

METALWORKS™ Linear (Interior & Exterior Applications)

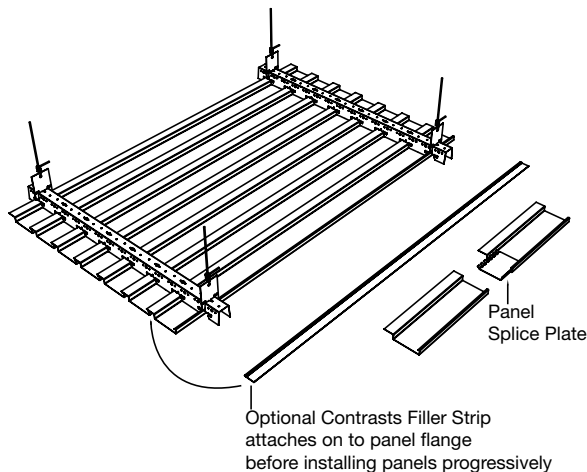
Assembly and Installation Instructions

1. GENERAL

1.1 Product Description

MetalWorks Linear is a linear metal ceiling system with either a Connections or Contrasts visual. Linear panels are available 8' long and in 4", 8" and 12" widths, including a 1-1/4" panel flange that can optionally be covered with a black plastic filler strip to create the Contrasts visual. Linear panels are made of 0.028" electro-galvanized steel. Their post-production powder-coated finish is available in white, Effects Wood Looks and a wide range of custom RAL colors. Microperforated options with a plain border, acoustical fleece backing or optional fiberglass infill are available.

The carrier channel is hung with 12-gauge hanger wire through a carrier hanger. Carriers are hung on 4 foot centers.



1.2 Storage and Handling

The ceiling panels 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 Site Conditions

Building areas to receive ceilings shall be free of construction dust and debris.

1.4 Ceiling Panel Layout

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

Example: 8" nominal panel 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 panel with 14 full rows of panels. This will create the best visual and installation.

2. PREPARATION

2.1 Determine desired height of new ceiling.

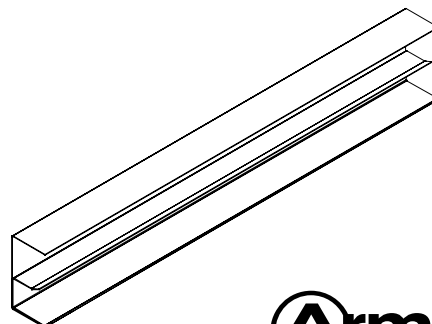
2.2 Strike a level line around the perimeter of the area at this height.

2.3 Determine direction of linear ceiling.

2.4 The carriers will be installed 4 feet on center perpendicular to this direction. The first and last carrier must be within 24 inches of the wall.

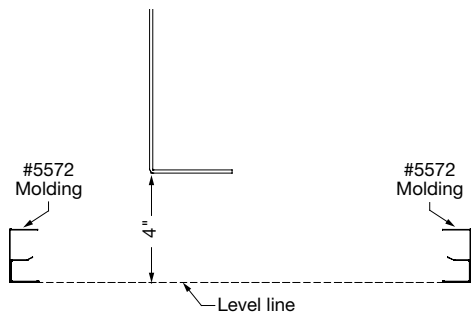
3. INSTALLATION

3.1 Install the standard Carrier Wall Molding (item 5572) on the perimeter walls. Molding is nominal 2" high and should be secured to wall every 16 to 24 inches. The bottom of the molding is the finish height of the linear panel.

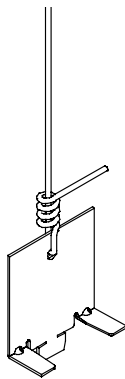


3.2 Secure hanger wires to the structure above to support the carriers. Wire spacing for carriers should be within 2 feet of each end and then 4 feet on center.

3.3 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 4" above the string or laser.

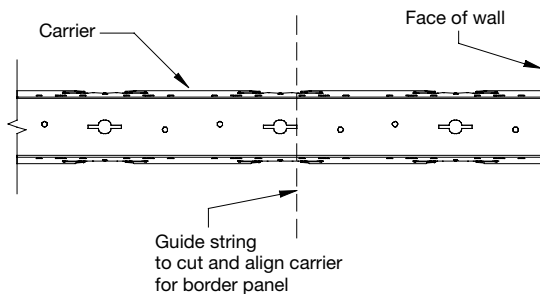


3.4 Hang a Carrier Hanger (item 5580) from each wire and secure with three wraps (as shown).

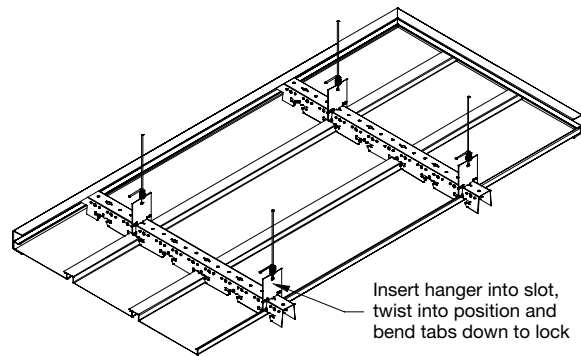


3.5 Stretch a string from one side of the room to the other at the top of the molding (string perpendicular to carrier). The string should be out from the "end" wall by the calculated width of the first "plank." See section 1.4 for border panel layout.

