MDSI Pressure Equalized Rainscreen

Series 20 New

Installation Guidelines

METAL DESIGN SYSTEMS

DESIGNED FOR A PERFECT FIT.

Metal Design Systems is pleased to offer an Installer's EDGE training course at our home office in Cedar Rapids, Iowa. This class is offered once a month free of charge to the installer. If you are interested in attending or would like more information, please contact MDSI via email at tech@crmdsi.com.

Metal Design Systems, Inc.
SERIES 20 NEW
Installation Guidelines

Required Equipment:

Forklift:
Typically crates are shipped directly to the job site from our fabrication facility via LTL carrier. This means that the crates will arrive in an enclosed trailer which will require either a dock and a fork lift or an extended reach forklift in order to unload the crates. The average crate size is 4' x 10', but they can be up to 5' x 16'. Large shipments can be delivered on flat bed trucks if prior arrangements are made.

Man-lift/Scaffolding/Ladders:
The terrain, accessibility, quantity of work on each area, and height of work will typically determine the type of lift equipment required to complete each project. The preferred option will usually be an all terrain scissor lift because they offer a larger platform allowing for more work space and fewer moves.

Work Table:
You will need a work surface to prep the panels for installation, cut penetrations or make field modifications. The table should be large enough to safely support the largest panels on the project and be covered with a long pile carpet to protect the panels from damage. Some installers prefer to build tables on site using the crating materials. This is perfectly acceptable provided that they are constructed in a sturdy fashion.

Power Tools:
10" or 12" miter saw with 80 tooth non-ferrous metal cutting blade for cutting extrusions; jig saw with plywood cutting blade for cutting penetrations in panels; router with carbide tipped, flat point V-bit; drill and various sized drill bits; screw gun with 5/16" hex head driver and #2 Phillips bit.

Hand Tools:
Pop-Rivet gun; rubber mallet; single-cut metal file; countersink bit; hole saw kit for penetrations; caulk gun; utility knife; single edge razor blades; tin snips; flat blade screw driver; tape measure; 4 foot level; torpedo level; (a laser or sight level can be very helpful for layout depending upon the complexity of the project); chalk line; safety glasses work gloves and hearing protection.

Supplies:
Always have an ample supply of fasteners in various sizes; plastic horseshoe shims in 1/4", 1/8" and 1/16" thicknesses; silicone sealant in the appropriate color; waterproof tarps to cover the crates and shop rags.

Fasteners:
Metal Design Systems, Inc. recommends a minimum size #12, 300 series stainless steel self-tapping fasteners for applications into steel or aluminum and #12, 300 series stainless steel T17 point fasteners for wood substrates. The recommended maximum spacing is 16" on center. Please reference the project specific details for fastener type and spacing requirements. If the system is applied over a gypsum sheathing substrate, ensure that the fasteners are of sufficient length to properly engage the structural framing members. Self-drilling/self-tapping fasteners require a minimum of 3 fully formed threads extending beyond the back of the metal, and wood screws require a minimum of 1" penetration.

Crew Size:

A crew size of three typically works best in most cases. This allows for two in the lift handling and installing the panels on the wall and one on the ground prepping panels, cutting and drilling extrusions, and for general ground support.

Unloading:

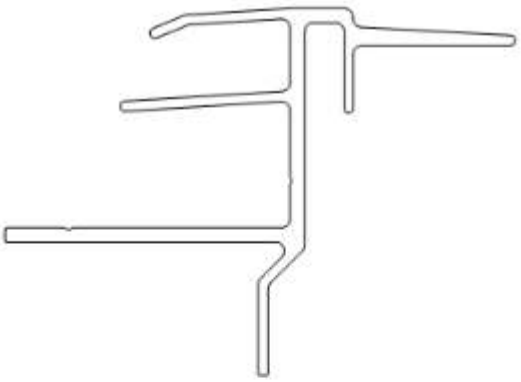
Prior to unloading the crates from the delivery truck, inspect the crates for damage.

Note: Report any damage to the carrier and note the damage on the shipping tickets. The receiver must make all claims for damage

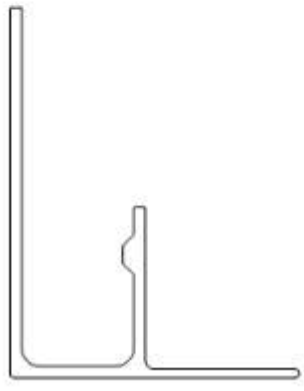
through the carrier upon receipt. Metal Design Systems, Inc. is not responsible for any damage after the product leaves the factory.

Unload the material one crate at a time, know and follow all safety rules. Use the proper equipment for the weight being unloaded. If unloading with an overhead crane, use a spreader bar and nylon slings, do not "choke" the crates. Do not attempt to lift the crates by hand, drag, drop or stack the crates.

Series 20 Available Extrusion Profiles:

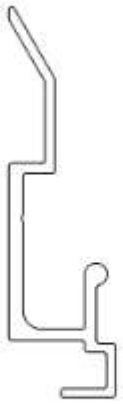


2004 Parapet Trim



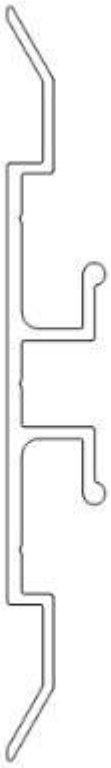
2006 Sill Trim

2010 Panel Perimeter

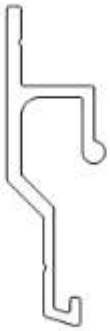


2011 Base/Starter J

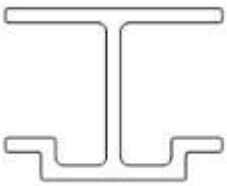
2012 Horizontal Wall Clip



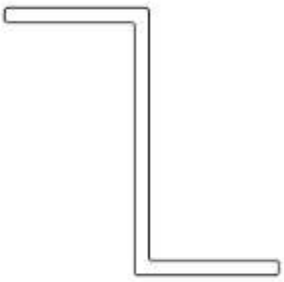
2013 Vertical Wall Clip



2015 Horizontal Top Hanger Clip



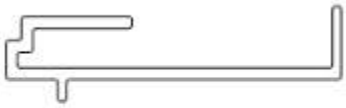
2016 Panel Stiffener



2017 Zee

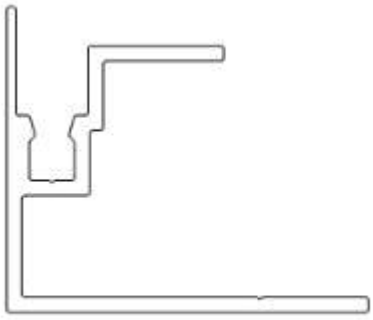
2018 Lock-Out Base

2019 Anti-Lift Clip



2020 Lock-Out Clip

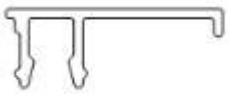
2021 Lock-Out Tube



2022 Field Cut Base

2023 Base/Starter J

4403 Retainer



5102 Field Cut Cover

Inspection and Inventory:

Shipping damage should be noted on the Bill of Lading and then reported to Metal Design Systems.

