

METALWORKS™ Linear (Interior & Exterior Applications)

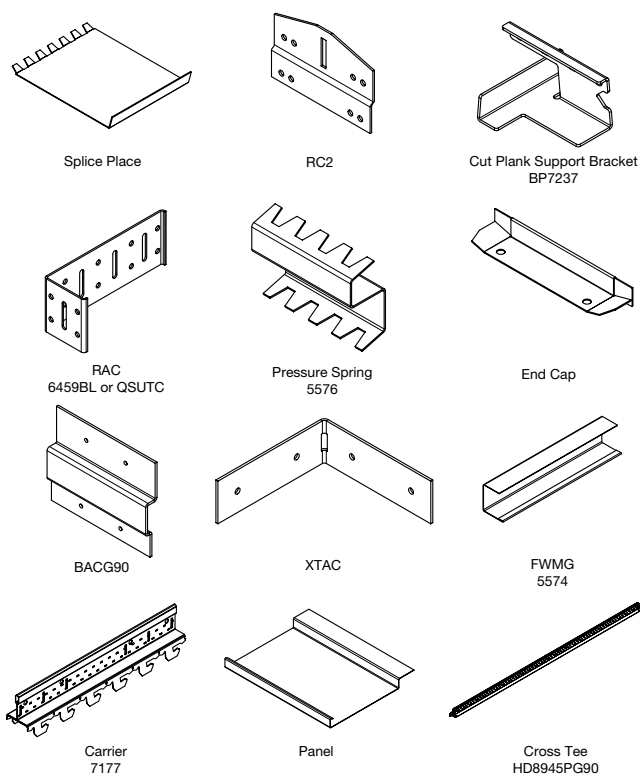
Assembly and Installation Instructions

METALWORKS LINEAR PLANKS ITEMS:

5490 – 96 x 4 x 5/8" Unperforated
7160 – 96 x 6 x 5/8" Unperforated
5491 – 96 x 8 x 5/8" Unperforated
5570 – 96 x 12 x 5/8" Unperforated
5492 – 96 x 4 x 5/8" Microperforated
7161 – 96 x 6 x 5/8" Microperforated
5493 – 96 x 8 x 5/8" Microperforated
5571 – 96 x 12 x 5/8" Microperforated

METALWORKS LINEAR PLANKS ACCESSORIES:

5581 – 4" End cap
7162 – 6" End cap
5582 – 8" End cap
5583 – 12" End Cap



1. GENERAL

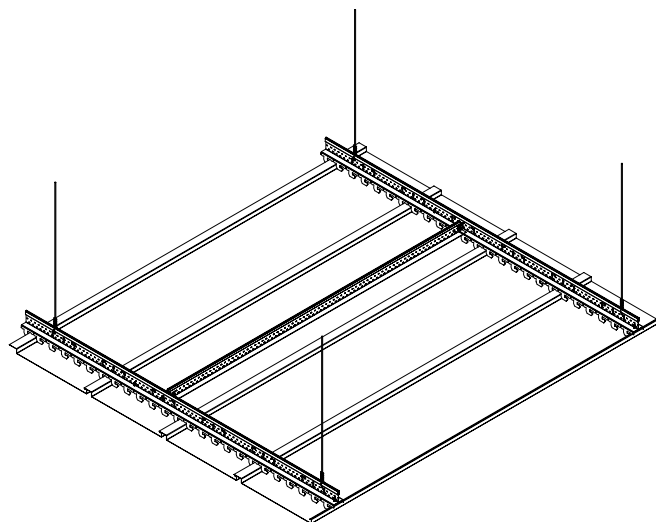
1.1 Product Description

MetalWorks Linear is a metal ceiling system that utilizes linear planks that are available 96" long and in 4", 6", 8", and 12" widths. All planks include a 1-1/4" plank flange that can optionally be covered with a black plastic filler strip to create the Contrasts visual. Linear planks are made of 0.028" thick electrogalvanized steel. Their post-production, powder-coated finish is available in White, Silver Grey, Gun Metal Grey, Effects™ Wood Looks finishes, and a wide range of custom colors. Microperforated options with a plain border, acoustical fleece backing, and optional fiberglass infill are available.

The Main Beam Carriers used to suspend the planks are directional and have hanging features at 2" increments. All plank widths can be installed on the same carrier system which allows for design and installation flexibility.

For Exterior installations refer to section 7.

For Seismic installations refer to section 8.



1.2 Storage and Handling

The ceiling planks shall be stored in a dry interior location and shall remain in cartons prior to installation to avoid damage. The cartons shall be stored in accordance with the instructions on the carton. Proper care should be taken when handling to avoid damage or soiling.

1.3 Ceiling Plank Layout

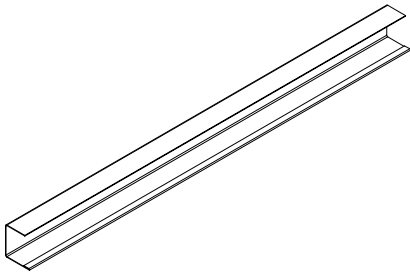
The ceiling plank layout should have perimeter planks equal in width on opposite ends. These cut perimeter planks should be more than 50% of their original width. See BPLA-295518 for MetalWorks cutting instructions. If the plank is less than 50% of the original width, divide the room dimension by the nominal width of the plank (4", 6", 8", or 12"). Determine the remainder, add one full plank width, and divide by two to determine the width of the border plank.

Example: 8" nominal plank width, room dimension 10' 4". Divide 10' 4" by 8" = 15 full sections with 4" remainder. Add 4" + 8" = 12". Divided by 2 = 6" border plank with 14 full rows of planks. This will create the best visual and installation.

2. SUSPENSION SYSTEM INSTALLATION

2.1 Perimeter Molding

Install the Carrier Molding (5574) on the perimeter walls. Molding should be secured to the wall every 16 to 24 inches. The bottom of the molding is the finish height of the linear plank.