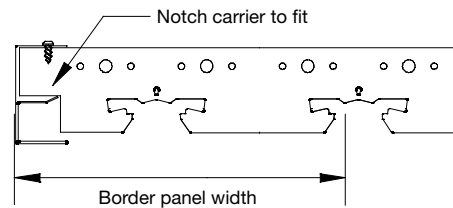
3.6 Measure from this string to the wall. Cut the first carrier channel in each row so the indicated notch lines up with this string.



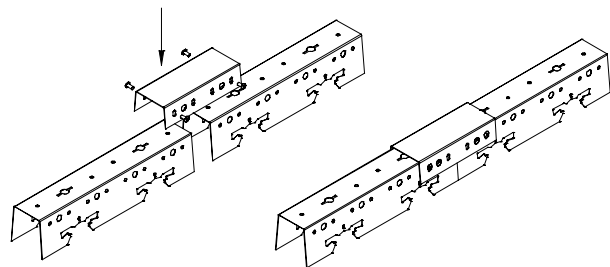
3.7 Secure the carriers to the carrier hangers. Insert the hanger clip into the pre-punched slot on top of the carrier and twist the clip 90 degrees. Bend both side tabs down to lock the clip onto the carrier.



3.8 Fasten the carrier to the molding at the proper location, align the notch as indicated in Section 3.6 and fasten with a framing screw or pop rivet. Notch the carrier to fit into the wall molding as needed.



3.9 Use the Carrier Splice (item 5499) to join sections of carrier together and maintain the proper spacing. Fit the splice over the top of the carrier. Line up all the holes and insert four framing screws or pop rivets (one on each side and at both ends of the carriers) to secure the splice to the carriers.



3.10 Complete the run of carriers to the other end of the space.

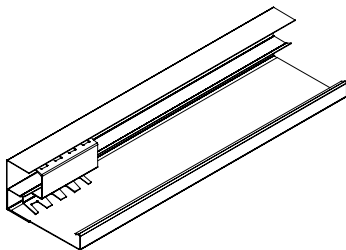
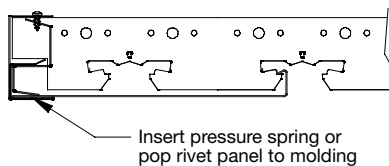
3.11 Measure from the wall to the string several places and determine the exact width of the first row of panels.

3.12 Mark the plank and cut to width with electric shears. The flange edge is the edge that should be cut off.

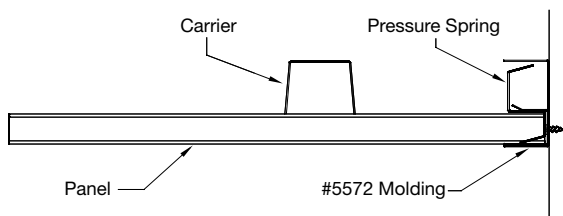
3.13 Slide the cut edge of this plank into the perimeter wall molding.

3.14 The opposite hook edge (factory edge) of the plank will fit onto the tab on the carrier.

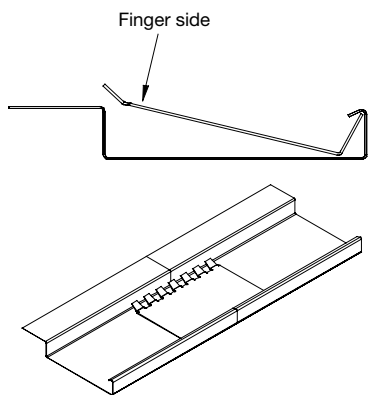
3.15 Insert pressure springs or pop rivet panel to secure the panel to the molding.



3.16 Cut the panels to length to fit into the perimeter molding at the sides, parallel to the carrier. Cut end will fit into the lower channel. Use pressure springs on ends as needed.