Note: The customer is responsible for filing a claim for freight damage with the shipping company within 24 hours of receipt. Failure to do so, may result in forfeiture of the right to receive corrective action.

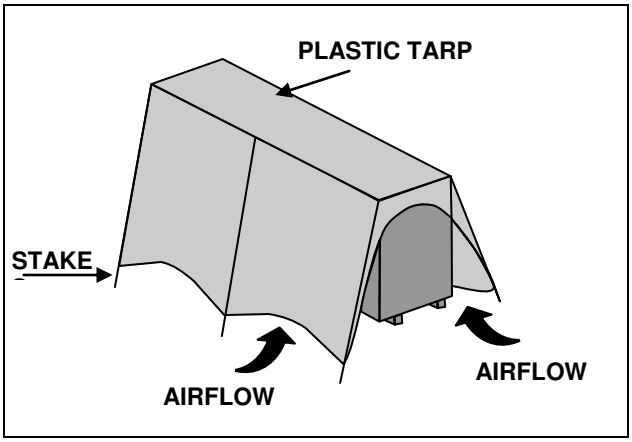
After verifying the condition of the product, inventory the panels and miscellaneous items and compare against the packing slip to ensure that all material is received.

Note: Notify Metal Design Systems immediately if the quantities received do not match the packing list. Failure to do so, may result in forfeiture of the right to receive corrective action.

Storage:

Store crates in a clean dry place. If the crates are to be stored outside, cover the crates to protect from the elements and ventilate to minimize heat build up (**Figure 1**). At the end of each work day, place loose panels back into the open crates, secure the panels, and cover the crate.

Figure 1



Shake Out:

Crate #1 will have a set of shop drawings revised to reflect field measurements and indicating panel part numbers and locations. Each crate will have a packing slip indicating the part numbers and quantities of the panels enclosed. At this time it may be beneficial to boldly write the contents of each crate on the outside for future reference. If possible, strategically place each crate in a location convenient to the final destination of its contents.

Handling Individual Panels:

When removing panels from the crate, always take care to lift and clear other panels and sidewalls of the crate (**Figure 2**). Never slide or drag panels out of its location. When carrying a panel, always carry it "on edge" and never flat (**Figure 3**). Always be aware of your surroundings and take special care when handling panels that have intermediate routs or panels that have welded connections. Do not place the panels in any position that will cause the panel face or edges to come into contact with any surface that will cause damage to the protective film or panel finish. The protective film is designed to prevent minor abrasions. Extreme care should still be taken to avoid dents and scratches.

Figure 2

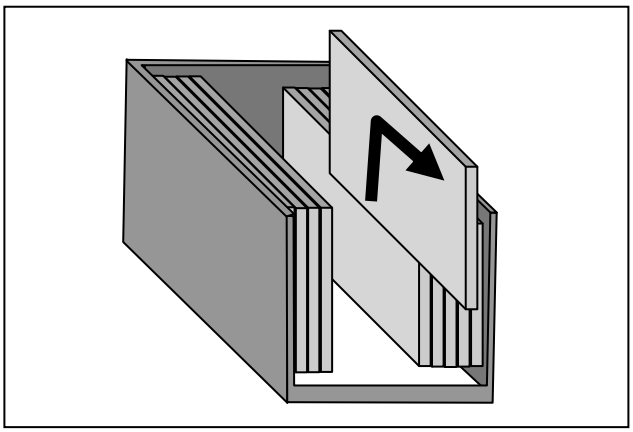
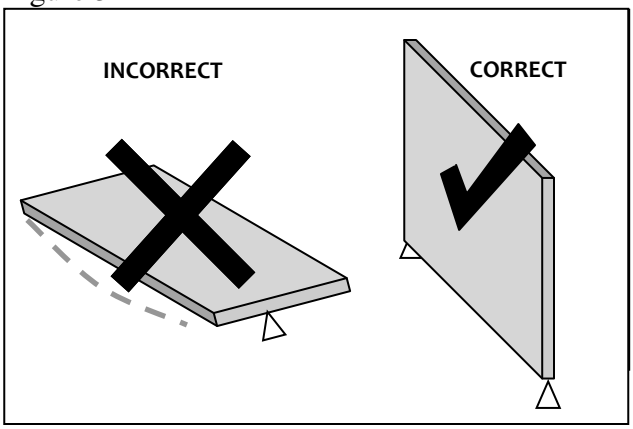


Figure 3



Substrate/Job Inspection:

Inspect the area that is to receive the panels to ensure that all work is complete and satisfactory. All substrates, weather barriers, penetrations, doors, windows, and any other adjacent materials should be in place and cleaned prior to proceeding with panel installation.

Note: Acid wash used for cleaning masonry will cause permanent damage to the panels.

Ensure that all surfaces are plumb, level, square, true, dry and free from defects. Do not begin installation until all unsatisfactory conditions have been corrected.

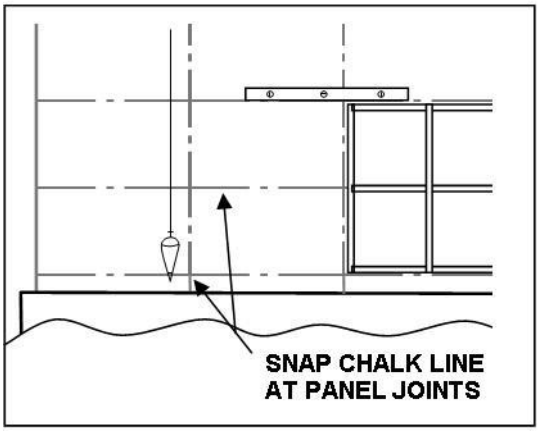
Flashing & Weather Barrier:

Series 20 is a drained and back ventilated cladding system. The wall panels shield the weather resistive barrier (WRB) from the majority of moisture and the ventilated panel joints allow the cavity space to dry. The system is not intended to be the primary weather barrier. Therefore the WRB must be properly installed, flashed, sealed and terminated at all conditions according to the manufactures instruction prior to installation of the wall panels system. All fastener penetrations through the WRB must be treated according to the WRB manufactures written instructions. Failure to do so could result in moisture infiltration.

Layout:

Reference the revised shop drawings and locate key components for panel system alignment (i.e. windows, doors, window mullions or other items that are critical to joint locations) and begin layout from these locations. Snap chalk lines at the center of each panel joint making sure that all lines are level and plumb (**Figure 4**). This will help to control panel gain or loss over a long run. If the panel system is to be installed over a gypsum board substrate, locate all framing members to ensure that all fasteners engage a structurally sound member.

