IMPORTANT NOTICE

READ THIS MANUAL COMPLETELY PRIOR TO BEGINNING THE INSTALLATION OF THE CFR INSULATED METAL PANEL SYSTEM. MBCI DETAILS MUST BE FOLLOWED AS A MINIMUM TO ENSURE APPROPRIATE WARRANTIES WILL BE ISSUED.

ALWAYS INSPECT EACH AND EVERY PANEL AND ALL ACCESSORIES BEFORE INSTALLATION. NEVER INSTALL ANY PRODUCT IF ITS QUALITY IS IN QUESTION. NOTIFY MBCI IMMEDIATELY IF ANY PRODUCT IS BELIEVED TO BE OUT OF TOLERANCE OR HAS BEEN DAMAGED DURING SHIPMENT.

IF THERE IS CONFLICT BETWEEN PROJECT ERECTION DRAWINGS PROVIDED OR APPROVED BY MBCI AND DETAILS IN THIS MANUAL, PROJECT ERECTION DRAWINGS WILL TAKE PRECEDENCE.

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MBCI’s insulated metal panel product line is manufactured by Metl-Span

Descriptions and specifications contained herein were in effect at the time this publication was approved for printing. In a continuing effort to refine and improve products, MBCI reserves the right to discontinue products at any time or change specifications and/or designs without incurring obligation. To ensure you have the latest information available, please inquire or visit our Web Site at www.mbci.com. Application details are for illustration purposes only and may not be appropriate for all environmental conditions, building designs or panel profiles. Projects should be engineered to conform to applicable building codes, regulations and accepted industry practices.

For complete performance specifications, product limitations and disclaimers, please consult MBCI’s Paint and Galvalume Plus® warranties. Upon receipt of payment in full, these warranties are available upon request for all painted or Galvalume Plus® prime products. Sample copies can be found at www.mbci.com or by contacting your local MBCI Sales Representative.
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The CFR roof system combines the proven thermal and structural performance of MBCI's composite panel technology with the superior weather resistance performance of a standing seam roof to provide the most effective roof system available today.

To meet the specified panel design requirements and ensure the ultimate performance and long service life of the roof, the CFR roof panels are computer designed and precision fabricated, using the highest quality materials.

To ensure maximum installation efficiency, the CFR roof system is provided with the most comprehensive system of factory preparation and installation aids. For example:

- Factory cut-back panel ends for the eave and endlap assemblies
- Factory notched and swaged panel ends for the endlap assemblies
- Integral panel backer plates for the endlap, ridge and high eave assemblies
- Factory provided sealant & fastener template for the endlap assemblies
- Factory provided clamps for the panel side joint and endlap assemblies
- Die formed metal ridge closures for the ridge and high eave assemblies
- Specifically profiled sealant tapes for the panel and flashing assemblies
- Optional factory installed vapor sealant for the panel side joints

However, even with its superior design features, the final in-place performance of the CFR roof is critically dependent upon complete and accurate assembly by the installer.

This installation guide provides technical information and suggested installation procedures to help you understand and successfully install your CFR roof. The guide will help you lay out the roof assembly and establish the installation sequence. The guide demonstrates suggested panel handling and installation procedures and points out conditions requiring special emphasis or caution.

**NOTE:** the information in this guide is based on the application of the standard CFR roof system for typical building conditions. Specific building design and construction conditions may require variations from the information in this guide. For such variations, refer to the project's installation drawings. In case of conflict between this guide and the installation drawings, the installation drawings will govern.

Clarification concerning the installation of roof panels should be directed to the MBCI Technical Services Dept. Contact the MBCI office:

14031 West Hardy  
Houston, Texas 77060  
TEL (281) 445-8555  
WEB: mbci.com
For the following information, the term “customer” refers to the project’s owner and/or his representatives, such as the project’s architect, design engineer, general contractor or subcontractor.

Concerning the application of CFR roof system for a specific project, the customer is responsible for assuring the following:

- The CFR roof panels and related flashing are suitable for the purpose which they are to be used.
- The project’s structural framing is properly designed and in satisfactory condition to accept the erection and design loads imposed by the CFR roof panels, and is properly designed for the applicable service considerations, such as expansion/contraction and vibration, etc.
- The application of vapor seals are properly specified for the project’s moisture and vapor control requirements.
- The selection of a competent installer who is qualified and experienced in the proper installation of composite panel and standing seam roof construction.
- The roof installer takes time to study and understand the project’s installation drawings and adapts or modifies the information in this installation guide as necessary to meet the project’s specific requirements.
- The CFR panels, flashing and related components are installed in compliance with the applicable codes, regulations, and good engineering and construction practices, and in accordance with the project’s installation drawings and the applicable portions of this installation guide.

DISCLAIMERS

MBCI does not guarantee and is not liable for the quality of installation, and is not responsible for defects that may be attributed to improper installation or the negligence of other parties.

Unless specified in writing, MBCI makes no expressed or implied warranties pertaining to the fitness of the CFR roof or its components for any particular purpose by the owner, and shall not be responsible for any indirect or consequential damages, such as to building contents, nor for any further loss of any kind to the owner or contractor.

Unless specified in writing, MBCI does not warrant any product or material as meeting the ordinances, laws or regulations of any particular state or local municipality, and MBCI is not responsible for conformance by the owner or contractor to such ordinances, laws or regulations.
The owner is responsible to provide a safe job site and safe working conditions. The owner and installer are responsible for the safe execution of the roof erection.

In the USA, the Occupational Safety and Health Act (OSHA) governs regulations with the objective of protecting workers from injury or accident. “Part 1926, Safety and Health Regulations for Construction” are applicable to the roof installation.

In Canada, Occupational Safety and Health (OSH) regulation is under the jurisdiction of the local provinces and territories. Federal employees and Crown agencies may be subject to federal OSH jurisdiction.

The OSHA and OSH regulations should be recognized as job site requirements and fully complied with. Safe installation practices may be further defined and made mandatory by state or local ordinances.

The information in this installation guide is not intended to prescribe comprehensive safety procedures. If the installer cannot safely install the CFR roof in accordance with the suggested procedures in this guide, it is the responsibility of the installer to determine appropriate alternate installation procedures.

SAFELY WORKING WITH ROOF PANELS

A. Panel Weight – the roof panels are relatively heavy. Proper lifting equipment and sufficient manpower will be required to handle panels without damage to the panels or injury to the workers.

B. Crew Size – the length of the roof panels must be considered when determining the crew size. It is recommended that, under normal conditions, there is a worker at each end of the panel, plus a worker at each 10’ interval of the panel length.

C. Safety Equipment – the use of safety equipment is recommended at all times during the roof erection process. However, when using lanyards, ensure that hooks and wire cables are covered in such a manner that they will not scratch the panel and flashing surfaces.

D. Walking on Roof Panels – an approved and safe walking platform should be used in high traffic areas to prevent the roof panel from being damaged by equipment and traffic.

CAUTION
Do not use a roof panel as a working platform. An unsecured panel can slide or even collapse under the weight of the workers and equipment. Do not stand on the end of unsupported (cantilevered) panels. Standing on the cantilever portion may result in panel upset or even collapse.
E. Point Loads – when properly supported by the roof framing, the roof panels are designed to support uniform loads which are evenly distributed over the panel surfaces. Point loads that occur in small or concentrated areas, such as by heavy equipment, ladders or platform feet, etc., may cause panel damage or even panel collapse and must be avoided.

F. Slick Surfaces – panel surfaces and structural surfaces are hard and non-absorbent causing them to be very slick when wet or covered with snow or ice. Sand and other loose materials can also cause slipping on these surfaces.

Caution must be exercised to prevent slipping and falling, or even sliding off the roof. Non-slip footwear is a necessity and non-slip working platforms are recommended.

