

INSTALLATION GUIDE

R3000 | R4000 | W5000

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Understanding the Function of the R4000 Panel System

CEI Materials R4000 series panels are designed for use as an external wall cladding in addition to a proper air vapor barrier to form a back ventilated rain screen design.

The cladding creates a protective layer for the building's air vapor barrier by providing a durable and aesthetically pleasing surface of panels that will significantly discourage the entry of surface water. Some water will enter and drain from the ventilated cavity behind the panels and must be repelled by the air vapor barrier. The general contractor, designers and installers must be clear on the location of the building envelope. A drainage plan exists behind our R4000 system where the weather resistant barrier is applied to the sheathing; not at the face of the panels.

The R4000 system is designed to transfer wind loads to the supporting structure of the panels. However, they are not designed to contribute to the structural stability of the building. In areas where panels are being installed to the building envelope, they should be completely weather tight prior to the installation of the R4000 system. The envelope does not rely on the face panel for any weather seal.

Initial Inspection of Building

Prior to installing the R4000 system, verify that the building is properly protected with the air vapor barrier per the manufacturer's recommendations. Special attention should


be taken at areas where the weather resistant barrier is interrupted. Penetrations including flashings, windows, doors, scuppers and electrical boxes, should be inspected for proper seal and manufacturers recommended guides should be followed. Using penetration seal tape or AVB sealant behind fasteners is critical in maintaining the integrity of the air vapor barrier. A ventilation compartment is established by shimming the system from the wall, without this essential space the system will not breathe correctly. The shimming also allows the panels to maintain a plumb vertical plane. Panels attached tight to the wall will likely trap water and condensation, without proper ventilation.

Equipment

All appropriate equipment for the offloading and installation of panels will be the direct responsibility of the installer. CEI will provide a specific time when the truck will arrive. However, this can vary based on traffic, weather and other unforeseen contingencies.

Receiving Your Shipment

Our panels typically arrive in a dry van semi. The crates will need to be pulled with a strap to the back of the truck so they can be unloaded with a fork lift. All crates are reinforced to allow a typical 4' fork truck the ability to lift from the end of the pallet. We will have crates as long as 16' at times depending on panel sizes. These crates should be lifted off from the back of the crate and set on the ground. Reposition the forks from the side and move around the site.



Crates should be transported across the job site in the safest and most secure manner. Upon arrival of your shipment, take inventory and inspect all crates, panels and accessories. Note any damage to the panels, packaging or accessories. Upon signs of damage note it on the bill of lading at the time of delivery. Failure to do so can make it difficult to file a freight claim. Send a list of damaged materials and photos to CEI Materials' representative for further instructions. It is crucial that the damaged panels, accessories or packaging be reported as soon as they are discovered.

MCM panels are transported on pallets. Typically there will be an accessory crate containing an installation packet. Within the packet you will find a master rollup identifying all panels and the crates they are located in. This should also be utilized to mark off panels as they are removed from the crates keeping the inventory current. There will also be an inventory list of accessories and a packet showing all trim profiles. Pull the panels from the crates individually taking care not to scratch or damage the adjacent panels when removing. Loose panels can be stored vertically on flat surfaces, free of debris or dirt as long as they are secure and protected. Crates with panels should be staged in a location that has been discussed with the general contractor and also allows efficient work flow.

Initial Layout

Note the direction of the material prior to beginning installation; the majority of MCM materials are directional. This means that

during manufacturing the paint is applied to the composite material in one consistent direction in order to maintain color and finish consistency across panels. Generally, each panel must be applied in the same direction. There are exceptions when sheet size limits or affects design. Directional arrows are located on the masking of the MCM panel and will be identified on CEI Materials' installation drawings.