2.2 Hanger Wires

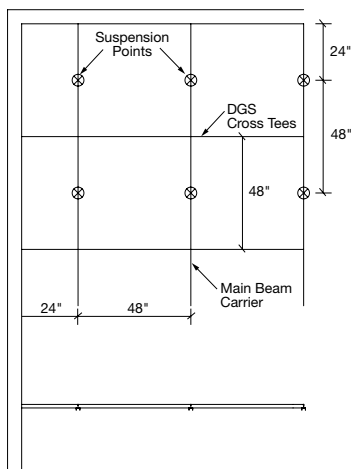
Secure hanger wires to the structure above to support the Main Beam Carriers. Wire spacing for Main Beam Carriers should be within 24" of the perimeter wall and then 48" OC.

2.3 Main Beam Carriers

The Main Beam Carriers will be installed 48" OC perpendicular to the desired plank length direction. The first and last Main Beam Carrier must be installed within 24" of the perimeter wall.

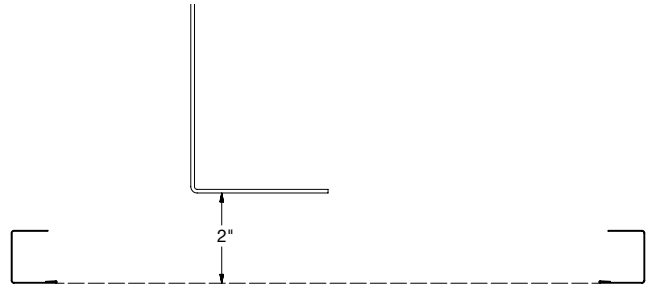
2.4 Main Beam Carriers are directional and must be installed accordingly. Main Carriers splice together with Superlock end detail just like standard drywall grid main beams.

2.5 System Layout Interior



2.6 Pre-bending Hanger Wires

Stretch a string line or set a laser at the bottom of the molding from one side to the other along a row of hanger wires. Bend the wires 2" above the string or laser.

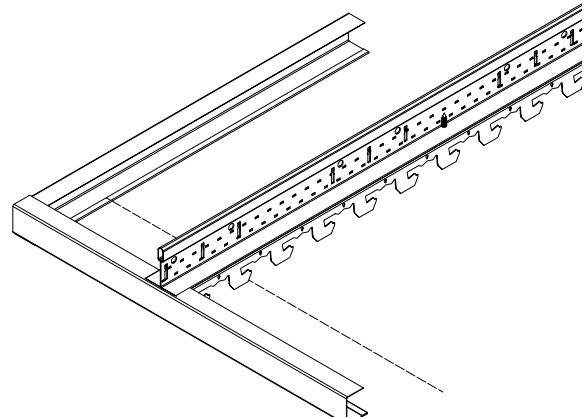


2.7 Squaring and Cutting the Main Beam Carriers

Stretch a string line from one side of the room to the other at the bottom of the molding (string perpendicular to the Carrier). The string should be out from the "end" wall by the calculated width of the first "plank." Refer back to Section 1.3 for width of border planks.

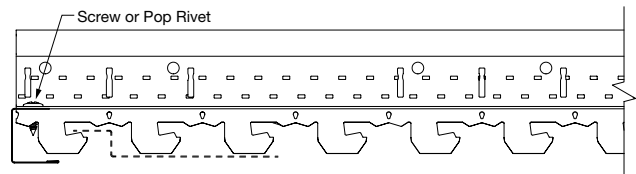
2.7.1 Measure from this string to the wall. Cut the first Main Beam Carrier in each row so the desired notch lines up with this string.

NOTE: The system can also be squared by measuring a 4' x 4' diagonal opening, as with installing a normal DGS ceiling.



2.8 Main Beam Carrier Attachment

The top flange of the Carrier Molding will slide in between the two components of the Main Beam Carriers. Once each Main Beam Carrier is aligned with the guide string as in the previous detail, fasten them to the perimeter molding with a framing screw or pop rivet as shown below.



2.8.1 Complete the run of Main Beam Carriers to the other end of the space.

3. PLANK INSTALLATION

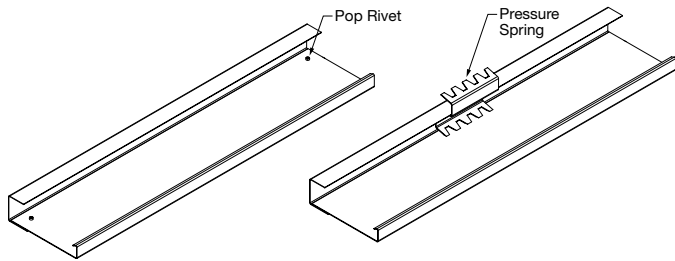
3.1 Starting Perimeter Row

Measure from the wall to the string several places and determine the exact width of the first row of planks.

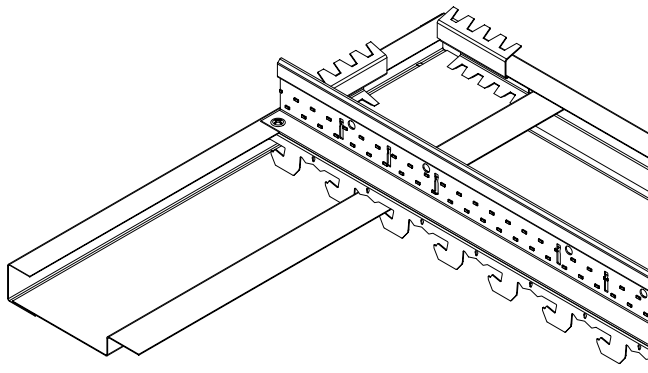
3.1.1 Mark the plank and cut to width. The 1-1/4" flange edge is the edge that should be cut off.

3.1.2 Slide the cut edge of the plank into the perimeter wall molding. The opposite hook edge (factory edge) of the plank will fit onto the tab on the carrier.