G. Electric Conductance – metal panels and flashing are excellent electrical conductors. A common cause of injury is the contact of metal panels with power lines during their handling. The erection process must be routed to avoid accidental contact with high voltage power lines, services and equipment.

All tools and power cords must be properly insulated and grounded, and the use of approved ground fault circuit breakers is recommended.

H. Sharp Edges – some edges of panels and flashing are razor sharp and can cause severe cuts if proper protective hand gear is not worn. Be careful not to injure others while moving panels and flashing.

I. Wind – do not attempt to move panels in strong winds. Wind pressure on a panel can easily cause the workers carrying the panel to lose balance and fall.

Loose, wind blown panels can cause severe injury and damage. Secure opened panel bundles with banding or tie-downs so wind will not blow the panels off the roof. Clamp individual unsecured panels to the roof framing.

J. Steep Roof Pitch – on steep roof slopes, provisions must be provided to prevent materials, equipment and workers from sliding off the roof.
Panel bundles set on the roof must be secured to the roof framing member that is bearing their weight. On opened panel bundles, end blocking must be provided to prevent the panels from sliding off the bundle. Individual (uninstalled) panels must be blocked or secured to the framing members. Depending upon the project’s contract conditions, the installation drawings for the CFR roof system may or may not be provided by MBCI. In either case, it is the owner’s responsibility to ensure that comprehensive and complete installation drawings are provided to the installer.

It is the installer’s responsibility to ensure the installation drawings are readily available at the job site during the preparation, installation and inspection of the roof and related construction.

The installation drawings must be reviewed for differences with the actual job conditions, and such differences must be resolved with the customer before proceeding with the installation. The installation drawings must also be reviewed for differences with this installation guide. Adapt or modify the information in this guide in accordance with the project conditions specified in the installation drawing.

A. Cold Storage – roofs for freezer and cooler building applications may require special vapor barrier provisions for the panel side joints and perimeter flashing assemblies. Reference the project’s installation drawings for the specific requirements.

B. Hips, Valleys and Beveled Eaves – roofs with hip, valley and beveled eave conditions require special details, special parts and extensive field cutting and fitting of the panels and flashing. Reference the project’s installation drawings for the specific requirements.

C. Roof Penetrations – the material and installation details for the support and flashing of penetrations through the roof are not provided by MBCI.

It is the customer’s responsibility to ensure that the roof penetrations design and materials (such as pipe flashing and roof curbs) are suitable for the specific application and appropriate installation instructions are provided to the installer. MBCI is not responsible for the performance of roof penetrations and their installation.
D. Other Special Conditions – for any other special conditions that are not specified in this installation guide, reference the project’s installation drawings for the specific requirements.

Before starting the roof installation, it must be verified that the structure is designed to accept the design loads imposed by the roof system, and support the material and erection loads during its installation. If roof panel bundles are going to be set on the roof, it must be verified that the respective framing members are designed to support the weight of the bundles.

Before starting the panel installation, it must be verified that the structure is complete and properly aligned, and with all structural connections and bracing in-place and secured.

ROOF FRAMING ALIGNMENT

The proper alignment of the roof framing members is necessary to ensure the proper fit-up and performance of the roof assembly. Before starting the roof installation, check the roof framing to confirm that it is in accordance with the specified dimensions and alignment tolerances.

A. Tolerances – following are the standard framing alignment tolerances for the CFR roof. Refer to the project’s installation drawings for specific tolerance requirements:

- **Out of Square** – the roof system can accommodate 1/4” of saw tooth tolerance (offset between the ends of adjacent panels) at the eave and endlaps.
- **Structure Length** – the roof system can accommodate an overall +/-2” rake to rake tolerance, or +/- 1” at each rake.
- **Structure Width** – the roof system can accommodate an overall +/-1” eave to ridge tolerance, or +/-1/2” at the eave, endlap and ridge (or high eave).
- **Vertical Alignment** – the roof system can accommodate a vertical deviation from the nominal roof plane of +/-1/8” in any 5’ length, +/- 1/4” in any 20’ length and +/-1/2” over the entire roof area.

B. Vertical Misalignment – an excessive (out of tolerance) vertical misalignment between adjacent framing members will cause deflection (bending) of the installed panel as it is connected to the misaligned member. This can cause a difficult or improper side joint assembly when attempting to engage the next (straight) panel to the deflected installed panel. The deflection of the panel may also cause bending stress that when combined with thermal stress and wind stress may cause buckling of the panel face.

C. Aesthetic Acceptance – although these roof framing tolerances will allow for a proper roof assembly, the extremes of these tolerances may be aesthetically objectionable and should be confirmed with the customer before starting the roof installation.

D. Corrections – any framing alignment error which exceeds the above stated tolerances must be corrected before the roof installation can begin. MBCI cannot ensure the performance of roof assemblies modified to accommodate out of tolerance framing.
1. Unloading and Lifting Equipment:
Forklifts or hoisting equipment are necessary to unload and position the panel bundles and accessory crates for site storage and installation. The equipment must have sufficient capacity and reach to safely lift and place the material where it is required for efficient erection.

Refer to the lifting instructions provided with the panel bundle shipments. The lifting instructions specify the required lifting points for various bundle lengths and bundle weights. The lifting instructions also specify suggested lifting provisions (such as antipinch boards, bearing boards and padding) to prevent panel damage.

2. Material Inventory:
Your material is carefully inspected and crated before leaving the plant. The material is accepted by the transportation company as being complete and in satisfactory condition. It is the transportation company’s responsibility to deliver the shipment intact and in satisfactory condition. It is the consignee’s responsibility to inspect the shipment for damage and shortages when it is delivered.

Conducting a material inventory at the time of delivery is essential. By conducting the materials inventory, the erector is able to identify any material shortage or damage and minimize later erection delays caused by such shortages or damaged materials.

It is most important that any shortages or damage of the delivered materials be noted at once and clearly marked on the bill of lading before signature of acceptance. Notify MBCI immediately of any conflicts. MBCI cannot be responsible for shortages or damaged materials unless they are noted on the bill of lading.

In the case of packaged components (such as clips, fasteners and sealants, etc.), the quantities are marked on their container and should be checked against the bill of materials. MBCI must be notified of any such shortages or concealed damage within 15 days of delivery.

3. Field Storage:
Upon acceptance of the shipment, the customer or his representative is responsible for proper handling, storage and security of the roof materials. MBCI is not liable for damage or loss of materials at the job site.
The roof panel bundles should be stored on the job site as follows:

- Store panels in a protected area, out of standing water and drifting snow, etc.
- Elevate panels with blocking to allow air circulation under the bundle. The blocking should be uniformly spaced at 10’ intervals.
- Arrange the blocking so that the panels are sloped. The slope should be steep enough to cause drainage of any accumulated moisture from the panel surfaces.
- To allow air circulation around and between the panels, slit the bundle’s protective wrapping along the bottom edge of the bundle. To prevent the wrapping from blowing off the bundle, cut intermittent slits rather than a continuous slit.
- Inspect panels daily for moisture accumulation. If panel bundles contain moisture, the panels should be dried and restacked.

Trim and accessories must be stored in a secure area and protected from damage, weather, and theft. Fasteners, sealants, closures, etc. must be stored out of the weather and protected from contamination and extreme temperatures. Refer to labels on sealant packages for information concerning shelf life and instructions for proper use.

4. Handling Panels:
When moving panel bundles, extra caution must be taken to prevent damage to the panel edges.

Be sure to set panel bundles on the roof in the proper orientation for the erection sequence. On steep roofs, provisions should be taken to prevent panels and panel crates from sliding off the roof.