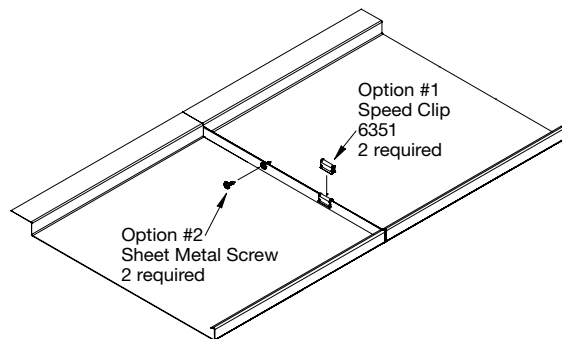
3.17 When 4" and 8" panels do not reach across the space in one piece, use a panel splice (available in 4" and 8" widths) to join and align adjacent panels. Install panels so the factory joint is tight. Install the splice by inserting the solid end under the panel hook. Then gently push the finger side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



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

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

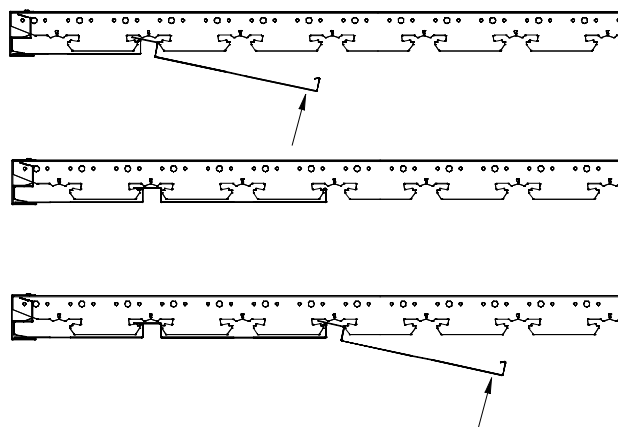
Option 2 – Insert sheet metal framing screws through the panel returns. This requires a clear plenum to work with power tools above the panel. Two screws required at each joint.



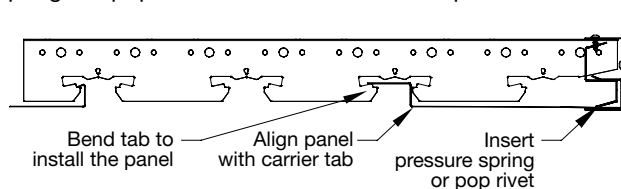
Note: Ends of installed panels will always be visible with this system.

3.18 Install the second row of panels by inserting the flange edge on top of the previous panel. Next, gently push the panel hook side up until it snaps onto the carrier tab.

3.19 Continue installing panels until you reach the other side of the room.

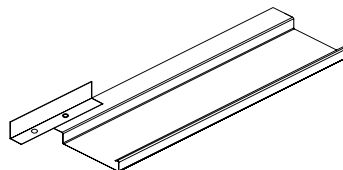


3.20 Do not install the last full panel at this time. Cut the last row border panel to width and insert the long cut edge into the molding above the bottom flange. Make sure the panel is against the carrier tab for proper alignment. Insert pressure springs or pop rivets to secure the border panel to the molding.



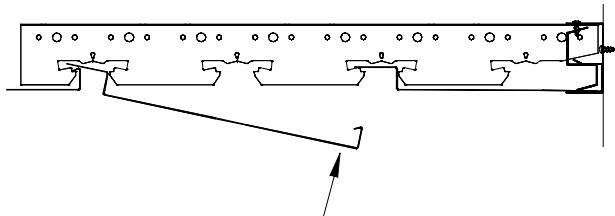
3.21 The last full row of 4" or 8" panels must be joined end-to-end after installation, but must be prepared before installation (for 12" panels see 3.21.8).

3.21.1 Pop-rivet a short section of metal angle to the flange of the first panel to be installed in the last row, as shown in the drawing below. This is the end of the panel that does not rest on the wall molding.

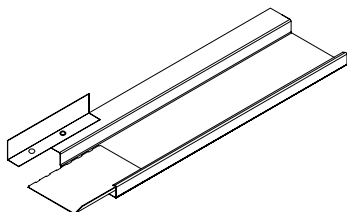


3.21.2 Align another section of the plank with the end of the one just prepared and drill or punch a hole for the pop-rivet in the second panel of the row, but do not install the rivet.

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



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

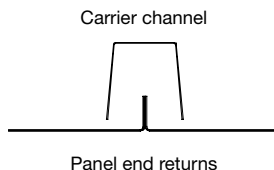


3.21.5 Prepare the third panel in the row as described in section 3.21.1 and 3.21.2 above. Install the second panel in the row and insert the pop-rivet in the holes prepared in section 3.21.2.

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

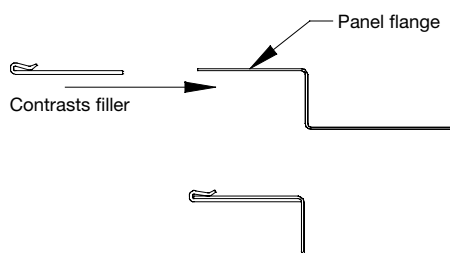
3.21.7 Color the exposed rivets to match the panel finish.