3.1.3 Insert pressure springs and/or pop rivet plank to secure the plank to the molding; frequency of pressure springs or pop rivets is as necessary, but typically 24" OC.

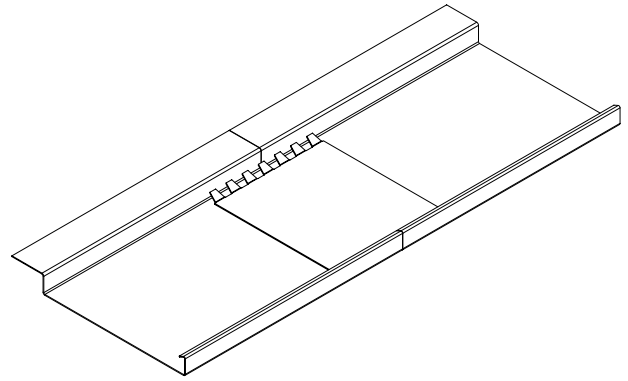
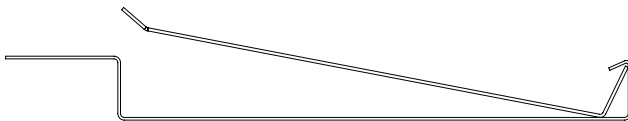


3.1.4 Cut the planks to length to fit into the perimeter molding at the sides parallel to the carrier. Use pressure springs on ends as needed.



3.2 Plank Splices

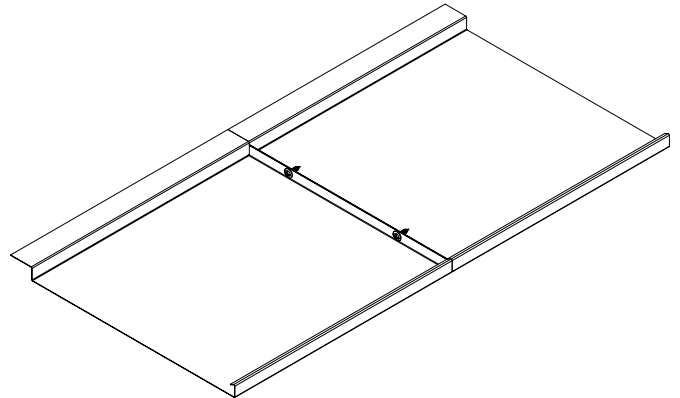
When 4", 6", and 8" planks do not reach across the space in one piece, use a plank splice (available in 4", 6", and 8" widths) to join and align adjacent planks. Install planks so the factory ends are at the splice locations and assure the joint is tight. Install the splice by inserting the solid end under the plank hook. Then gently push the finger side down on the opposite side to lock the plank joints together.



Planks 12" wide have a factory return on the ends and have two options to splice the planks when they do not reach across the space in one piece. Install planks so the factory joint is tight and use vise grip pliers to temporarily hold together.

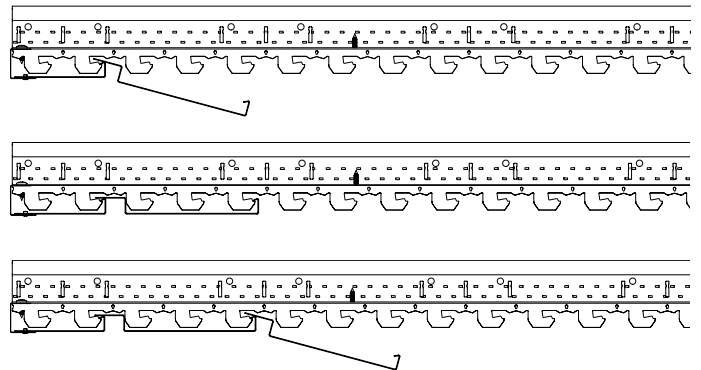
Option 1 – Insert speed clips (item 6351) over the two plank returns. Use one hand to support the plank face and the other hand to snap the speed clip on the returns. Two speed clips are required at each joint.

Option 2 – Insert sheet metal framing screws through the plank returns. This requires a clear plenum to work with power tools above the plank. Two screws are required at each joint.



3.3 Field Plank Installation

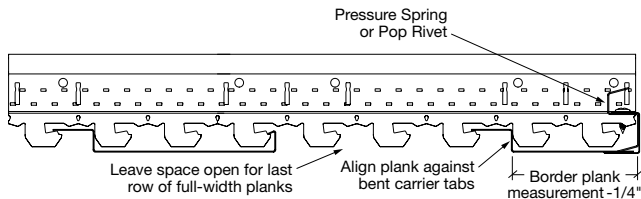
Install the second row of planks by inserting the flange edge on top of the previous plank. Next, gently push the plank hook side up until it snaps onto the carrier tab. Continue installing planks until you reach the other side of the room.



3.4 Last Perimeter Row

Do not install the last row of full width planks at this time. Cut the perimeter row of planks to width based on the border plank size calculated previously. Take the measurement as shown below and transfer this to the face of the planks. Cut the planks to retain the flange side.

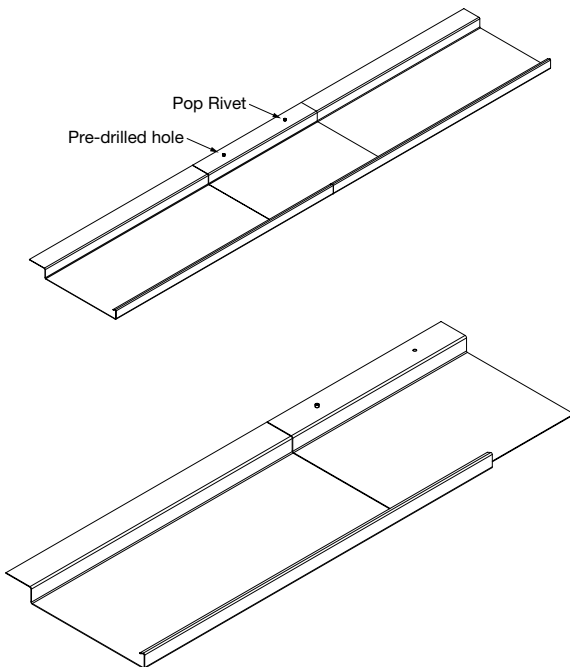
Use pliers to bend the carrier tab out 90 degrees. Next, insert the long cut edge of the plank into the molding, align the plank in the carrier, and use pliers to bend the supporting tabs back to the original position. Insert pressure springs or pop rivets to secure the border planks to the molding as shown in section 3.1.3.