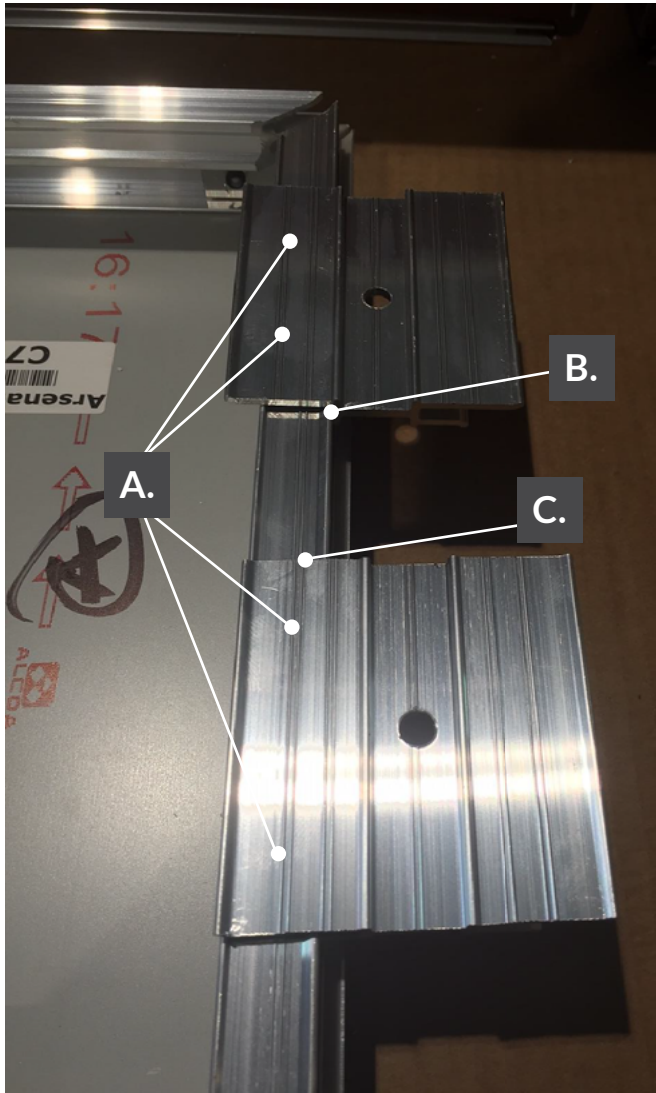
By reviewing the installation drawings prior to starting installation, it allows you to establish a plan. Reference lines should be based off of critical design intent locations. Reference lines should be confirmed by laying out the panels PRIOR to starting Installation. An accurate starting point is essential to the installation process and the first panel must be positioned correctly and installed Plumb and Square. Develop a written plan or sketch that takes panel installation sequence into consideration and periodically evaluate to avoid unforeseen circumstances. Due to the nature of the R4000 panel system, certain panels are installed prior to others. Panels are progressively installed and this is particularly true around doors or windows.

Items To Consider When Laying Out A Building

Reference lines should be established with a quality laser. Typically every 20' on a horizontal line should be shot in. Plumb lasers should also be used to establish control lines. When you encounter an issue, work toward a solution considering minor adjustments. Once you have a plan contact your CEI Materials representative to discuss prior to modifying any panels.

- A. How will my corner panels affect the layout on the adjacent elevation.
- B. How much shimming is required so my panels terminate 1/2" off of window as detailed.
- C. Where is the high point of my roof and how will it affect the layout.
- D. Where do my panels need to land to line up with the mullions.
- E. Where is the low point of my soffit and how will it affect the layout





Panel Prep Installation Guidelines

Wall clips will come out in your accessories crate. Position wall clips along the frame 16" – 24" OC. On a building with a Gypsum substrate, all wall clips along the horizontal panel edge will need to align with the structural member within the wall. A layout should be established to aid in efficiency and ensure secure attachment. If the substrate is plywood, clips should be located as identified in the installation drawings using the correct fasteners. Fasten the wall clips firmly to the panel frame tightening no more than a half turn beyond snug (over torqued fasteners may result in shearing or stripping). For clip-frame alignment for joint spacing of $\frac{1}{2}$ " or $\frac{3}{4}$ " (See diagram). Do not over tighten the fasteners into the wall. Always make sure fastener type and spacing are in accordance with the Installation drawings for the specific project.

