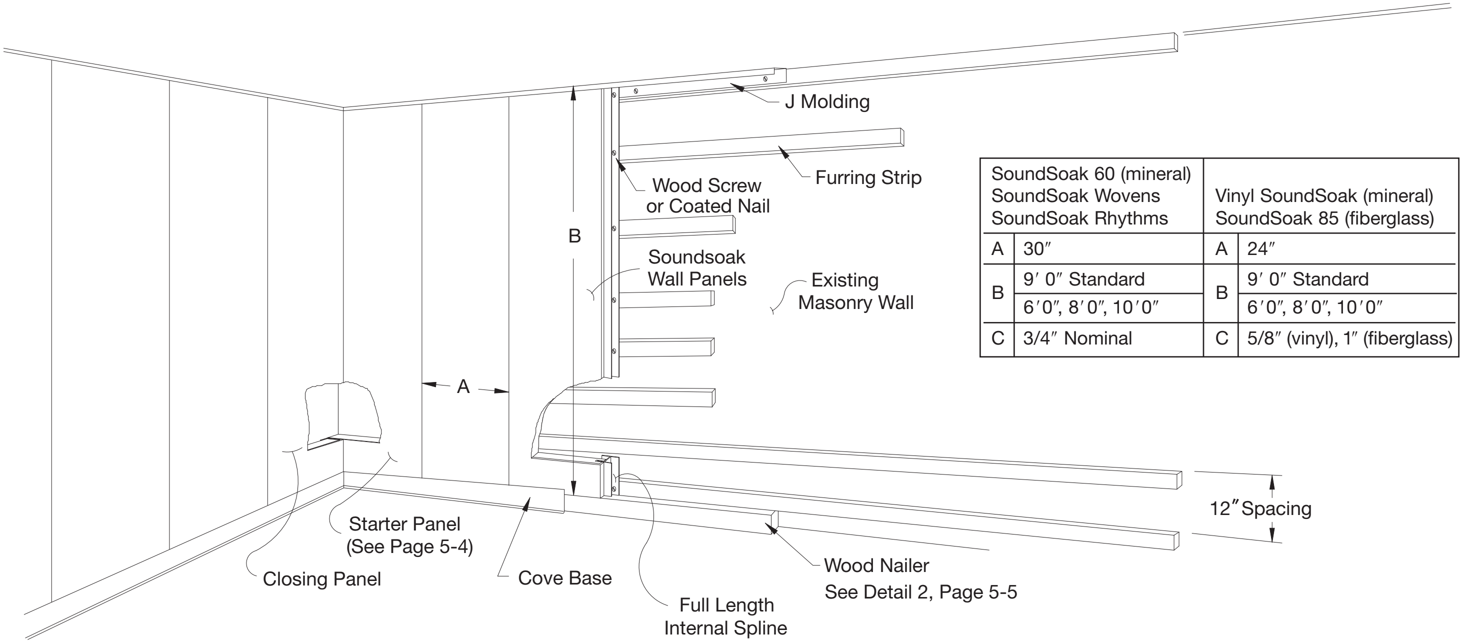
Installation to Drywall





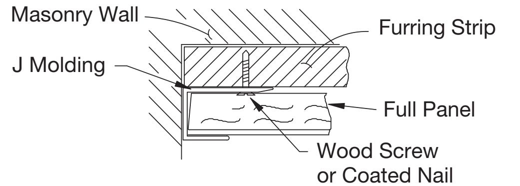


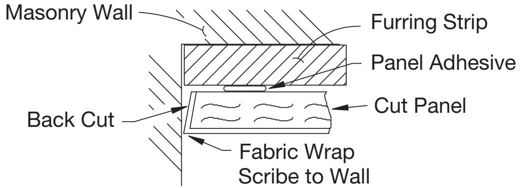
Installation to Masonry

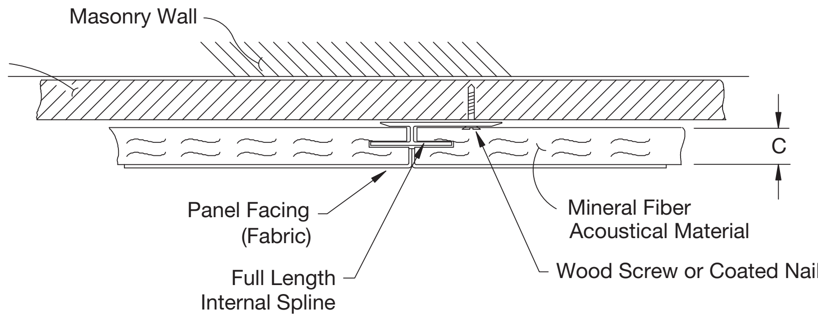


SoundSoak 60 (mineral) SoundSoak Wovens SoundSoak Rhythms		Vinyl SoundSoak (mineral) SoundSoak 85 (fiberglass)	
A	30″	A	24″
B	9′ 0″ Standard	B	9′ 0″ Standard
	6′0″, 8′0″, 10′0″		6′0″, 8′0″, 10′0″
C	3/4″ Nominal	C	5/8″ (vinyl), 1″ (fiberglass)

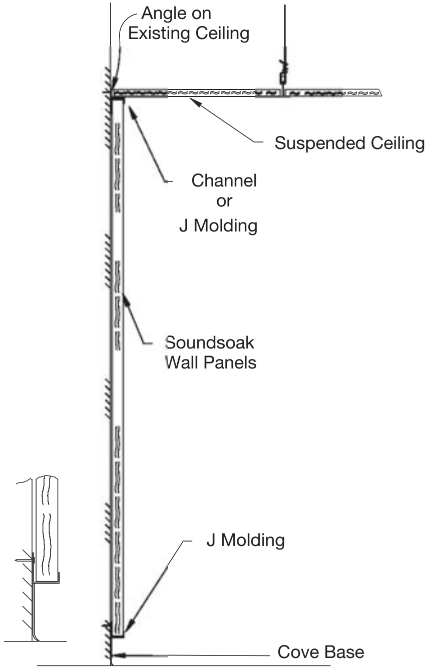
Installation to Masonry







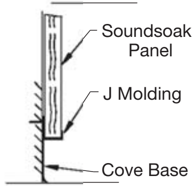
Typical Panel and Cove Base Installation



Typical Wall Installation

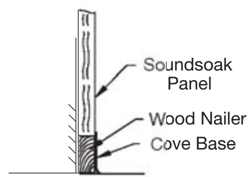
- Never extend Soundsoak panels above the ceiling line. This could create airflow through the panel, into the ceiling plenum, causing soiling of the fabric surface.
- Any cutouts made on the back of a panel should be resealed with an adhered tape or foil or a heavy mastic, to prevent fabric soiling in that area, due to airflow through the panel.
- When Soundsoak panels are applied to the inside of an exterior wall, first apply a polyethylene film to prevent fabric soiling due to otherwise higher airflow though the panels in these areas.
- A reveal can be created at the top of the wall by leaving a 1″ to 4″ space between the top molding and the ceiling.
- If panels are stacked on a high wall, use two (2) – J moldings, an H molding, between top and bottom panels.
- Install Soundsoak panels with arrows on the back all in the same direction.

Detail 1



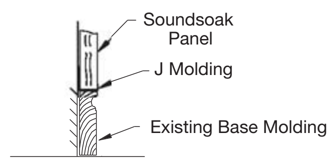
Cove Applied to Wall,
Panel Rests on J Molding

Detail 2



Cove Applied to Wood Nailer
Panel Rests on Nailer

Detail 3

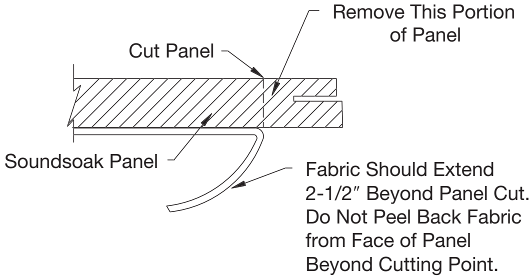


Panel and J Molding Rests on
Existing Base Molding

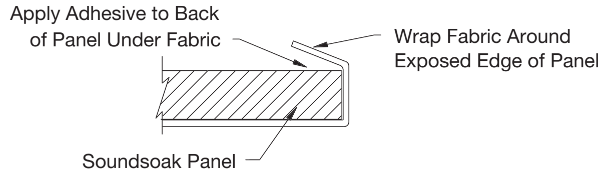
Armstrong®

Fabric Wrapping Procedure for Cut Edges

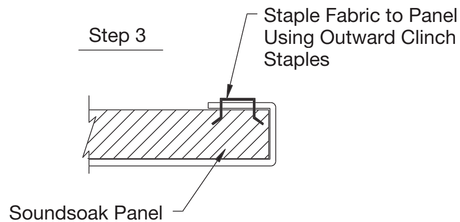
Step 1



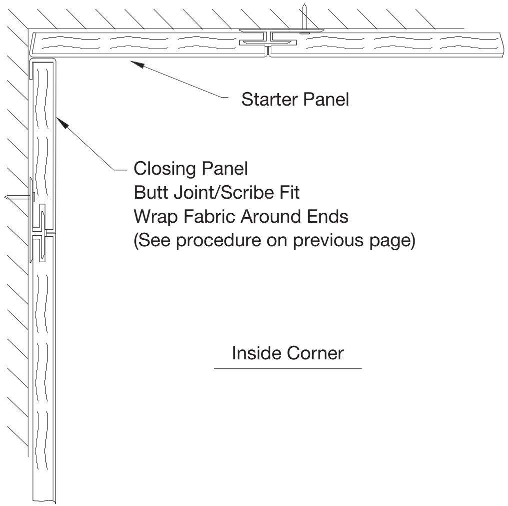
Step 2



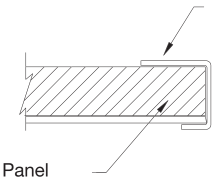
Step 3



Fabric Wrapping Procedure for Cut Edges (butt-joint inside corner)



Inside Corner

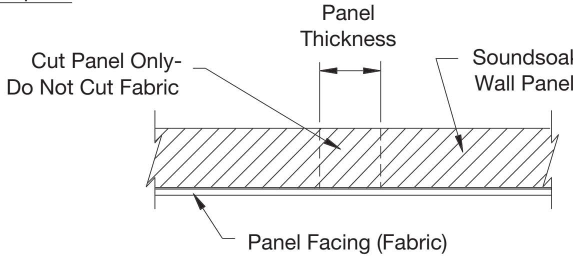


Optional-Cut Edge Molding

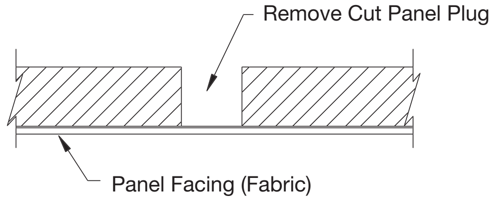
(Often used with Vinyl Soundsoak because of difficulty in cut edge wrapping)

Continuous-Wrapped Outside Corner

Step 1

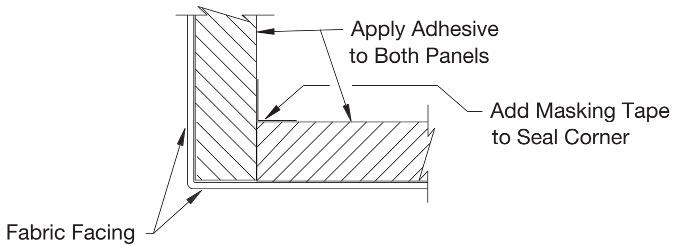


Step 2

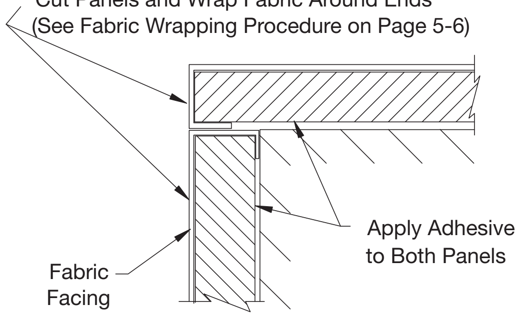


Step 3

Completed Corner



Optional Outside Corners



Wrapped Outside Corner

NOTE:
The details shown on these pages are provided in addition to the in-carton instructions. Please refer to the printed instructions (also available online) for step-by-step instructions.

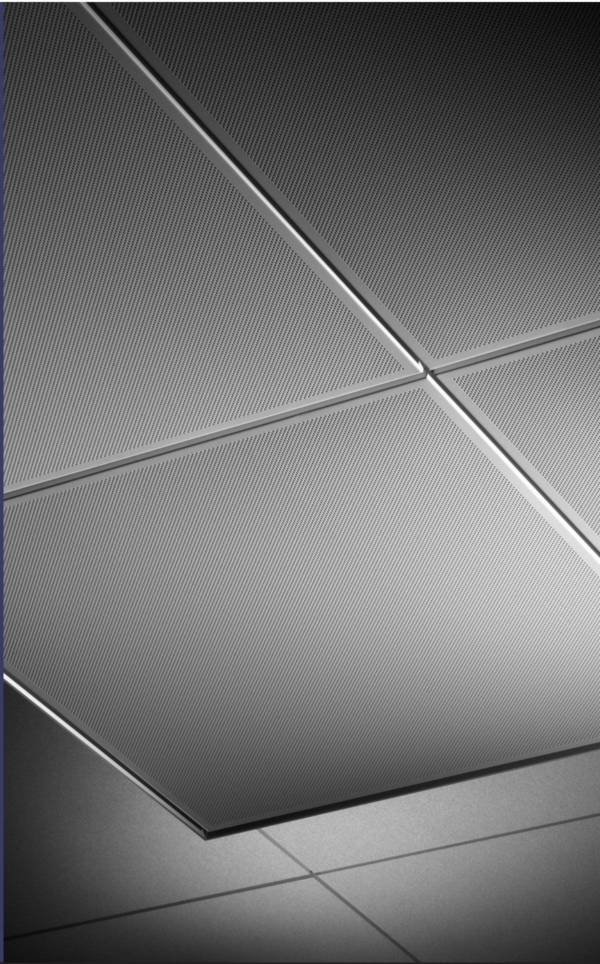
These details do not include different installation methods for Custom Soundsoak panels. Please refer to Custom Soundsoak Instructions online.

CEILING & WALL SYSTEMS

[Between us, ideas become reality.]®

Vector® Ceiling Systems

Commercial Ceilings and Walls Solutions Guide



Armstrong®

WHAT ARE VECTOR CEILINGS?

The Vector™ family of ceilings offers a unique edge detail that helps hide the grid on a standard suspension system. Vector ceiling panels have a kerf on two sides. The other two sides have non-supporting reverse tegular edges. This revolutionary, patented edge design results in a narrow 1/4″ reveal that minimizes the existing grid and gives the ceiling an upscale, almost monolithic look.

NOTE: The Vector detail pages in this guide are in addition to the step-by-step instructions provided in the in-carton instructions, which are also available online.

Installation Using Standard 15/16″ Suspension System

Since Vector ceilings work with standard 15/16″ grid, there's no need to remove or replace an existing suspension system. The only requirement is that the grid system is square and level.

Vector panels slide on to the grid, rather than through the grid opening and into the plenum like ordinary lay-in panels. This downward access installation method is easier, and eliminates the possibility of damage to the ceiling panel from hanger wires and other plenum obstructions.

Vector Family of Ceilings

The sleek, Vector look is available in a variety of materials, depending on your design and performance needs.

ULTIMA™ VECTOR

Ideal for mixed (open/closed plan) applications, such as schools and offices.

- Panel size options: 12″ x 24″ and 24″ x 24″
- Excellent noise reduction: NRC 0.70
- DuraBrite™ surface provides high-light reflectance: .90
- i-ceilings® wireless compatible

OPTIMA VECTOR

Your best choice for open office plans when high-acoustical performance is required.

- Panel size options: 12″ x 24″, 24″ x 24″, 30″ x 30″, 24″ x 48″, 48″ x 48″, 24″ x 72″ and 24″ x 96″
- Reduced background conversation noise: AC 190 (CAC 26 with backing)
- Superior noise reduction: NRC 0.90 (0.80 with backing)
- DuraBrite™ surface provides high-light reflectance: .90

METALWORKS™ VECTOR

For a classic look, especially in high-access areas like lobbies, entryways, corridors and airport terminals.

- Good sound absorption when perforated and used with acoustical fleece
- Custom colors and perforations options available

METALWORKS VECTOR for Exterior Applications

- Designed to withstand wind uplift requirements

METALWORKS EFFECTS™ Wood Looks VECTOR

- Metal panels powder-coated to look like wood in a variety of images. Also available for exterior applications.

WOODWORKS® VECTOR

Natural beauty in a wide variety of real wood veneers. Provides a sophisticated look in executive offices, boardrooms, lobbies and other high-visibility areas.

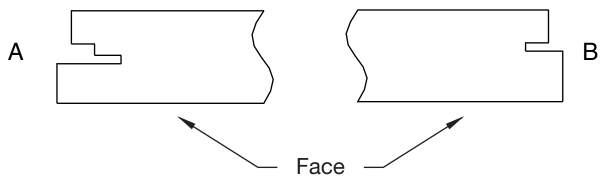
- Acoustical and non-acoustical options
- Custom veneers and perforations also available

ULTIMA/OPTIMA VECTOR PANEL EDGES

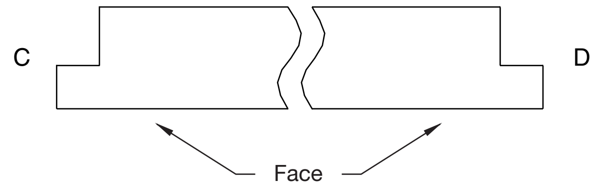
The edges of the Vector panels feature unique edge detailing. The following drawings will illustrate and explain the function of the edge details.

The panel edge designated as “A” has a stepped groove detail and is called the access kerf. This edge is the first to engage the suspension system. An arrow printed on the back of the panel will identify this edge.

Edge “B” has a single kerf detail that supports the second side and centers the panel in the A-B direction. This edge is referred to as the registration kerf and is opposite edge “A”.

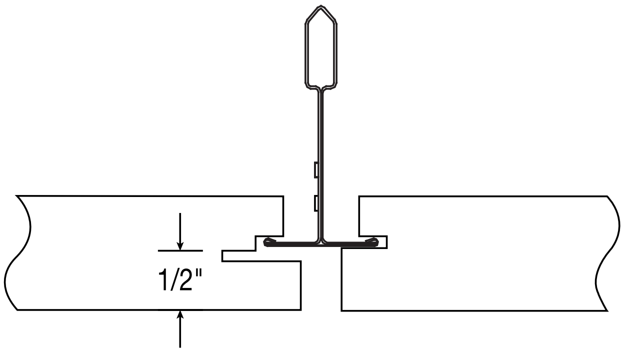


The remaining panel edges are formed to fit between the flanges of the grid system. These edges center the panel in the C-D direction and are called reversed tegular edges.



ULTIMA/OPTIMA Vector Panel Face Offset

The face of the Vector panel extends 1/2″ below the suspension system. The height of the components that interface with the ceiling panels, such as sprinkler heads and light fixture trim rings, will have to be adjusted to accommodate this 1/2″ offset.

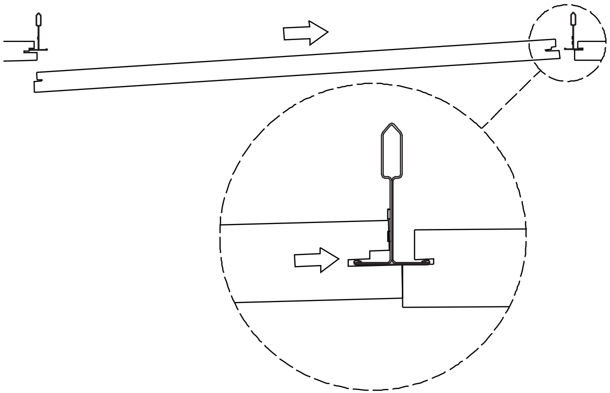


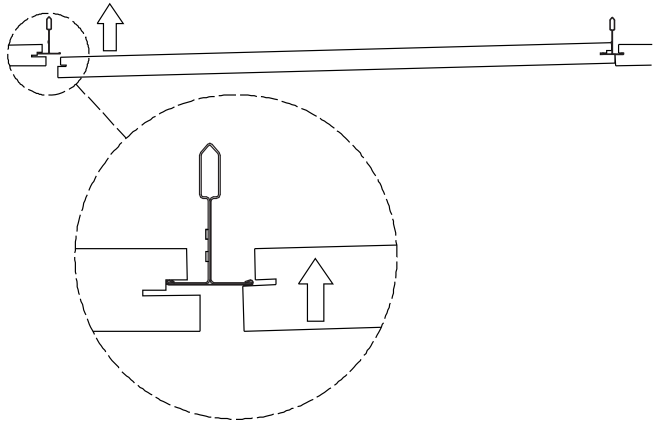
Orientation of Full Panels

Install all full-size panels with the “A” edge facing in the same direction to provide access consistency, uniform visual and proper panel alignment. Align panels as you proceed to ensure a uniform reveal width in both directions. Pay particular attention to this alignment process. Minor variations in placement can be difficult to see from the scaffold, but will become obvious when looking down long runs of panels.

Installing Full Size ULTIMA/OPTIMA Vector Panels

The Vector panels are installed in a simple three step process.