Figure 4

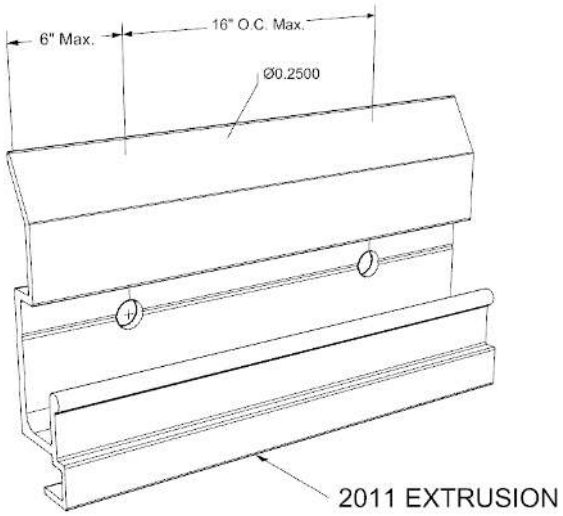


Installing Panels
Metal Design Systems Series 20:

Setting up:
Locate work table and miter saw in a safe and convenient location relative to the installation area. Locate the starter "J" (Part # 2011), Horizontal Wall Clips, (Part # 2012) and Vertical Wall Clips (Part #2013) along with the 1 1/8" and 1 5/8" wide composite joint fillers. 1 1/8" wide fillers will be used at system perimeters, and 1 5/8" wide fillers will be used at ½" wide panel to panel joints. 3/4" wide fillers will be used at lock out conditions.

Extrusion Prep:
Begin by drilling clear holes in the starter "J" extrusion. Holes should be located in the "witness groove" and to align with the structural support and a maximum of 6" from the end and 16" on center (**Figure 5**). The "J" starters (extrusion 2011) are typically preinstalled to the wall in continuous lengths.

Figure 5



Factory supplied Horizontal Wall Clip are supplied in pre drilled 3" lengths for design loads up to 40 psf (**Figure 6)** and 5" lengths for design loads up to 66 psf. (**Figure 6.1**).

Figure 6

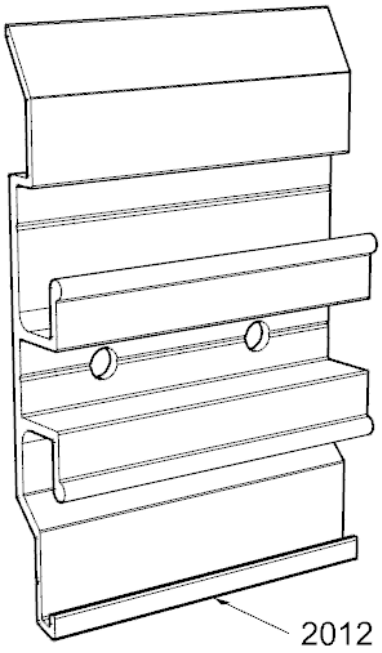
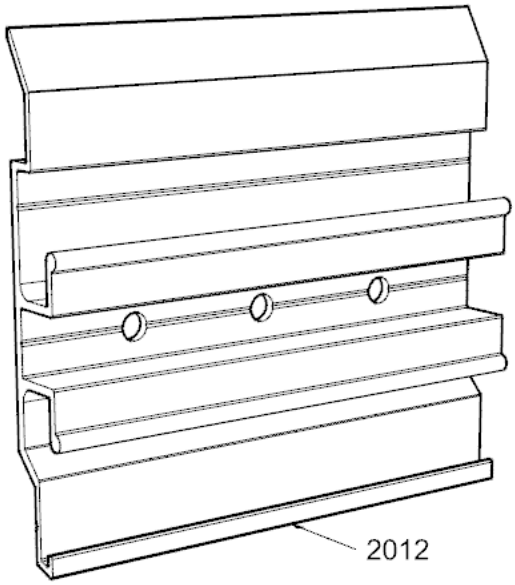


Figure 6.1



Wall clips provided for the vertical joints are slightly different than the horizontal clips. Vertical Wall Clips (Part #2013) are supplied pre-drilled in 3" lengths for design loads up to 40psf **(Figure 6.2)** and 5" lengths for design loads up to 66psf **(Figure 6.3)**.

Figure 6.2

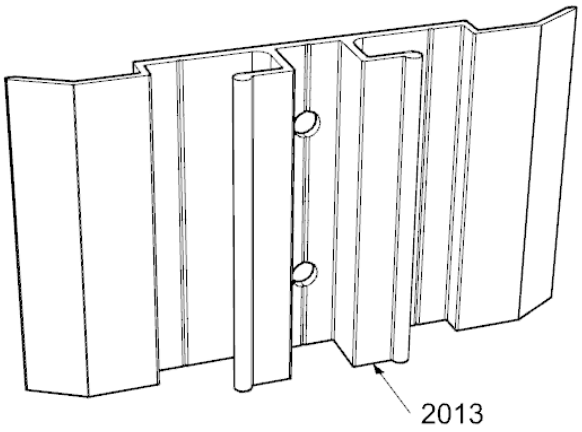
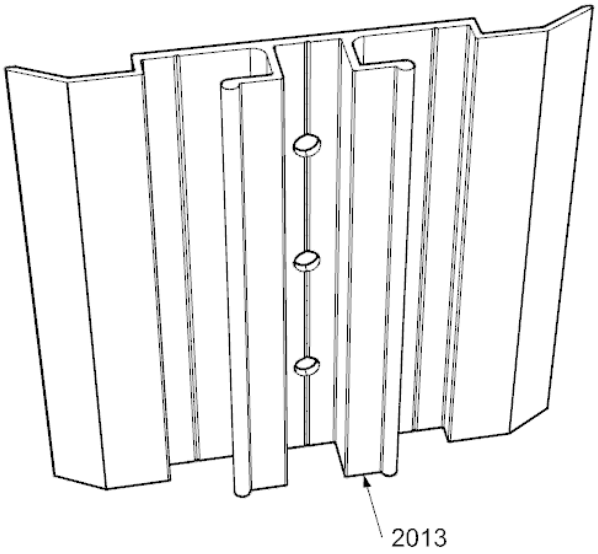


Figure 6.3

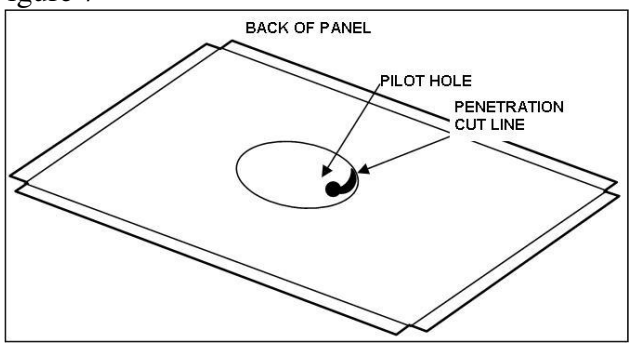


Reference the approved shop drawings for wall clip spacing, as well as fastener quantity, type and placement recommended. Special clips will be provided for projects requiring higher design loads.