- A. Fastening locations, pre-drill clips with $\frac{1}{8}$ " hole.
- B. $\frac{1}{2}$ " system requires bottoming out clip on frame.
- C. $\frac{3}{4}$ " joint system requires lining up second set of grooves.

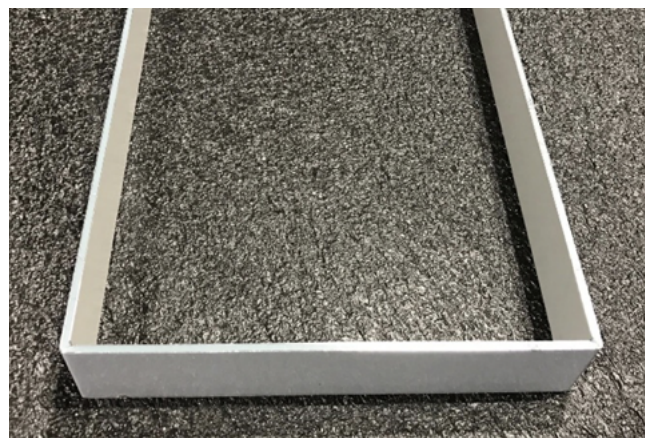
Spline Orientation

Whenever possible, allow the vertical splines to pass through the horizontals. Care should be taken that cut ends are square to maintain a clean appearance.



Using 12" speed square will allow you to route multiple pieces at once.

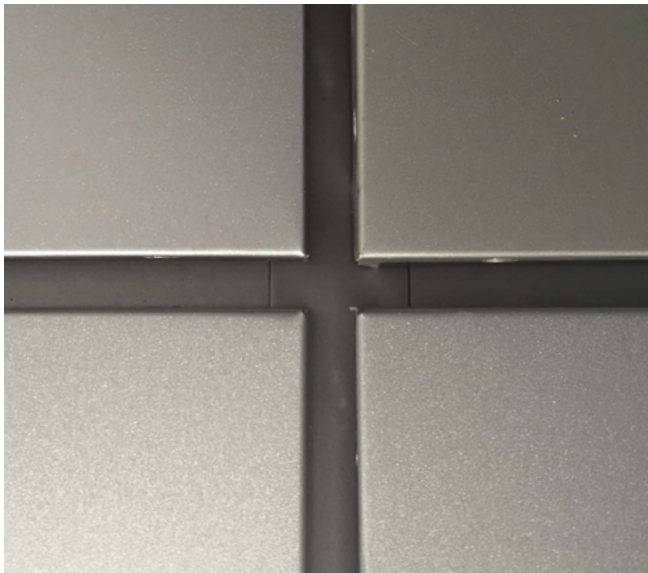
Notch edges of spline to hold in frame when terminating. This will keep spline from sliding.



Outside corners of spline should always be routed. This makes for a very clean joint appearance. Face of spline sits 1" back from face of panel. A 3-sided panel that requires a spline can be made by simply taking the face dimension and reduce by 2" for width.

** The R3000 system requires the use of Neophrene Rope Gasket in the frame of the panels. This eliminates the ability to slide the spline. The other main difference is each individual panel will have weep holes in the bottom of the panels. This allows for equal pressure on the outside and inside of the panel system.

** When using the W5000 system, spline is eliminated in lieu of backer rod and caulk. Be sure to reference and follow manufacturer's recommendation for application with wall panels.



Vertical spline runs through horizontal. A small miter saw works well for square cutting spline.

Taper corners of spline when sliding down through panel extrusions.



Handling the Panels, Field Fabrication and Tools

To avoid scratching the panel finish, all cutting, routing and drilling should be performed on the backside of the MCM material. MCM consists of two layers, both materials are fairly easy to cut and route. Make sure your work table is rigid and flat. Typically good quality plywood supported by cross members and saw horses is sufficient. Keep a brush handy to clear all debris off the table prior to setting panel face down. For straight cutting, use a circular saw with a fine carbide blade. Guides are often utilized for keeping lines straight. Any curves, holes or small detail cuts should use a jigsaw with a fine tooth metal blade. Hole saws can also be used for electrical conduit. For routing use a standard router with 110° V type router bit. Make sure manufacturer recommended (see diagram) route depths are being utilized or risk voiding of warranty. When drilling and countersinking use standard metal bits.