3.5 Last Full Plank Width Row

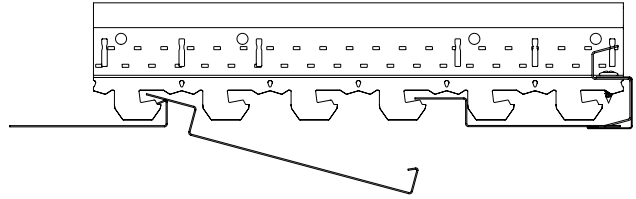
The last full row of 4", 6", or 8" planks must be joined end-to-end after installation, but must be prepared before installation (for 12" planks see Section 3.5.8)

3.5.1 Cut a scrap piece of plank as shown below (4-6" length). Nest this piece into the flange of the first plank to be installed in the last row and pop rivet, as shown below. This is the end of the plank that does not rest on the wall molding.



3.5.2 Align another section of the plank with the end of the one just prepared and drill a hole for the pop rivet in the second plank of the row, but do not install the rivet.

3.5.3 Install the first plank in the ceiling by inserting the flange edge on top of the previous plank. Next, gently push the plank hook side up until it snaps onto the carrier tab.



3.5.4 Cut the fingers off of a splice plate and secure it into the end of the installed plank with a piece of two-faced tape.

3.5.5 Prepare the third plank in the row as described in Section 3.21.1 and 3.21.2 above. Install the second plank in the row and insert the pop rivet in the holes prepared in Section 3.21.2.

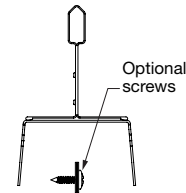
3.5.6 Continue this pattern for the remainder of the row. The splice plate installed in the next to last plank can only extend about 1/2" into the end of the last plank in the row.

3.5.7 Color the exposed rivets to match the plank finish.

3.5.8 To install the last full plank width row of 12" planks

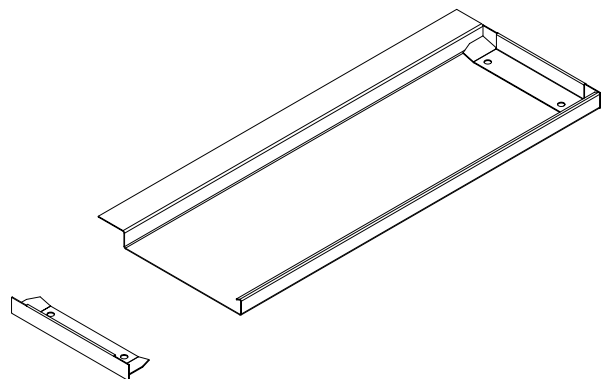
Cut the first plank to length so the end return will be at the middle of a carrier channel. Install the plank flange edge as normal and then gently push the plank hook side up until it snaps onto the carrier tab. The splice will be directly under the carrier channel to keep the joint aligned. Carriers are installed on 4' centers, and the remaining plank joints should be at carrier channel.

NOTE: Screws can be added through the upturns to keep the planks tightly together (as shown in detail below).



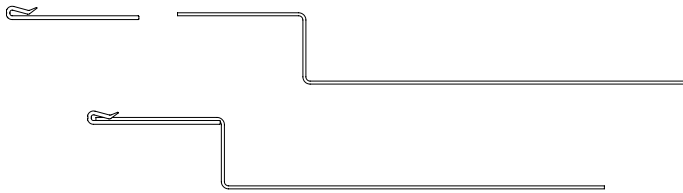
3.6 Optional Plank End Caps

Plank end caps can be used when the plank end is not covered by a molding. This may occur at a ceiling penetration or custom perimeter treatment, such as a floating installation. The plank end must be cut square and clean. Press the cap into the plank until it is flush with the end.



3.7 Optional Contrasts Fillers

Nominal 1-1/4" wide black Contrasts filler strips are field applied to planks before installation. Slide the filler hem over the plank flange. Install the plank as usual.

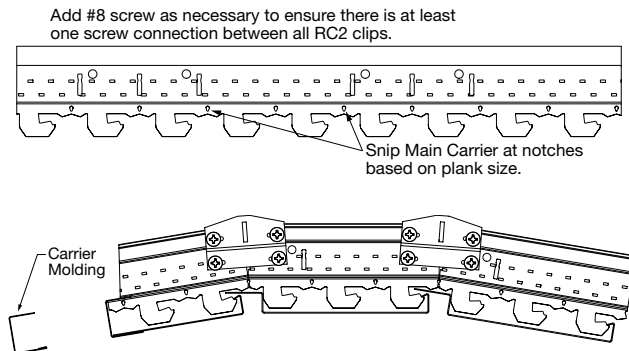


4. CURVED INSTALLATIONS

MetalWorks™ Linear planks can be installed to create a curved or vaulted ceiling. To do this, install the Main Beam Carriers at the radius or shape of the desired ceiling from the job plan. Follow the Curved Drywall Grid Technical Guide, BPCS-3540, for hanging curved ceilings. Copies are available on the web at <http://www.armstrong.com/pdbupimages-clg/205659.pdf>.