To manually handle individual panels, the panels must be lifted by lifting on the underside face. Attempting to lift the panel by only the top face or standing seam may cause separation of the face from the foam core. To prevent bending damage of the panel, the lifting points should be no more than 8’ to 10’ apart. Do not attempt to lift long panels by the ends only.

When setting the panel on its edge to turn it over, soft wood or foam bearing pads must be set under the panel edge to prevent scuffing and crushing damage.

To lift the panels to the roof, suitable hoisting equipment with a vacuum lift or multiple sling lift is recommended. The vacuum heads or slings must be appropriately spaced to prevent panel bending damage. The hoisting equipment must have sufficient capacity and reach to safely set the panels into position on the roof framing.
1. Sheeting Direction and Modularity:
   A. Sheeting Direction – the CFR roof panels must be installed from left to right, when looking from the eave towards the ridge. The required installation sequence is to complete each panel run from eave to ridge before starting the next panel run. This sequence will help ensure straight runs and proper endlap assembly.

   B. Panel Modularity – during installation of the roof, consideration must be made for maintaining panel modularity (side joint to side joint coverage width). By maintaining panel modularity, proper roof coverage can be obtained and the standard perimeter parts will fit properly without necessity of field modifications or reordering parts, etc.

   The standard CFR panels have a coverage width of 30", 36", or 42". Refer to the project’s installation drawings for the specified panel widths and installation requirements.

   C. Module Tolerance – for proper fit-up of the panel sidelaps, endlaps and closures, the panel modularity must be held to the panel coverage width +/-1/8".

   D. Accumulated Tolerance – accumulated coverage tolerance (start panel to finish panel) is determined by the ability to keep the panels parallel and to correctly fit and assemble the finish rake condition. If the roof has conditions such as fixed penetration locations, parapets, fire walls, etc., the accumulated panel coverage may require tighter tolerances for proper fit-up and weathertightness of the roof system.

2. Layout & Checking for Coverage:
   A. General – recommended for all roofs, but a must for large or complex roofs, is to make a layout of the actual (field measured) structure so that the starting and finish roof panel dimensions can be laid out to accommodate any structural misalignments.

   B. Starting Dimension – the starting dimension will be used to lay out the field cutting of the starting panel and to align the starting panel on the roof structurals. After the starting panel is erected, its seam will be the reference line for checking accumulated panel coverage.

   C. Checking Coverage – panel coverage is always checked at the eave, ridge, and end splices so that non-parallel seam (or dogleg) conditions can be detected and corrected before they become objectionable. The coverage check should be done with a measuring tape held taut and measured to the same side of the seam and always parallel to the eave to prevent any measuring error. Every four to six panel runs should be checked for panel modularity.

   D. Correction of Coverage – If the panels are off module, they should be corrected by equal adjustments of the next four to six panel runs. Do not attempt to adjust the coverage by more than + 1/8” and - 1/16” per panel.

3. Appearance Considerations:
   Although the roof panels can be erected within a reasonably liberal coverage tolerance, visible conditions such as: non-parallel panel seams, dogleg of the panel seam at the endlaps, tapered finish panel width and mismatch of panel seams across the ridge, may be objectionable and should be confirmed with the customer before continuing roof erection.
1. Installation Drawings:
Ensure that the installation drawings are available at the job site and are the latest issue with the latest revisions and additions.

2. Proper Tools:
Before starting panel installation, be sure that the proper equipment and tools are on hand. The basic tools required for installing the CFR Roof System are standard for the metal construction industry.

The tools must be in good operating condition and operators should adhere to safety precautions at all times. Improperly operating tools, too few tools, inadequate power source, or other equipment deficiencies slow down the installation process. The cost of inefficient labor practices is usually greater than the cost of providing good equipment.

The following special tools are necessary for erection of the CFR Roof System:

A. Rib Clamps – the CFR Rib Clamps are required to pull together the roof panel sidelaps. Sufficient clamps should be available for use at each 10’ panel length interval.

B. Seam Clamp – the CFR Seam Clamps are required to pull together the roof panel seam at the endlaps. During cold weather, the seam clamp helps compress the endlap’s seam sealant prior to the seaming operation.

C. Hand Seamer – the CFR Hand Seamer is required to crimp the panel clips to the roof panel and to start and finish the roof panel seams. The hand seamer can be used to close the entire seam in cases where it is impractical to use the motor seamer.

The seam clamps, rib clamps and hand seamer are specially designed for the CFR roof and are available only from MBCI. Do not attempt to use other tools which may damage the panels or result in panel performance failure.

D. Motor Seamer – the CFR motor seamer is required to close the roof panel seams. The seamer’s motor requires a 20 amp, 120 Volt, AC power supply. The power cords must be of sufficient size to provide a full 20 amp to the motor without power drop.

The motor seamer is specially designed for the CFR roof and is available only from MBCI. The motor seamer is shipped direct to the job site. Contact MBCI Seamer Coordinator to schedule motor seamer shipment and return.

E. Endlap Assembly Gauge – the CFR endlap assembly gauge is required to help assure the proper positioning of the endlap sealant and endlap fasteners.

The rib clamps, seam clamps and endlap assembly gauge should be ordered with the CFR roof materials.
3. Weather Sealants:
   A. General – the proper application of the roof system’s sealants (and fasteners) is usually the most critical factor effecting the roof’s weathertight performance. It is the erector’s responsibility to understand and ensure that the correct sealants are used and that they are applied in the proper manner and condition. This includes understanding the function and proper application of the sealant pigtails.

   B. Temperature Effects – temperature extremes must be considered during erection of the roof due to the sensitivity of sealants. The recommended erection temperature range is 20º F to 120º F. At colder temperatures, the sealant stiffens resulting in loss of adhesion and compressibility. At hotter temperatures, the sealant becomes too soft for practical handling. On cold but sunny days, the panel’s surface may become warm enough to accept the application of a heated sealant even though the air temperature is below 20º.

   When overnight temperatures fall below freezing, the sealant should be stored in a heated room so it will be warm enough to use the following day. On hot days, the sealant cartons should be stored off the roof in a cool and shaded area, and sealant rolls on the roof should be kept shaded until actually used.

   C. Contamination – to assure proper adhesion and sealing, the sealant must have complete contact with the adjoining surfaces. Contaminants such as water, oil, dirt and dust prevent such contact. The panel and flashing surfaces must be dry and thoroughly cleaned of all contaminants. The sealant must also be free of contamination or distortion of its profile.

   Before applying the sealant, check that it is not contaminated, torn or flattened. Do not use contaminated or damaged sealant.

   During cool and/or humid weather, condensation or light mist can accumulate on the panel, flashing and sealant surfaces and not be easily noticed. It is important that the sealants always be kept under protective cover and that the panel and flashing surfaces be wiped dry immediately before installation.

   Tape sealant is provided with a paper backing to reduce contamination. To protect the sealant during erection, leave the paper on the sealant until the final assembly. When it is time to remove the paper, check that the paper is completely removed. Remaining strips of the paper will prevent adhesion of the sealant to the adjacent surfaces.

   D. Alignment – the tape sealants paper backing is specially designed to act as an alignment guide for the proper placement of the sealant. When applying the sealant, use the edge of the paper to guide the sealant as instructed in the installation guide details.
E. Compression – to assure proper adhesion and seal, the tape sealant must be compressed between the panel or flashing surfaces with firm and uniform pressure. In most cases, the required pressure is applied by the clamping action of screws pulling the adjoining surfaces together.

During cold weather, the fasteners must be tightened slowly to allow the sealant time to uniformly compress. If the fasteners are tightened too fast, the fastener may strip out before the sealant is compressed, or the panel or flashing may deform in the immediate area of the fastener, leaving the rest of the sealant insufficiently compressed.