Use of specialized tools is required for bending of panel returns to maintain straight panel edges. Route and returns are required whenever backer rod and caulk are detailed. The pre mask will not stop debris from scratching the panel face and the utmost care should be taken when handling panels. Large panels should be handled by 2 individuals to avoid damage or injury.

Routed Cuts

Circular Saws: Alcoa Architectural Products recommends working with a custom tooling supplier. A special circular saw blade should be acquired that is wide enough to accommodate the special tooth design necessary to cut the correct groove, per figure 6. A tool steel saw is adequate for machining aluminum- or zinc-skinned Reynobond®. Carbide blade teeth, or inserts, are recommended for Stainless Steel, Copper or Titanium Reynobond®. Ideal grooves are 105°, with a 1/32" flat to allow the proper clearance when the panel is bent to 90°.

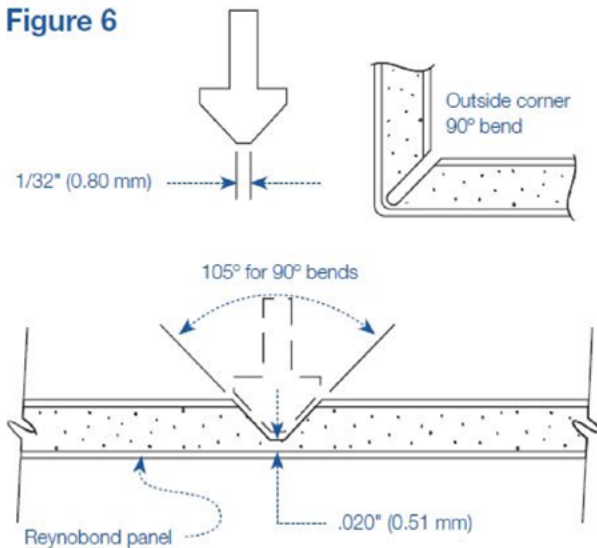
The saw-type cutter should be at least 4" in diameter. The cutter should operate at an rpm and feed rate to yield approximately 500 surface feet per minute as a beginning target. This can be increased for aluminum or decreased for other metals such as stainless steel. A chip thickness of 0.002" or less should be targeted. Too aggressive a feed may cause delamination of the skin. A sample cutter could be 8" in diameter with 18 insert-type teeth. The cutter would be operated at 250 rpm (revolutions per minute) and 10 ipm (inches per minute) to attain 524 sfpm (surface feet per minute) with a chip thickness of 0.0022". This cutter would be used to machine stainless steel-skinned Reynobond®.

Note: The groove must be cut to remove the back metal skin and part of the core material. At least 0.020" of core materials must be left with the front metal skin to ensure a proper bend radius when the 90° bend is made.

This is true for all types of Reynobond® and for any type of cutter used (see figure 6 for a detail of the groove).

Router Bits: Router bits may be used to machine the 105° V-groove in aluminum- or zinc-skinned Reynobond®. The cutter should have an included angle of 105° and have the end ground to provide the 1/32" flat cut necessary for the proper groove (see figure 6). This type of cutter does not have a very good tool life when machining other types of Reynobond®. A saw-type cutter has better capacity to machine the product while dissipating the heat generated at a more rapid rate. Should the cutter get too hot, the core chips will stick and overload the cutter.