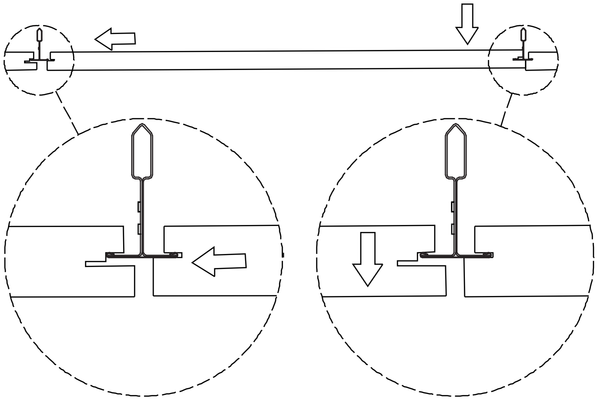




1. Fully insert the deepest kerf on edge “A”, the access kerf, onto the exposed grid flange.

2. Raise the “B” edge of the panel, the registration kerf, into the grid opening until the kerf lines up with the grid flange.

Installing Full Size ULTIMA/OPTIMA Vector Panels



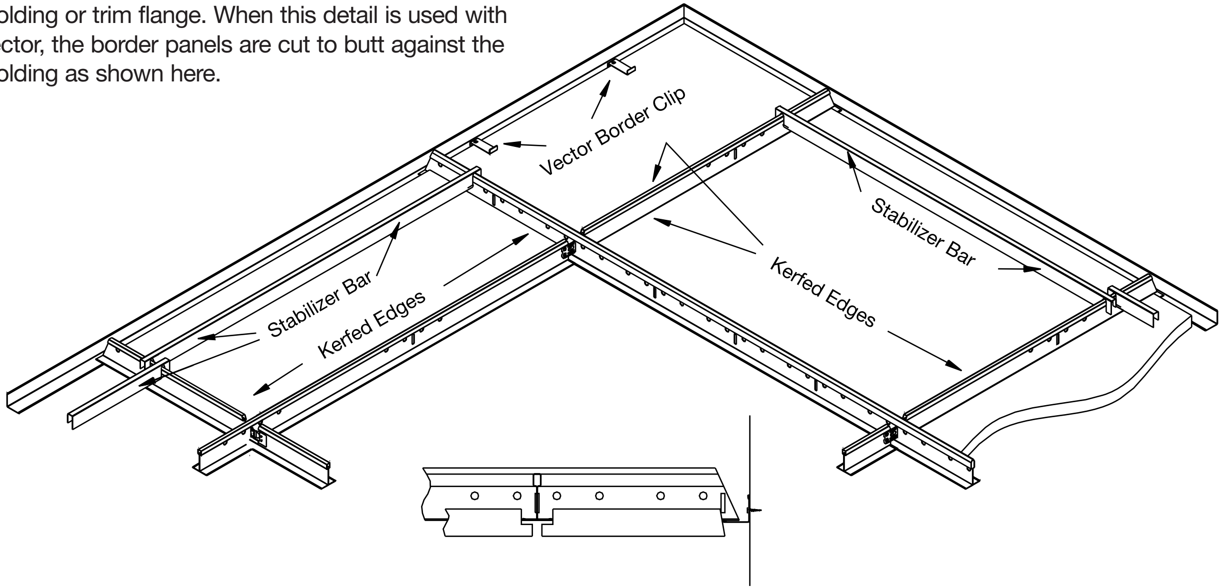
3 Slide the panel so that the registration kerf on the edge “B” engages the grid flange. Ensure that the access kerf on edge “A” drops down into the correct position.

ULTIMA/OPTIMA Vector Border Options

Many options are available for perimeter detailing. Regardless of the actual material used, either the grid will rest on the wall molding, or the face of the panel will. Follow the instructions appropriate for the job conditions.

Grid Resting on Wall Molding

In a conventional installation of t-bar grid, the face suspension system components rest directly on the molding or trim flange. When this detail is used with Vector, the border panels are cut to butt against the molding as shown here.



Seismic Installation with Grid Resting on Wall Molding

Vector Seismic Clips

Vector Seismic Clips are available for use on installations in areas of light to moderate seismic activity (Zones 0-2 or SDC A, B & C) and recommended in areas of severe seismic activity (Zones 3-4 or SDC D, E & F).

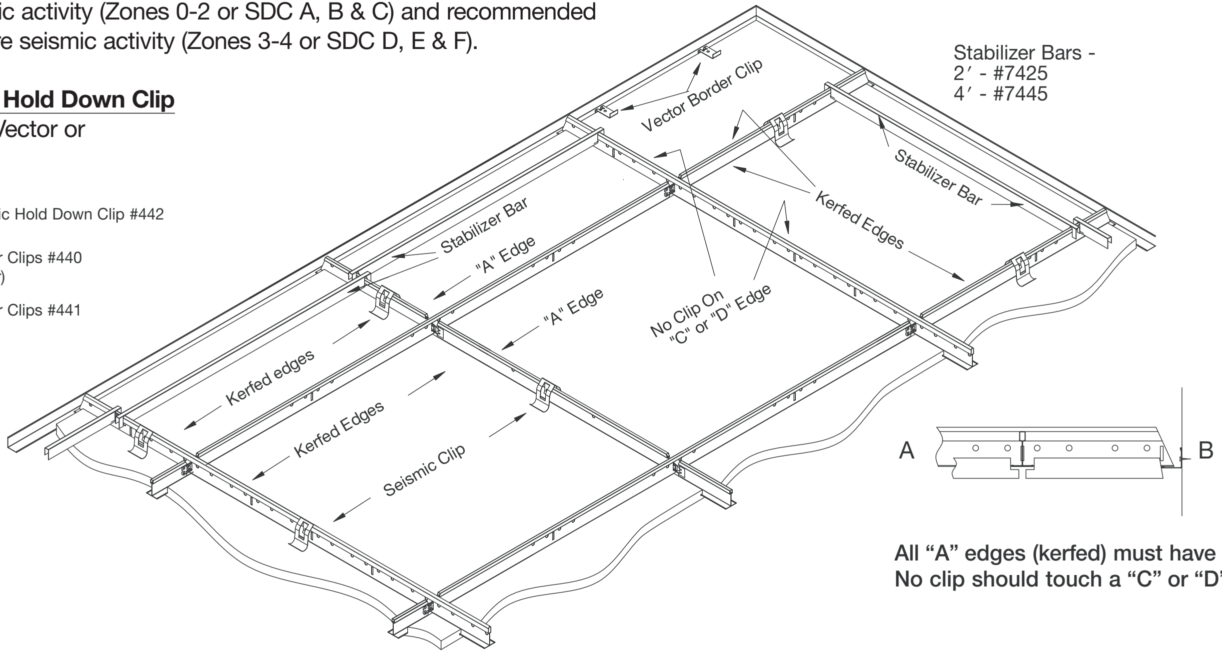
Vector Seismic Hold Down Clip

Using OPTIMA Vector or
ULTIMA Vector


Vector Seismic Hold Down Clip #442


Vector Border Clips #440
(Mineral Fiber)

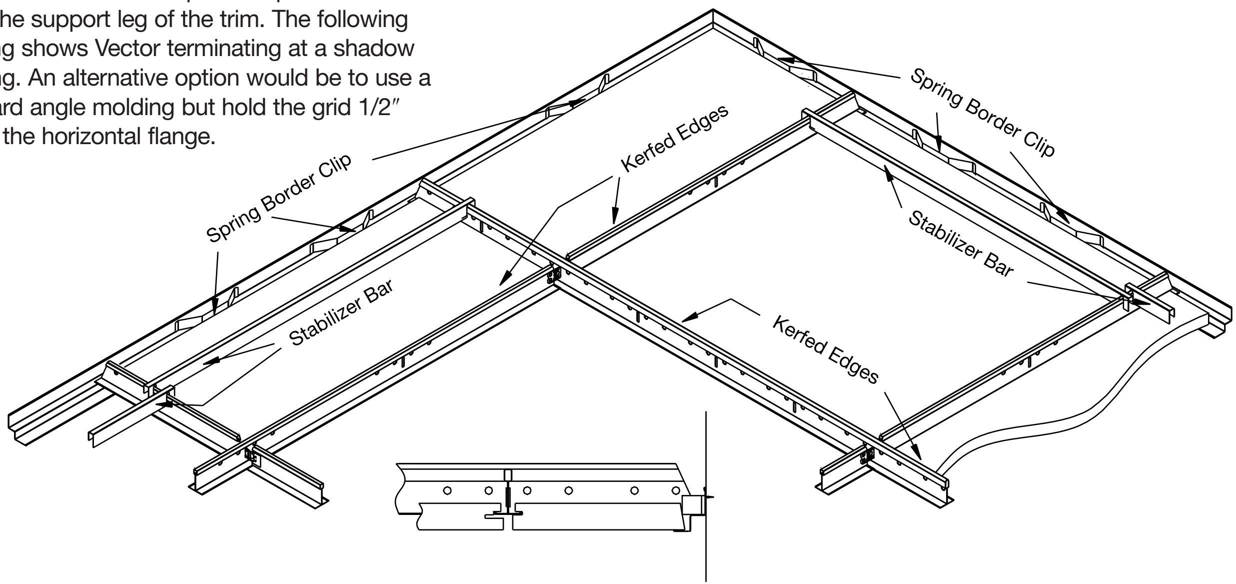

Vector Border Clips #441
(Fiberglass)



All “A” edges (kerfed) must have clips
No clip should touch a “C” or “D” edge

Panel Face Resting on Wall Molding

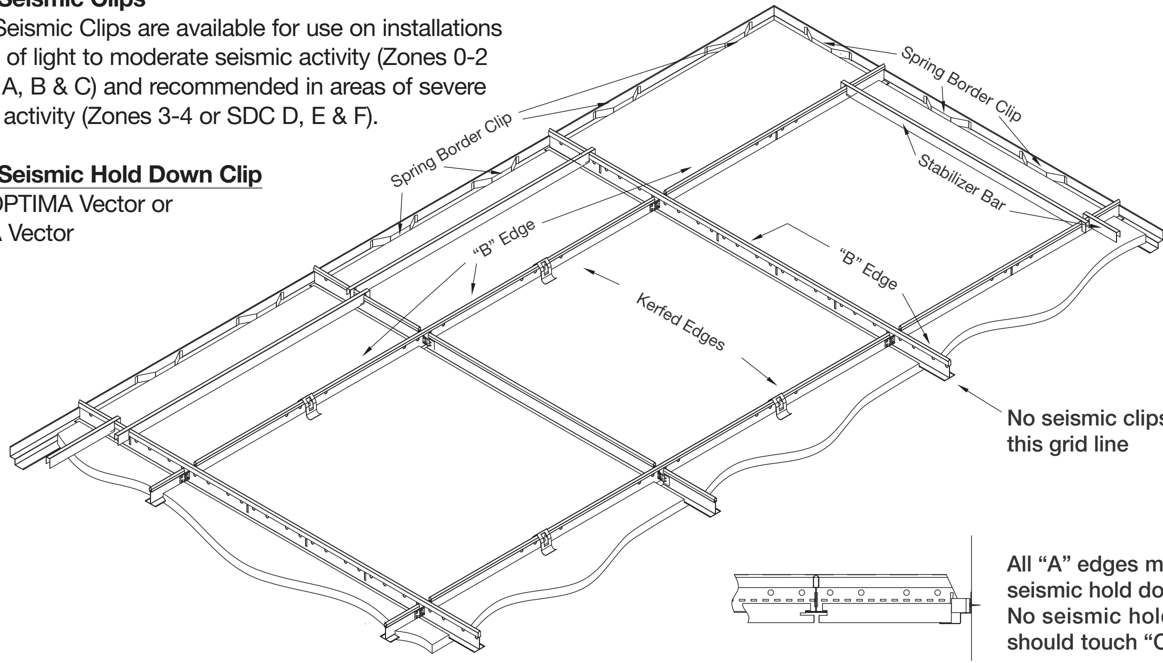
The second perimeter option is to have the grid system raised above the trim by 1/2″. This clearance will allow the face of the panel to pass over and rest upon the support leg of the trim. The following drawing shows Vector terminating at a shadow molding. An alternative option would be to use a standard angle molding but hold the grid 1/2″ above the horizontal flange.



Seismic Installation with Panel Face Resting on Wall Molding

Vector Seismic Clips
Vector Seismic Clips are available for use on installations in areas of light to moderate seismic activity (Zones 0-2 or SDC A, B & C) and recommended in areas of severe seismic activity (Zones 3-4 or SDC D, E & F).

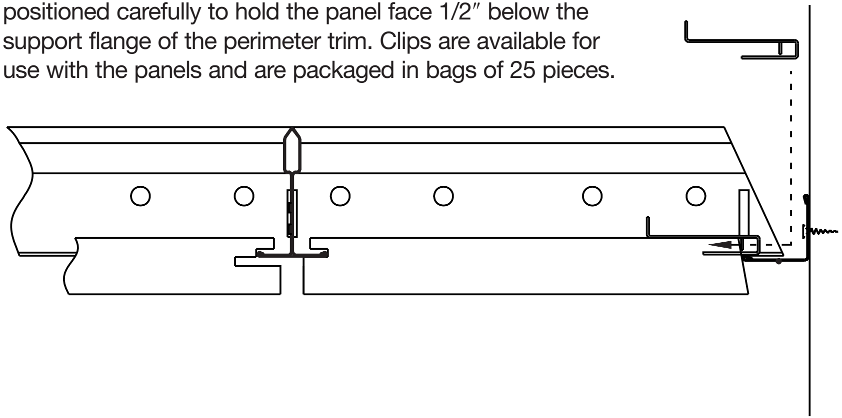
Vector Seismic Hold Down Clip
Using OPTIMA Vector or ULTIMA Vector



All "A" edges must have seismic hold down clips
No seismic hold down clips should touch "C" or "D" edges

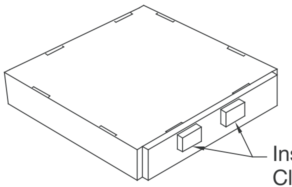
ULTIMA/OPTIMA Vector Corner Panel Installation

Preparation of the corner panel will require the removal of two edges. Mark and cut the panel to retain a portion of the “B” edge. When the grid is resting on the wall molding, support the opposite side of the panel by inserting two Vector Border Clips as shown in the drawing. Use item #441 with Optima Vector and item #440 with Ultima Vector panels. Finish nails or short pieces of hanger wire may be substituted for the Vector Border Clips. These substitutions must be positioned carefully to hold the panel face 1/2″ below the support flange of the perimeter trim. Clips are available for use with the panels and are packaged in bags of 25 pieces.

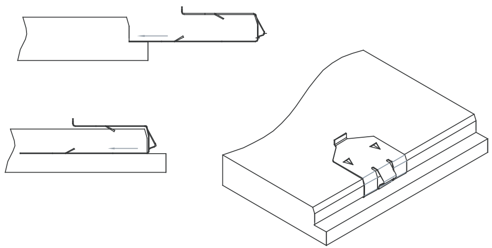


Installation Clips for 4′ x 4′ OPTIMA Vector

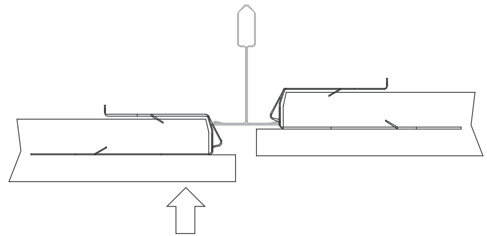
Installation Clips
A box of Optima Vector Mid-Point Clips (item #522) and Vector Border Clips (item #441) are included with each carton of panels. Remove them from the protective pad on the end and be careful not to discard with waste wrapping.



Mid-Point Clips (MPC)
(Supplied in a separate box with each carton of panels) Use a Mid-Point Clip at the middle of both C and D edges to support the panel on the grid flange. Rest the bottom of the clip on top of the C or D edge and gently push the clip into the edge until it fits against the reverse tegular edge.



Gently push up on the “C” and “D” edge at the location of the Mid-Point Clip to engage the clip on the grid flange.



OPTIMA™ Vector™ Plank

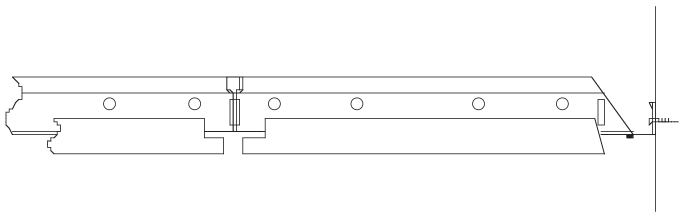
Optima Vector Plank panels are available in 24″ x 48″, 24″ x 72″ and 24″ x 96″ sizes. Optima Vector plank panels can be used with standard Optima Vector 12″ x 24″ and 24″ x 24″ panel sizes.

Vector Border Clips (#441) are provided to support the sides of the larger size panels.

OPTIMA™ Vector™ Plank Perimeter Details

Perimeter Panel Orientation
Because Optima Plank panels are rectangular, different perimeter procedures are required when the long "A/B" kerf or short "C/D" kerf meet the wall molding.

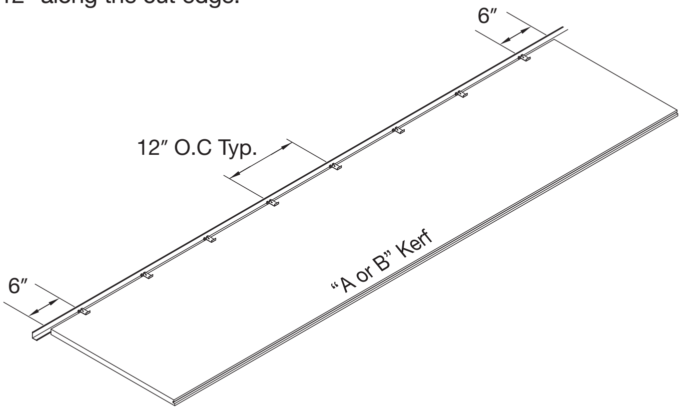
"C/D" Edge along the Perimeter
When this option is used, the cut is made parallel to either the "C" or "D" edge of the panel. This will retain the "A" and "B" details on opposite sides of the border panel. Install this border panel like a full panel with the cut edge at the perimeter.



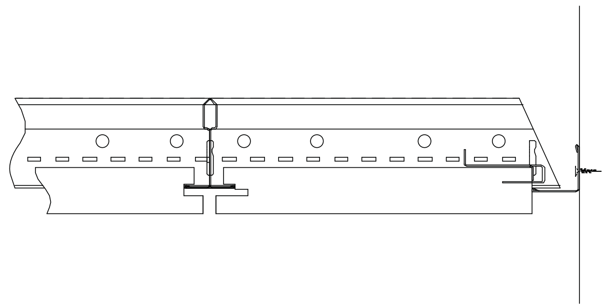
OPTIMA™ Vector™ Plank Perimeter Details

"A" Kerf along the Perimeter

When this option is used, the cut is made parallel to the kerfed edge of the panel. For ease of installation and panel accessibility, retain the "A" kerf and cut off the "B" kerf. Support the cut side of the panel by inserting Vector Border Clips #441. Clips must be within 6″ of the end and space 12″ along the cut edge.

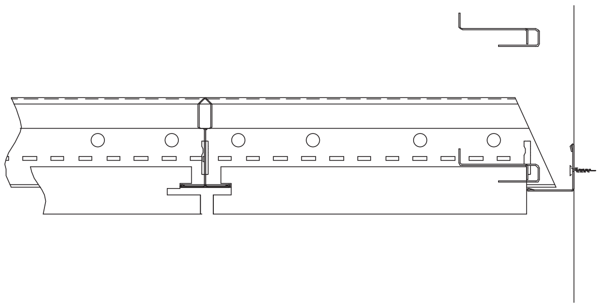


To install this panel, fully engage the "A" kerf on the grid. Raise the cut edge up until the border clips are above the wall molding. Slide the panel towards the wall until the access kerf of "A" edge drops down into the correct position. The vector border clips will support the cut edge along the wall molding.



“B” Kerf along the Perimeter

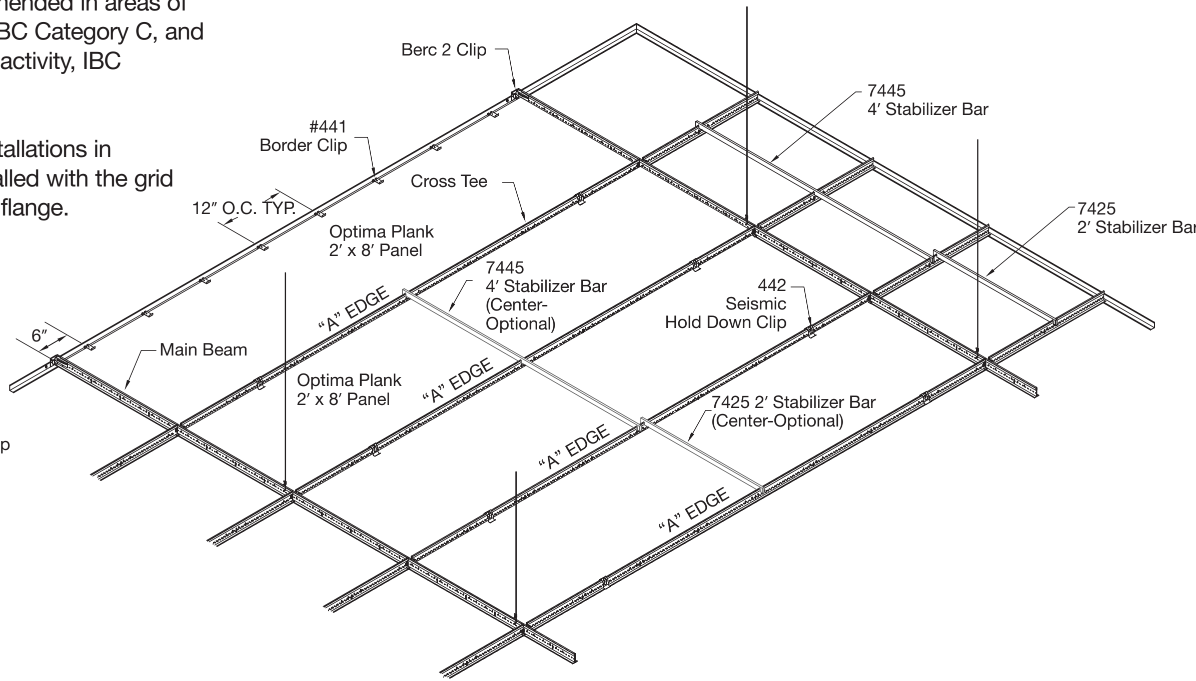
This option may be used when required but the panel is not accessible. The cut is made parallel to the “B” kerf. To install this panel, engage the “B” kerf on the grid and raise the cut edge up until it is above the wall molding. From above the grid insert the Vector Border Clips #441, along the cut edge. Clips must be within 6″ of the end and spaced 12″ along the cut edge.