4.1 Faceting the Main Beam Carriers

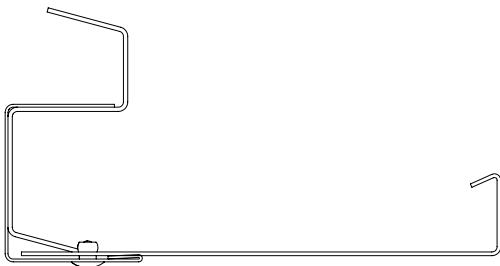
A MetalWorks Linear curved system is actually a faceted application with a 4", 6", 8", or 12" facet depending on the plank width. To curve or facet the Main Beam Carrier, snip the small vertical section between plank tabs and through the web to the flange. Use RC2 clips to reinforce the cuts in the Main Beam Carrier per the Curved Drywall Grid Technical Guide, BPCS-3540.



4.2 The carrier molding is used at the perimeter of curved linear metal installations. The carrier molding is not flexible and it is to be notched in the field for curved applications.

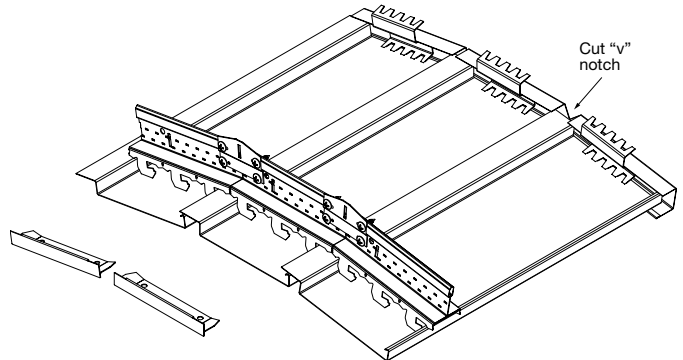
4.3 Perpendicular to the Carrier

On the two sides that the molding runs perpendicular to the modified carriers, it can be attached to the carriers as detailed in section 2.8 Main Beam Carrier Attachment. Use pressure springs to keep the plank tight in the carrier molding.

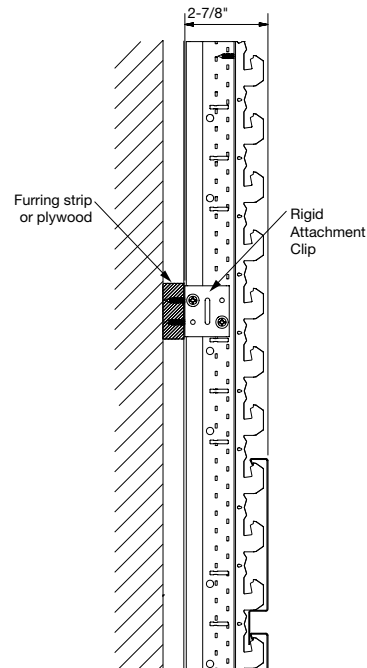


4.4 Perpendicular to the Linear Planks

The molding along the curved end will need to be faceted to match the plank width – 4", 6", 8", or 12". Cut a V-notch on the top flange at the module length. This will provide clearance to make a vertical cut on the side. Attach the molding to the wall to match the elevation of the planks. Use pressure springs to keep the plank tight in the flex carrier molding.



4.5 Wall Installations



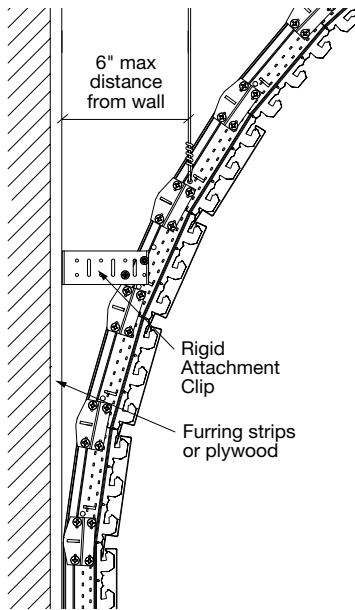
4.5.1 MetalWorks™ Linear planks can only be installed on the wall horizontally. Install Rigid Attachment Clips to furring strips or 5/8" plywood, securing them with appropriate fasteners for the substrate. Pacing between clips along the Main Carrier should not be more than 24". The first row of clips at the bottom should be elevated from the floor by no more than 6". The last row of clips at the top should be within 6" from the existing ceiling.

4.5.2 Install the Main Beam Carrier directly to the clips 48" on center. The first and last carrier must be within 8" from the end to control plank twist. Install the planks with the flange facing down starting at the bottom going up.

4.5.3 Install splice plates at plank joints. Splice plate installation will be blind because of proximity to the wall structure.

4.5.4 If not wall-to-wall, use end caps on planks, but all other components may be in line of sight.

4.6 Curved Ceiling-to-Wall Transitions



4.6.1 MetalWorks Linear can be installed to create a curved transition from ceiling to wall by faceting the Main Beam Carriers.

Radius minimums:

- 12" plank – 6' radius
- 8" plank – 4' radius
- 6" plank – 3' radius
- 4" plank – 2' radius

See Section 4. *CURVED INSTALLATIONS* for instructions on how to facet Main Beam Carriers.

4.6.2 Use Rigid Attachment Clips (item 6459BL) to stabilize the Main Beam Carriers. Install hanger wires to deck 6" from wall, then 24" OC along the curved segment of the Main Carriers. Install planks with flange down starting from the bottom.

4.6.3 MetalWorks™ Linear curved transitions are single wall only, due to the directional attachment of the planks.

5. PLANK PENETRATIONS

5.1 Penetrations through linear metal planks are made using typical metal working equipment. Hole saws work well for sprinklers. Tin snips can be used for larger openings. All penetrations should be fitted with escutcheons that conceal the cut plank edges.

5.2 Planks are not to be used to support the weight of ceiling mounted hardware. These items are to be supported from the Main Beam Carriers or directly from the overhead structure.

6. ACCESS PANELS (INTERIOR ONLY)

6.1 Access panels must be installed at each location where entry through the ceiling is required. Maximum access panel size is 36" wide by 36" long. Plan size and location carefully to ensure that all above ceiling equipment requiring service is reachable.