In very cold weather, it is recommended that the fasteners be tightened slowly and only tight enough that the sealant is in full contact with the panel or flashing. Then, on the next sunny day, complete the tightening process after the sun warms the panel and flashing surfaces.

F. Inside Corners – an inside corner, such as where the panel flat meets a standing rib, is usually the most critical area to seal. Contaminants often accumulate in the corners and careful attention is required to be sure that the corners are wiped completely clean.

It is a common error for the erector to bridge (dogleg) the sealant across the inside corners. When the lapping panel or flashing is pushed into place, the bridged sealant is stretched and thinned. The sealant may then be too thin to adequately seal this critical area. When tape sealant is applied at an inside corner, it is recommended that the sealant be folded back on itself, then push the sealant fold into the corner.

4. Vapor Sealant:
A. General – because of the CFR roof’s exceptional thermal efficiency and the resulting greater vapor pressure differentials, the proper application of the vapor sealants is most critical to prevent condensation from occurring within the panel joints and perimeter assemblies.

On the typical commercial and industrial buildings, the vapor sealants are specified at the exterior and interior junctions of the roof’s joints and perimeter assemblies. In most cases, the weather sealant serves the function of the exterior vapor sealant.

On the typical cold storage buildings, most freezer rooms and some cooler rooms will require the vapor sealant only at the warm side (exterior) and not at the cold side (interior) junctions of the roof’s joints and perimeter assemblies. Because of the even greater vapor pressure differentials occurring within cold storage buildings, auxiliary vapor seal provisions may be required at the exterior junctions of the perimeter assemblies.

On buildings with multiple functions, the vapor sealant requirements may vary between different rooms or areas.

Refer to the project’s installation drawings or specifications for the specified vapor sealant requirements.
B. Perimeter Conditions – at the perimeter conditions, the roof panel edge is normally sealed to the top surface of the perimeter structural or flashing. It is the erector’s responsibility to ensure that the perimeter structural or flashing joints are sealed vapor tight and provide a proper surface to receive the roof panel’s vapor sealants.

C. Bead Size – apply the vapor sealant in a large enough bead to fully seal the panel’s Mesa profile at the perimeter conditions and a \( \frac{1}{2}'' \) bead to fully seal the panel’s tongue and groove joint at the sidelaps. Do not apply so much sealant that it spills over onto the visible surfaces.

D. Factory Sealant – optional, the panels may have factory applied interior side joint sealant.

5. Fasteners:
   A. General – the proper application of the roof’s fasteners is usually the most critical factor effecting the roof’s wind resistance and is equally critical to the roof’s weathertight performance.

   B. Screw Gun – use torque control screw guns for driving self-drilling and self-tapping screws. High amperage guns (6 AMP minimum) are required to achieve the proper torque for secure fastening.

   C. Sockets & Bits – use good quality sockets and bits. Good fitting sockets and bits reduce wobble and stripping of the screw heads, especially the alloy heads. They also minimize objectionable paint chipping and scuffing on colored screws and minimize damage to the protective coating on unpainted screws.

   Magnetic sockets collect drill shavings which will build up and eventually prevent the socket from seating properly on the screw heads. One method of removing the drill shavings is to roll up a ball of tape sealant and push the socket into the sealant. When the socket is removed from the sealant, most of the drill shavings will remain embedded in the sealant thereby cleaning the socket. This process should be repeated as often as needed to keep the socket clear of drill shavings.

   D. Extensions – Because of the roof panel’s thickness, socket extensions are recommended for installing the panel clip screws. With the extension, the screw can be driven straight down without tilting the screw gun to clear the panel or clip. Since extensions are slow to wear out, it is usually more cost effective to purchase extensions and good quality sockets rather than purchase sockets with built-in extensions.
E. Drill Bits – self tapping screws will require pre-drilled holes. Providing the correct size hole is most critical to the fastener’s structural performance. See the following chart for the proper drill bit size required for the specific roof structural thickness. Caution: the eave, rake and roof structuralss are often of different thicknesses and may require different size drill bits.

<table>
<thead>
<tr>
<th>THICKNESS OF STEEL</th>
<th>SIZE OF DRILL</th>
<th>TYPE OF SCREW</th>
</tr>
</thead>
<tbody>
<tr>
<td>18 GAUGE</td>
<td>3/16” DRILL</td>
<td>B,BP, AB,A</td>
</tr>
<tr>
<td>16 GAUGE</td>
<td>#9 DRILL</td>
<td>B,BP, AB,A</td>
</tr>
<tr>
<td>14 GAUGE</td>
<td>#9 DRILL</td>
<td>B,BP, AB,A</td>
</tr>
<tr>
<td>12 GAUGE</td>
<td>#3 DRILL</td>
<td>B,BP</td>
</tr>
<tr>
<td>11 GAUGE</td>
<td>#2 DRILL</td>
<td>B,BP</td>
</tr>
<tr>
<td>OVER 11 GAUGE THRU 3/8”</td>
<td>#1 DRILL</td>
<td>B,BP</td>
</tr>
<tr>
<td>OVER 3/8” THICKNESS</td>
<td>.234 DRILL</td>
<td>B,BP</td>
</tr>
</tbody>
</table>

Because of the roof panel’s thickness, the drill bits must be long enough to allow drilling without tilting to clear the panel and clip.

F. Installation – before starting the screw, the materials to be joined must be pressed together with foot or hand pressure. The pressure must be maintained until the screw has drilled through all the materials and the threads have engaged.

Most self-drilling screws require 20 pounds of pressure to maintain the drilling action and to start the thread cutting action. Also, applying such pressure before starting the screw gun will usually prevent tip walking or wandering. If too little pressure is applied, the drill point may not cut into the metal and the point will heat up and become dull. If the pressure is too heavy, the bottom material may be deflected away, causing a stand-off condition, or the drill tip may be broken or split.

For proper seating of the fastener’s sealing washer, the panel or flashing surface must be clean and drill shavings must be removed from under washers before seating. The fastener must be driven perpendicular to the panel surface so that the washer can seat level without warping or cupping.

Do not over drive screws. Over driving can strip the threads and/or damage the sealing washer. When possible, use drivers with torque control set to function properly for the combination of fastener size, hole size, and material thickness.

The fastener should be driven tight enough to uniformly compress the washer but not so tight that the washer splits or rolls out from under the metal backer. The recommended procedure is to tighten the fastener until the sealing washer just starts to visually bulge from under the metal backer.
As a good installation practice, all roof installers should carry approved oversized screws. Upon stripping or breaking a screw, the screw must be immediately removed and replaced with the appropriate oversized screw. Do not defer the screw replacement to be remembered and fixed later or to be found by the clean-up crew. The majority of such screws will be overlooked until the customer complains of leakage.

6. Field Cutting:
   A. Cutting Panels – the panels are easily cut with circular saws or reciprocating saws using proper metal cutting blades. If the saw cannot cut through the entire panel thickness or if shears are used, cut each panel face and use a thin knife to cut through the remaining foam.

   Be sure to properly support the panel during the cutting operation to prevent delamination or buckling of the panel. Carefully cut the standing ribs to prevent bending the rib or delaminating the rib from the panel’s foam core.

   B. Abrasive Saw Problems – abrasive saws (circular saws with friction disks) are not recommended for cutting roof panels or flashing. Abrasive saws create high heat which may burn away the protective cladding from the panel edges causing the edge to rust. Also, abrasive sawing emits fine, hot steel particles which will accumulate on the panel and flashing surfaces where they rust and can cause staining and rusting of those surfaces. Rust caused by abrasive saw damage or abrasive sawing particles is excluded from the material warranty claims.