3.21.8 Installing the last row of full 12" panels. Cut the first panel to length so the end return will be at the middle of a carrier channel. Install the panel flange edge as normal and then gently push the panel 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, the remaining panel joints should be at carrier channel.



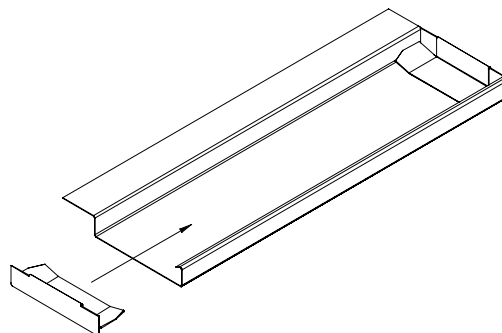
3.22 Optional Contrasts Fillers

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



3.23 Optional Panel End Caps

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



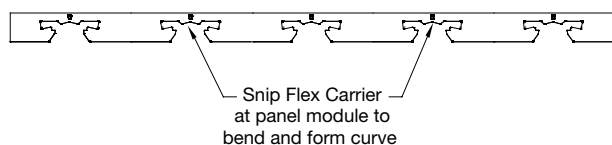
4. CURVED INSTALLATIONS

MetalWorks Linear panels can be installed to create a curved or vaulted ceiling. To do this, first install Armstrong drywall grid at the radius or shape of the desired ceiling from the job plan. Follow the Drywall Grid Technical Guide, CS-3540, for hanging curved ceilings. Copies are available on the web at www.armstrong.com/drywall.

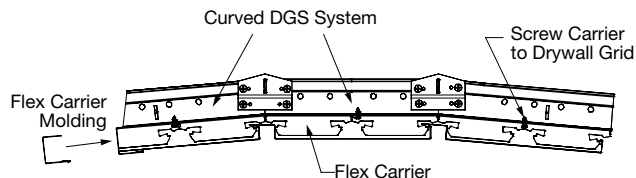
Curved MetalWorks Linear systems use the Flex Carrier (item 5498) and Flex Carrier Molding (item 5574). The Flex Carrier Molding is not flexible and it is to be notched in the field for curved applications.

4.1 Flex Carrier

A MetalWorks Linear curved system is actually a faceted application with a 4", 8" or 12" facet depending on the panel width. To curve or facet the flex carrier, snip the small vertical section between panel tabs.



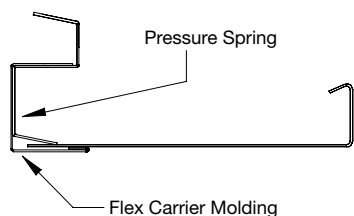
4.2 Attach the flex carrier to the drywall grid with a typical #7 x 7/16" framing screw. Start installing the carrier at one side, flex the carrier as needed, attaching the midpoint of the carrier to the curved drywall grid system. Install the linear panels in the same way as described in Section 3.



4.3 Flex Carrier Molding is used at the perimeter of curved linear metal installations. The Flex Carrier Molding is not flexible and it is to be notched in the field for curved applications.

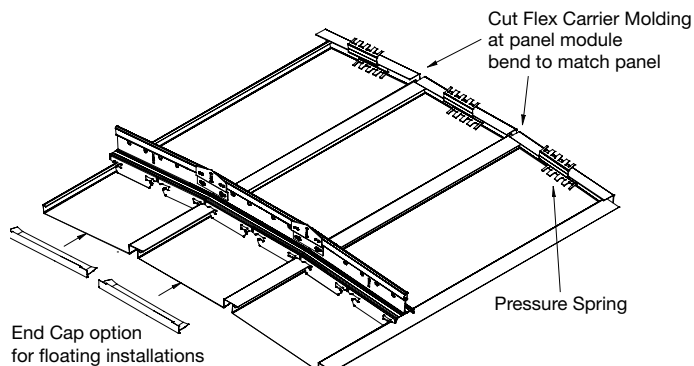
4.3.1 Perpendicular to the Carrier

The molding can be attached to the flex carrier when installed perpendicular to the flex carrier. Use pressure springs to keep the panel tight in the flex carrier molding.

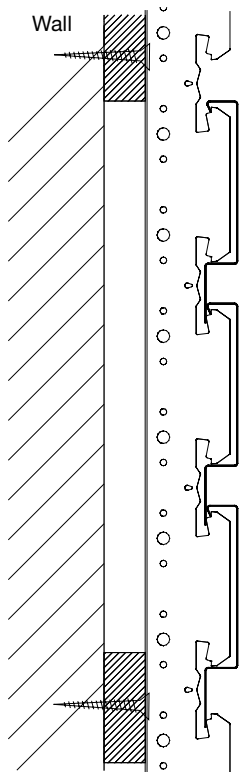


4.3.2 Perpendicular to the Linear Panels

The molding along the curved end will need to be faceted to match the panel width, 4", 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 panels. Use pressure springs to keep the panel tight in the flex carrier molding.