OPTIMA™ Vector™ Plank Seismic Installation

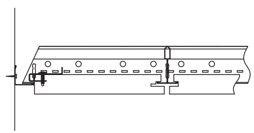
These solutions are recommended in areas of moderate seismic activity, IBC Category C, and required for severe seismic activity, IBC Category D, E and F.

All Optima Vector Plank installations in SDC D, E & F must be installed with the grid resting on the wall molding flange.




#442 Seismic Hold Down Clip


#441 Vector Border Clip



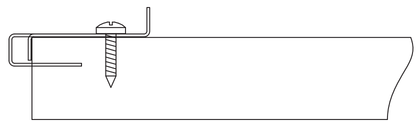
Vector Seismic Hold Down Clips

Vector Seismic Hold Down Clips, #442, are recommended for use on installations in areas of moderate seismic activity (SDC C) and required in areas of severe seismic activity (SDC D, E & F).

Snap the clip onto the grid so they will press down on the "A" edge of all panels. A single clip at the mid point is used for planks up to 4′ long. Planks greater than 4′ long will use a clip about 12″ in from each end.

Border Clips

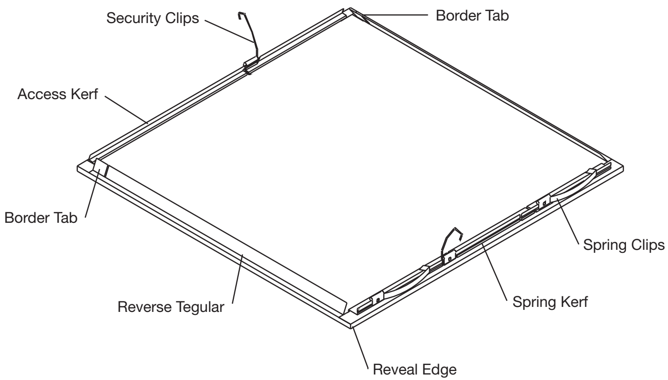
The following modification to the #441 border clip is required for OPTIMA Vector Planks installation in SDC C, D, E & F. Insert the #441 clip on the panel. Push a #8 x 9/16 sheet metal screw (or equivalent) through the clip into the plank to secure the border clip to the plank.

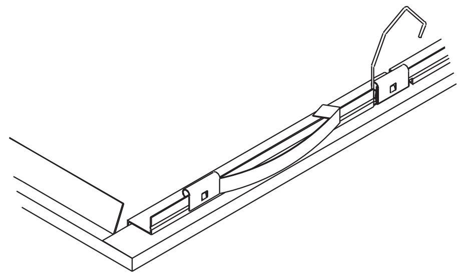


METALWORKS VECTOR PANEL EDGES

The edges of the MetalWorks Vector panels feature unique detailing. The following drawings will illustrate and explain the function of the edge details.

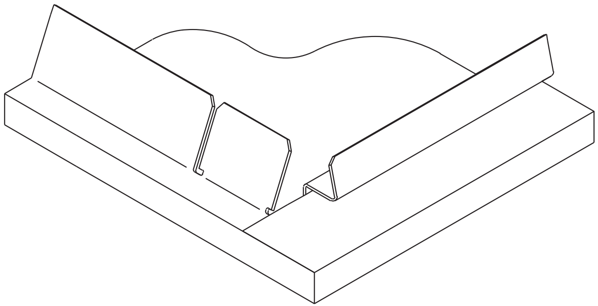
Spring Kerf: as the name applies, this edge is fitted with two steel spring clips that serve to hold the panel in position. This edge is the first to engage the suspension system.



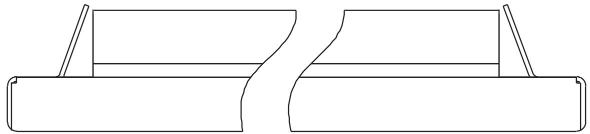


METALWORKS VECTOR PANEL EDGES

Access Kerf: this edge has a simple kerf detail that serves to locate the panel on the grid flange when the springs push in this direction. This edge is opposite the spring kerf, and is the edge that is pressed to disengage a panel for the purpose of attaining "access" to the plenum.



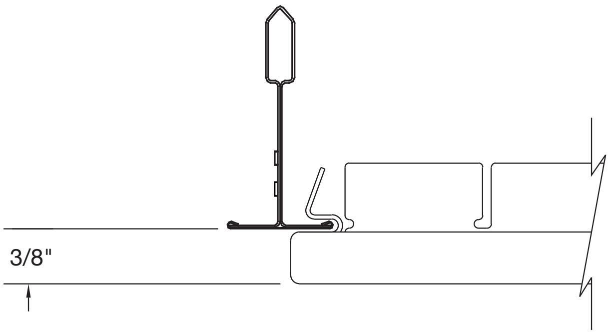
Reverse Tegular Edges: The two remaining panel edges are formed to fit between the flanges of the grid system. These edges center the panel in the grid opening and are called reversed tegular edges.



Orientation of Full Panels
Install all full-size panels with the "A" edge facing in the same direction to provide access consistency, uniform visual and proper panel alignment. Align panels as you proceed to ensure a uniform reveal width in both directions. Pay particular attention to this alignment process. Minor variations in placement can be difficult to see from the scaffold, but will become obvious when looking down long runs of panels.

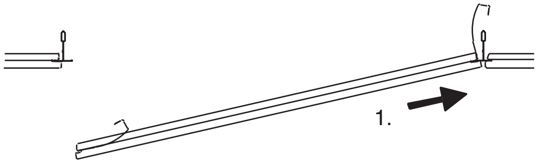
METALWORKS Vector Panel Face Offset

The face of the MetalWorks Vector panel extends 3/8″ below the face of the suspension system. The height of components that interface with the ceiling panels, such as sprinkler heads and light fixture trim rings, will have to be adjusted to accommodate this 3/8″ offset.



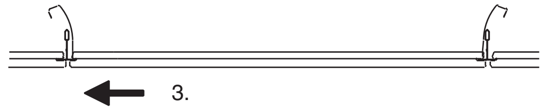
Installing Full Size METALWORKS Vector Panels

The MetalWorks Vector panels are installed in a simple three-step process.



1 Fully insert the spring kerf onto the exposed grid flange.

2 Raise the panel into the grid module until horizontal.



3 Slide the panel in the direction of the access kerf to fully position and center the panel in the grid.

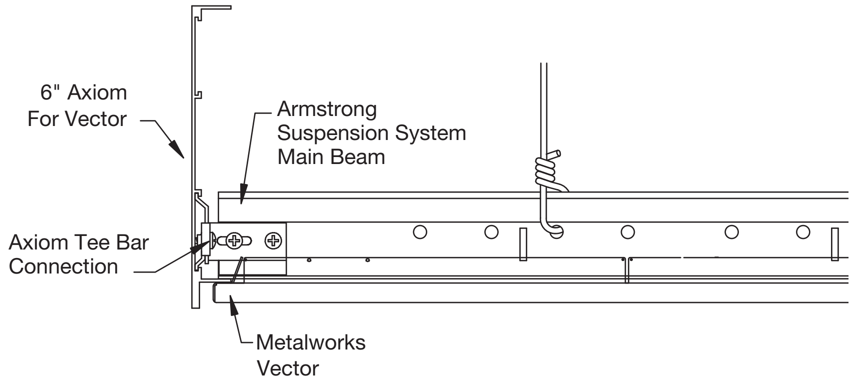
NOTE: The security clips are automatically positioned when the grid flanges enter the kerfs.

METALWORKS Vector Border Options

While the actual materials used to trim out the perimeters of a MetalWorks Vector installation are varied, installation will fall into one of two categories; either the panels will all be full size, or the cut edges will rest on and be concealed by some form of molding.

FULL PANEL INSTALLATIONS

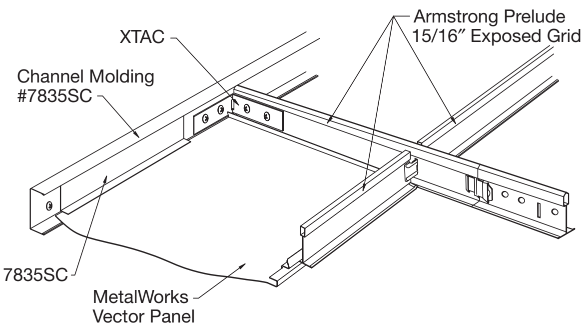
A number of detail options are available and include drywall borders, perimeter soffits and free-floating clouds. In all cases, the size of the grid opening must be maintained at exactly 23-1/16″. Squaring of the grid is also important and must be watched carefully when drywall borders are being applied.

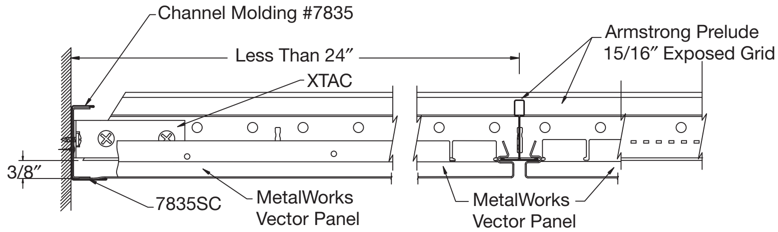


Full size panel installation of MetalWorks Vector with Axiom Perimeter Trim.

CUT PANEL INSTALLATIONS

When the grid system is raised above the trim by 3/8″, the clearance will allow the face of the panel to pass over and rest upon the support leg of the trim.





Note: Prelude grid offset 3/8″
from bottom of channel molding.

METALWORKS Vector Edge Caps

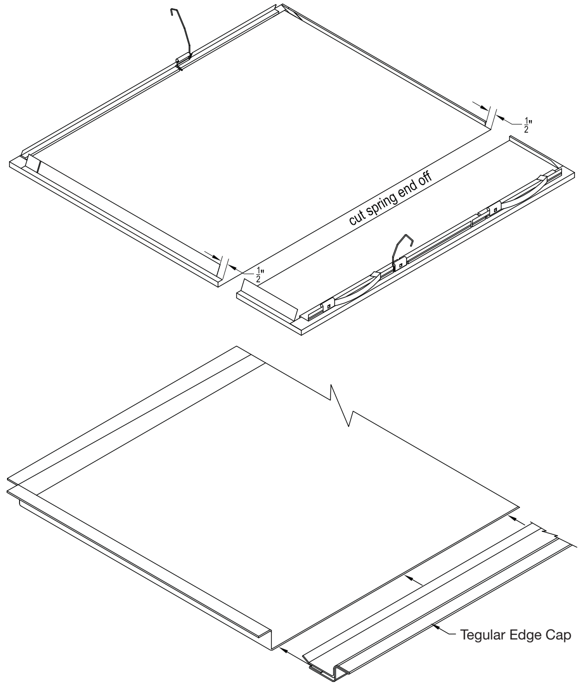
FOR CUT PANEL INSTALLATIONS

METALWORKS Edge Caps are available to finish edges of panels that have been cut to fit grid openings that are less than 2′ x 2′. Caps are available for use with METALWORKS Tegular panels and METALWORKS Vector panels.

DESIGN CONSIDERATIONS

METALWORKS Edge Caps are most appropriate for use on installations where the cut edge of the panel is parallel to the factory edge, either at the perimeters of an installation or where a panel in the field of the ceiling is reduced in size.

Edge Caps are not to be used at curved wall conditions.



Armstrong®

METALWORKS Faceted Overview

METALWORKS 2′ x 2′ Faceted is a non-flat ceiling system composed of METALWORKS Vector™ or Tegular 24″ x 24″ panels with a PRELUDE® XL 15/16″ suspension system.

Installed panels are supported by the installation system as described on the following pages. Tegular panels require the use of hold down clips, which will reduce accessibility. Use item FHDC – Faceted Hold Down Clip for these installations. Vector installations remain fully accessible.

Only Armstrong PRELUDE main beams and PRELUDE XL 2′ cross tees can be used. Main beams must be spaced 2′ on center. Only Armstrong METALWORKS Tegular and Vector panels can be used. Tegular panels will require the use of hold down clips.

DESIGN CONSIDERATIONS

Faceted installations are limited to a minimum radius of 22-1/2 feet. There is no maximum radius limitation.

Both Hills and Valleys may be created, and any portion of the circumference of the circle may be used. Hills and valleys may be connected together to create waves.

Reveals between panels will NOT be consistent on all sides. On hill installations, the spacing between panels on adjacent facets will be slightly less than between panels on the same facet. Valley conditions will have spaces that are slightly greater. This difference is slight, and is dependent on the radius of the installation.

METALWORKS Faceted Installation

Installations must comply with the requirements of ASTM C 636 with the following exceptions:

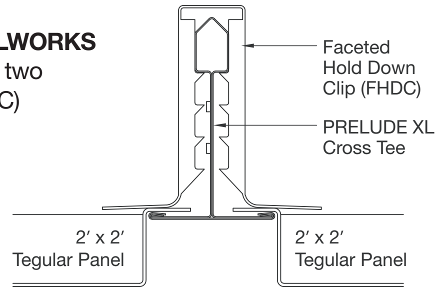
Suspend main beams 2 feet on center. Hangers must comply with ASTM C 636 requirements.

Install cross tees every 2 feet along the length of the mains.

Every second row of mains must be held in position by struts (or compression posts that extend from the main to the structure above. The function of these struts is to overcome the grid system's natural tendency to flatten out. These struts are necessary to maintain the desired curve, and must be spaced not more than 12 feet apart along the length of the mains. (See drawing on page 6-28).

Acceptable material for these struts is #16 gage, steel, cold rolled channels measuring 1/2″ x 1-1/2″ or 1/2″ diameter EMT. Struts are to be attached to the grid by means of two #8 x 3/4″ self drilling sheet metal screws, and to the structure by means of hardware appropriate for the materials encountered. Attachments to the structure must be capable of withstanding a minimum of 100 pounds of force in both tension and compression.

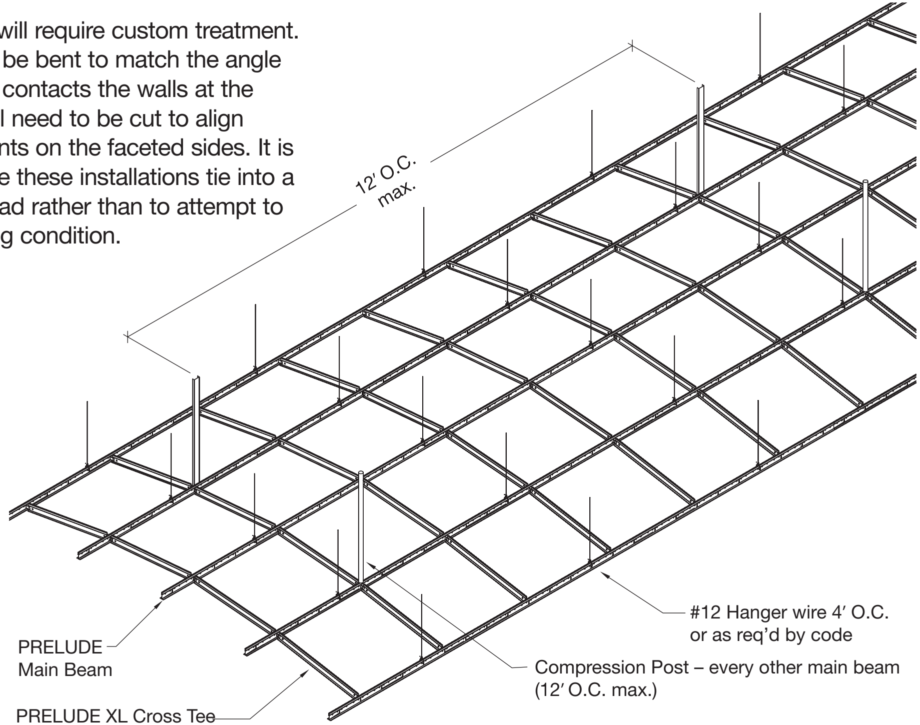
Installations using METALWORKS Tegular panels must have two hold down clips (item FHDC) applied to each cross tee.



METALWORKS Vector panels must be positioned so that all kerfed edges engage cross tees.

METALWORKS Faceted Perimeter Details

Perimeter conditions will require custom treatment. Moldings will need to be bent to match the angle of the ceiling where it contacts the walls at the straight sides, and will need to be cut to align with the panel segments on the faceted sides. It is recommended to have these installations tie into a wall or drywall bulkhead rather than to attempt to create a floating ceiling condition.



METALWORKS Faceted Seismic and Building Code Requirements

SEISMIC RESTRAINT

Installations requiring seismic restraint shall have splayed wire or rigid lateral force bracing applied as prescribed by local building code for flat ceilings.

BUILDING CODE REQUIREMENTS

Standard flat ceiling applications are governed by ASTM C 636. Armstrong Faceted installations are curved applications using standard items and do not follow the guidelines of ASTM C 636. Faceted applications are subject to plan check review. Consulting the local code inspector prior to installation is recommended.

The International Building Code (IBC), as well as its antecedents, permits alternate designs, materials and methods of construction so long as any such alternate is approved by the Authority Having Jurisdiction (AHJ). The AHJ can approve an alternate that has performance equivalent to the prescribed code requirements. Such equivalent performance is typically established through an engineering evaluation or third party testing. An alternate design, material or construction method DOES meet building code requirements once approved by the AHJ.

In order to establish equivalent performance of our alternateinstallation method for building code approval by an AHJ, Armstrong uses reports generated by the Structural Engineering Earthquake Simulation Laboratory (SEESL) at the State University of New York's Buffalo campus.

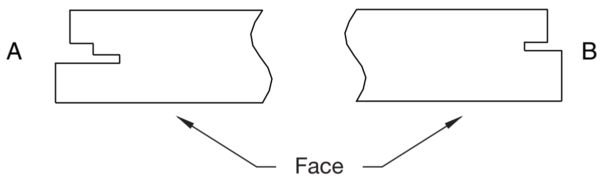
Armstrong reports reflect only the performance of the materials used during our testing. This means that faceted installations can only be created using Armstrong PRELUDE main beams and PRELUDE XL 2' cross tees and may only be used with METALWORKS Vector and Tegular ceiling panels. For a copy of the reports, please contact TechLine.

WOODWORKS VECTOR PANEL EDGES

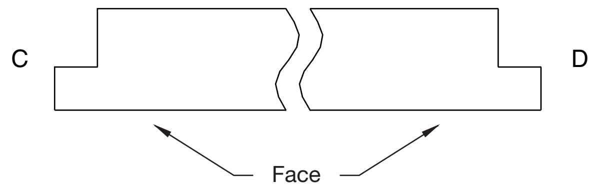
The edges of the WoodWorks Vector panels feature unique detailing. The following drawings will illustrate and explain the function of the edge details.

The panel edge designated as “A” has a stepped groove detail and is called the access kerf. This edge is the first to engage the suspension system and also the side that must be raised to access the plenum.

Edge “B” has a single kerf detail that supports the second side and centers the panel in the A-B direction. This edge is referred to as the registration kerf and is opposite edge “A”.

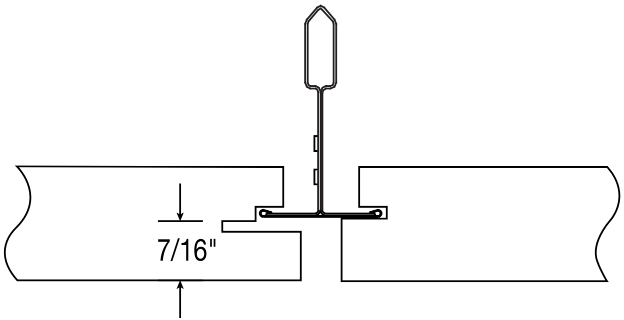


The two remaining panel edges are formed to fit between the flanges of the grid system. These edges center the panel in the C-D direction and are called reversed tegular edges.



WOODWORKS Vector Panel Face Offset

The face of the WoodWorks Vector panel extends 7/16″ below the suspension system. The height of the components that interface with the ceiling panels, such as sprinkler heads and light fixture trim rings, will have to be adjusted to accommodate this 7/16″ offset.

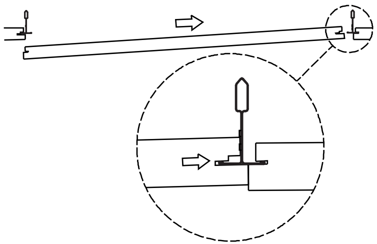


Orientation of Full Panels
Install all full-size panels with the “A” edge facing in the same direction to provide access consistency, uniform visual and proper panel alignment. Align panels as you proceed to ensure a uniform reveal width in both directions. Pay particular attention to this alignment process. Minor variations in placement can be difficult to see from the scaffold, but will become obvious when looking down long runs of panels.

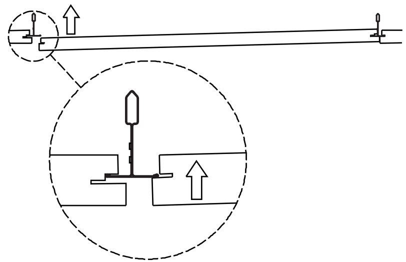
Installing Full Size WOODWORKS Vector Panels

WoodWorks Vector ceilings are easily installed and removed from below the suspension system without the aid of tools or special equipment, allowing easy downward access to the plenum.