   C. Cutting Flashing – It is recommended that flashing be cut with shears to provide a clean, undamaged cut. On shear cut edges, the protective cladding extends to the edge of the cut and is often wiped over the edge to further protect the base metal.

   When field cutting complex shapes, it is usually easier to cut out a 1” wide strip using both left and right hand shears. The 1” cut-out provides the clearance to make smooth cuts and the clearance to work the shears around tight corners.

   Whenever possible, fit the material so that the factory cut edge is exposed and the field cut edge is covered.

   D. Layout and Marking - when marking the panels for cutting, avoid marking the panels in a manner which will leave marks or stains on the visible surfaces. Use chalk or washable felt tip markers.

   Do not use graphite pencils on unpainted panel surfaces, the graphite can cause rusting of the surface.

   When making repetitive cuts (such as cutting panels at a hip or valley) it is recommended that a template be made from a piece of drop-off panel or flashing to provide fast and accurate marking for the field cut. When using panel material for the template, cut off the top portion of the panel ribs so that the template is easily laid onto the panel being marked.
7. **Surface Protection:**
   A. **Surface Damage** – damaged roof panel and flashing surfaces are subject to corrosion and performance problems and may void the material warranties. Assure that the surfaces are not being subjected to abusive conditions such as: careless handling of panels and flashing, excessive roof traffic, abrasive or contaminated footwear, rough handling of materials, tools and equipment, and contact with abrasive materials or residue, etc.

   B. **Iron Objects** – ensure that the panel and flashing surfaces are not being subjected to exposed iron or steel objects and materials left on the roof such as: tools, material drop-off, fasteners, wire and banding, cutting or drilling chips, etc. In the process of rusting, these materials will absorb the panel’s protective coating, thus leaving the panels exposed to rusting.

   C. **Wet Conditions** – ensure that the panels and flashing are not being subjected to long term wet conditions such as: standing water or consistent sources of steam, spray and dripping moisture, wet debris, wet insulation or other moisture holding materials.

   D. **Corrosive Materials** – ensure that the panels and flashing are not subjected to direct contact or runoff from corrosive materials such as: copper pipes and flashing, uncured cement, treated lumber, anti-icing chemicals, strong solvents or other corrosive materials.

8. **Unspecified Materials:**

   Use of the wrong materials may cause installation and performance problems and may void the material warranties. All installed roof system materials, especially sealants and fasteners, must be those which are provided by MBCI or are specified on the project’s installation drawings and are used only as specified on the installation drawings and this erection guide.

   MBCI cannot be responsible for the performance of roof materials which are not provided, specified or approved by MBCI.

9. **Inspection During Erection:**

   During the roof erection, all areas of the roof system assembly must be frequently inspected to ensure that the roof system is being erected in a proper and weathertight manner and in accordance with the installation drawings and this erection guide.

   Failure to assemble the roof system correctly will result in roof performance problems which may require costly corrective work, roof replacement, and performance and damage claims, etc. Also, incorrect installation may void the material warranties.
A. General – the following details provide graphic illustration of the roof assembly steps. The purpose is to provide suggestions to the erector for the proper and efficient assembly of the roof system.

B. Installation Drawings – study the project’s installation drawings to determine the roof conditions on your project and to determine any differences with these details. If differences exist, the installation drawings have precedence.

C. Specific Details – because of the many variations in roof conditions, it is important that you review all of the erection details to select and isolate the specific details required for your project.

D. Detail Sequence – these details are arranged in a step-by-step sequence for the standard roof conditions. Following this sequence ensures correct assembly and ensures that the area to be worked on will be readily accessible for the next assembly step. Do not short-cut this sequence without careful consideration of the possibility of incorrect or omitted assembly and the resulting corrective rework.

E. Detail Orientation – to minimize confusion, the details are typically oriented so that the view is from eave to ridge, with the starting rake at the left and finish rake at the right. At the beginning of each erection section, a general overview detail is provided to help the understanding of the roof assembly orientation.

F. Weathertightness – to help ensure the roof’s weathertight assembly, the details emphasize proper fit-up, sealing and fastening. The type and size of fasteners and sealants are specified for each condition. Be sure that these critical instructions are reviewed often and the roof assembly is checked at each assembly step.
STANDARD PANEL DESCRIPTION

Panel Section

30", 36", or 42" Panel Width

Trailimg Edge of Panel

Female Rib

Exterior Face

Male Rib

Groove

Tongue

Foam Core

Interior Face

Mesa Rib (typ.)

2" to 6" Panel Thickness

Leading Edge of Panel

Note: All standard roof panels are the same except for the panel length variations, and the notch and swag used only at endlaps. Refer to the job's Installation Drawings for location of the specific length panels.

SEE www.mbcicom FOR CURRENT INFORMATION
## GENERAL INFORMATION

### PRODUCT CHECKLIST

**CFR Panel**

- **Panel Thickness & Width**
  - 2" 4" 42"
  - 2½" 5" 36"
  - 3" 6" 30"

- **Panel Thickness & Width**

**CFR Clip**

- **Panel Thickness**
  - 4102 2"
  - 4125 2½"
  - 4103 3"
  - 4104 4"
  - 4105 5"
  - 4106 6"

**Back-up Plate**

- **Dimensions**
  - 1⅛" x 1" x 40’
  - 16 Gauge Galvanized
  - Factory installed for ridge and high eave
  - Field installed for hip panels

**Tube Sealant**

- **Types**
  - Urethane
    - HW-540 (White)
  - Non-Skinning Butyl
    - 7100 (White)
  - For use in panel vapor groove

**Clip Butyl Sealant Tape**

- **Dimensions**
  - 3/16” Diameter x 40’
  - Applied to clip before installation

**Perimeter Flashing Butyl Sealant Tape**

- **Dimensions**
  - ¼” x 1” x 20’
  - Use to seal trim to panels when sealant will cross mesa profile of panel

**Endlap Butyl Sealant Tape**

- **Dimensions**
  - ⅜” x ⅛” x 30’
  - For use at end laps

** Seam Butyl Sealant Tape**

- **Dimensions**
  - ⅜” x ⅛” x 40’
  - Applied to male leg of panels

**1” Butyl Sealant Tape**

- **Dimensions**
  - ⅛” x 1” x 40’
  - Used to seal between flashings and panels
  - Gray

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**CFR-22** REV 01.01
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**PRODUCT CHECKLIST**

### Metal Outside Closure
- Used at ridge and high eave conditions
- 24 Gauge

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Panel Width</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>7900</td>
<td>42&quot;</td>
<td>Kynar Polar White</td>
</tr>
<tr>
<td>7900</td>
<td>42&quot;</td>
<td>Sandstone</td>
</tr>
<tr>
<td>7900</td>
<td>42&quot;</td>
<td>Black</td>
</tr>
<tr>
<td>7901</td>
<td>30&quot;</td>
<td>Black</td>
</tr>
<tr>
<td>7902</td>
<td>36&quot;</td>
<td>Black</td>
</tr>
</tbody>
</table>

### Gutter Strap
- Used to attach gutter to CFR Panel
- 2 Fasteners (#4) per strap.

### Rake Zee
- 1" length
- 2" width

### Parapet Reglet
- 1/4" thickness
- 2" width

### Parapet High Eave Trim
- 4" length
- Specify angle

### Parapet Rake Trim
- 4" length

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**REV 01.01**

**CFR-23**
GENERAL INFORMATION

PRODUCT CHECKLIST

Interior Ridge Trim

Exterior Ridge/Hip Trim

Valley Trim

Interior Transition Trim

<table>
<thead>
<tr>
<th>PART NO.</th>
<th>ROOF THICKNESS</th>
<th>DIM &quot;A&quot;</th>
<th>Girth</th>
</tr>
</thead>
<tbody>
<tr>
<td>F-3412</td>
<td>2&quot;, 2½&quot; &amp; 3&quot;</td>
<td>9&quot;</td>
<td>14&quot;</td>
</tr>
<tr>
<td>F-3413</td>
<td>4&quot;, 5&quot; &amp; 6&quot;</td>
<td>12&quot;</td>
<td>17&quot;</td>
</tr>
</tbody>
</table>