6.2 Access Panel Opening

Make sure that a carrier is installed not more than 12" from each end of the openings. If sections of carrier must be added, they should extend at least one full plank width beyond the sides of the openings.

6.3 Frame the opening with sections of Carrier Molding (item 5574) to match the size of the opening. Fasten the backside corners of the frame overlap with metal framing screws.

6.3.1 Pop rivet the frame to the cut planks 6" from all corners and 12" OC to hold the frame in place.

6.4 Access Panel Construction

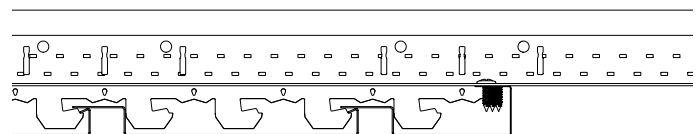
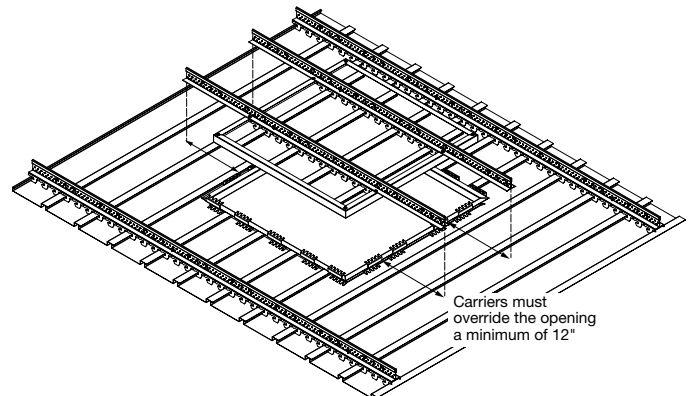
Fabricate a second frame for the access panel out of the Carrier Molding. Size this frame 1/2" smaller, in both directions, than the ceiling opening.

6.5 Cut lengths of plank to fill the frame, making sure that they will line up with the planks in the field of the ceiling. Pop rivet the long side of the planks to the inside of each end of the frame 6" in and 12" OC.

6.6 Cut Main Beam Carriers 12" past cut opening. Remove lower portion of Main Beam Carrier so that the Main Beam Carrier fits inside of the access panel frame (see detail 6.8). Carriers are to be not more than 6" from the ends of the access panel and not more than 24" on center.

6.7 Assemble the frame around the cut planks and secure with sheet metal screws.

6.8 Attach 1/4" thick foam gasket to the edges of the door. Hold the gasket about 1/2" up from the face of the molding.



(See Section 8 For Seismic Installation Considerations)

7. EXTERIOR INSTALLATION

MetalWorks Linear planks, 4", 6", 8" and 12" widths, (unperforated and microperforated) are recommended for non-exposed exterior applications.

7.1 Only these specific suspension system items and accessories should be used for wind uplift applications:

- 7177 Main Beam Carrier
- XL7936G90 3' DGS cross tee
- XL8926G90 2' DGS cross tee
- MetalWorks Linear Carrier Molding item 5574
- 20AWG 3-5/8" CSJ Compression Posts
- 16AWG CRC U Profile
- BACG90 Clips
- XTAC (Cross Tee Adapter Clip)
- MetalWorks Linear 4" Splice Plate item 5495
- MetalWorks Linear 6" Splice Plate item 7166
- MetalWorks Linear 8" Splice Plate item 5496
- MetalWorks Linear Pressure Spring item 5576

7.2 This section provides details for the proper application of these products in areas requiring resistance to wind uplift forces. The details and descriptions provided in this section depict the method used during independent testing conducted according to UL580 "Standard Test for Uplift Resistance of Roof Assemblies".

7.2.1 Armstrong is not licensed to provide professional architecture or engineering design services. These drawings and descriptions 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, statutes, ordinances, rules, and regulations (legal requirements) that may be applicable for a particular installation.

Armstrong does not warrant, and assumes no liability for the accuracy or completeness of the drawings for a particular installation or their fitness for a particular purpose. The user is advised to consult with a duly licensed architect or engineer in the particular locale of the installation to assure compliance with all legal requirements.

7.3 Installation of Suspension System

7.3.1 Install the 5574 Flex Carrier Molding at the finish ceiling elevation.

7.3.2 Attachment should be by metal fasteners of a type and size appropriate for the mounting surface. Fasteners should be evenly spaced along the length of the track and the maximum center spacing should not exceed 16".

7.3.3 Cut Main Beam Carriers to length as described in section 2.7.

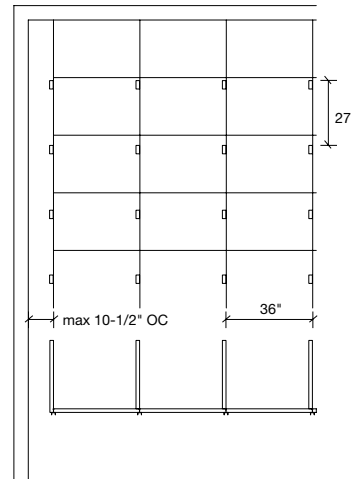
7.3.4 Main Beam Carrier spacing for exterior applications is dependant upon the plank width being used. For 4" and 6" wide planks main beam carriers are to be placed 36" OC with compression posts placed 27" OC along the main beam carriers. For 8" and 12" planks main beam carriers are to be placed 24" OC with compression posts placed 24" OC along the Main Beam Carriers. Hang carriers with galvanized #12 gauge steel suspension wires at 4 ft. on center.

7.3.5 Stretch a string from one side of the room to the other at the bottom of the molding (string perpendicular to DGS main beams). See detail 2.7.1. The string should be out from the "end" wall by the calculated width of the first "plank." See Section 3 for border plank layout.