Figure 6



Equipment

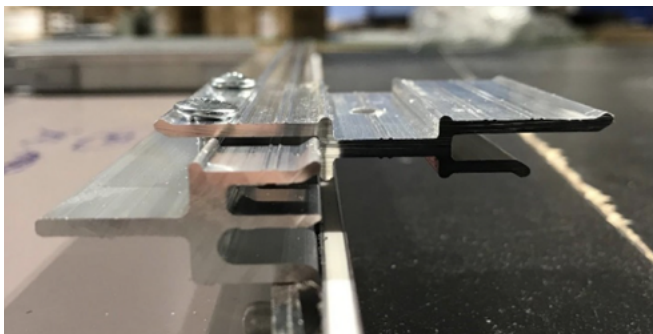


Panel Return Folders



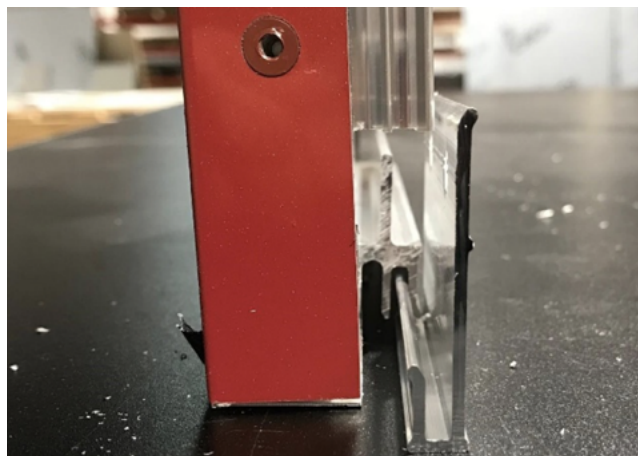
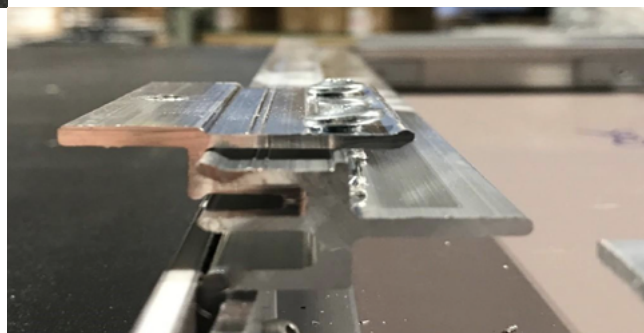
Using a 4" Palm Router or Laminate Router will make modifications in the field easy. Make sure to follow appropriate route depth as to not void the warranty.

Components



Full Clip: This is our typical panel to panel clip.

Half Clip: Typically used where ever we terminate into an adjacent finish that requires a 1/2" joint.



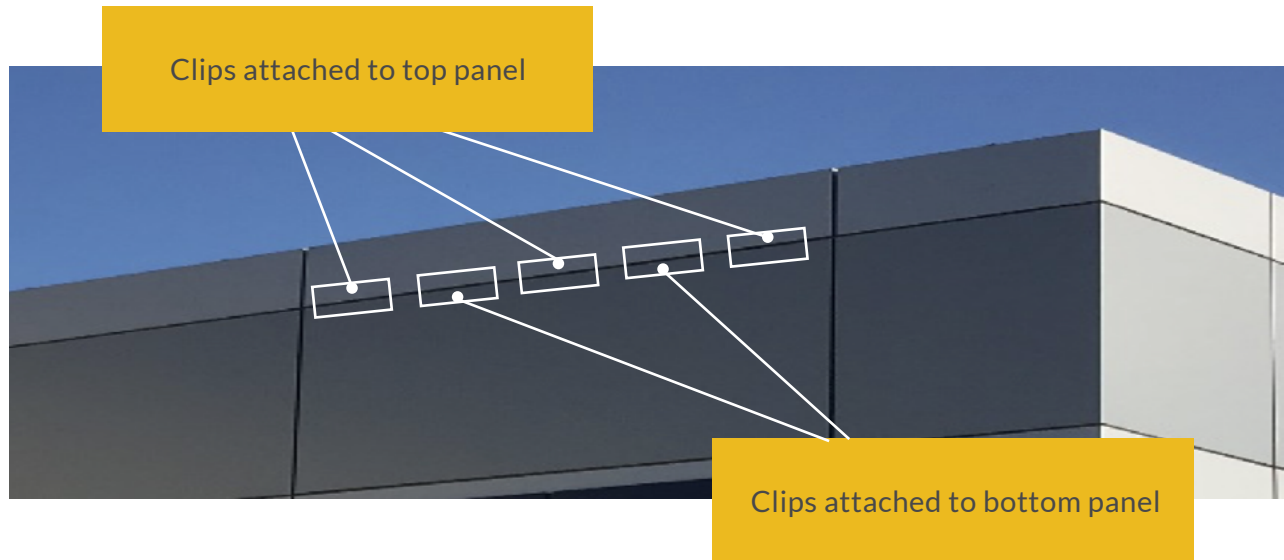
Starter Clips: Attached to substrate prior to panel install. Typical at base terminations, soffit returns and window heads.