Panel Prep:
Remove panel from crate and inspect again for damage. Make sure weep holes are free from obstructions. If penetrations need to be cut in the panel it should be done so at this time.

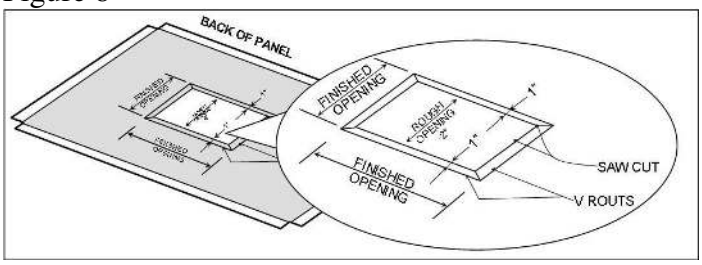
Cutting Penetrations:
Verify location and size of penetration, remembering to allow for engagement into anchor extrusions. Mark penetration on the back of the panel and drill a pilot hole within the penetration, large enough for a jig saw blade. Cut the opening from the back side of the panel using a variable speed jig saw with a plywood cutting blade (**Figure 7**). Smooth the cut with a single cut metal file.

Figure 7



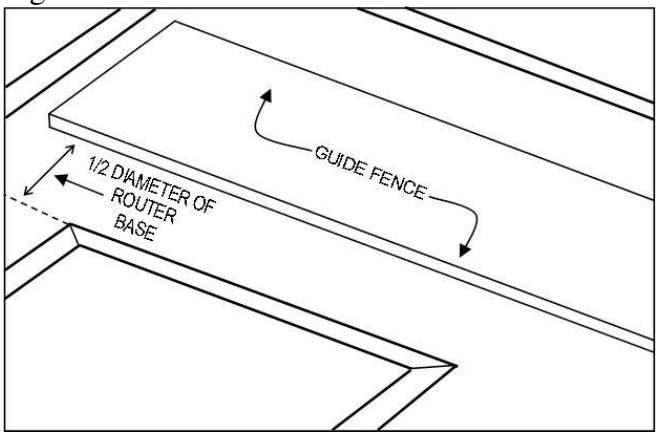
Note: If the object penetrating the panel does not have a weatherproof escutcheon, you will need to caulk around the object penetrating. Therefore the panel will require a return leg around the opening to caulk to. Cut opening in the same manner as above except that the opening should be 1" smaller than the object penetrating the panel. Using the router and the v-bit, rout grooves around the opening 1" away from the opening (**Figure 8**).

Figure 8



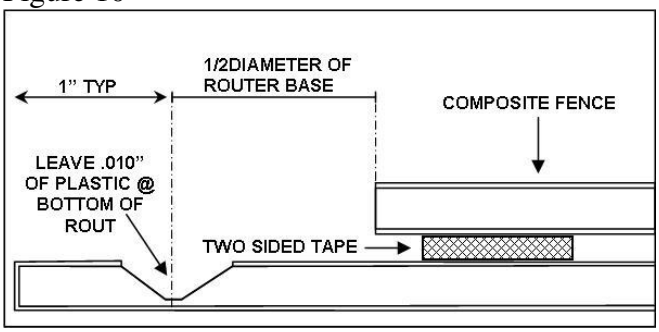
Use a fence to protect the good side of the panel and allow a clean straight rout (**Figure 9**).

Figure 9



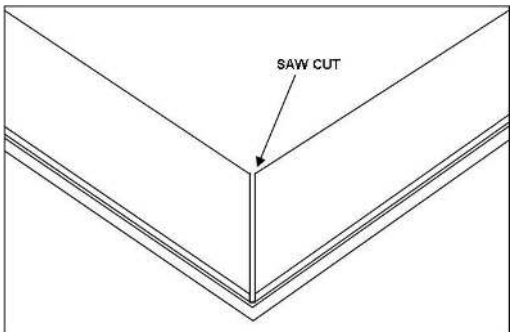
Two sided tape works well to temporarily secure the fence to the back of the panel (**Figure 10**).

Figure 10



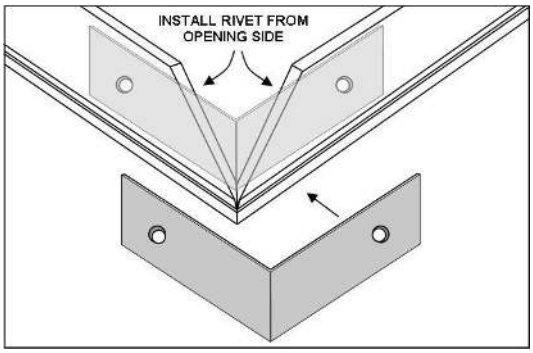
Saw cut the returns at the inside corners taking care not to cut past the v-rout (**Figure 11**).

Figure 11



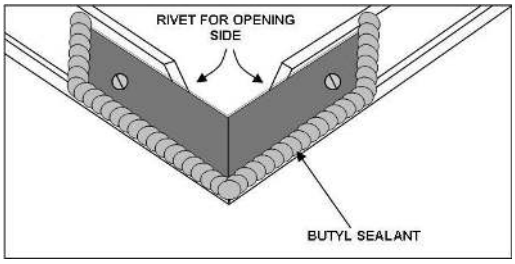
Back up the returns at the inside corners using a small piece of aluminum sheet bent to an angle. Pop-rivet or screw into place (**Figure 12**).

Figure 12



Back up the angle with butyl sealant (**Figure 13**).