4.4 Wall Installations



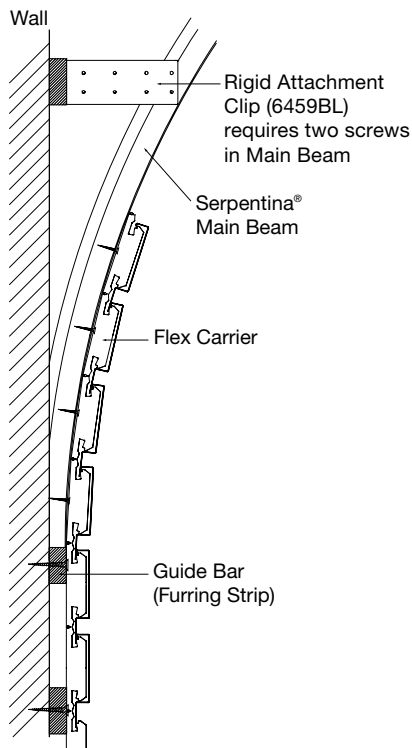
4.4.1 MetalWorks Linear can only be installed on the wall horizontally. Install wood furring strips horizontally, securing them to wall studs or a solid wall with appropriate fasteners for the substrate. Spacing between furring should not be more than 24". The first furring strip at the bottom should be elevated from the floor by no more than 6". The last furring strip at the top should be within 6" from the existing ceiling.

4.4.2 Install carrier directly to furring 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.

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

4.4.4 Wall-to-wall installations can use standard carrier molding. If not wall-to-wall, use end caps on planks but all other components may be in line of sight.

4.5 Curved Ceiling-to-Wall Transitions



4.5.1 MetalWorks Linear can be installed to create a curved transition from ceiling to wall by using either Serpentina main beams (only for 4" wide planks) or faceting drywall grid main beams.

Radius minimums:
12" plank - 6' radius
8" plank - 4' radius
4" plank - 2' radius

See section 4. CURVED INSTALLATIONS for instructions on how to facet drywall grid main beams.

4.5.2 Once you have your desired radius in either the Serpentina main beam or DGS main beam, fit the bottom of it to sit flush with the guide bar (furring strip). Use Rigid Attachment Clips (item 6459BL) or other rigid kicker (by others) to stabilize curved piece. Install hanger wires to deck 6" from wall, then 24" spacing going up the transition. Attach the flex carrier to the curved main beam every 12" using appropriate fasteners per substrate. Install planks with flange down starting from the bottom.

4.5.3 If a curved transition is installed, use flex carrier for horizontal ceiling installation.

4.5.4 MetalWorks Linear curved transitions are single wall only.

5. PANEL PENETRATIONS

5.1 Penetrations through linear metal panels 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 panel edges.

5.2 Panels are not to be used to support the weight of ceiling mounted hardware. These items are to be supported from the carriers or directly from the overhead structure.

6. ACCESS PANELS

6.1 Access panels must be installed at each location where entry through the ceiling is required; plan size and location carefully to ensure that all above ceiling equipment requiring service is reachable.

6.2 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 standard Carrier Wall Molding (item 5572) carefully mitered and cut to match the size of the opening. Fasten the corners of the frame with a XTAC inserted into the upper channel of the molding. Secure the clip with pop-rivets.

6.4 Fabricate a second frame for the infill panel. Size this frame 1/2" smaller, in both directions, than the ceiling opening.

6.5 Cut lengths of panel to fill the door making sure that they will line up with the panels in the field of the ceiling.

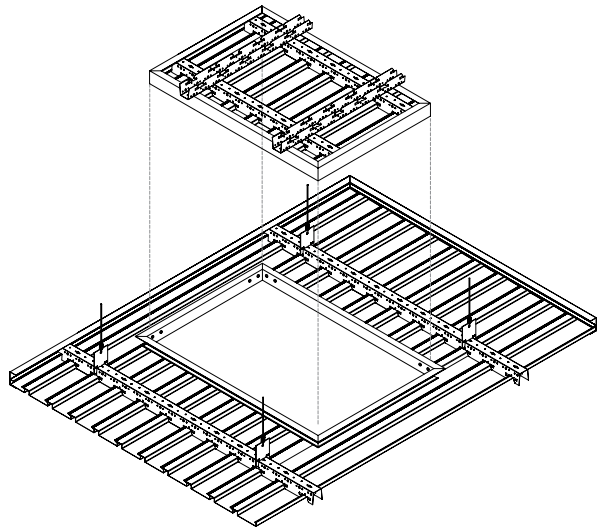
6.6 Attach the panel sections to lengths of standard carrier cut to fit in the completed frame. Carriers are to be not more than 12" from the ends of the access panel and not more than 48" on center.