F-3450

F-3445

FL-3502

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SUBJECT TO CHANGE WITHOUT NOTICE
# General Information

## Product Checklist

| 4A | • Use to attach trim to panels  
• Use to attach gutter strap |
| ¼-14 x ⅞” Laptek |

| 43L | • Use at end laps  
30” Panel = 7 per endlap  
36” Panel = 9 per endlap  
42” Panel = 11 per endlap |
| ¼-14 x 1½” TEK2 Long Life w/1⅛” diameter washer |

<table>
<thead>
<tr>
<th>1100 Series</th>
<th>• For fastening Rake Zee to 16-12 Ga. Steel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panel Thickness</td>
<td>Fastener Length “A”</td>
</tr>
<tr>
<td>2”</td>
<td>3”</td>
</tr>
<tr>
<td>2½” or 3”</td>
<td>4”</td>
</tr>
<tr>
<td>4”</td>
<td>5”</td>
</tr>
<tr>
<td>¼-14 x &quot;A&quot; TEK 3 w/washer</td>
<td>5”</td>
</tr>
<tr>
<td>6”</td>
<td>7”</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>1200 Series</th>
<th>• For fastening CFR Rake Through Panel Fastener</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panel Thickness</td>
<td>Fastener Length “A”</td>
</tr>
<tr>
<td>2”</td>
<td>4”</td>
</tr>
<tr>
<td>2½” or 3”</td>
<td>5”</td>
</tr>
<tr>
<td>4”</td>
<td>6”</td>
</tr>
<tr>
<td>¼-14 x &quot;A&quot; TEK 5 w/washer</td>
<td>5”</td>
</tr>
<tr>
<td>6”</td>
<td>8”</td>
</tr>
</tbody>
</table>

| 1724 | • For fastening clips into ⅝”-⅞” Steel |
| ¼-14 x 3” TEK5 w/o washer |

| 1816 | • Optional Clip Fastener |
| ¼-14 x 2” Type B w/o washer |

| 1816S | • Optional Clip Fastener |
| ¼-14 x 2” Type B 304 Stainless w/o washer |

| 17 | • Use to attach outside closures to panels |
| 12 x 1” TEK3 w/washer |

| 14 | • Use to fasten panels from the back side when required |
| 2202 - 1/4” grip |
| 2204 - 1/4” - 1/2” grip |
| 2206 - 1/2” - 3/4” grip |

| 14A | • Stainless Steel  
• ⅝” Diameter  
• ¼” Grip Range |
| ⅝” x ⅜” Pop Rivet |

| 1616 | • For fastening clips into 16-12 Ga. Steel  
• Two per clip  
• For FM, use three fasteners per clip if fastening into support members less than 12 gauge |
| ¼-14 x 2” TEK 3 w/o washer |

| 1816 | • Optional Clip Fastener |
| ¼-14 x 2” Type B 304 Stainless w/o washer |

| 1816S | • Optional Clip Fastener |
| ¼-14 x 2” Type B 304 Stainless w/o washer |

| 17 | • Use to attach outside closures to panels |
| 12 x 1” TEK3 w/washer |

| 14 | • Use to fasten panels from the back side when required |
| 2202 - 1/4” grip |
| 2204 - 1/4” - 1/2” grip |
| 2206 - 1/2” - 3/4” grip |

| 14A | • Stainless Steel  
• ⅝” Diameter  
• ¼” Grip Range |
| ⅝” x ⅜” Pop Rivet |
### PRODUCT CHECKLIST

<table>
<thead>
<tr>
<th>Endlap Assembly Gauge</th>
<th>Seam Clamp</th>
</tr>
</thead>
<tbody>
<tr>
<td>30” Panel - 9947</td>
<td>• Used at endlap to help hold module. Two recommended per project.</td>
</tr>
<tr>
<td>36” Panel - 9948</td>
<td></td>
</tr>
<tr>
<td>42” Panel - 9949</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rib Clamp</th>
<th>Hand Seamer</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Used to pull the male and female ribs together during installation to insure that the tongue and groove joint is fully engaged. One every 10’ of panel length recommended with a minimum of 3.</td>
<td>• Used to crimp each roof sidelap at the eave and ridge end of the panels and at the roof panel endlaps prior to using the motorized seamer. One per project.</td>
</tr>
</tbody>
</table>

| 30” Panel - 9947 | 9910 |
| 36” Panel - 9948 |      |
| 42” Panel - 9949 |      |

| 9920 | HW-1269 |

**Note:** These clamps must be ordered from MBCI. Do not attempt to install the roof with other tools which are not specifically designed for the CFR roof. The clamps may be padded with plastic or cloth tape to avoid marring the roof panel surfaces.
Typical Roof Panel Installation

This section describes the roof panel installation for a typical roof with a ridge condition.

For other conditions such as roof panel overlaps, high eave trim and high eave transition, refer to that specific section in addition to this section.
1. If the roof has a ridge condition, the interior ridge flashing must be installed before the vapor sealant and roof panels are installed.

2. Position the flashing so that it is centered over the ridge structural.

3. Align the end of the flashing flush with the outer edge of the rake structural.

4. Fasten the flashing to the structural with 1/8” dia. blind rivets as necessary to secure the flashing until the roof panels are installed.

5. At flashing splices, apply vapor seal caulk, lap flashings 2” and secure lap with blind rivets @ 3” o.c. and centered over vapor sealant.
**Starting Dimension Layout**

1. Determine the starting dimension. Note: The starting dimension may be shown on the job's installation drawings.

2. Measure the starting dimension from the face of the rake structural and mark the dimension on the eave structural and the ridge or high eave structural.

3. Stretch a chalk line between the marks and snap the chalk line across the roof structural.
Perimeter Vapor Seal Application

1. Apply continuous beads of vapor seal caulk along the rake and eave structural and along the ridge flashing.

2. To avoid damage or contamination of the caulk, do not apply until immediately before installation of the next roof panel and apply only as much caulk as needed for that panel.

3. Apply the caulking bead large enough to assure filling the roof panel's interior face mesa ribs.

4. Ensure that the perimeter structural joints have been vapor sealed. Note: These seals are not specified or provided by MBCI.

5. Important: Cold storage applications may not require the vapor seal at the roof's interior face. Refer to the installation drawings for specific instructions.
Starting Panel Installation

1. Field cut the starting panel to the required width and clean the panel of cutting residue.
2. Position the leading edge of the starting panel along the starting dimension chalk marks.
3. Position the end of the panel at 2" beyond the face of the wall. This dimension may vary for specific job conditions, refer to the job’s installation drawings.
4. Temporarily clamp (or fasten) the cut edge of the panel to the rake structural.
5. Secure the leading edge of the panel to the eave and roof structural with the panel clips. See following Panel Clip Installation Detail.
Panel Clip Installation

1. Apply clip sealant to underside of the clip’s tab. Extend sealant 1/4” beyond ends of clip tab.
2. Remove sealant’s paper backing and position clip over the panel’s leading edge. Align the clip’s center attachment holes over the roof structural’s top flange.
3. While holding the clip tight against the panel’s edge, push the clip’s base into the panel’s foam core.
4. Fasten the clip to the roof structural with the specified type and quantity of fasteners.
5. Crimp the clip’s tab around the panel’s male rib with the manual seaming tool.