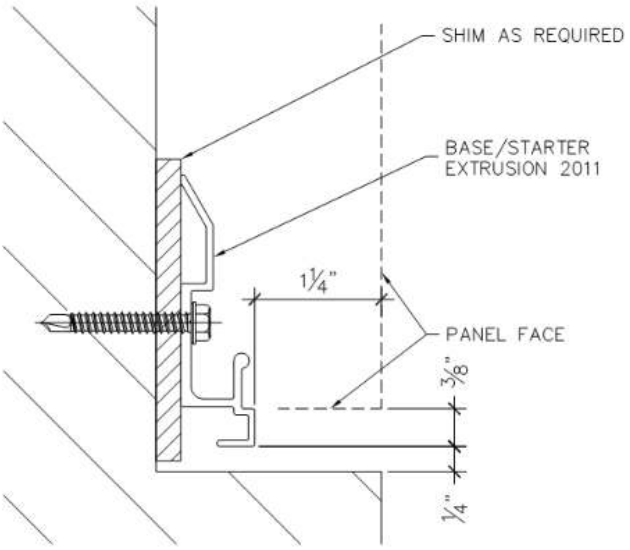
Figure 13



Setting Starter "J" Extrusions:

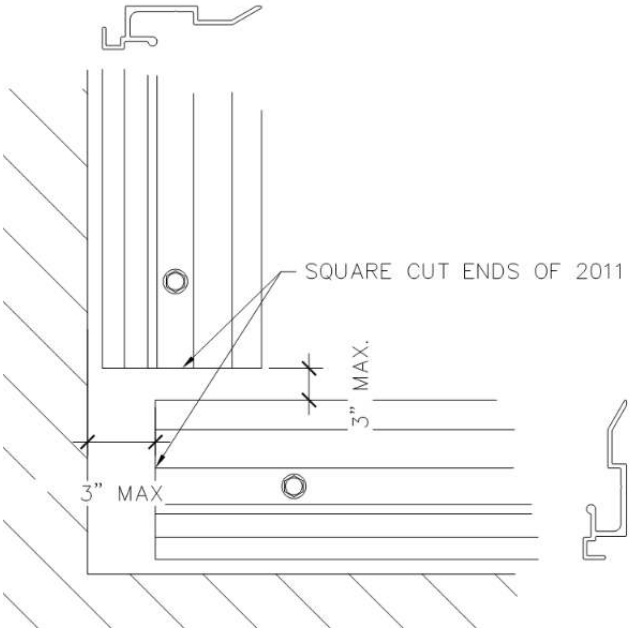
The “J” extrusion (2011) will be set ¼” off the adjacent materials. This accommodates a 5/8” wide reveal joint at the system perimeter. Joint width may vary or be adjusted based on the results of the layout. Fasten the extrusion to the wall using fasteners and spacing as noted on the project shop drawings **(Figure 14)**.

Figure 14



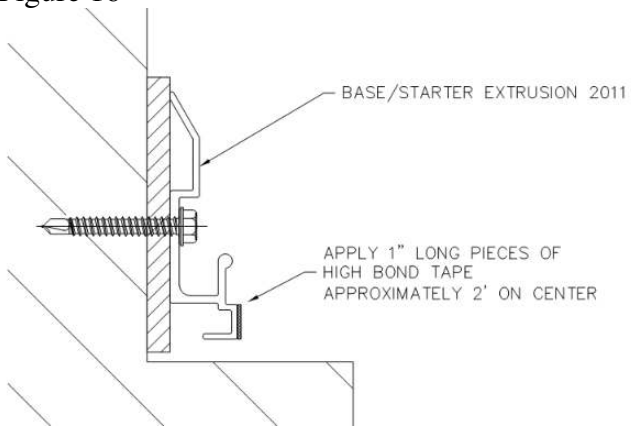
It is not necessary to miter cut the extrusions at the corners. They can be square cut and stopped short. Keep the ends within 3” of the corners in all cases **(Figure 15)**.

Figure 15



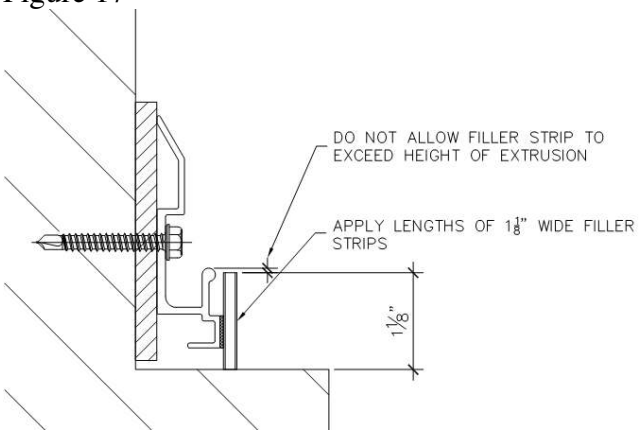
Apply small pieces of two sided high bond tape to the 2011 extrusion to temporarily secure the joint filler strip until the panel is installed **(Figure 16)**.

Figure 16



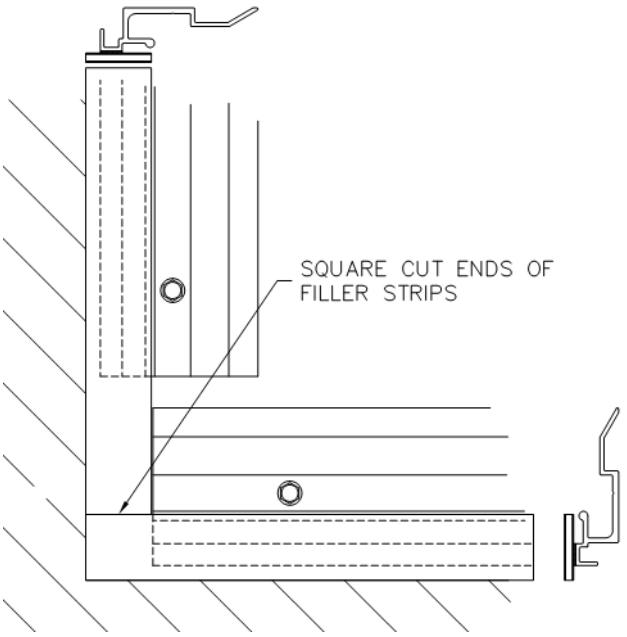
Apply 1-1/8” wide filler strips to the starter extrusions where panels will be installed. Make sure the filler strip does not extend inboard past the ball portion of the extrusion **(Figure 17)**.

Figure 17



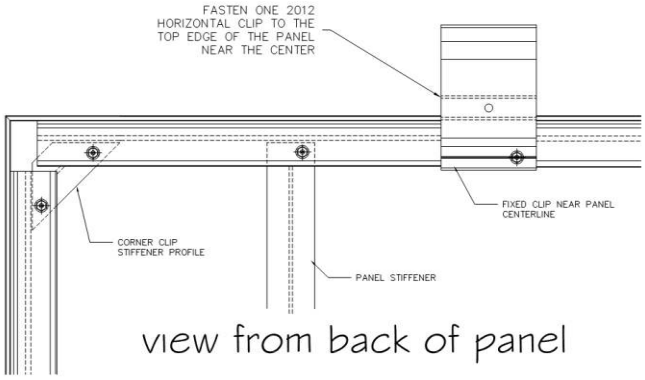
Filler strips can be square cut at the ends and butted together. General rule of practice will be that horizontal fillers will run continuous and verticals will fit between horizontals. **(Figure 18)**

Figure 18



Preparing panels:
From the back side of the panel, fasten one 2012 clip to the top horizontal extrusion. Fasten the clip near the center of the panel. This will pin the panel in place against thermal creep. The balance of the horizontal clips (2012) will be inserted after the panel has been set into place on the wall **(Figure 19)**.