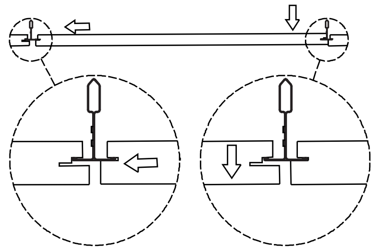
The WoodWorks Vector panels are installed in a simple three step process.



1. Fully insert the deepest kerf, the access kerf, onto the exposed grid flange.



2. Raise the registration kerf into the grid opening until the kerf lines up with the grid flange.

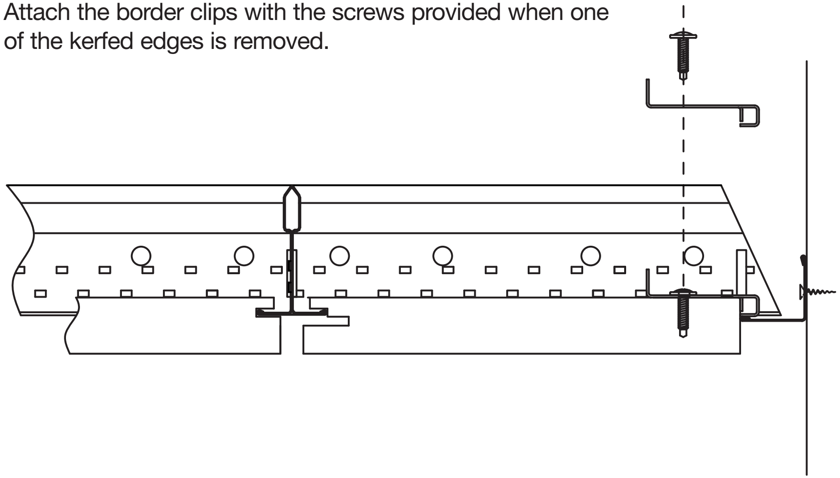


3. Slide the panel so that the registration kerf engages the grid flange. Ensure that the access kerf drops down into the correct position.

WOODWORKS Vector Border Options

The face of the suspension system components rest directly on the molding or trim flange. The border panels are cut to butt against the molding as shown. The grain pattern on the panels dictate that they can be rotated 180 degrees, but not 90 degrees.

Attach the border clips with the screws provided when one of the kerfed edges is removed.



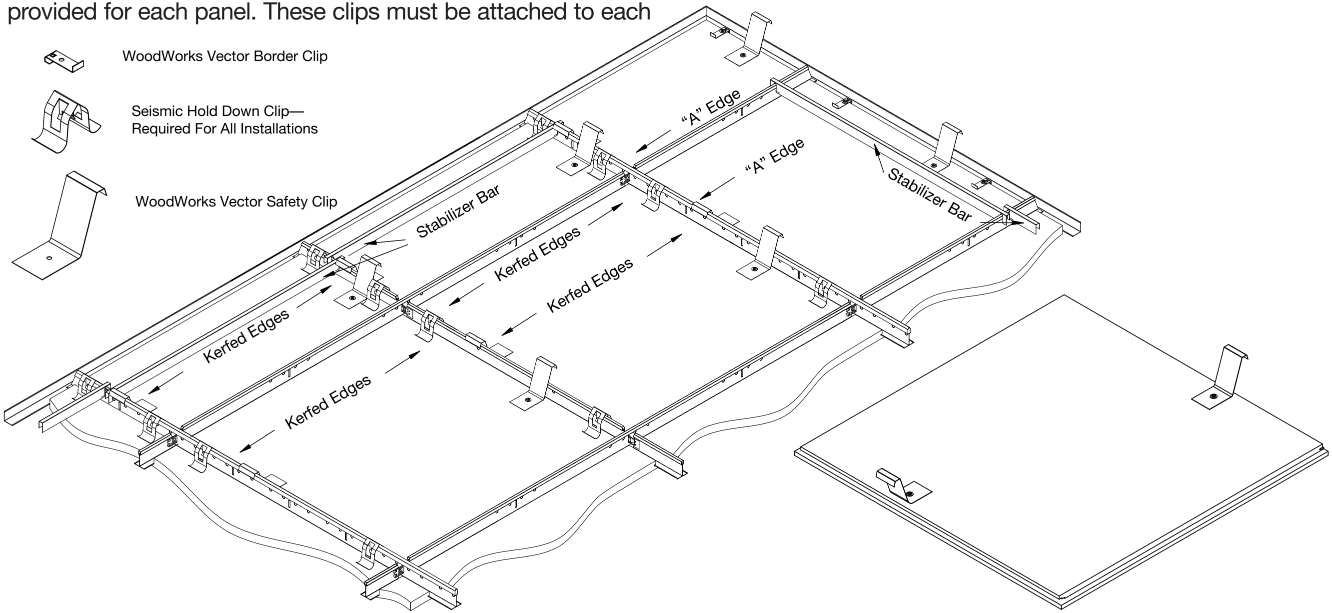
WOODWORKS Vector Weight Considerations

WoodWorks Vector panels weigh 2.75 lbs./sf. Main beams must be capable of carrying the weight of the panels plus any additional ceiling components that are not independently supported from the building structure. The minimum acceptable load capacity for the main beam, when supporting only ceiling panels, is 12 lbs./lf., and the 4′ cross tees must be capable of carrying a

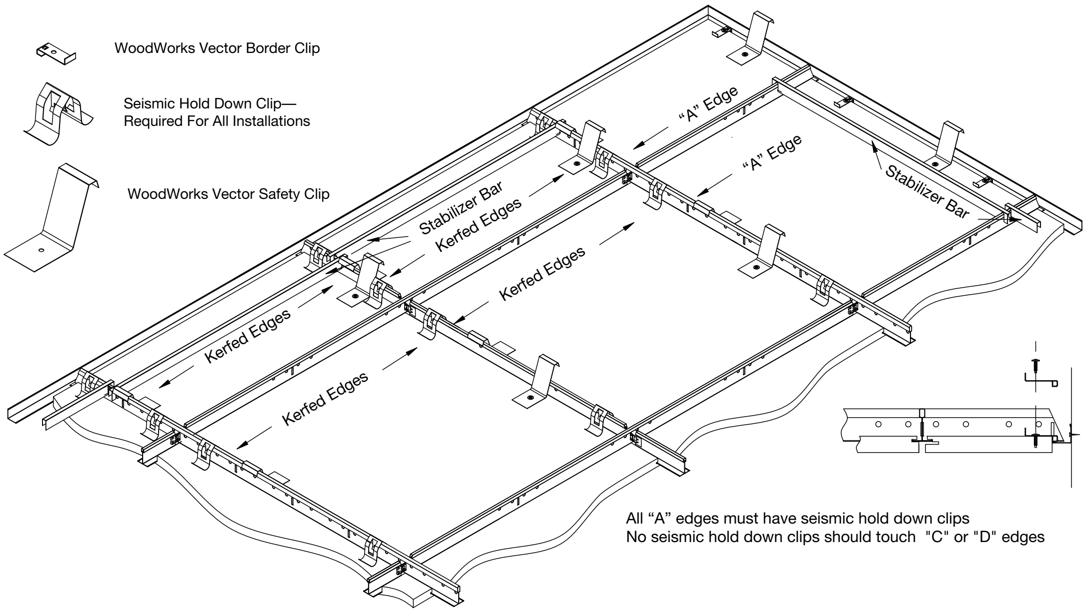
NOTE: WoodWorks Vector must be installed to meet severe seismic standards as outlined in the in-carton installation instructions (also available online).

WOODWORKS Vector Safety Clips

The weight of the panels and downward nature of the access suggests the need for a mechanism to prevent panels from dropping when disengaged from the grid. Two safety clips are provided for each panel. These clips must be attached to each panel by means of the #8 x 9/16″ screws provided. Pre-drilled pilot holes are located along each kerfed edge of the panel.



WoodWorks Vector Clip Arrangement



All "A" edges must have seismic hold down clips
No seismic hold down clips should touch "C" or "D" edges

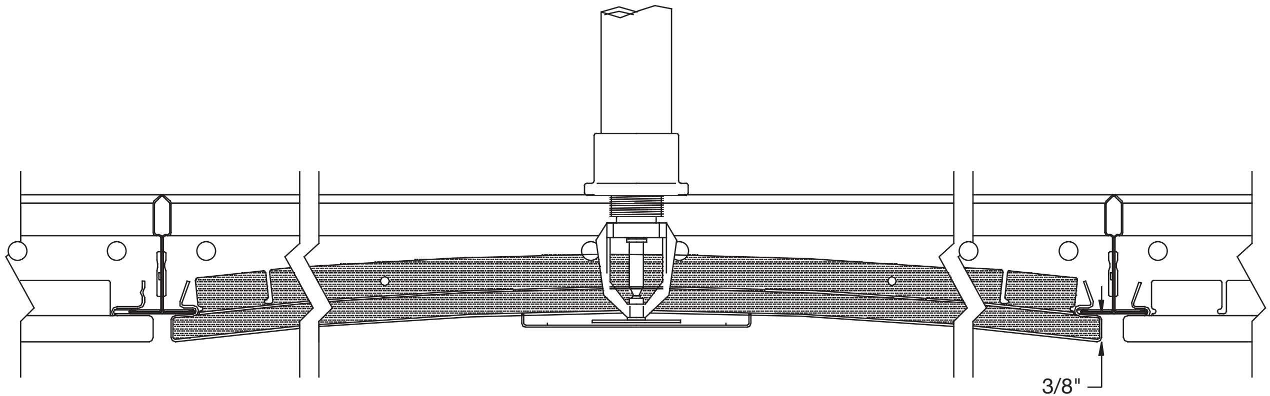
Penetrations Through Vector Ceilings

PENETRATIONS AND THE VECTOR CEILING PLANE

Most Vector ceilings will be installed with penetrations through the panels at some location or another. The trades installing these penetrations must be made aware that the actual ceiling plane is not the height of the grid. The grid will likely be in place when the sprinklers are installed or electricians install "can" lights, so the grid will be the only reference these other trades have to work from.

RESULTS OF IMPROPER INSTALLATION

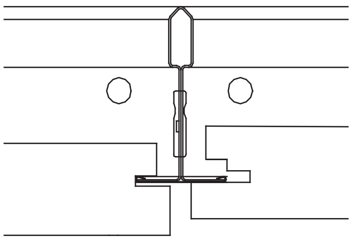
If the sprinkler or "can" light is installed flush with the grid in a MetalWorks Vector ceiling, the panel will be bowed upward around the penetration as shown below.



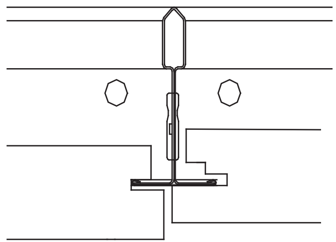
Penetrations Through Vector Ceilings

If the sprinkler or "can" light is installed flush with the grid in a WoodWorks, Optima or Ultima Vector ceiling, not only will this create an undesirable visual (see "A" below), but it can also shift the panel to the side reducing the 1/4″ inch reveal between panels (see "B" below).

A

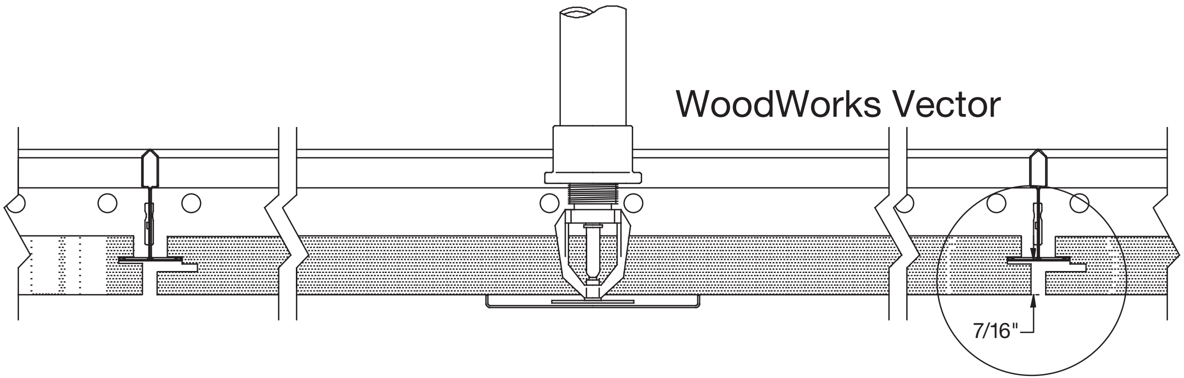


B

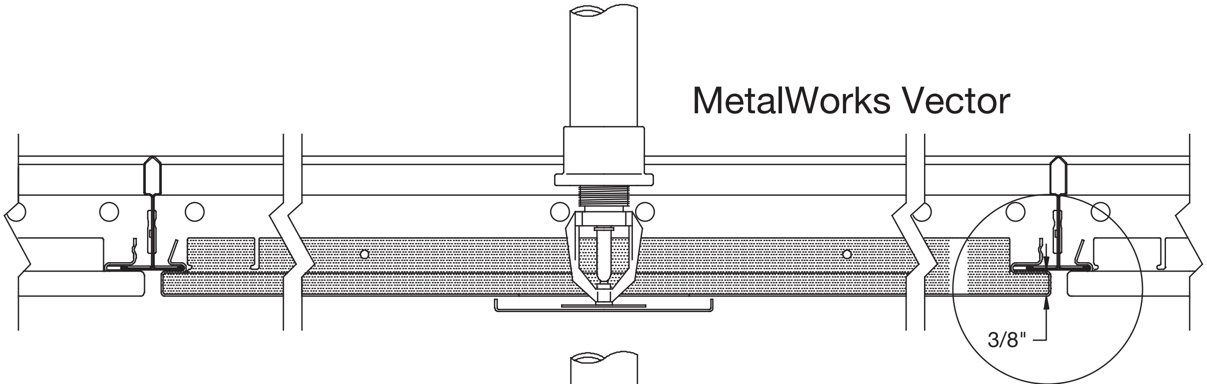


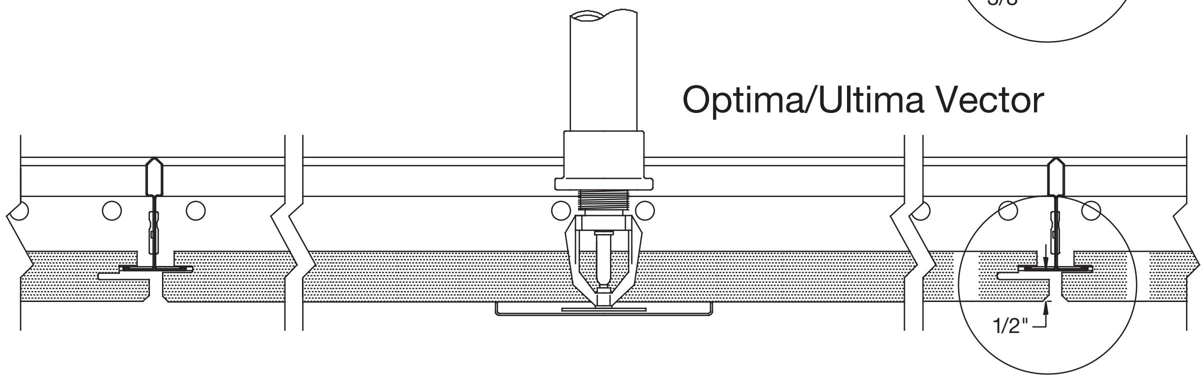
GETTING THE BEST RESULT WITH VECTOR CEILINGS

The drawings below show that the penetrations must be installed to finish below the plane of the grid. There are three different measurements circled in the three illustrations. The first is for WoodWorks Vector (7/16″), the second is for MetalWorks Vector (3/8″) and the third is for Optima and Ultima Vector (1/2″).



Penetrations Through Vector Ceilings





CEILING & WALL SYSTEMS

[Between us, ideas become reality.]®

Axiom® Perimeter Trim

Commercial Ceilings and Walls Solutions Guide

Axiom® Perimeter Trim

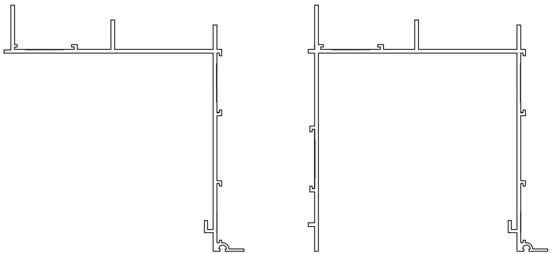
AXIOM Trim

The Axiom family of products provide functional and visual options in ceiling design.

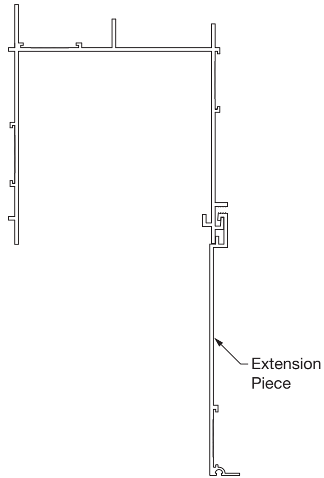
- Extruded aluminum offers clean, crisp details
- Straight and curved options
- More than 17 different profiles and visuals
- Installation instructions are included in the cartons

AXIOM Building Perimeter System

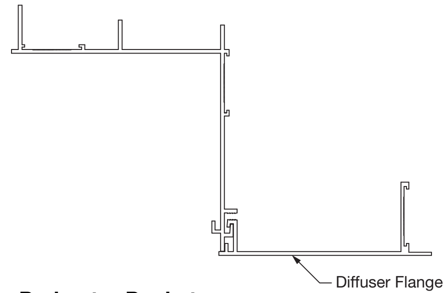
Pre-engineered approach to integrating drapery pockets, air distribution and ceiling elevation changes. The system is comprised of three basic aluminum extrusion components.



Perimeter Pockets:
2 or 3 sided aluminum extrusion that accepts a T-Bar Connection Clip and Splice Plate



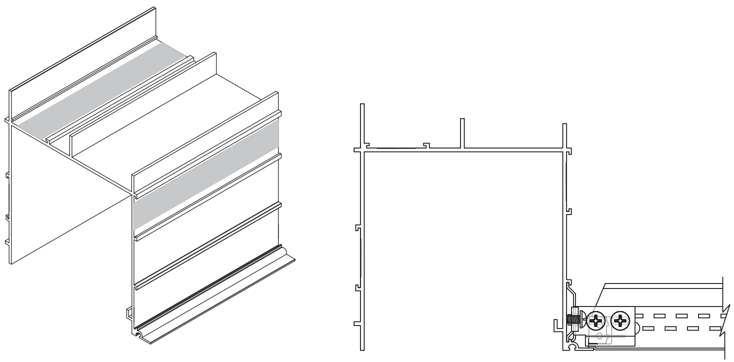
Perimeter Pockets Extensions:
Pre-engineered 4″, 6″ or 8″ extension piece fully integrates with perimeter pocket allowing for larger perimeter pockets and ceiling elevation changes



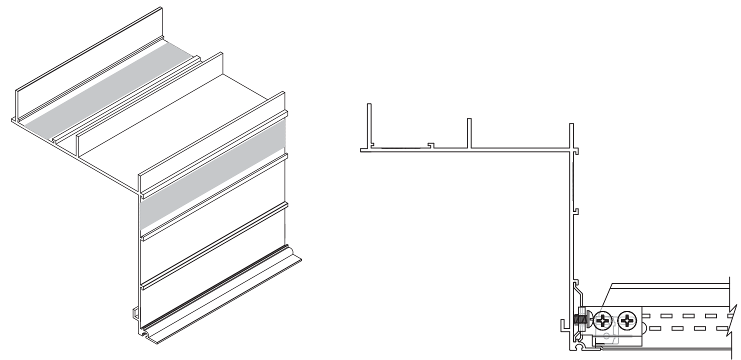
Perimeter Pockets with Diffuser Face Plate:
Pre-engineered 4″ or 7″ diffuser face plate fully integrates with perimeter pocket; diffuser can be slotted to provide air distribution at the perimeter

Armstrong

AXIOM Building Perimeter System pocket details

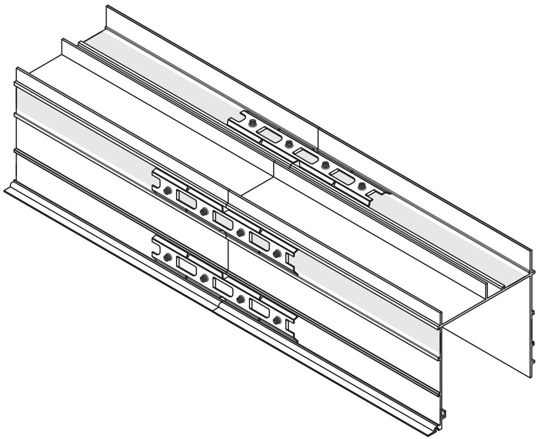


3-Sided Perimeter Pocket with transition to Acoustical/Drywall Grid
(Acoustical Transition Shown)



2-Sided Perimeter Pocket with transition to Acoustical/Drywall Grid
(Acoustical Transition Shown)

Steel splice plates are used to align and secure joints between sections of ABPS trim. Each joint requires a splice plate at every set of channel bosses for the proper trim alignment. Join straight sections of ABPS using the AX4SPLICE (4 screws) splice plates. Splice plates are secured to the trim sections using factory installed setscrews. A 1/8″ hex key is included with the hardware. Three splice plates per-joint recommended.