SEE www.mbci.com FOR CURRENT INFORMATION

REV 01.01 CFR-33
**Seam Sealant & Vapor Sealant Application**

1. Apply seam sealant continuously along top of the panel's male rib and panel clips. Use the sealant's paper backing as a guide to center the sealant on the rib. The seam sealant must marry with the exposed clip sealant ends.
2. Apply vapor seal chalk continuously in the panel's interior face groove.
3. Apply vapor seal chalk pigtails to connect the vapor seal in the groove with the vapor seal on the eave structural and on the interior ridge flashing. The pigtails must marry with the vapor seals.
4. Apply sealant pigtails at the eave and ridge ends of the panel's male rib. See following Sealant Pigtail Application Detail.
Vapor Seal Pigtail
(eave shown, ridge similar)

Sealant Pigtail Application

1. Apply sealant pigtail at the panel's eave end. The pigtail must marry with the seam sealant and extend below the panel's face to later engage the sealant on the eave trim.
2. Apply sealant pigtail at the panel's ridge end. The pigtail must marry with the seam sealant and must cover the full width of the male rib's underside.
3. Do not remove the pigtail's paper backings until installation of the next panel.
4. Apply vapor seal pigtail at the panel's eave and ridge end. The pigtail must marry with the vapor seal in the panel's groove and the eave and ridge perimeter vapor seals.
Panel Sidelap Engagement

1. Remove the paper backing from the seam sealant on the previously installed panel.
2. Carry the roof panel to its position next to the previous panel.
3. Tilt the panel to hook its female rib over the male rib of the previous panel.
4. Align the eave end of the panel with the end of the previous panel.
5. Lower and push on the leading edge of the panel so that its tongue engages the groove of the previous panel.
Panel Installation

1. Check that the end of the panel is 2" beyond the outer face of the wall (or the dimension specified on the project’s installation drawings).
2. Use the rib clamps to pull the panel sideloap together.
3. Check that the panel’s tongue and groove joint is fully engaged, metal to metal contact at the interior face is desired.
4. Important: If the adjacent panels are bowed due to vertical misalignment of the roof structural or thermal bowing, it may be necessary to walk along the panel’s trailing edge to force the panel’s tongue into vertical alignment with the previous panel’s groove. Then use the rib clamps to pull the panel sideloap together.
Panel Edge Attachment

1. Check for excessive space between the bottom edge of the panel and the top of each roof structural. A space exceeding 1/8" indicates a low roof structural.

2. At the low roof structural, install the required thickness of shims to fill the space between the panel and the roof structural. The shims may be fabricated from layers of corrosion resistant sheet metal and must provide a minimum bearing of 2 1/2" x 6".

3. Install a panel clip at each roof structural (including the eave structural). Attach the clips to the roof structural with the specified quantity and type of clip fasteners. If there are roof panel end laps, do not install the panel clips at the end lap support structural until after the end lap is assembled.

Important
While standing on the panel, a space between the panel and the structural indicates a low purlin. The space must be shimmed before installing the panel clip.
Panel Coverage Measurement

1. To assure proper fit-up of the finish rake, ridge closures and roof accessories, the panel coverage must be checked frequently and corrected as necessary.

2. During the panel installation, adjust the closing pressure of the rib clamps to provide an exact 30", 36", or 42" coverage per panel.

3. If correction is required, do not attempt more than +1/8" or -1/16" correction per panel.

* Note: Hold at equal distance so measurement is parallel to eave or ridge
Finish Panel Installation

1. Complete the installation of all the roof panels except for the finish panel.
2. Field cut the finish panel to the required width and clean the panel of cutting residue.
3. Install the finish panel and temporarily clamp the cut edge of the panel to the rake structural.
Typical Roof With Endlap Condition

This section describes the assembly of roof panel endlaps for a typical roof with endlap conditions.

Use this section in conjunction with the previous Roof Panel Installation section.
Endlap Vapor Seal Application

1. Apply continuous beads of vapor seal caulk upslope and downslope of the center of the endlap support structural.

2. To avoid damage or contamination of the caulk, do not apply until immediately before installation of the next roof panel and apply only as much caulk as needed for that panel.

3. Apply the caulking bead large enough to assure filling the roof panel’s interior face mesa ribs.

4. Assure that the endlap support structural joints have been vapor sealed. Note: These seals are not specified or provided by MBCI.

5. Important: Cold storage applications may not require the vapor seal at the roof’s interior face. Refer to the installation drawings for specific instructions.
**Downslope Panel Installation**

1. Position the downslope panel and check that it’s end aligns with the center of the endlap support structural ± 1/2”.

2. Install the panel and secure the panel edge with the panel clips. Do not install the panel clip at the endlap until after the upslope panel is installed.

3. Set the Endlap Assembly Gauge on the end of the panel. Set the gauge with the long lip turned down and flush against the end of the panel.
Endlap Sealant Application

1. Apply endlap sealant continuous across the panel. Align the edge of the sealant’s paper backing with the lip of the gauge. See following Sealant Placement detail.

2. Apply 3 1/2” strip of seam sealant on the end of the female rib. Extend the sealant to marry to the endlap sealant and the previous seam sealant.

3. At this time, check that all of the panel’s back-up plates are in position. See Standard Roof Panel Description detail. Contact MBCI for replacement plates and installation instructions.
Endlap Sealant Placement

1. Start the endlap sealant by marrying its end to the previous sealant pigtail.
2. Apply the endlap sealant continuous across the panel. Align the edge of the paper backing with the assembly gauge and panel notches. Be sure that it is pushed completely into all of the panel’s corners.
3. Finish the endlap sealant by folding its end 1/4" over the panel’s leading edge.

Important
The sealant must be its full thickness. Do not use flattened, pinched or stretched sealant.
Upslope Panel Engagement

1. Position the upslope panel so the end of its female rib butts the notch of the downslope panel. Be sure the panel’s tongue is engaging the previous panel’s groove.

2. Push the male rib of the downslope panel outward and lower the upslope panel to nest into the downslope panel.

3. Check that the endlap sealant is not displaced or peeled off from the panel ribs when the upslope panel is lowered into the downslope panel.
Upslope Panel Installation

1. Use rib clamps to pull the upslope panel sidetap together. Check that the panel is aligned to the alignment marks. Secure the panel to the roof structural with panel clips. Do not install clips at the endlap until the endlap assembly is completed.

2. Compress the endlap together by using seam clamps on the panel ribs. At the trailing edge, position the clamp over the lapped ribs. At the leading edge position the clamp to straddle both (upslope and downslope) ribs.

3. In cold weather, close the clamps slowly to allow the sealant to flow and prevent distortion of the panel ribs.
**Endlap Fastener Layout**

1. Set the endlap assembly gauge on the end of the upslope panel. Set the gauge with its short lip down and against the edge of the panel.

2. Using a marking pen, mark the panel through each hole in the endlap assembly gauge.

3. Check that the marks are at the center of each high mesa rib and are 3/4" from the edge of the panel.

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**Important**
The marks for the endlap screws must be at the center of each high mesa rib and 3/4" from the panel edge.
Important
Allow the endlap screws to drill through to the back-up plates. Forcing the screws may push the back-up plates into the foam and away from the screw.

Endlap Fastener Installation

1. Stand on the upslope panel's end to compress the endlap during installation of the endlap fasteners.

2. Install the endlap fasteners at each mark. Check that the fasteners are penetrating the center of the endlap sealant.

3. Tighten the endlap fasteners as necessary to assure uniform and complete contact of the endlap sealant to both panel surfaces.
Endlap Pigtail and Panel Clip Installation

1. Apply endlap pigtail to straddle the male rib's butt joint. Use a 1 1/4" strip of seam sealant for pigtail. Lap one end of pigtail over the side of the rib. Lap the other end under the rib.