Figure 19



Setting panels:
Engage perimeter extrusion of the panel into the "J" extrusion and adjust panel to align with layout lines. Shim the panel off the base so the witness groove on the 2012 clip installed at the top of the panel aligns with the layout line representing the centerline of the joint. **(Figure 20 and 21)** Start a screw through the clip and into the substrate but do not tighten. Drop horseshoe shims over the screw until the panel face is plumb and tighten the screw. **(Figure 21)**

Figure 20

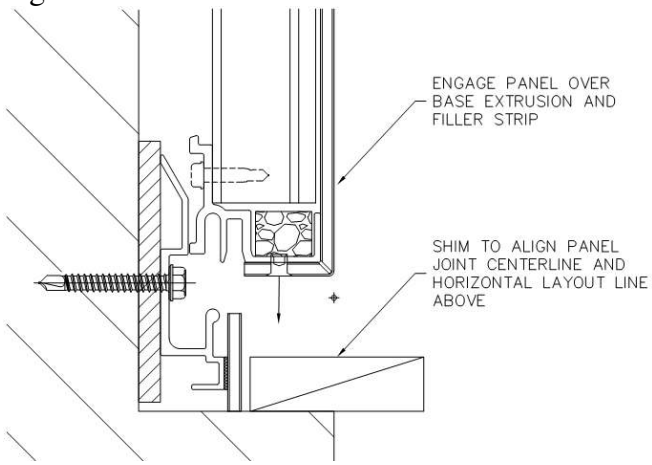
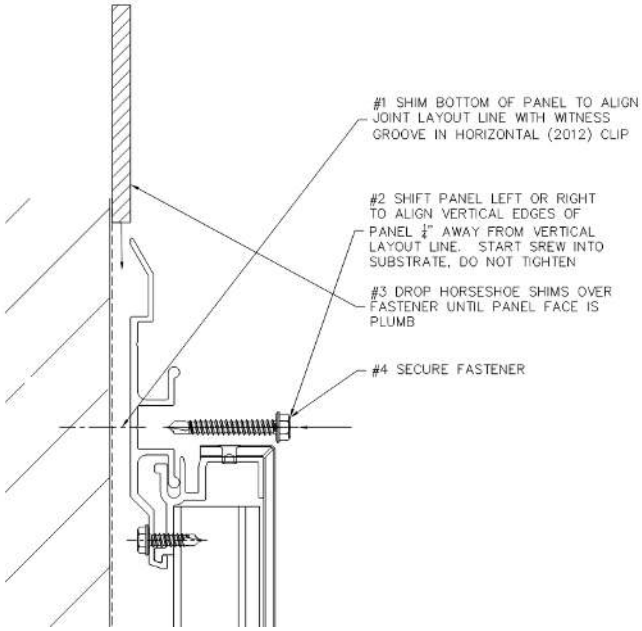


Figure 21



Drop in additional 2012 horizontal clips along the top of panel. Slide the clips to the appropriate spacing and position them in line with the structural members. Each clip should be lifted until the bottom of the clip engages with the panel extrusion so the clip will prevent the panel from dropping. Align the witness groove with the layout line. Start a fastener in the clip but do not tighten. Repeat the process for all the clips along the top of the panel. At this time, drop the appropriate size plastic horseshoe shim over the fasteners so the entire panel face is straight and

plumb. Tighten fasteners. (**Figures 22 and 23**). Ensure that the panel edge remains straight throughout the process. Adjust shim thicknesses as required to keep the panel edge true.

Figure 22

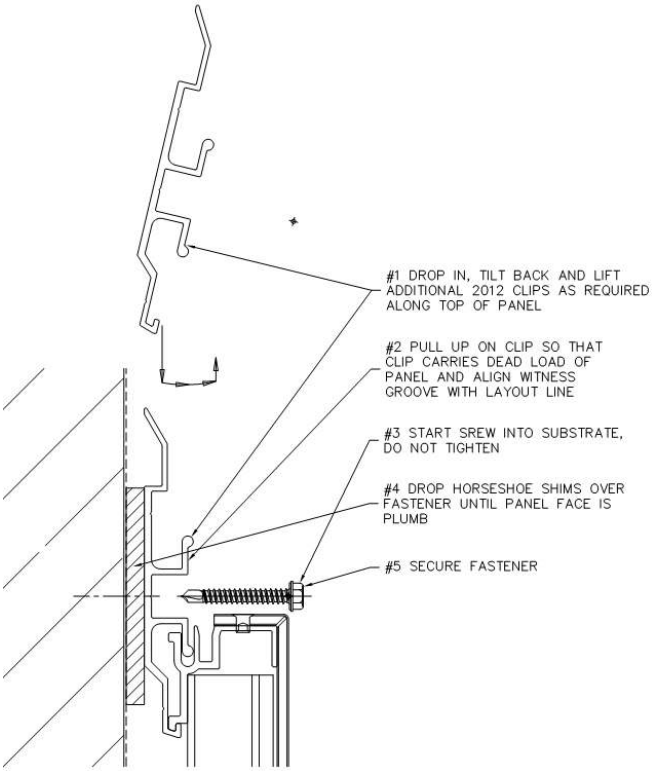
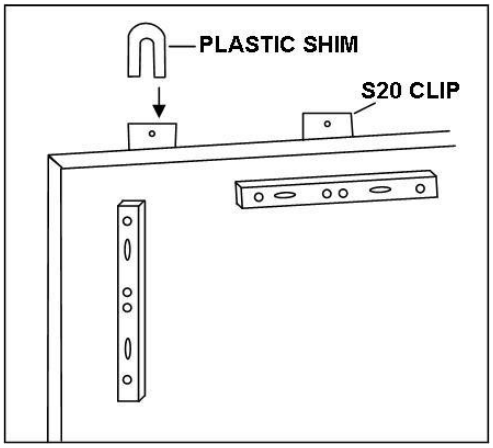


Figure 23

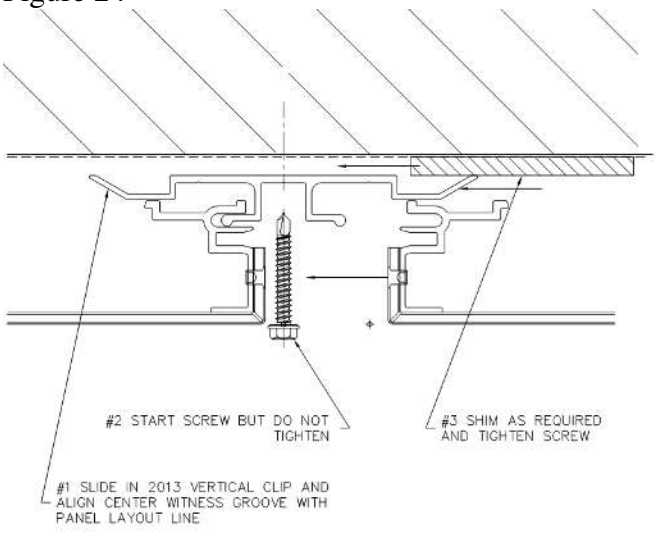


The vertical panel joints will use a 2013 clip, they are slightly different than the 2012. These clips allow for thermal expansion of the panel and only restrain the panel from movement perpendicular to the wall surface.