6.7 Assemble the frame around panel sections and secure with XTAC clips and pop-rivets.

6.8 Attach two support rails the top side of the infill panel. These may be fabricated from sections of standard carrier or from steel stud. The rails should run parallel to the length of the door and extend at least 1' beyond the frame at both ends.

6.9 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.

6.10 Lay the access door in place.



(SEE SECTION 8 FOR SEISMIC INSTALLATION CONSIDERATIONS)

7. EXTERIOR INSTALLATION

MetalWorks Linear Connections panels, 4" and 8" widths, (unperforated) and (microperforated) are recommended for nonexposed exterior applications except in geographical areas with high concentrations of acid rain.

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

DGS Main Beam item #HD8906

DGS Cross Tee item #XL8926

1 5/8" 20 ga. Track

MetalWorks Linear 4" splice plate item #5495

MetalWorks Linear 8" splice plate item #5496

MetalWorks Linear standard carrier item #5497

MetalWorks Linear standard carrier molding item #5572

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". The result of this test was a Class 30, 60 and 90 rating. Only 4" and 8" widths are approved for exterior wind uplift installations.

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 the Drywall Grid Suspension Support Structure

7.3.1 Product Description

The recommended support structure for MetalWorks Linear exterior installations is the Armstrong Drywall Grid System (DGS). The DGS support structure must be installed with the main beams running perpendicular to the MetalWorks plank. Refer to the reflected ceiling plan for panel direction.

7.3.2 The DGS structure uses standard 1-5/8" 20 ga. track as wall molding. Install the track 2" above the desired elevation of the MetalWorks Linear ceiling.

7.3.3. 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".

7.3.4 DGS mains, HD8906, should be installed 2' on center. Hanger wires are of little consequence, as support for the mains will be by means of compression struts spaced at 2' centers. Wires may be used as required to install and level the DGS system prior to the attachment of the compression struts. Hanger wires may remain in place or may be removed after the installation is completed. Insert 2' DGS cross tees, XL8926, at 2' OC. Attach the ends of the mains and all border cross tees to the perimeter track using two #8 x 1/2" sheet metal framing screws.

See *PLAN VIEW* on page 9 for an example of the DGS support structure for a Class 90 installation.

7.4 Installation of the Compression Struts

7.4.1 Compression struts are required to brace the DGS main beams. The size and shape of the strut material must be designed to meet the requirements of the particular application. Independent testing was successfully conducted to Class 30, 60 and 90 using 25-gauge steel stud (CSJ flange measuring 2-1/2" deep, with a 1-5/8" flange width) at a length of 30".

7.4.2 Compression strut requirements for each Class are below.

- UL 580 Class 30 - Compression struts 4 feet on center along DGS main
- UL 580 Class 60 - Compression struts 3 feet on center along DGS main
- UL 580 Class 90 - Compression struts 2 feet on center along DGS main adjacent to the intersection of the cross tees.

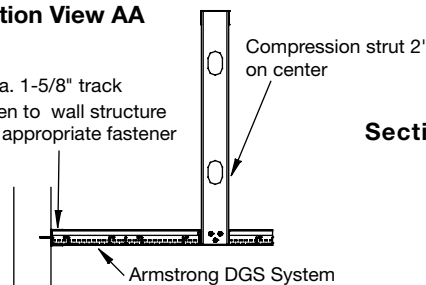
7.4.3 Note that the bottom end of the strut should fit tight against the flange of the DGS main.

7.4.4 The top end of the strut is fashioned by cutting through the flanges of the stud and folding over a short horizontal leg of approximately 3" to 5". The top end of the strut shall be attached to the structure by means of at least two metal fasteners of a type and size appropriate for the application.

7.4.5 Attach the strut to the DGS main using three #8 x 3/4" sheet metal screws. Insert two screws into the bulb and one screw into the web.

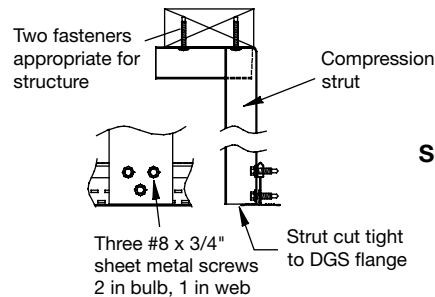
Section View AA

20 ga. 1-5/8" track
Fasten to wall structure
with appropriate fastener



Section View BB

Compression Strut Connections



Section View CC

7.5 Installation of the MetalWorks Linear System

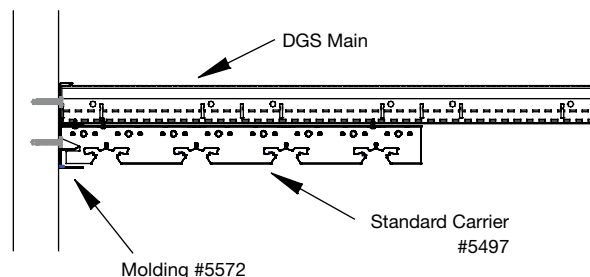
7.5.1 Please refer to Sections 1.4, 2 and 3 in this document for general information regarding the installation of MetalWorks Linear panels and suspension system.