Clip Alignment: When installing wall clips to panels, make sure all clips align with one another and parallel with panel face.

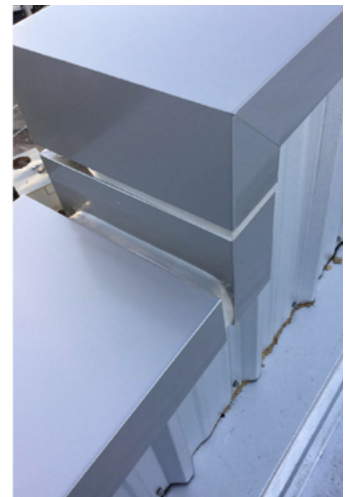
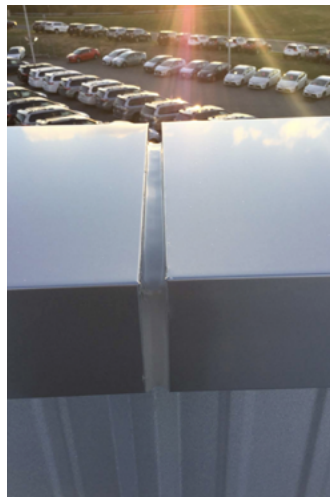


Coping

When installing coping it is critical to get positive attachment on the coping panel. This is progressively installed then the spline is slid in to cover the attachment.



It is critical to seal the skyward joints with backer rod and caulk.



Replacing A Panel



Cut panel diagonally taking care not to damage the adjacent panels.

Score back of return with a razor knife to remove the face of the panel.



Drill out existing rivets and remove return legs leaving frame and spline in place.



Any frame that is not secure will need termination clips attached and fastened to substrate considering the overall size of panel when placed.

Utilize factory weld product and a special gun for adhesive weld.



Use shims to wedge panel to adjacent panels and plane panel face to match facade.

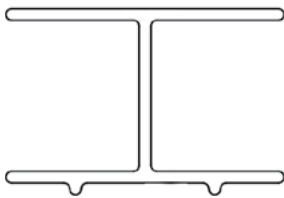
Clean Up

Keep all areas clean and free of trip hazards that could cause injury or damage to panels. At the end of each work day sweep and place all refuse in appropriate containers. Collect and dispose of all foam packaging material as panels are prepped to eliminate risk of blowing away on the jobsite. All crates should be broken down and disposed of accordingly.

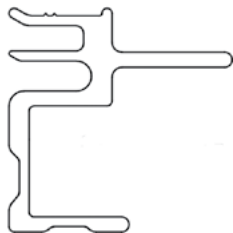
Safety

Always use appropriate PPE. Safety glasses, gloves, boots, pants, harnesses and hard hats protect workers. At a minimum, everyone on the crew should have an OSHA 10 certification. Equipment operator cards are required. Tool box talks should occur on site daily. Include pertinent items like sharp hazards, handling of panels in windy conditions, ground fault requirements on power cords, ect.

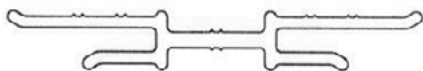
Components List



Stiffener



Rainscreen Frame



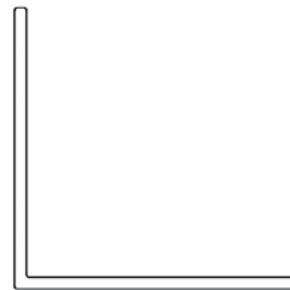
Wall Clip



Termination Clip



Half Clip



Aluminum Angle