Typical procedure

1. Insert splices into channel trim bosses

2. Close the joint

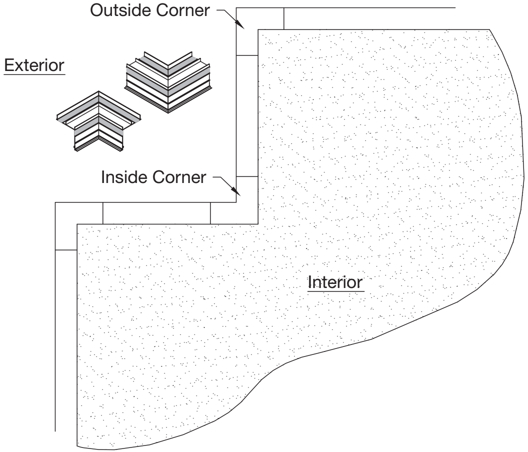
3. Tighten screws

NOTE: Splice plates can slide completely into the channel bosses and then slide into the adjoining section after trim is aligned. This will aide splice plate connections for the last piece or mitered intersections.

CAUTION: Do not over-tighten these screws. Apply only enough force to lock the components together. Over tightening the screws can deform the exposed face of the channel trim.

AXIOM Building Perimeter System factory mitered corners

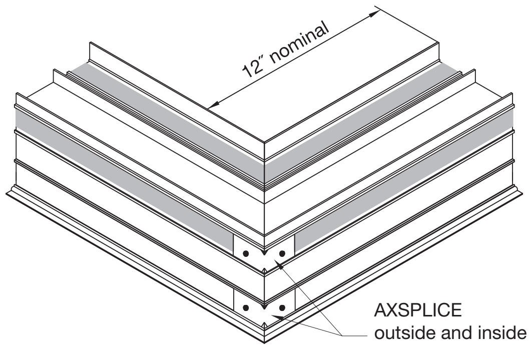
ABPS perimeter pockets are available with factory mitered corners. Mitered sections of trim will measure nominal 12″ along the inside flange of the miter. Factory mitered corners ship in sections and must be assembled on the job. All hardware is included. The mitered ends of ABPS are joined using the AXSPLICE (2 screw) splice plates. AXSPLICE plates are shipped flat. Hand-bend the plates as required for mitered intersections. Insert AXSPLICE in outside and inside channel bosses. The square ends are attached to adjoining straight sections of Axiom trim using the AX4SPLICEB (4 screw) splice plates.



ABPS pocket mitered corner trim should be installed before the straight sections. Work away from the corners and field cut straight sections as needed.

Field mitering ABPS Perimeter Pockets is not recommended due to the shape and size of the trim.

ABPS extension pieces and diffuser face plates can be cut and mitered in the field for the best fit. These cuts are best made using an appropriately sized sliding compound miter saw fitted with carbide tipped blade designed for cutting non-ferrous metals.

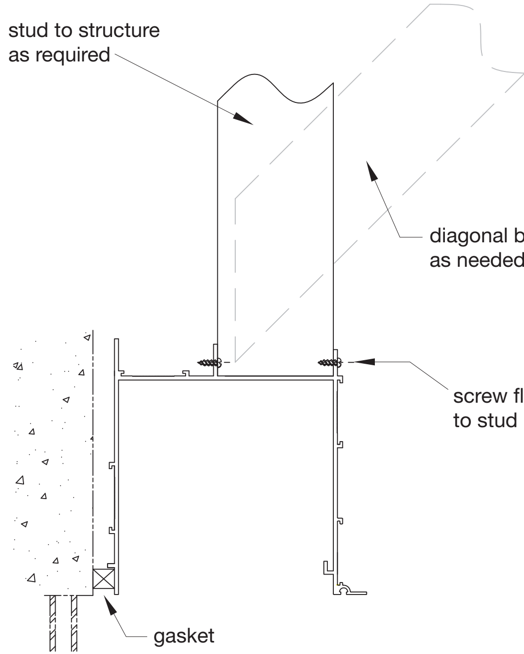


AXIOM Building Perimeter System pocket installation – free floating

Typical procedure

1. Fasten a 2-1/2″ track or wood blocking to the structure directly above the ABPS perimeter pocket track location. Use appropriate fasteners along the track to carry the weight of the ABPS.
2. Cut nominal 2-1/2″ metal studs to fit between the structure track and the ABPS Pocket track.
3. Install the 1/2″ x 1/2″ self stick foam gasket just below the tab along the bottom outside edge of the ABPS pocket.
4. Use a laser or leveling device and temporarily secure the ABPS pocket to several studs with clamps or vice grips.
5. Use sheet metal screws, typ. #8 x 1/2″ framing screw, to attach both sides of the stud to the ABPS track.
6. Studs should be located every 24″ (max stud spacing is 48″ OC) along the track or as required by local authorities.
7. Use diagonal bracing to structure as needed to maintain the correct alignment of the ABPS pocket.

The foam gasket will seal the ABPS pocket along the wall and-make up for slight wall irregularities.



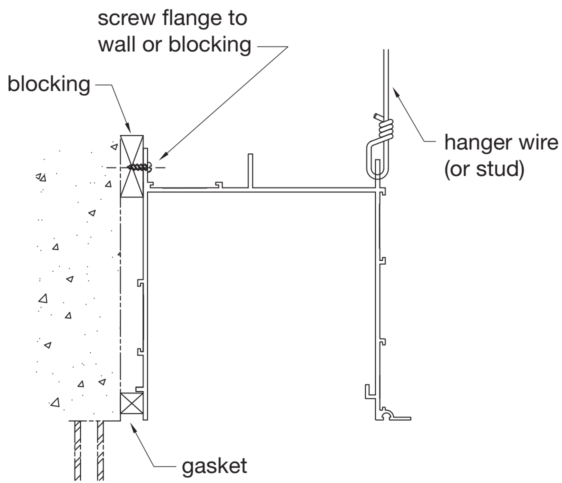
AXIOM Building Perimeter System pocket installation – attached to wall

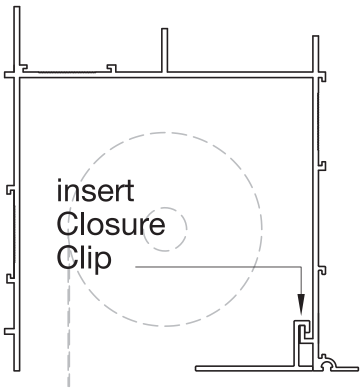
Typical procedure

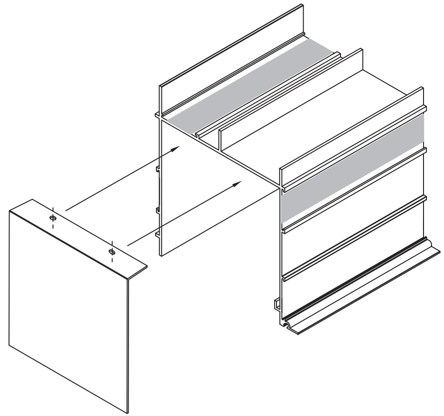
1. Attach blocking to the wall structure with the appropriate fasteners. Shim as needed at any wall irregularities to create a straight run.
2. Predrill clearance holes every 16″ to 24″ or as needed along the top wall flange of the pocket.
3. Install the 1/2″ x 1/2″ self stick foam gasket just below the tab along the bottom outside edge of the ABPS pocket.
4. Use a laser to level the pocket along the wall and secure it to the blocking every 16″ to 24″ or as required by local authorities.
5. The front of the pocket can be supported with 12 ga. wire or a strut. Predrill a clearance hole in the top front flange to attach a hanger wire. Attach hanger wire to structure, then to the pocket. Wire spacing should not exceed 48″.

NOTE: All hanger wire holes must be drilled to have a minimum of 1/4″ between the top of the hole and the top of the flange for load requirements.

The foam gasket will seal the ABPS pocket along the wall and make up for slight wall irregularities.



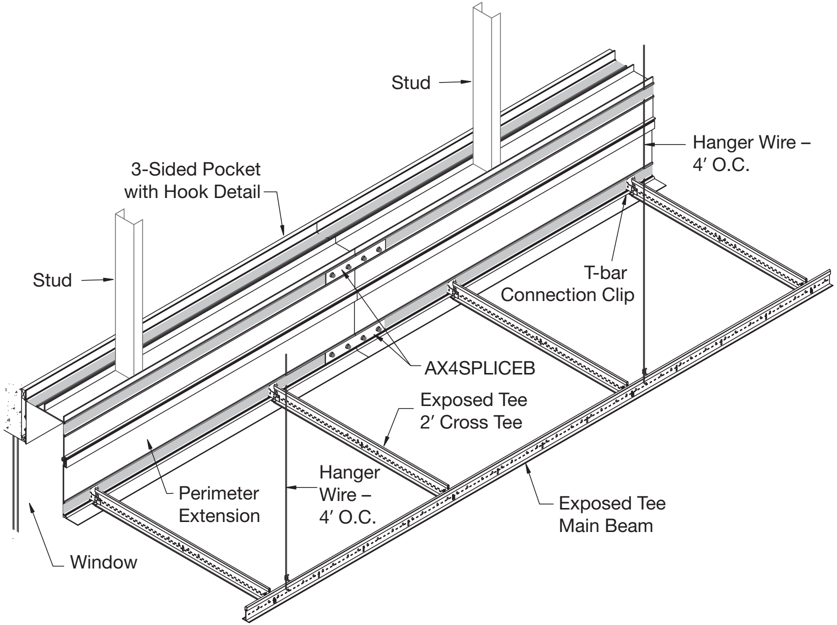


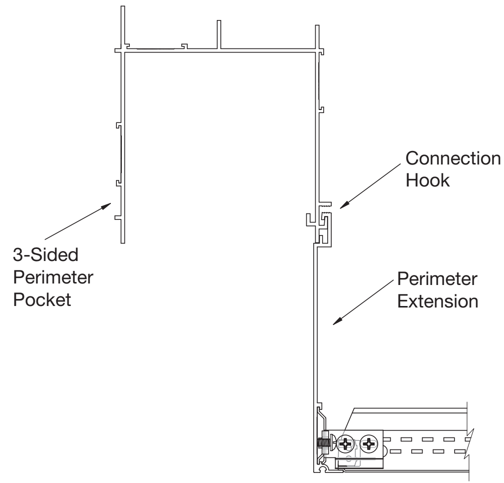


Perimeter Closure Clip
Fits inside the room side of the pocket to close off or reduce the opening of the pocket. It is available 2″ and 3″ wide and come 10′ in length.

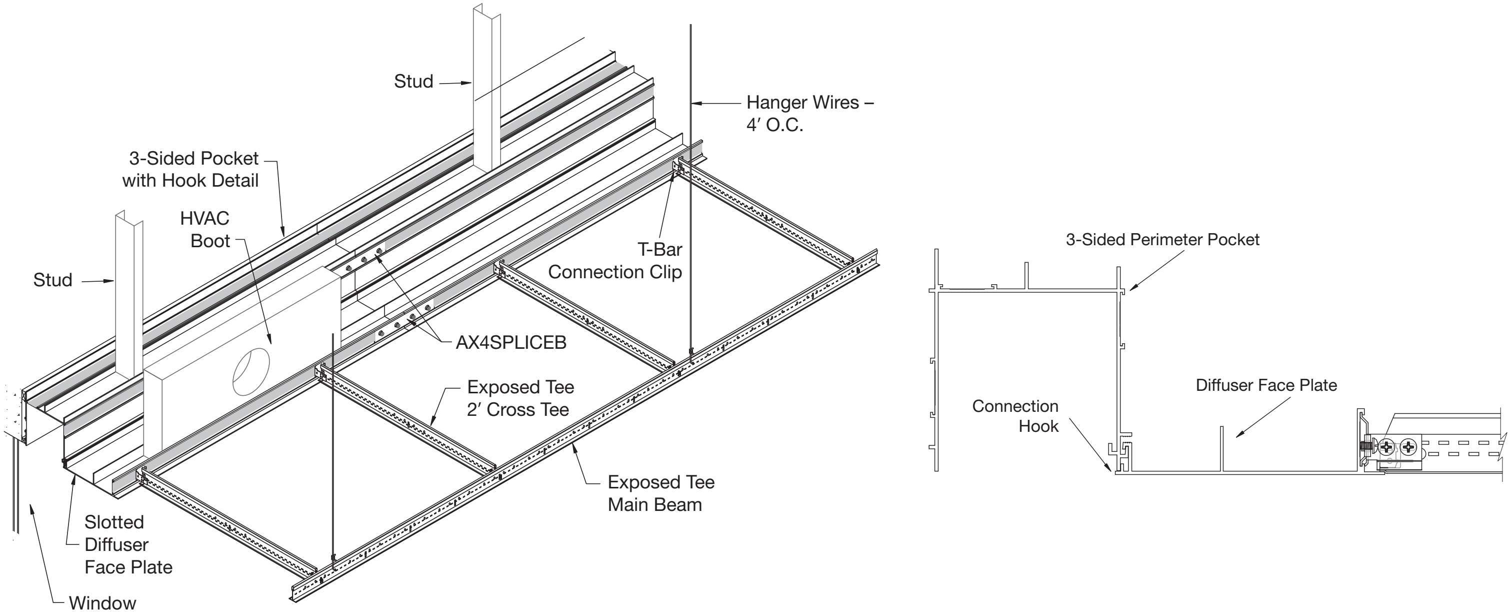
End Plate
Use the End Plate to close off the ABPS Pocket at open ends, to conceal curtain ends, seal the pocket at partition walls or as needed.

AXIOM Building Perimeter System extension detail



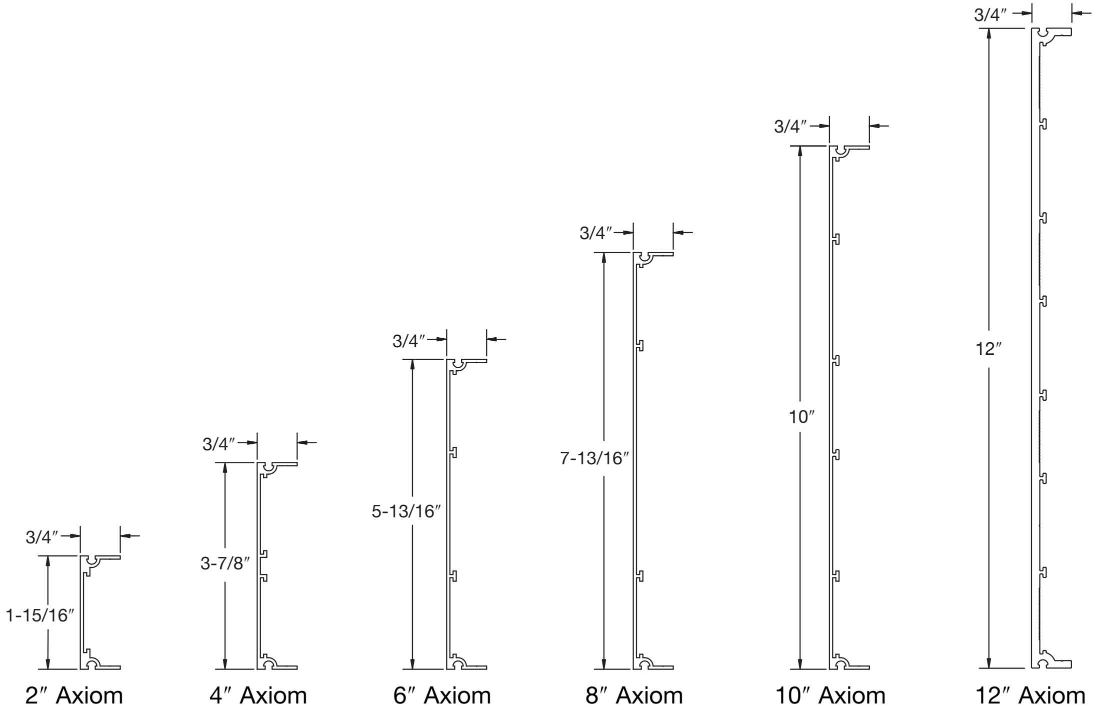


Three-sided Perimeter Pocket with Perimeter Extension Plate



Three-sided Perimeter Pocket with Diffuser Face Plate

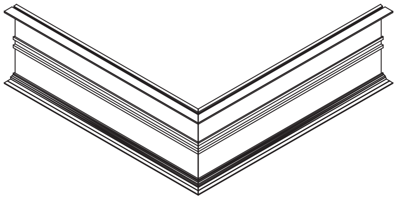
AXIOM-Classic profiles



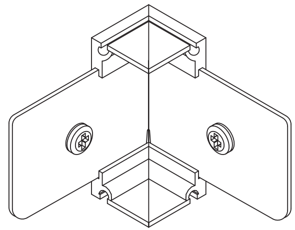
Minimum Bend Radius For Axiom-Classic

2″, 4″, 6″, 8″ profile — 24″ minimum
10″ profile — 36″ minimum
12″ profile — 60″ minimum

AXIOM-Classic corners



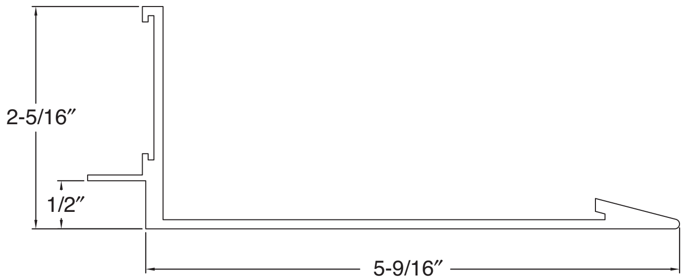
AXIOM-Classic
Inside Corner



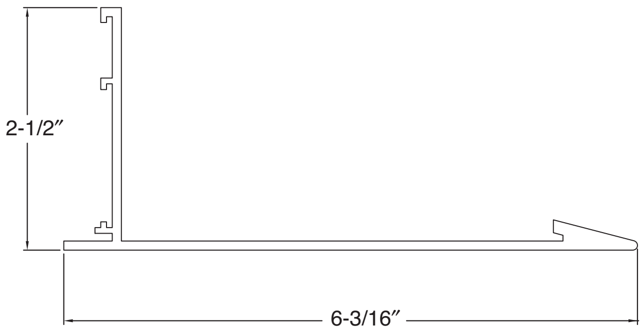
AXIOM-Classic
Outside Corner Post

AXIOM-Knife Edge profiles

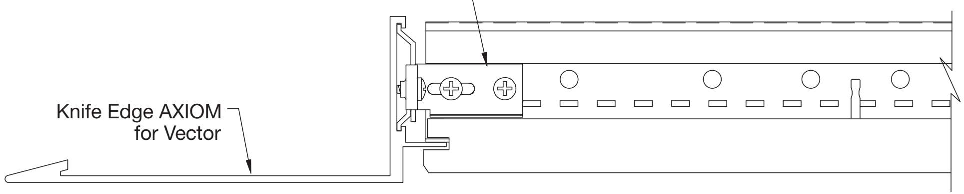
Axiom-Knife Edge For Vector
for the unique Vector panel



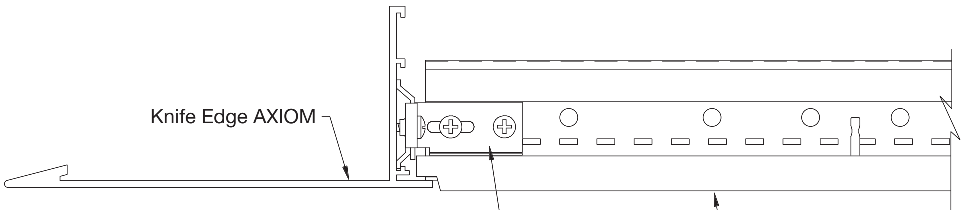
Axiom-Knife Edge
for traditional acoustical



AXIOM-Knife Edge details



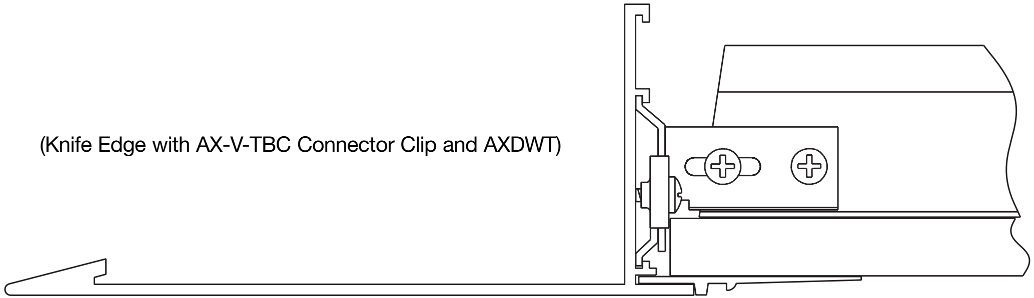
Axiom-Knife Edge For Vector
with Vector panel



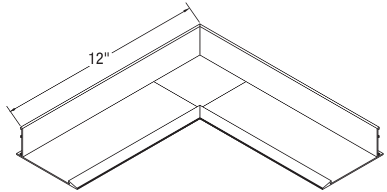
Axiom-Knife Edge
with Tegular panel

AXIOM-Knife Edge with Drywall detail

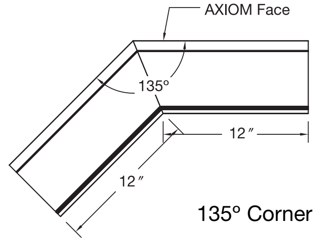
(Knife Edge with AX-V-TBC Connector Clip and AXDWT)



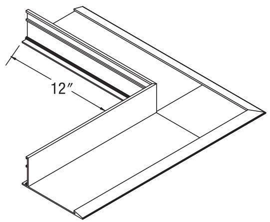
**Factory-assembled corner configurations
available 60-135º (upon request)**



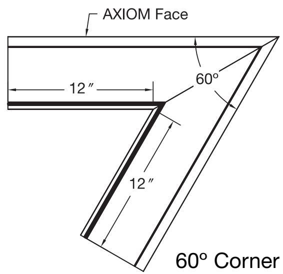
AXIOM-Knife Edge
Factory Bonded Inside Corner