7.5.2 Ceiling Panel Layout
(See Section 1.4)

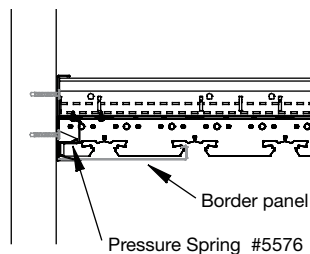
7.5.3 Molding: Install the standard Carrier Wall Molding (item 5572) on the perimeter walls. Molding is nominal 2" high and should be secured to the wall every 16" with fasteners appropriate for the structure. The top of the molding should fit tight against the bottom of the DGS support track. The bottom of the molding is the finish height of the linear panel.

7.5.4 Stretch a string from one side of the room to the other at the bottom of the molding (string perpendicular to DGS mains). The string should be out from the "end" wall by the calculated width of the first "plank." See section 4.2 for border panel layout.

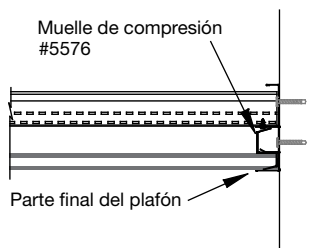
7.5.5 Carrier: The standard carrier (item 5497) is screwed directly along each DGS main. Carriers must be attached to each DGS main at 2' on center. Use the string line to determine where to cut the first carrier for the border panel. Notch the carrier to fit into the wall molding. Align the carrier panel tab with the guide string and then fasten the carrier to the DGS main. Use #6 x 7/16" sheet metal framing screws 12" on center. Butt carrier ends together and fasten to the DGS mains until you reach the other side of the room. Carrier splices are not required.



7.5.6 Install panels: Measure, cut, and install the first border panel as described in standard MetalWorks Linear instructions. Install pressure spring (item 5576) every 12" along the border panel.

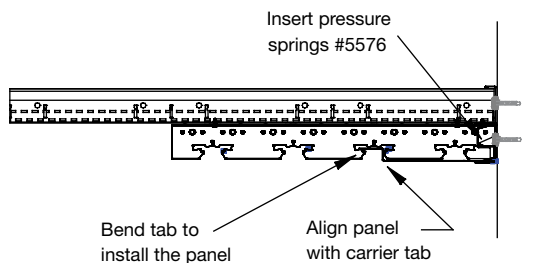


The end of the panel will fit into the molding channel on the adjacent wall. A pressure spring is required on the end of all 8" wide panels that rest on the wall molding.



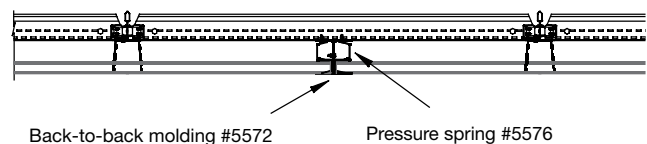
7.5.7 Continue installing rows of panels across the room until you reach the last two full-width panels. Do not install the last two full-width panels until the last border panel is installed.

7.5.8 Last border panel: You must install the last border panel while you still have access above the carrier. Cut the last row border panel to width. Locate the carrier tab that supports the border panel flange. Then use pliers to bend the carrier tab out 90 degrees. Next insert the long cut edge of the panel into the molding, align the panel in the carrier and use pliers to bend the supporting tab back to the original position. Install pressure spring (item 5576) every 12" along the border panel. Install the full panel that is next to the last border panel and make sure the panel hook locks securely onto the tabs that were bent. Finish installing the final row of panels by gently pushing up on the hook side of the panel until it snaps onto the carrier tab.

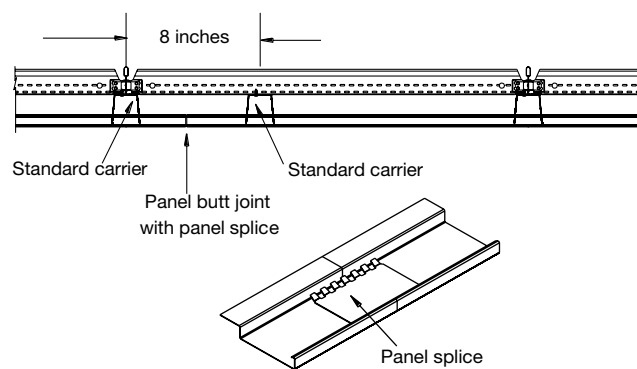


7.5.9 Panel Joints: There are two options for panel joint connection in exterior installations. Use back-to-back wall molding as a joint trim or use panel splice plates to align panel butt joints. Refer to the reflected ceiling plan for panel joint detail. Follow the following guidelines for the selected option.