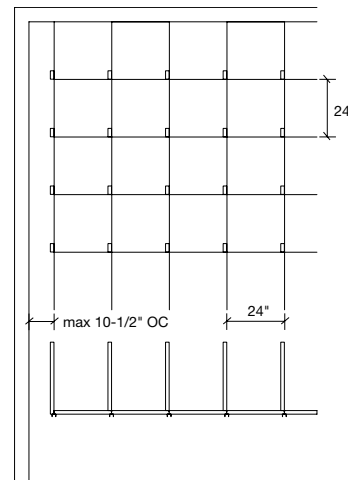
7.3.6 Insert DGS cross tees every 24" OC along the main beam carriers. All single tee connections or cut cross tees must be reinforced with an XTAC.

7.3.7 Attach the ends of the main beams to the Carrier Molding using #8 x 1/2" self-drilling screws.

(See plan views below for system layout.)



Layout for 36" OC Main Beam Carriers and 27" OC Compression Posts.



Layout for 24" OC Main Beam Carriers and 24" OC Compression Posts.

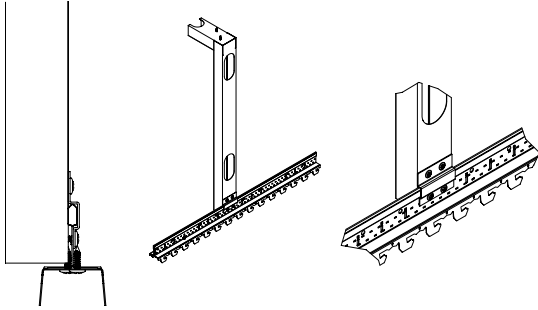
7.4 Installation of the Compression Posts

7.4.1 Independent testing was successfully conducted to Class 30, 60, and 90 using 20AWG 3-5/8" CSJ Compression Posts with a 30" plenum. Plenum depths beyond 30" will require a structurally engineered configuration.

7.4.2 Note that the bottom end of the posts should fit tight against the flange of the Main Beam Carrier.

7.4.3 The top end of the post is made by cutting through the flanges of the stud and folding over a short horizontal leg of approximately 3" to 5" add a screw to secure the folded stud. The top end of the post shall be attached to the structure by means of at least two metal fasteners of a type and size appropriate for the application.

7.4.4 Attachment to the Main Beam Carrier shall be by means of the Armstrong BACG90A clip. Begin by clamping the post and the BACG90A clip in position. Then use four #8 x 3/4" self drilling sheet metal screws to fasten the post to the BACG90A clip. The top screws will fasten the strut to the clip and the bottom screws will fasten the strut and Main Beam Carrier to the clip.



7.5 Please refer to Sections 1.4, 2, and 3 in this document for general information regarding the installation of MetalWorks Linear planks and suspension system.

7.5.1 Install Planks

Measure, cut, and install the first border plank as described in section 3. Install a Pressure Spring (item 5576) every 12" along the border plank. Pop rivet the plank to the Carrier Molding 12" OC in between the carriers and within 3" of plank ends.

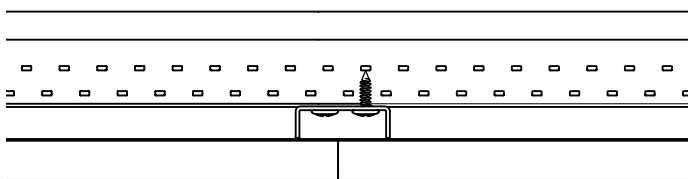
The end of the plank will fit into the Carrier Molding on the adjacent wall. One pressure spring is required on the end for all 4", 6", and 8" wide planks, two pressure springs are required on the short ends of each 12" plank that rests on the wall molding.

7.5.7 Continue installing rows of planks across the space until you reach the last full width plank row. Do not install this row until the last perimeter row is installed.

7.6 Plank Joints

For 4", 6", and 8" planks:

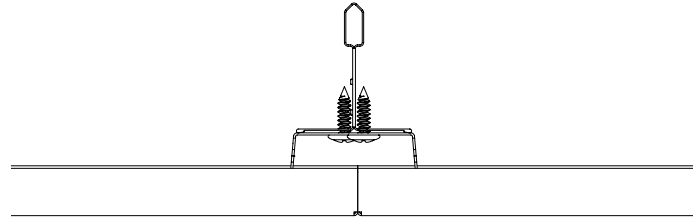
- Splice locations must be centered between two Main Beam Carriers
- 16AWG CRC U Profile must be installed perpendicular to the DGS cross tees above all splice locations (see detail)



- Splice plates will be installed as normal

For 12" planks:

- Splice locations must be directly under Main Beam Carriers (see detail)
- Screws through the plank upturns can be added as detailed in section 3.5.8 to secure the plank reveals.



7.7 Last Border Plank

You must install the last border plank while you still have access above the carrier. Cut the last row border plank to width. Locate the carrier tabs that support the border plank flange, then use pliers to bend the carrier tabs out 90 degrees. Then use pliers to bend the carrier tab out 90 degrees. Next, insert the long cut edge of the plank into the molding, align the plank in the carrier, and use pliers to bend the supporting tabs back to the original position. Install a Pressure Spring (item 5576) every 12" along the border plank. Pop rivet the plank to the Flex Carrier Molding 12" OC in between the carriers and within 3" of plank ends.

Refer to section 3.5 for details on installing the last full width row of planks.

8. SEISMIC INSTALLATION (IBC C, D, E, AND F)

MetalWorks™ Linear has been engineered and tested for application in all seismic areas based on the following installation procedures.

The following installation guidelines should be used in areas where anticipated seismic activity will be moderate to severe (IBC Seismic Design Categories C, D, E, and F). Consult the local building code department to ensure compliance with their unique requirements.

8.1 Seismic Suspension System

The following requirements are in addition to the interior installation sections of this guide, ASTM – E580, and the Armstrong Seismic Ceiling Installation Guide BPCS-4141 requirement for a ceiling system.