135º Corner



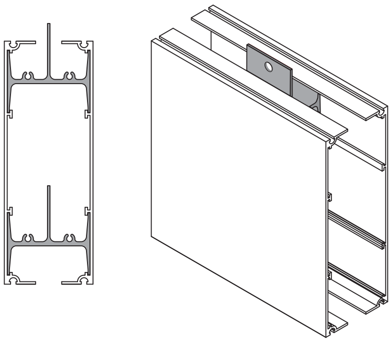
AXIOM-Knife Edge
Factory Bonded Outside Corner



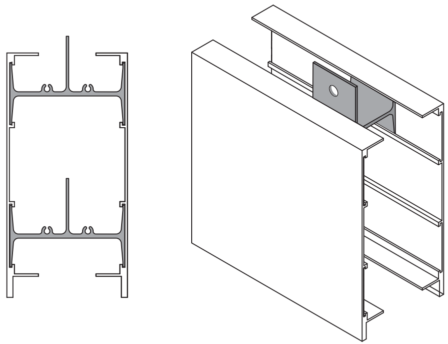
60º Corner

AXIOM-Paired

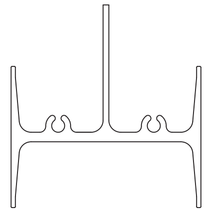
Unique system allows tandem sections of curved or straight Axiom to run parallel with a 5/8″ or 1-3/8″ reveal between profiles



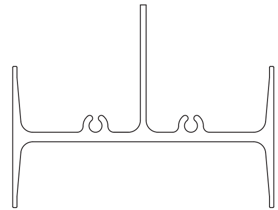
Paired AXIOM-Classic – available in 2″, 4″, 6″ or 8″ profiles



Paired AXIOM-Vector – available in 2″, 4″, or 6″ profiles



Hanging Bracket
for 5/8″ reveal
(AXPHANG58)

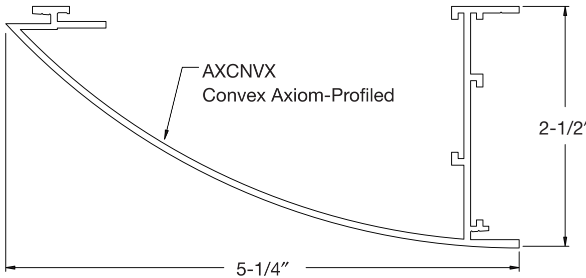


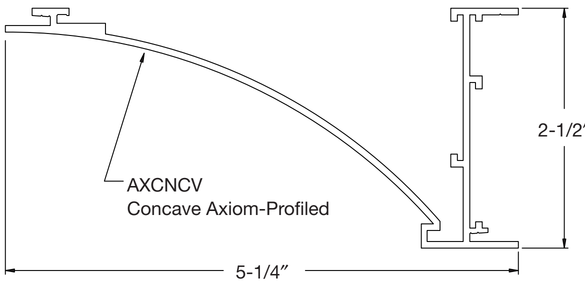
Hanging Bracket
for 1-3/8″ reveal
(AXPHANG118)

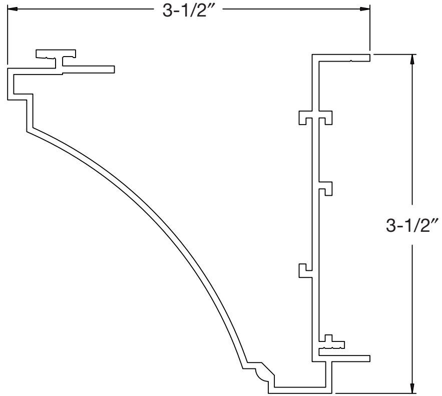
NOTES: For all 4″, 6″ or 8″ profiles, stack two Hanging Brackets on top of each other and place every 4′ on center.

Paired sections less than 4′ long require two sets of Hanging Brackets per section.

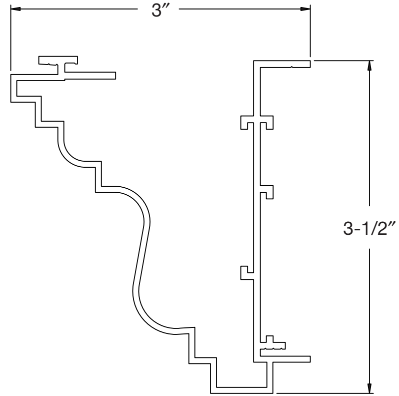
AXIOM-Profiled Convex, Concave, Cove and Crown profiles







AXCOVE - Cove Axiom-Profiled

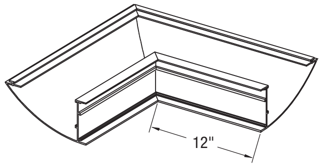


AXCRWN - Crown Axiom-Profiled

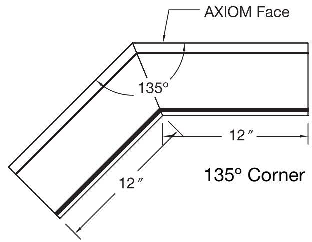
Armstrong®

AXIOM-Profiled corners

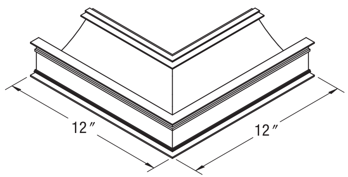
Factory-welded corner configurations available 60-135º (upon request)



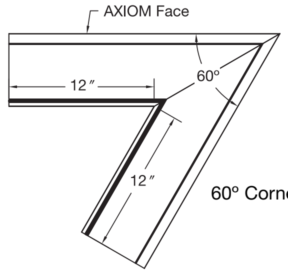
Convex
Outside Corner



135º Corner



Convex
Inside Corner



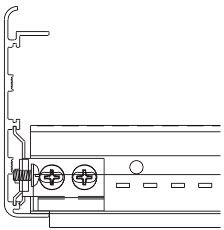
60º Corner

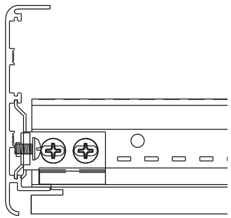
AXIOM-Soft Edge profiles

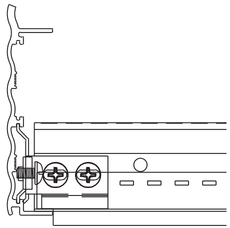
- Aluminum extrusion in three profiles – Soft Corner, Ripple and Convex
- Profile heights of 2-1/2″ and 4″
- 1/4″ reveal between full-size Vector panels; opposite flange accommodates either a lay-in or tegular panel.

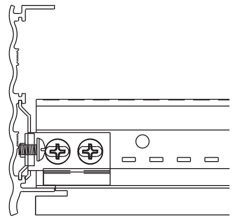
MINIMUM BEND RADIUS FOR AXIOM-Soft Edge

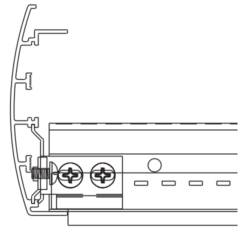
	Outside Curve (face out)	Inside Curve (face in)
Soft Corner	10′	4′
Ripple	5′	4′
Convex	cannot curve	cannot curve

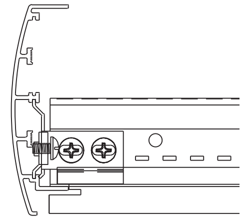

Soft Corner Profile – Tegular


Soft Corner Profile – Vector


Ripple Profile – Tegular

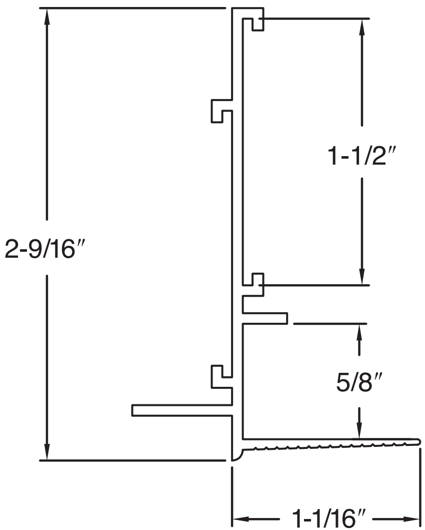

Ripple Profile – Vector


Convex Profile – Tegular


Convex Profile – Vector

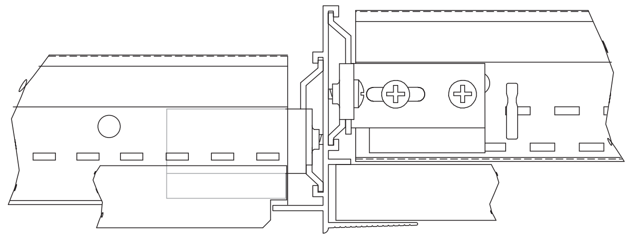
Note: The same parts can be used to accommodate either Vector or Tegular.

AXIOM-Transitions Tegular panel to drywall perimeter profile



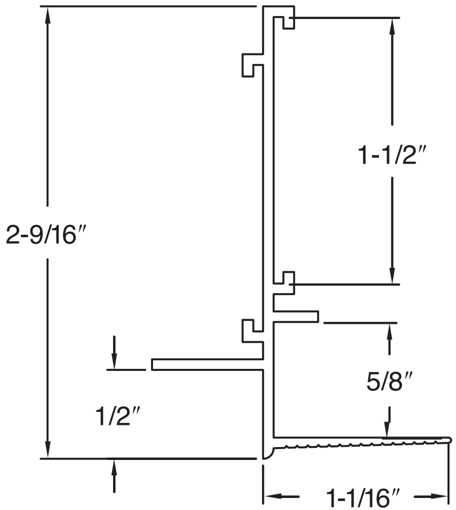
Axiom-Transitions —
Tegular is available curved and straight with field cut perimeter panels

Note: Minimum bending radius 2′ (24″)



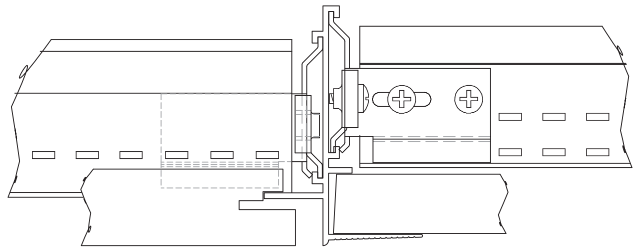
AXIOM – Transition from
Tegular to drywall application

AXIOM-Transitions Vector panel to drywall perimeter profile



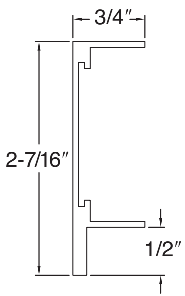
Axiom-Transitions —
Vector is available straight only for use with full size Vector panels (field cutting Vector panels can be avoided)

Note: Minimum bending radius 2′ (24″)

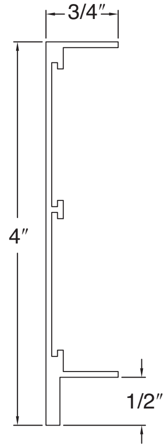


AXIOM – Transition from
Vector to drywall application

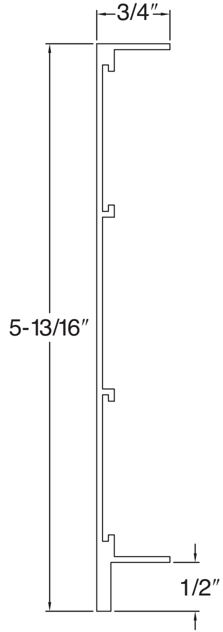
AXIOM-Vector profiles



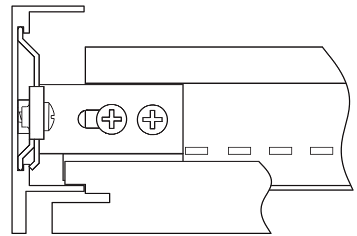
2″ Axiom-Vector



4″ Axiom-Vector

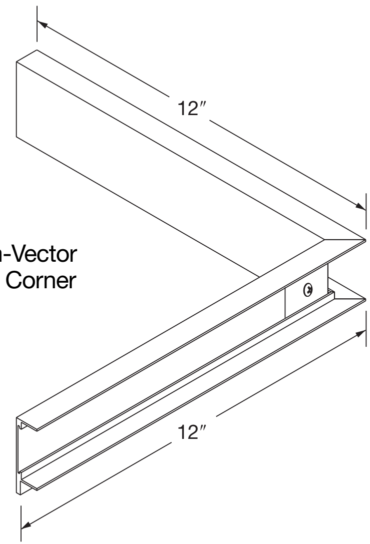


6″ Axiom-Vector

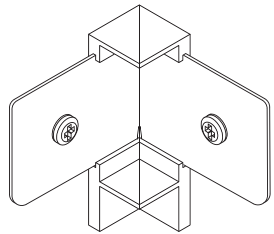


Axiom – Vector
application

AXIOM-Vector corners

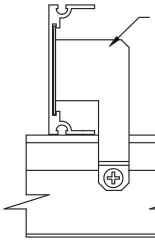


Axiom-Vector
Inside Corner

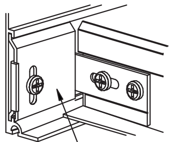


Axiom-Vector Outside Corner
with (AXSPLICE) Splice Plate

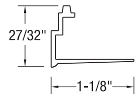
AXIOM accessories



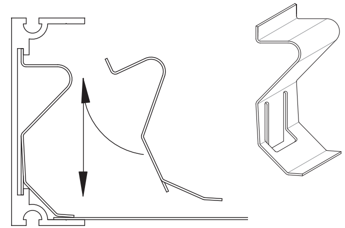
Hanging Clip
(AXAC)



T-Bar Connector Clip
(AXTBC)

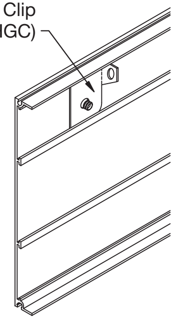


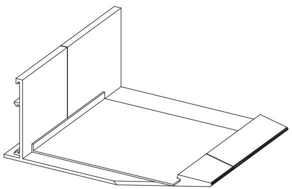
Drywall Bottom Trim
(for 5/8″ drywall only)
(AXBT)



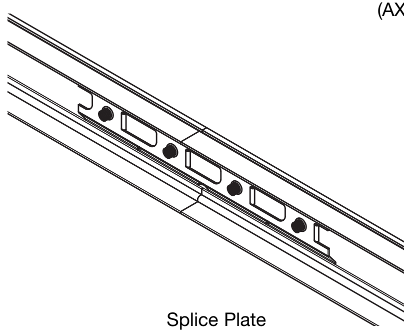
Trim Hold Down Clip
(AXSPTHDC)

AXIOM Hanging Clip
(AX2HGC)





Knife Edge Alignment Clip
(AXKEALIGN)



Splice Plate
(AX4SPLICEB)

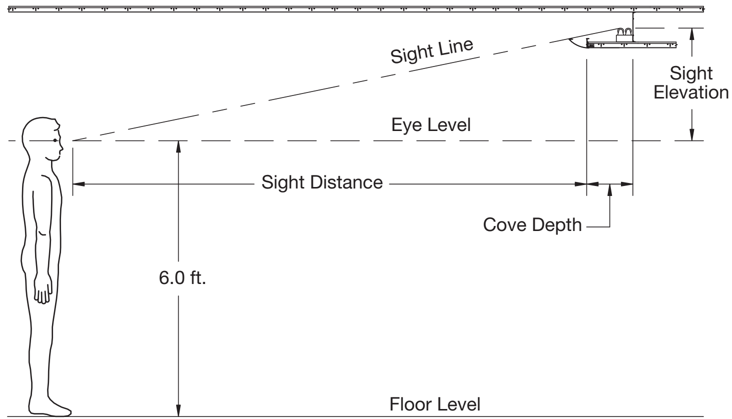
Sight Distance Calculation light coves built using AXIOM Perimeter Trim

FACTORS	
2″ Standard Axiom	2.3
4″ Standard Axiom	5.7
6″ – 12″ Standard Axiom	*
Knife Edge	2.7
Knife Edge for Vector	2.1
2″ Axiom for Vector	2.2
4″ Axiom for Vector	4.5
6″ and 8″ Axiom for Vector	*

* = Sufficient to hide most light fixtures completely

PROFILED AXIOM FACTORS (acoustical)	
Concave	4.1
Convex	4.1
Crown	4.6
Cove	4.8

PROFILED AXIOM FACTORS (w/ drywall)	
Concave	3.1
Convex	3.1
Crown	3.3
Cove	3.5



Calculations	**Actual**		**Example**
1. Enter the finished ceiling height at light cove, (in feet)	—		9.2′
2. Add 0.5 ft. (approx. distance from #1 to top of bulbs)	—	"+"	0.5′
3. Subtract 6.0 ft. (98th percentile U.S. male eye level)	6.0′	"-"	6.0′
4. This is your SIGHT ELEVATION	—	Total	3.7′
5. Enter the COVE DEPTH (in feet) (see drawing)	—		1.0′
6. Enter the PROFILE FACTOR (see factor table)	—		2.7′

[(SIGHT ELEV. (ft.)) x (COVE DEPTH (ft.)) x (PROFILE FACTOR)]

[(3.7) x (1.0) x (2.7)] = 10.0 ft.

7. This is your SIGHT DISTANCE (+- 5%) (beyond this distance the top of the bulbs may be visible)	—	10.0′

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CEILING & WALL SYSTEMS

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Moldings and Accessories

Commercial Ceilings and Walls Solutions Guide

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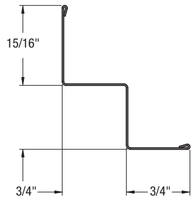
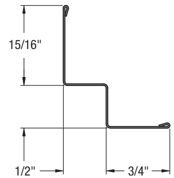
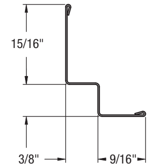
Step Molding Options



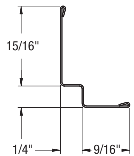
10′ – Shadow Molding – **#7871**



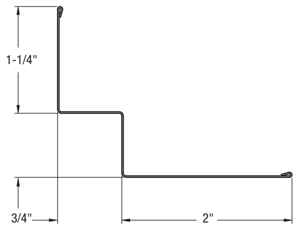
10′ – Shadow Molding – **#7875**



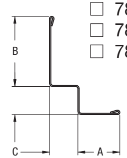
10′ – Shadow Molding – **#7873**



10′ – Shadow Molding – **#7874**

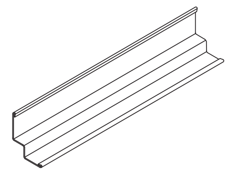


10′ – Shadow Molding – **#7823**

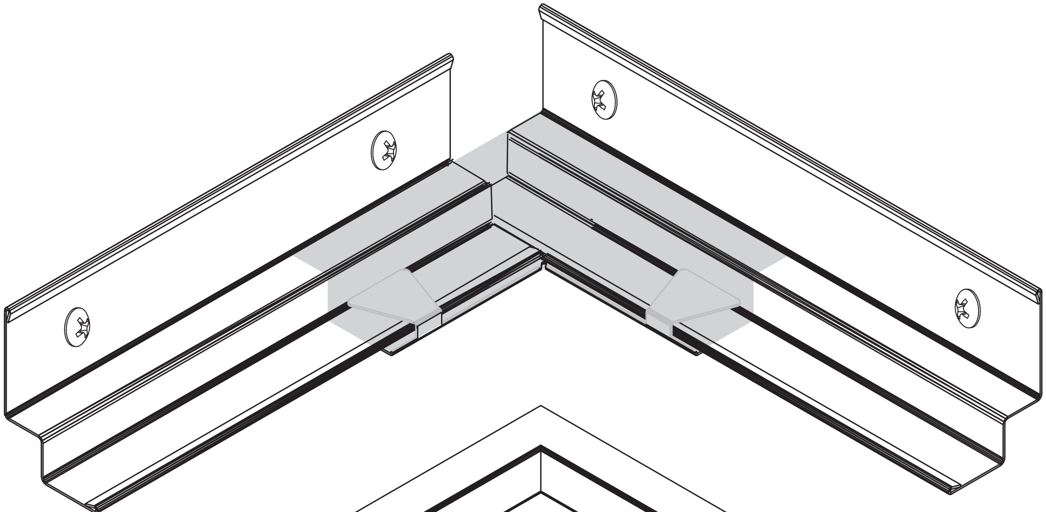


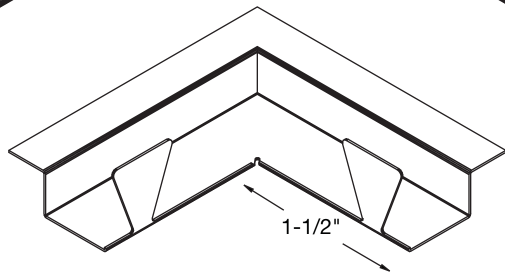
Item #	Length	(A) Flange	(B) Flange	(C) Reveal	Ln. Ft./Ctn.
☐ 7823	120″	2″	1-1/4″	3/4″	100
☐ 7871	120″	3/4″	15/16″	3/4″	300
☐ 7873	120″	9/16″	15/16″	3/8″	300
☐ 7874	120″	9/16″	15/16″	1/4″	300
☐ 7875	120″	3/4″	15/16″	1/2″	300

Note: Step molding can be rotated to be used with either 15/16″ or 9/16″ flange.