Calculate the number of clips required on the vertical edge of the panel according to the spacing recommended on the project shop drawings and mark approximate locations on the substrate. Slide a 2013 clip onto the vertical edge of the panel at the layout location, engaging the panel perimeter extrusion as shown in **Figure 24**. Align the center witness groove with the panel layout line and start the fastener into the substrate but do not tighten. Continue starting clips along the entire edge of the panel without tightening the fasteners. Drop horseshoe shims over the fasteners, behind the clips until the space is filled out and the panel edge will be straight when tightened. Proceed to tighten all the fasteners on the vertical edge starting in the middle and working outward. Ensure that the panel edge remains straight throughout the process. Adjust shim thicknesses as required to keep the panel edge true.

It is important that the vertical clips are kept parallel to the panel edge. If the clips are left rotated, they may restrict the thermal movement of the panel.

Figure 24



Prepare next panel with the center horizontal clip as described previously and shown in **Figure 19**. Set the panel onto 2011 base/starter "J" and shift into the mating 2013 vertical clip of the previously set panel **(Figures 25 and 26)**.

Figure 25

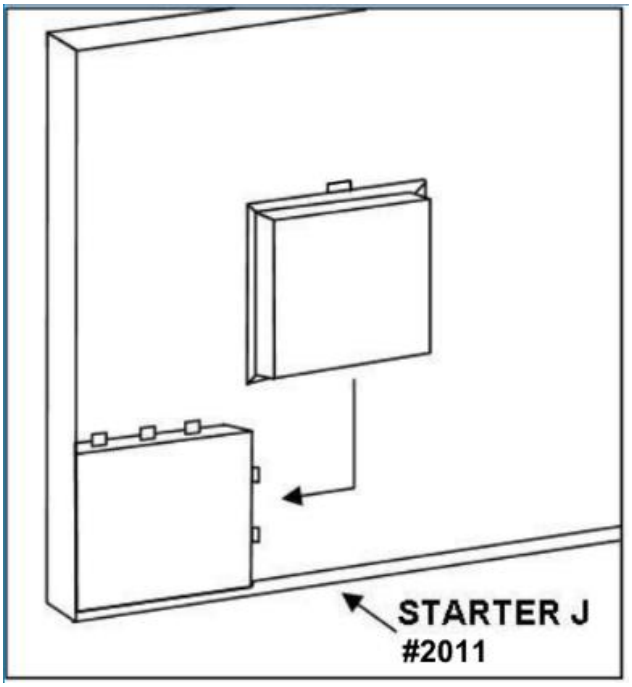
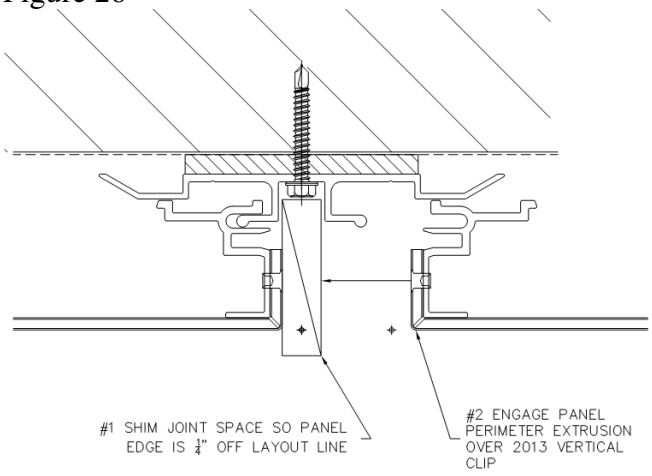


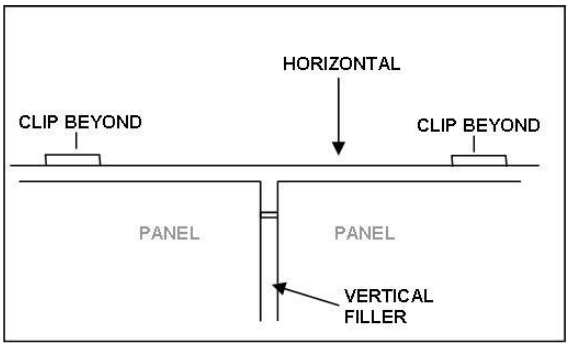
Figure 26



Shim the bottom of the panel so that witness groove in clip aligns with the horizontal layout line. **(Figures 20 and 21)**. Continue to secure the top of the panel as previously described.

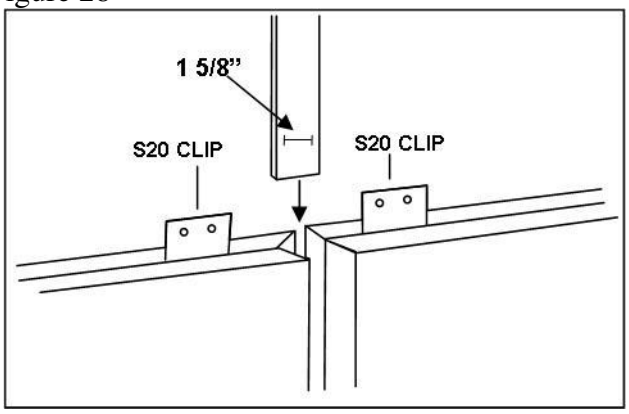
Installing Filler Strips:
Typically horizontal fillers will carry through continuously and verticals will be cut to allow the horizontal to pass through the panel joint. (**Figure 27**).

Figure 27



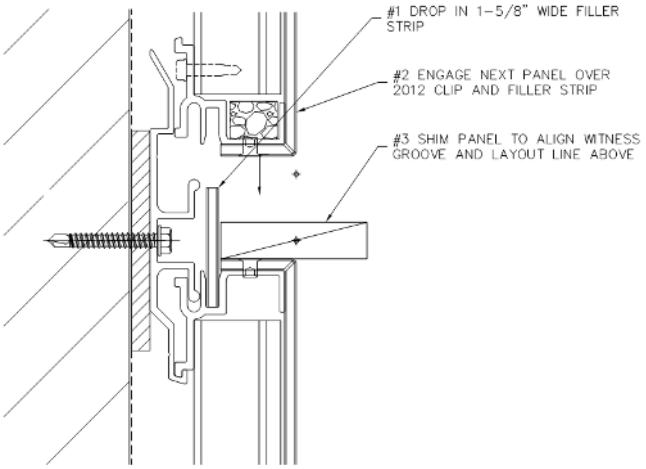
Cut a 1 5/8" wide joint filler to the appropriate length (vertical panel face dimension – 1-1/8"). Remove the protective film from the filler strip and drop it into the filler pockets of the mating panels (**Figure 28**).