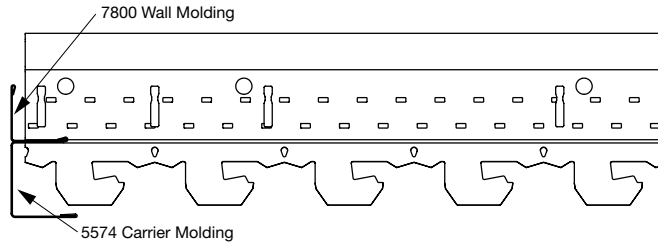
Layout of the grid system is the same regardless of the linear plank width selected. MetalWorks Linear has only been tested for a flat installation in IBC Seismic Categories (C, D, E, and F)

8.2 Seismic Components

- 7177 12' Main Beam Carrier
- XL8945 4' DGS Cross Tee
- BERC2 Clip
- 7800 7/8" Wall Angle Molding
- 5574 Carrier Molding
- 5576 Pressure Springs
- 7237 Cut Plank Support Bracket

8.3 Suspension System General Requirements

- Install 7800 Wall Molding on top of 5574 Carrier Molding as shown in detail below.



- Main Carriers must be installed 48" OC, perpendicular to the desired plank length direction.
- The first and last Main carrier must be installed within 24" of the perimeter wall.
- Install XL8945P 48" DGS cross tees at 48" OC with the first tee no more than 24" from the wall.
- Install BERC2 over all grid connections to the wall
- Main Beam Carriers and cross tees must be mechanically attached to the molding on two adjacent walls
- The opposite unattached walls must have 3/4" clearance
- Perimeter wires must be installed to support all Main Carrier and cross tees within 8" of the wall
- All continuous ceilings over 1,000 SF will require compression post per ASTM – E580

8.4 Seismic Linear Plank Installation – General

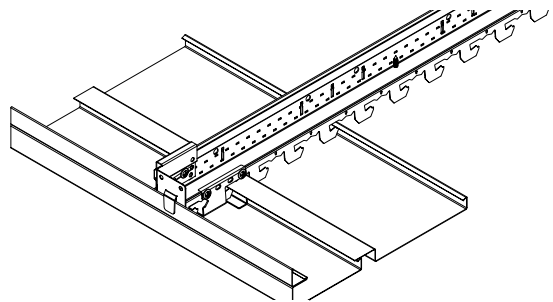
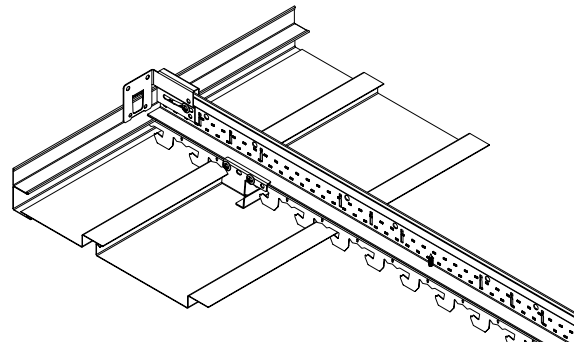
All plank sizes have been successfully tested in all IBC seismic categories.

8.5 Seismic Linear Plank – Field

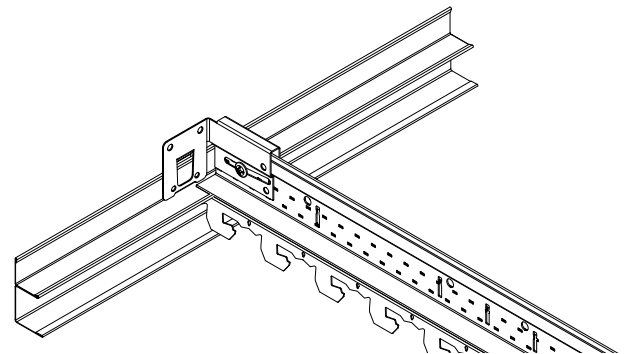
- MetalWorks Linear planks in the field require no additional considerations. Please follow installation as described in Section 3.0 of this guide for general requirements.

8.6 Plank Interface with Wall Molding – Borders

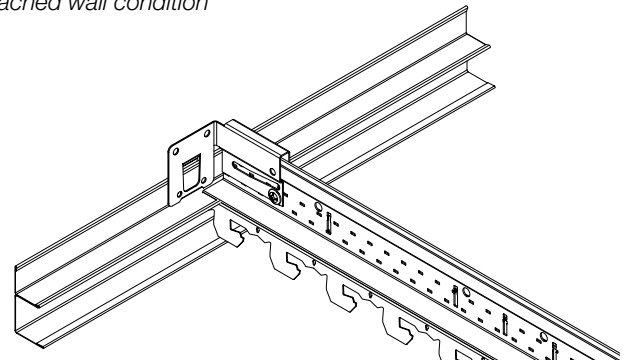
- Planks cut to width along an attached wall require pop rivets 24" OC or the Cut Plank Support Bracket (CPSB) 48" OC to keep the planks fully engaged.
- BP7237, Cut Plank Support Bracket is a bracket used in conjunction with wall molding, to secure MetalWorks Linear planks to the carrier system when one of the plank's engagement edges has been removed. The function of the bracket is intended to keep the remaining plank edge engaged with the carrier feature, while the other edge is supported and allowed to float on the wall molding flange.
- Short ends of the planks along both attached and unattached walls only require Pressure Springs (1 per 4", 6", 8" plank and 2 per 12" plank).
- Unattached long side of the planks will require additional border clips to keep the planks engaged during a seismic occurrence. The Cut Plank Support Bracket (CPSB) attaches to the main Beam Carrier and will lock onto the cut edge of the planks to allow 3/4" movement. See drawings following.



Please see details following for attached and unattached wall descriptions.



Unattached wall condition



Attached wall condition

Testing conducted at the Structural Engineering Earthquake Simulation Laboratory, located at the State University of New York – Buffalo campus, produced satisfactory results with the guidelines listed above.

MORE INFORMATION

For more information, or for an Armstrong representative, call 1 877 ARMSTRONG.

For complete technical information, detail drawings, CAD design assistance, installation information, and many other technical services, call TechLineSM at 1 877 ARMSTRONG or FAX 1 800 572 TECH.

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