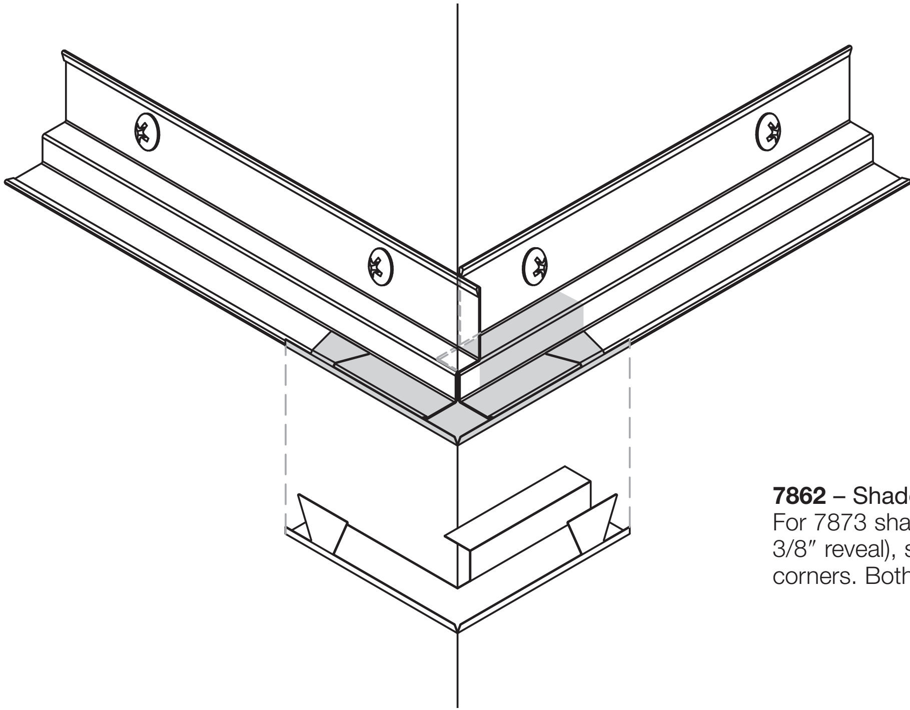
Inside Corner — Option 1 (7873 step molding only)

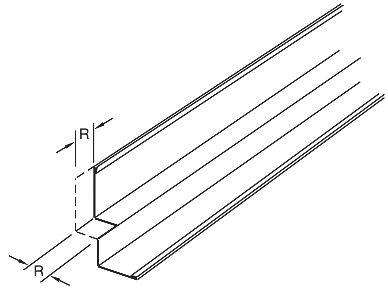




7861 – Shadow Molding-Inside Corner
For 7873 shadow mold (9/16″ horizontal leg, 3/8″ reveal), snaps over mold to easily trim inside corners. Both legs equal in length.

Outside Corner — Option 1 (7873 step molding only)



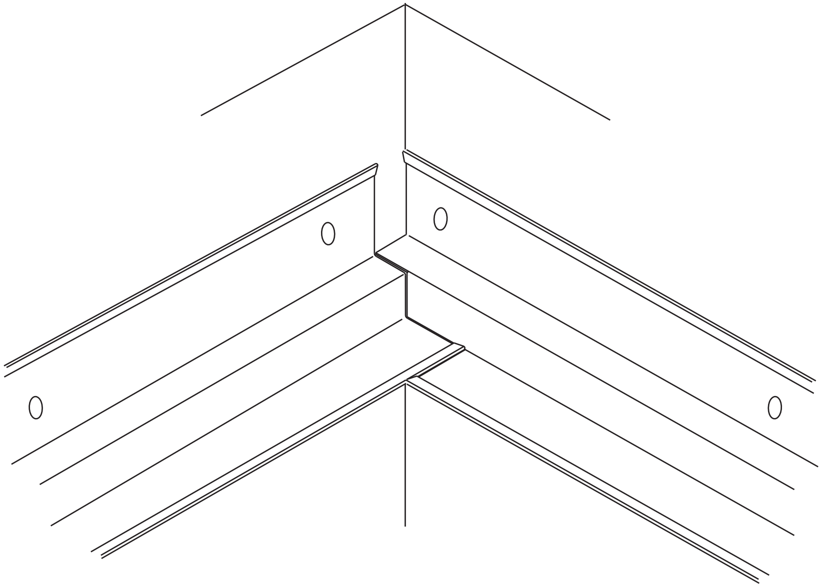


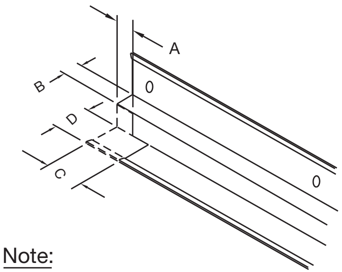
Cut width of recess (R)
depending on molding used

7862 – Shadow Molding-Outside Corner
For 7873 shadow mold (9/16″ horizontal leg, 3/8″ reveal), snaps over mold to easily trim outside corners. Both legs equal in length.

Inside Corner — Option 2 (all step molding items)

Inside corners can be created with no additional clips or accessories required.

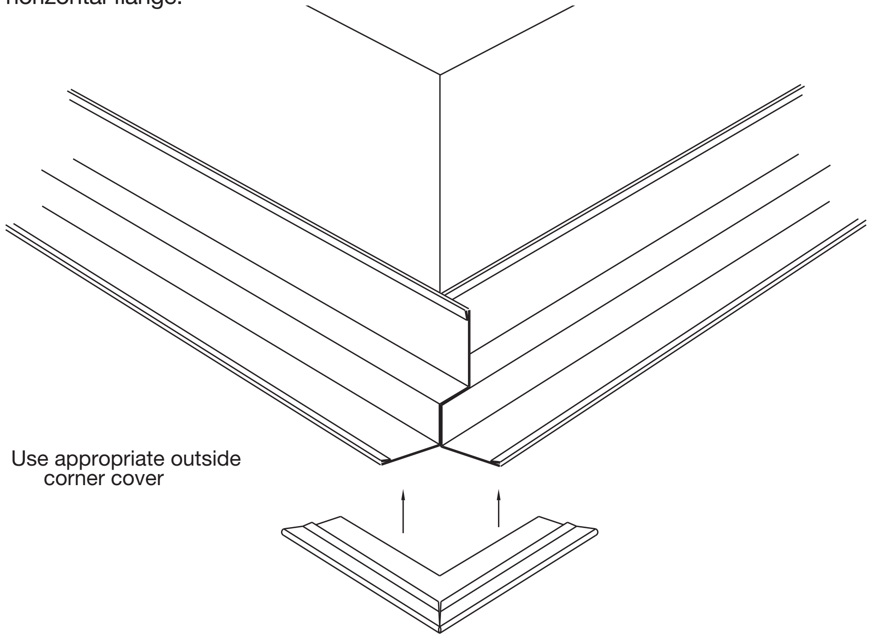




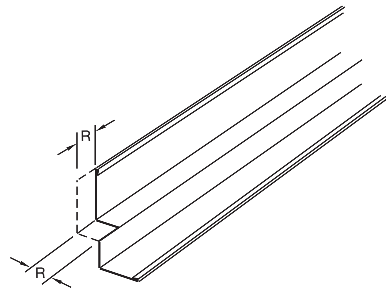
Note:
Cut "A" equal to "B"
Cut "C" equal to "D"

Outside Corner — Option 2 (all step molding items)

Outside corners require cuts similar to the inside corners, but in a different location, and require the use of a corner cover. The specific corner cover used depends on the dimension of the lower horizontal flange.



Use appropriate outside corner cover

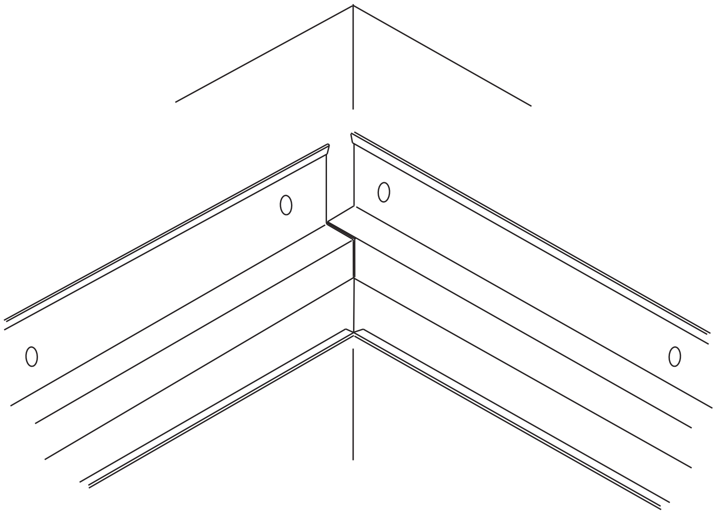


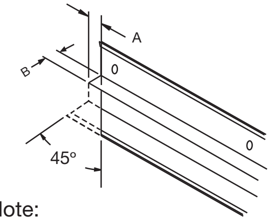
Cut width of recess (R) depending on molding used

Armstrong®

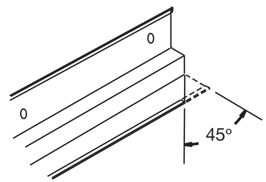
Inside Corner — Option 3 (all step molding items)

For a mitered lower horizontal flange or for off-angle inside corners where the walls do not intersect at 90 degrees, simply modify the angle of the cuts as required.



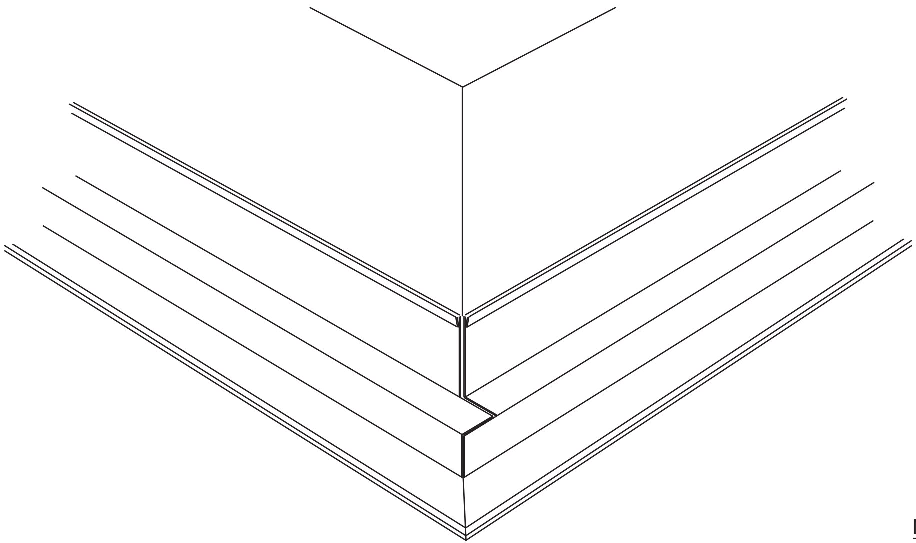


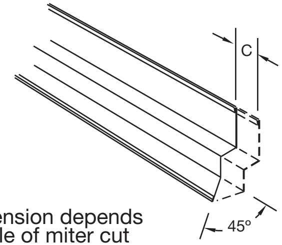
Note:
Cut “A” equal to “B”



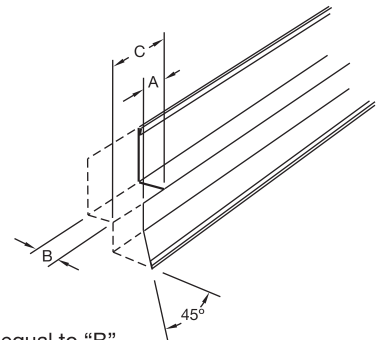
Outside Corner — Option 3 (all step molding items)

For a mitered lower horizontal flange or for off-angle outside corners where the walls do not intersect at 90 degrees, simply modify the angle of the cuts as required.



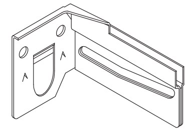
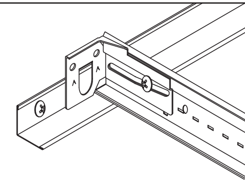
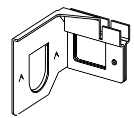
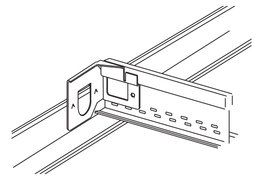
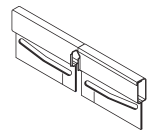
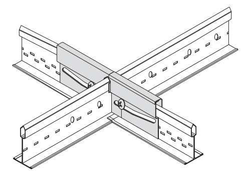
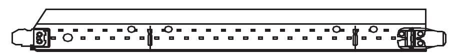


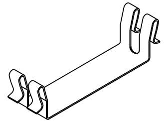
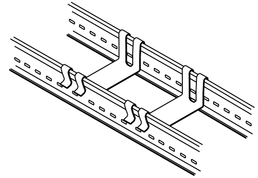
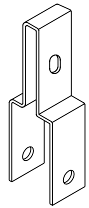
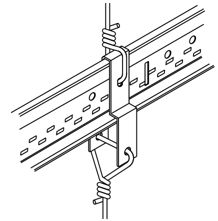
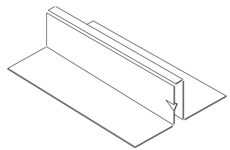
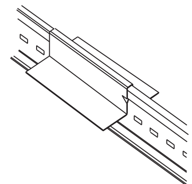
"C" dimension depends on angle of miter cut on lower flange

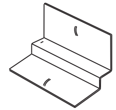
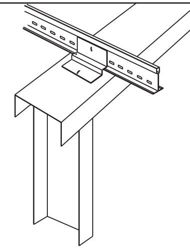
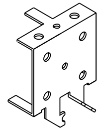
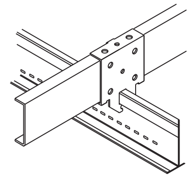
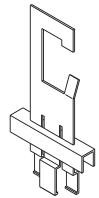
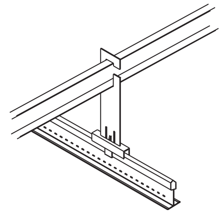


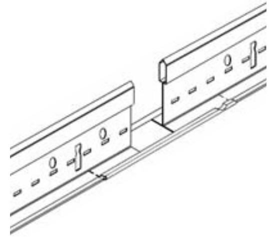
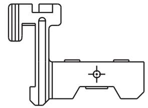
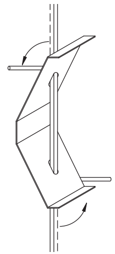
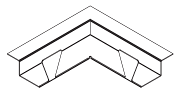
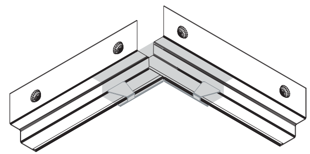
Note:
Cut "A" equal to "B"

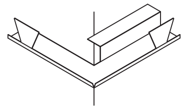
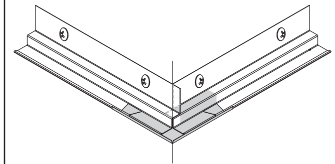
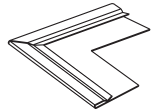
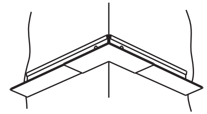
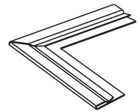
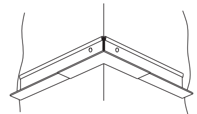
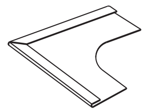
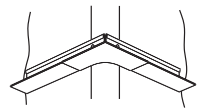
Exposed Tee System Accessories

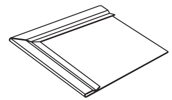
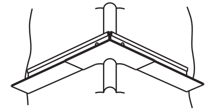
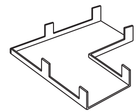
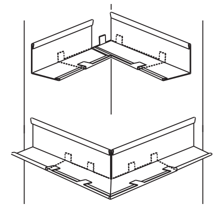
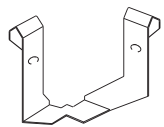
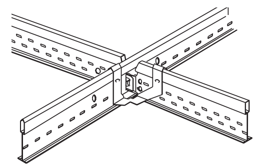
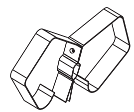
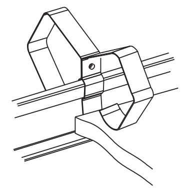
Item #	Qty.	Description	Isometric	Application
BERC2	200	**2″ Beam End Retaining Clip** joins main beam or cross tee to wall molding and web of grid with no visible pop rivets		
BERC	200	**Beam End Retaining Clip** joins web of main beam or cross tee to wall molding with no visible pop rivets		
SJC	200	**Seismic Joint Clip –** Offers a faster, easier and better seismic solution for Seismic Category D, E and F installations.		
GA7327	60	**Grid Adapter –** Allows for easy directional changes of Prelude main beams; 27″ long component has two different end details.		

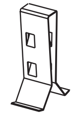
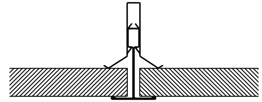
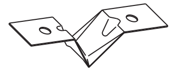
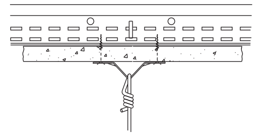
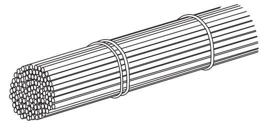
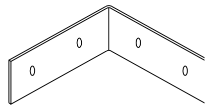
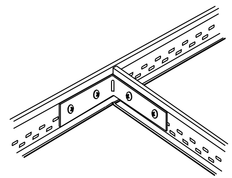
Item #	Qty.	Description	Isometric	Application
ABSC	250	**Air Bar Spacer Clip –** Parallel attachment of main runners; evenly spaces grid members for air diffuser; available in sizes from 1-7/8″ to 6″ in 1/8″ increments		
DLCC	250	**Direct Load Ceiling Clip –** To hang suspension system below existing 15/16″ grid face, transferring weight directly to hanger wire; may be used to preserve the fire rating of an existing ceiling and to support heavy accessories		
EHDC50 EHDC58 EHDC75	125 125 125	**Exterior Hold Down Clip for 1/2″, 5/8″, and 3/4″ lay-in ceiling panels and drywall –** Locks under bulb of grid member to prevent upward movement		

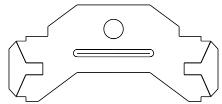
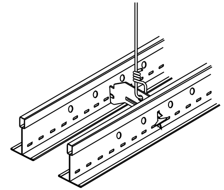
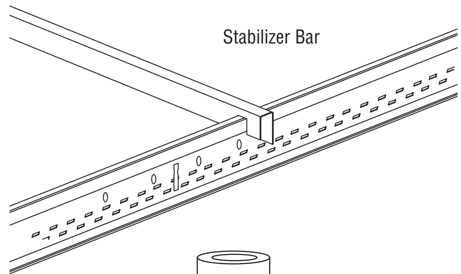
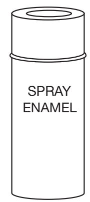
Item #	Qty.	Description	Isometric	Application
UPC	200	**Partition Clip** fastens partition track section to grid for secure attachment; flip for 9/16″ or 15/16″ grid		
UTC	250	**Uptight Clip** For tight grid attachment to 1-1/2″ channel; bridging under HVAC ducts; can be used to install grid tight to wood joists		
CBS4 CBS6 CBS8 CBS10 CBS12	100 100 100 100 75	**4″, 6″, 8″, 10″, and 12″ Channel Beam Splice –** Used to suspend main beams to 1-1/2″ black iron carrying channels		
CBS2006 CBS2008	100 100	**6″ and 8″ Channel Beam Splice –** Used to suspend main beams to 2″ black iron carrying channels		

Item #	Qty.	Description	Isometric	Application
ES4	100	**4″ Expansion Sleeve** for 15/16″ main beams and cross tee; covers expansion joints, screw holes in grid face		
C1430	200	**Variable Placement Hook Clip –** Attach to T-bar to create special length tees and position anywhere along the main beams		
WS12	1,000	**Hanger Wire Splice –** Splices #12 gauge hanger wire; recommended for renovation applications; provides easy adjustment of ceiling height		
7861	100	**Shadow Mold - Inside Corner –** For 7873 shadow mold (9/16″ horizontal leg, 3/8″ reveal), snaps over mold to easily trim inside corner.		

Item #	Qty.	Description	Isometric	Application
7862	100	**Shadow Mold - Outside Corner –** For 7873 shadow mold (9/16″ horizontal leg, 3/8″ reveal), snaps over mold to easily trim outside corner.		
7863	100	**Outside Corner Cover –** For nominal 7/8″ angle molding; snap over molding to trim outside corners; 2″ legs		
7865	100	**Outside Corner Cover –** For nominal 9/16″ angle molding; snap over molding to trim outside corners; 2″ legs		
7866	100	**Bullnose Corner Cover –** For nominal 7/8″ molding; snap over molding to trim outside corners; fits 1″ radius block; 2″ legs		
7864	100	**Bullnose Corner Cover –** For nominal 7/8″ molding; snap over molding to trim outside corners; fits 3/4″ radius block; 2″ legs		

Item #	Qty.	Description	Isometric	Application
7867	100	**Field Cut Corner Cover –** For nominal 15/16″ molding; cut to fit irregular corner conditions; 2″ legs		
7869	50	**Inside/Outside Corner Cover –** For nominal 7/8″ angle molding; 1-3/4″ legs		
LFC	50	**Fixture Clip –** Prefinished white for use at corners of light fixture modules on 9/16″ exposed tee grid systems (Suprafine, Interlude, Silhouette); increases corner size to 15/16″ which adapts light fixtures designed for 15/16″ grid; used when fixtures are not positively attached to grid		
414	100	**Retention Clip –** Attaches to main beams and cross tees behind lay-in ceiling; helps prevent accidental panel displacement by basketballs and other forces from below ceiling		

Item #	Qty.	Description	Isometric	Application
UHDC	1,000	**Universal Hold Down Clip –** Clip attaches to top bulb of grid to hold 1/16″ to 5/8″ lay-in tile in place; helps to prevent ceiling tile fluttering at entryways		
DWC	250	**Drywall Clip –** Allows for a “second” ceiling to be installed below a drywall ceiling; attach through installed drywall to supporting structure; DWC is approved for use in UL Designs: P237, P239, P240 and P241.		
7891	140	**12 Gauge Soft Hanger Wire (12′ length) –** Used to hang suspended ceilings from structure		
XTAC	100	**Cross Tee Adapter Clip –** Used to attach field cut cross tees to main beams.		