Figure 28



Horizontal filler strips can be installed in stock or random lengths, splice locations are not critical. Remove the film from a 1-5/8" wide strip and drop it into the horizontal filler pocket. **(Figure 27 and 29)**.

Figure 29



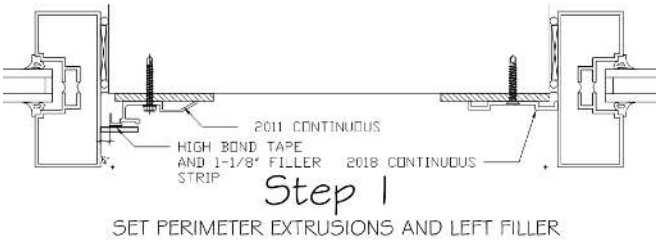
Stack the next panel on top of the bottom panel and insert shims to align witness groove of top clip with second horizontal layout line **(Figure 29)**.

Continue with installing horizontal clips as previously mentioned. The panels can be installed either by progressing horizontally or vertically. Continue this process until all panels are installed.

Lock-Out Conditions:
Series 20 provides designed solutions where standard installation techniques and attachment extrusions may not be used effectively. These are typically "last in" panels or panels that have abutment to other products such window, doors and other types of cladding products on two adjacent or opposing edges of a single panel. In some cases, 2011 starter/base extrusions can be pre-installed on two opposing sides of the panel and the panel can be slid in and secured with the standard methods. In cases where this is not possible, please use the following installation methods for example.

Affix a continuous length of 2011 base extrusion to the substrate on one side and a continuous length of 2018 base one the other **(Figure 30)**.

Figure 30



Attach 2020 clips (16" oc max.) to the perimeter extrusion of the panel edge that matches the 2018 base. Fasten the clips with the provided fasteners through the slotted hole so that the clip is just free to slide back and forth. Push the outer edge of the clips inboard on the panel so the clips do not project out past the panel edge. Insert the panel straight into the opening against the base extrusions. **(Figure 31 and 32)**

Figure 31

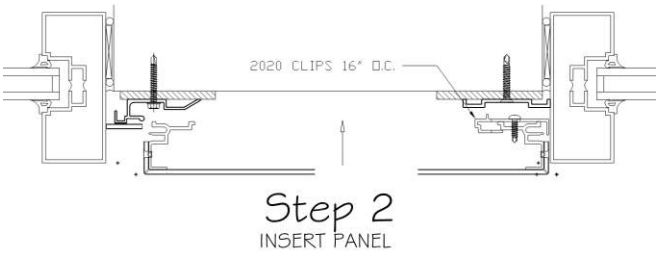
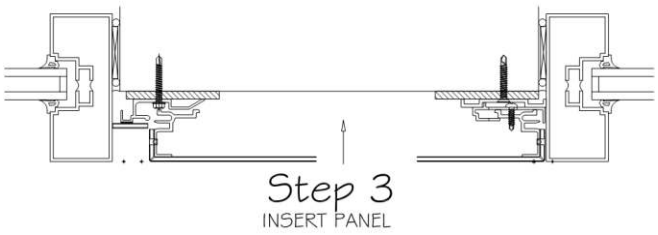
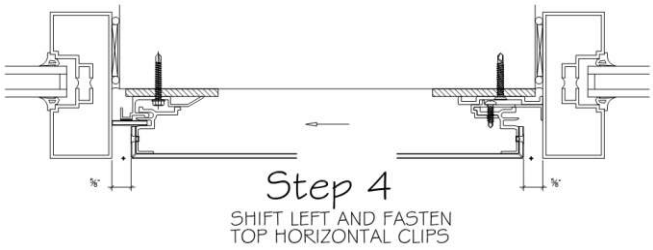


Figure 32



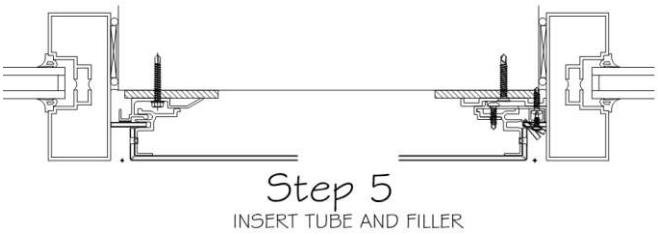
Hold the panel edge firmly against the 2018 extrusion and shift the panel to engage the 2011 base extrusion. The 2020 clips will remain engaged on the 2018 base as the panel is shifted away from that edge. **(Figure 33)**

Figure 33



Cut a length of the 2021 rectangular tube approximately equal to the length of the panel face. Drill 3/8" diameter clear holes in one face (the wider face of the rectangular tube) at the locations of the 2020 clips. Insert the tube in the panel joint to capture the 2020 clips. Use the provided Philips drive pan head screws to secure the tube to the clips and base extrusion through the clear hole. Insert a length of ¾" wide filler strip over the tube and secure into place with silicone adhesive or small headed fasteners. **(Figure 34)**

Figure 34



Special Conditions:

Please consider that not all conditions can be covered within these general installation guidelines. Please reference the project specific shop drawings for special details and instruction for conditions not covered. For additional instruction or clarification, please contact your MDSI Project Manager.

Removing Protective Film:

The protective film should be removed immediately after final installation of the panel or at least at the end of each work day. Peel the film back against itself on the same plane as the panel face.

Note: The film removal process may cause a static charge to build. To reduce the possibility of static shock, ground yourself against the portion of the panel with the film removed.

Note: Panels with film left exposed to UV for extended periods of time may become difficult to remove. Panels with film partially removed and left exposed to UV may become discolored.

Cleaning Panels:

In most cases, never use anything more than mild detergent and a soft cloth to clean the panels. Rise with clean water immediately afterwards. See panel manufacturer's recommendations for proper cleaning methods.

Clean up:

Keep work areas free of objects that could cause injury or damage to the panels. At the end of each work day, place all trash and debris into the appropriate containers for disposal.

These guidelines are intended to convey the general sequences and procedures. Each application may vary and require specialized procedures. Refer to the project specific details for specialized instruction or contact Metal Design Systems, Inc. phone: 319-362-7454

Revised 9/25/20