7.5.9.1 Option 1 – Back-to-back wall molding trim. This option will have all panel joints aligned. Fasten two pieces of standard carrier molding back to back with #6 x 7/16" sheet metal framing screws 12" on center. Attach the double molding to the DGS cross tees between the carrier. Use two #6 x 7/16" framing screws at each cross tee intersection. Spacing of the double molding for full-length panels will be 8'-1". Install the panel by inserting one end of the panel into the molding channel, snap the panel onto the carrier, then slide the panel into the opposite molding channel. The panel must be centered between moldings with 1/2" of the panel resting on each molding flange. For border or less than full length panels, measure the opening between the molding flanges. Add 1" to this measurement to determine the panel length. Insert a pressure spring on both ends of the panel to keep it aligned. Note – the last panel installed must be pop riveted to the molding since you will not be able to insert pressure springs.



7.5.9.2 Option 2 - Uses standard panel splice plates to align the panel butt joints. All panel joints must be aligned with this option. Panel joints will be offset 4" from a carrier mounted to a DGS main beam. Determine the location of the panel joint. Install an additional carrier 8" away from the adjacent carrier. Fasten this carrier to each DGS cross tee using two #6 x 7/16" framing screws. An additional carrier will be installed every 8 feet adjacent to the panel joints. Install the panels so the joints align between the two carriers. Pull the butt ends together and insert a panel splice to keep the joint tight and aligned.



8. SEISMIC INSTALLATION

The MetalWorks Linear Connections and Constrasts systems have been engineered and tested for application in all seismic areas based on these 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 & F). Consult the local building department to ensure compliance with their unique requirements.

8.1 Flat Installations

Carriers must be mechanically attached to the molding on one wall with 3/4" clearance on the opposite wall.

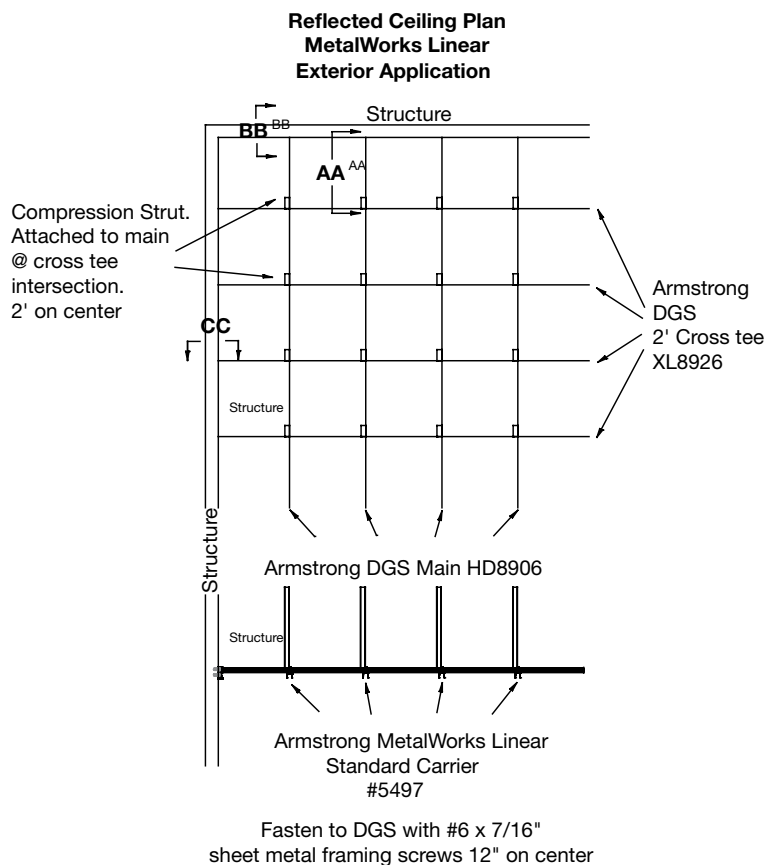
8.1.1 Run a drywall main beam perpendicular to, and on top of the carriers, first row within 6 feet of the wall and then every 12 feet on center. Attach the drywall main to the top of the carrier with framing screws. This provides system stability and an attachment point for lateral force bracing when required.

8.1.2 Fasten the drywall main to the top of the molding on the adjacent wall. Leave 3/4" clearance on the opposite wall.

8.1.3 Linear panel ends must be mechanically attached every 24 inches to the molding (on the same wall the drywall main is attached).

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.

Plan View



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 Architectural Specialties at 1 877 ARMSTRONG options 1-1-4.

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