Item #	Qty.	Description	Isometric	Application
MBSC2	200	**Main Beam Spacer Clip (2″ in length) –** Used to space two parallel main beams for air supply or return; typically used 4′ O.C.		
7445 7425	100 100	**24″ and 48″ Stablilizer Bars –** Used to maintain uniform spacing of suspension system components (main beams and cross tees) 7445 – 48″ Length 7425 – 24″ Length		
789512	6	**Suspension System Touch Up Paint** – White, 12 oz. cans		

CEILING & WALL SYSTEMS

[Between us, ideas become reality.]®

Serpentina Grid Systems

Commercial Ceilings and Walls Solutions Guide

Armstrong®

Serpentina Grid Systems

Serpentina Overview

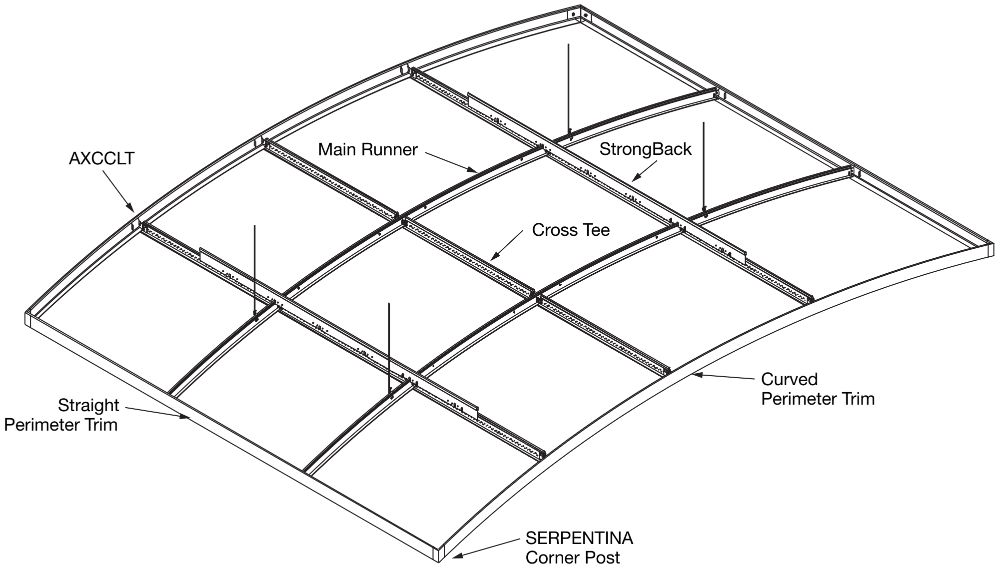
Serpentina are pre-engineered curved clouds that consists of a group of standard length curved and straight main beams, straight cross tees, and curved and straight perimeter trims.

Serpentina comes in 4 distinct families:

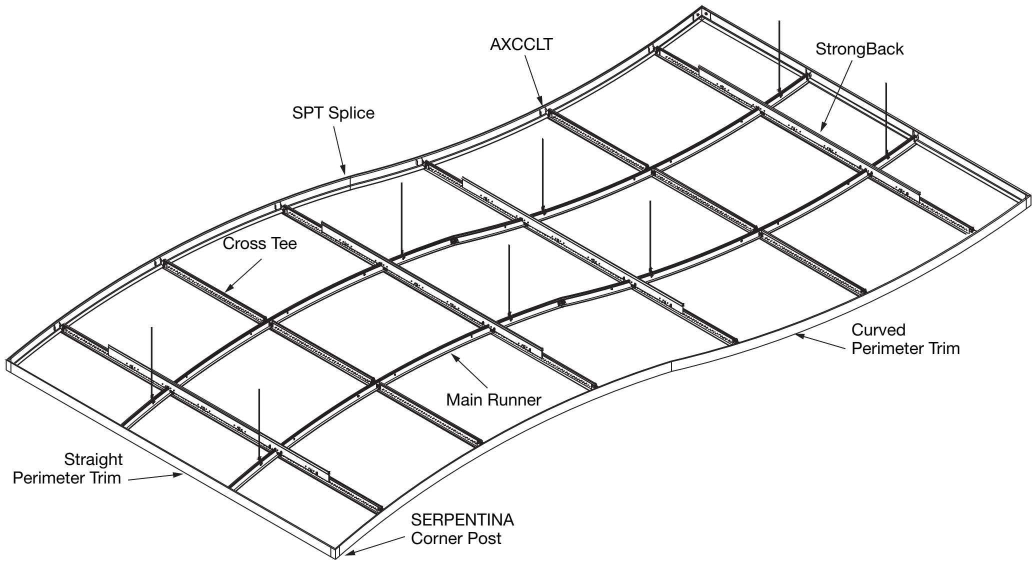
- **Serpentina Classic:**
  This exposed tee system offers flexible 2′ x 2′, 2′ x 4′ and 2′ x 6′ metal panels.
- **Serpentina Semi-concealed:**
  This concealed tee system offers flexible 2′ x 4′ and 2′ x 6′ metal panels.
- **Serpentina Vault:**
  Choose between three pre-set arcs – 15, 30 and 45-degrees.
  These 23-1/8″ x 72″ panels are available in perforated and non-perforated.
- **Serpentina Waves:**
  Offers a large scale 2’ wide flexible infill panels available in lengths
  from 4′ to 12′ in 2′ increments.

Installation instructions are included with every shipment of Serpentina.

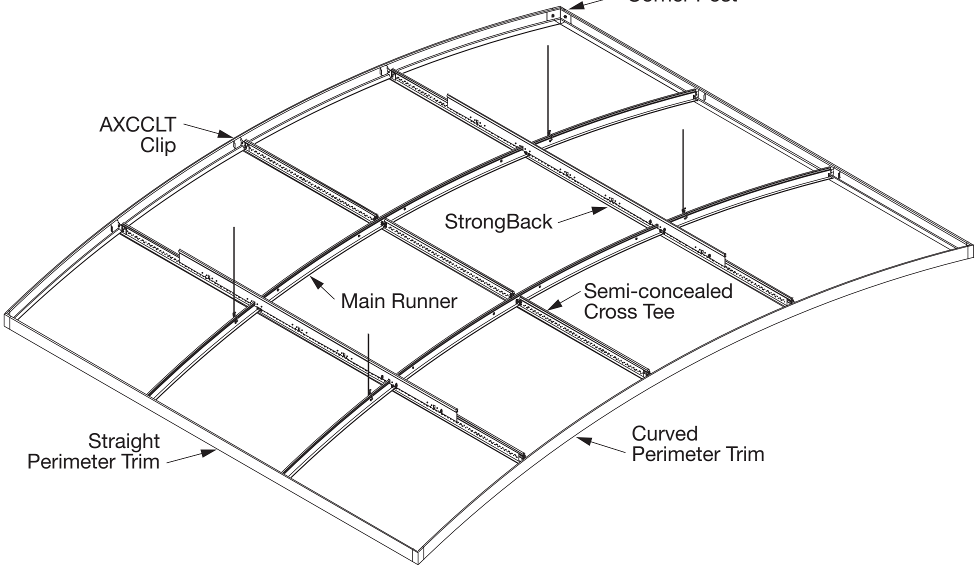
Serpentina Classic One Main Beam Long



Serpentina Classic Mains Connected End-to-End

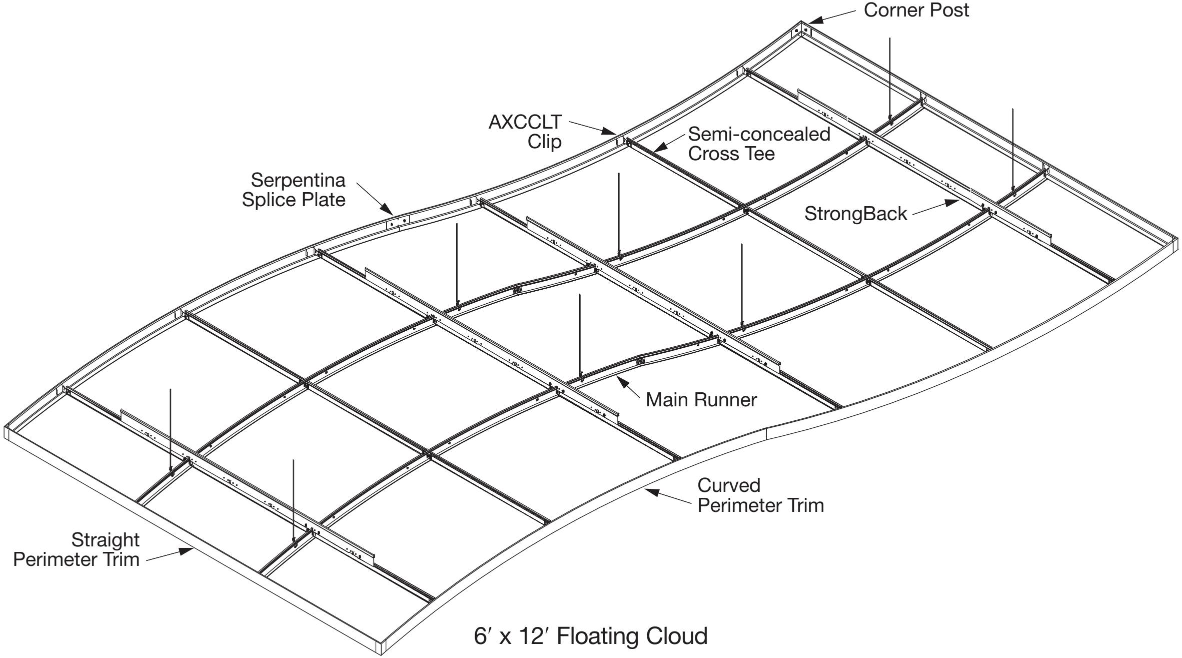


Serpentina Semi-Concealed Assembly One Main Beam Long



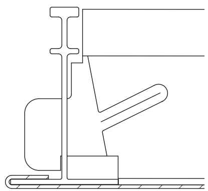
6′ x 8′ Floating Cloud

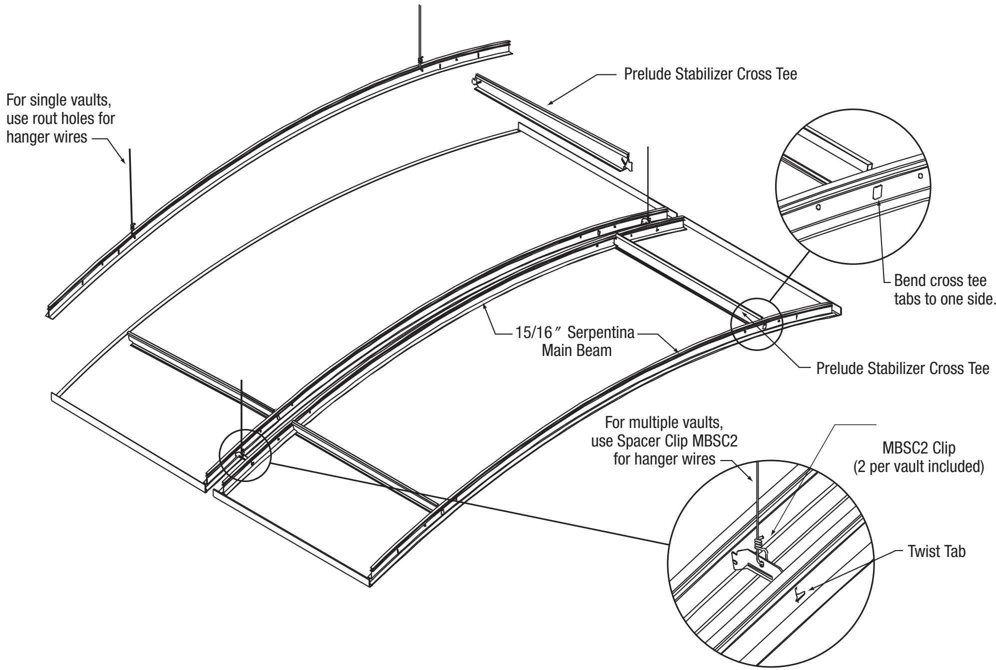
Serpentina Semi-Concealed Assembly Mains Connected End-to-End



6′ x 12′ Floating Cloud

Serpentina Vault Assembly





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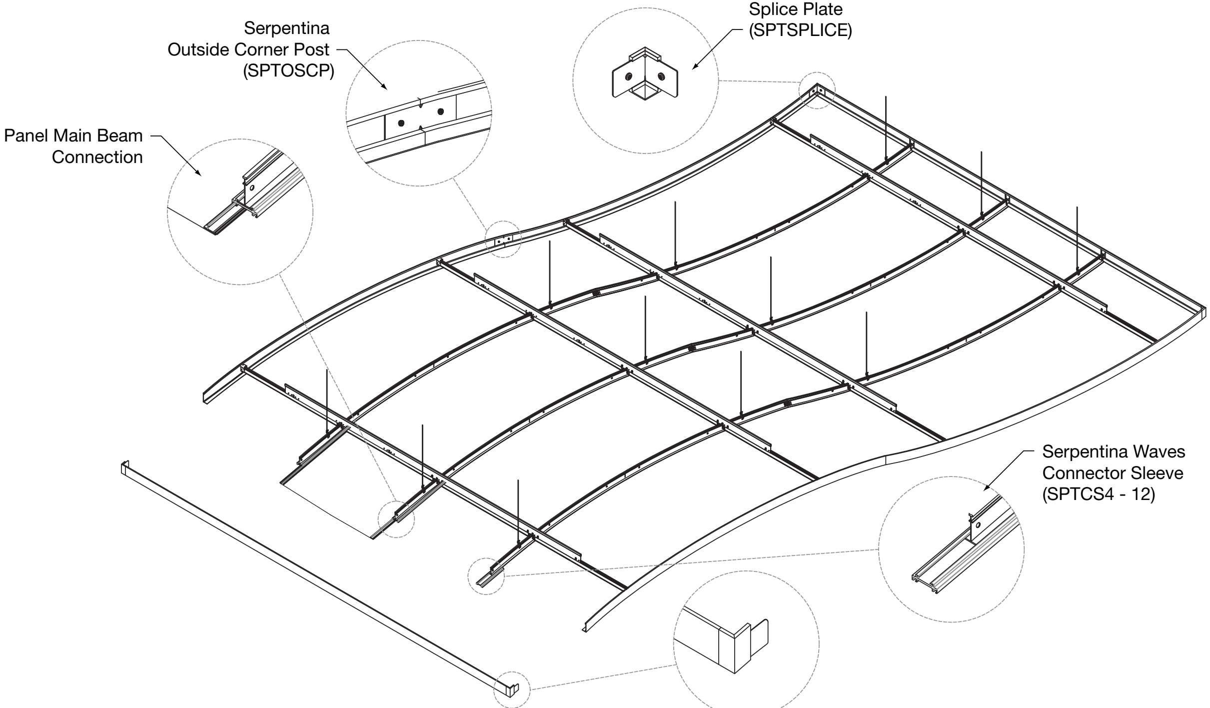
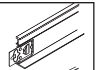
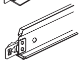
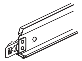
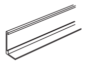
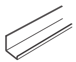
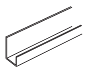
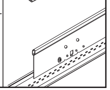
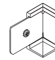
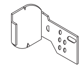
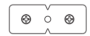
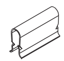
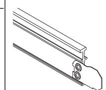
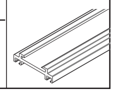
Serpentina Waves Assembly



Serpentina Components

___H/V	Main Beam (15/16″, 9/16″)	
SPTB7328	2′ Prelude Cross Tee (15/16″)	
SPTB7520	2′ Suprafine Cross Tee (9/16″)	
SPTSTR	1′-12′ Straight Trim	
___H/V PT	Curved Trim	
SJMS	Serpentina “J” Molding for shallow radius (7.5, 15, 22.5, 30, 37.5 and 45)	
SJMT	Serpentina “J” Molding for tight radius (45, 52.5, 60, 75 and 90)	
____	Serpentina StrongBack System	

SPTOSCP	Serpentina Outside Corner Post	
AXCCLT	Serpentina Trim Clip	
SPTSPLICE	Splice Plate	
AX-SPT-HDC	Serpentina Trim Hold Down Clip	
SPTCHDC	Serpentina Clear Hold Down Clip	
Speed Clip	Serpentina Semi-Concealed Splice Clip (3 per panel interface)	
SCXT24MR SCXT24SPT SCXT24SPT2 SCXT24SPTUD	Serpentina Semi-concealed Connector Cross Tees	
SPTCS4-12	Serpentina WAVES Connector Sleeve	

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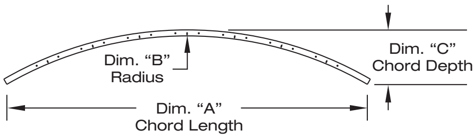
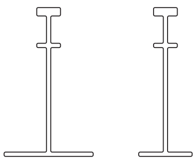
Serpentina Main Beams and Perimeter Trim



Serpentina main beams are identified by arc length. For example, a 690 hill main beam has a 5′ 4-1/2″ chord length and will occupy 5′ 4-1/2″ of ceiling area.

690H/V916 PT

- PT – Indicates curved trim
- 916 – Indicates 9/16" narrow face (excluded if 15/16" face)
- H/V – Indicates hill (arch) or valley (reverse arch)
- 90 – Indicates degree of arc
- 6 – Indicates actual arc length



15/16" Serpentina   9/16" Serpentina

	Part #	Arc	Dim. A	Dim. B	Dim. C
	10075 H/V	7.5º	9′ 11-15/16″	76′ 4-3/4″	2-3/4″
	1015 H/V	15º	9′ 11-13/16″	38′ 2-3/8″	3-15/16″
	10225 H/V	22.5º	9′ 11-1/4″	25′ 5-9/16″	5-7/8″
	1030 H/V	30º	9′ 10-5/8″	19′ 1-3/16″	7-3/16″
	10375 H/V	37.5º	9′ 9-7/8″	15′ 3-5/16″	9-3/4″
	1045 H/V	45º	9′ 7-11/16″	12′ 8-13/16″	11-3/8″
	10525 H/V	52.5º	9′ 7-7/8″	10′ 10-15/16″	1′ 1-1/2″
	1060 H/V	60º	9′ 6-9/16″	9′ 6-9/16″	1′ 3-5/8″
	1075 H/V	75º	9′ 3-5/8″	7′ 7-11/16″	1′ 7-7/16″
	1090 H/V	90º	9′ 0″	6′ 4-3/8″	1′ 10-11/16″
	8075 H/V	7.5º	7′ 11-15/16″	61′ 1-3/8″	1-9/16″
	815 H/V	15º	7′ 11-3/4″	30′ 6-11/16″	3-1/8″
	8225 H/V	22.5º	7′ 11-3/8″	20′ 2-7/8″	4-3/4″
	830 H/V	30º	7′ 10-7/8″	15′ 3-3/8″	6-1/4″
	8375 H/V	37.5º	7′ 10-5/16″	12′ 2-11/16″	7-3/4″
	845 H/V	45º	7′ 9-3/8″	10′ 2-1/4″	9-7/16″

(all dimensions are nominal)

Serpentina Main Beams and Perimeter Trim

Part #	Arc	Dim. A	Dim. B	Dim. C
8525 H/V	52.5º	7′ 8-11/16″	8′ 8-3/4″	10-13/16″
860 H/V	60º	7′ 7-15/16″	7′ 7-11/16″	1′ 7/16″
875 H/V	75º	7′ 7-11/16″	7′ 7-5/8″	12-1/4″
890 H/V	90º	7′ 2-7/16″	5′ 1-1/8″	1′ 6-1/8″
6075 H/V	7.5º	5′ 11-15/16″	45′ 5-1/16″	1-3/16″
615 H/V	15º	5′ 11-13/16″	22′ 11″	2-3/8″
6225 H/V	22.5º	5′ 11-9/16″	15′ 3-3/8″	3-9/16″
630 H/V	30º	5′ 10-5/8″	11′ 5-1/2″	4-9/16″
6375 H/V	37.5º	5′ 10-3/4″	9′ 2″	5-13/16″
645 H/V	45º	5′ 10-1/8″	7′ 7-11/16″	7-1/16″
6525 H/V	52.5º	5′ 9-1/2″	6′ 6-9/16″	8-1/8″
660 H/V	60º	5′ 8-13/16″	5′ 8-3/4″	9-5/16″
675 H/V	75º	5′ 7″	4′ 7″	11-3/8″
690 H/V	90º	5′ 4-1/2″	3′ 9-13/16″	1′ 1-1/6″

Part #	Arc	Dim. A	Dim. B	Dim. C
4075 H/V	7.5º	3′ 11-15/16″	30′ 6-5/8″	13/16″
415 H/V	15º	3′ 11-7/8″	15′ 3-3/8″	1-9/16″
4225 H/V	22.5º	3′ 11-11/16″	10′ 2-1/4″	2-5/16″
430 H/V	30º	3′ 11-3/8″	7′ 7-11/16″	3-1/8″
4375 H/V	37.5º	3′ 11-1/8″	6′ 1-3/8″	3-7/8″
445 H/V	45º	3′ 10-3/4″	5′ 1-1/8″	4-5/8″
4525 H/V	52.5º	3′ 10-5/16″	4′ 4-3/8″	5-3/8″
460 H/V	60º	3′ 9-7/8″	3′ 9-13/16″	6-1/16″
475 H/V	75º	3′ 8-1/2″	3′ 5/8″	7-1/2″
490 H/V	90º	3′ 7-1/4″	2′ 6-9/16″	8-13/16″
4STR	N/A	N/A	N/A	N/A
6STR	N/A	N/A	N/A	N/A
8STR	N/A	N/A	N/A	N/A
10STR	N/A	N/A	N/A	N/A

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