2. Install panel clips at the ends of the upslope and downslope panels. Position both clips so they can be fastened to the endlap support structural.

3. Install the clip fasteners through the clip's outer holes as necessary for attachment to the endlap support structural.

4. Crimp the clips over the panel's male ribs with the manual seaming tool.
Seam Sealant and Vapor Sealant Application

1. Apply seam sealant continuously along the top of the panel run’s male rib and panel clips. The seam sealant must marry with the clip sealant ends.

2. Apply vapor sealant caulk continuous in the panel’s interior face groove.

3. Apply vapor seal pigtails to connect the vapor seal in the groove to the vapor seals on the endlap support structural.
Start/Finish Panel Pigtailing Application
(Finish Panel Shown, Start Panel Similar)

1. Before installing the upslope starting and finish panels, apply the start/finish pigtailing sealant. Use a 4" long strip of seam sealant for the pigtailing. Marry the edge of the pigtailing sealant with the edge of the endlap sealant.

2. Check that the rake closure sealant will cross the pigtailing sealant when the rake closure is installed.

3. Install the upslope starting or finish panel and cover the exposed pigtailing sealant with its paper backing until immediately before installation of the rake closure.
SEAMING OPERATION

As panels are installed, hand tool the seam at each clip with hand tool. Panels should be completely seamed with electric seamer as soon as possible.

Place hand tool over clip location with crimping arms together. Push crimping arms apart to form finished seam.

Bring crimping arms back together and remove hand tool from seam.

NOTE

The ridge end of the panel seams must be closed before installation of the ridge closures.
SEAMING OPERATION (continued)

The electric seamer will run upslope and downslope and is controlled by a hand-held forward and reverse remote switch. The seamer will form the seam when running in either direction. An orientation plate on the seamer indicates forward and reverse. The remote switch is designed to stop the seamer when the button is released. The seamer will continue for approximately 6 to 8 inches after the button is released. Do not try to immediately switch directions with the seamer button to stop the seamer.

On lower roof slopes, walking with the seamer is recommended.

On steep sloped roofs (6:12 and greater) a 12-gauge extension cord (not included with seamer kit) may be installed between the remote switch and the seamer. Seaming can then be accomplished by starting the seamer at the eave from a manlift. When using this method the seam will be formed upslope and then the seamer will be reversed down the seam to the eave, removed and placed on the next seam. During panel installation, hand crimp the end of the panels 12” downslope from the ridge or high side of the roof. Stop the seamer at this point to prevent the seamer from running into the flashing or running off the roof. Finish remainder of seam with the hand crimper. To prevent the seamer from running off of the roof, always hand crimp the first and last 12” of panel seam.

To begin seaming, set the seamer on the seam with the locking arm up and to the open side of the seam. The wheels should be even with the edge of the panel. Push the locking arm down to engage the tools and turn on the seamer.

CAUTION

- Seamer operation should be closely supervised at all times.
- A safety line should be attached to the seamer.
- Be aware of which direction the seamer will move before engaging the switch.
- Do not entangle the electrical cords in the seamer tooling while it is in operation. This could cause serious injury or death to the operator and severely damage the seamer.
- Electrical cords should be 10-gauge to provide power to the seamer and never be over 200 feet from the electrical source.
- The seamer will move approximately 6” to 8” after the hand switch is released.
- Bring seamer to a complete stop before changing direction.

CAUTION

The use of any field seaming machine other than that provided by the manufacturer may damage the panels, void all warranties and will void all engineering data.
CURB INSTALLATION - CONTINUED

(6) FASTENER #1B 1/4-14 x 1 1/4" SD W/O WASHER FOR PURLIN OR CURB SUPPORT 14GA OR LESS.

(6) FASTENER #55 12-24 x 1 1/4" SD DP5 W/O WASHER FOR PURLIN OR CURB SUPPORT 12GA OR GREATER.

L 4 X 4 X 14GA X 6" FIELD CUT FROM

CURB SUPPORT (8", 10" OR 12" CEE)

L 4 X 4 X 14GA X 6" FIELD CUT FROM

SUB-FRAMING SUPPORT

L 4 X 4 X 14 GA, ANGLE FIELD CUT FROM

(4) FASTENER #1B 1/2-14 X 1 1/4" SD W/O WASHER AT EACH ANGLE LEG

ROOF CURB SUPPORT CHANNEL
FACTORY LOCATED CURBS WITH A SINGLE PANEL RUNNING EAVE TO RIDGE: PANELS ARE TO BE DETAILED WITH AN ENDLAP AT THE UPSLOPE CURB LOCATION ONLY.

FIELD LOCATED CURBS WITH A SINGLE PANEL RUNNING EAVE TO RIDGE: PANELS AT CURB LOCATION MUST BE A MINIMUM OF 3" LONGER TO PERMIT FIELD CUTTING AND NOTCHING / REMOVAL OF FOAM AT UPSLOPE SPlice LOCATION OF CURB.

FACTORY LOCATED CURBS ON MULTIPLE PANELS RUNNING EAVE TO RIDGE: PANELS MUST BE DETAILED FOR AN ENDLAP AT THE UPSLOPE CURB LOCATION.

FIELD LOCATED CURBS ON MULTIPLE PANELS RUNNING EAVE TO RIDGE: PANELS UPSLOPE OF CURB LOCATION MUST BE A MINIMUM OF 3" LONGER TO PERMIT FIELD CUTTING AND NOTCHING / REMOVAL OF FOAM AT UPSLOPE SPlice LOCATION OF CURB.

ROOF ERECTION SEQUENCE IS LEFT TO RIGHT ON EACH PLANE

ENDLAP SUPPORT ANGLE UNDER CURB AREA ONLY. L2 X 4 X 16GA FIELD CUT TO LENGTH.

FIELD FABRICATE AND FIELD LOCATE ENDLAP. REFERENCE STANDARD ENDLAP

REMOVE PANEL RIB

PURLIN

STEP 1
CURB INSTALLATION - CONTINUED

ROOF CURBS MUST BE INSTALLED AS THE ROOF PANELS ARE INSTALLED

THESE DRAWINGS ARE FOR CONCEPTUAL PURPOSES ONLY. INDIVIDUAL DETAILS MAY VARY. REFERENCE SHOP DRAWINGS AND/OR DESIGN INSTALLATIONS MANUAL.

FIELD REMOVE PANEL RIBS TO ALLOW CURB TO SET FLAT.

PANCAKE HEAD FASTENER 8" O.C. INTO SUB-FRAMING. LENGTH OF FASTENER IS DEPENDANT ON ROOF PANEL THICKNESS.

URETHANE SEALANT

TRIPLE-BEAD TAPE SEALANT (CONTINUOUS)

ENDLAP SUPPORT ANGLE UNDER CURB AREA ONLY.

ROOF CURB SUPPORT CHANNEL FIELD CUT AND NOTCH

STEP 2

HAND CRIMP (9" MIN.) AND TOOL SEAM PRIOR TO PLACING CURB. SEE STEP 3 FOR ADDITIONAL CRIMP REQUIREMENTS
CURB INSTALLATION - CONTINUED

NOTCH CURB BASE A MINIMUM OF 3" @ STANDING SEAM CAP LOCATION.
FASTENER #4 1/4-14 X 1/2" LL SD W/WASHER AT 3" O.C.

APPLY URETHANE SEALANT ALONG THE INTERIOR SEAM, HAND CRIMP SEAM OVER ANOTHER 90° FOR 6" AT EACH CAP CELL LOCATION.

FINISHED SEAM PROFILE

TRIPLE BEAD TAPE SEALANT CONTINUOUS
URETHANE SEALANT CONTINUOUS
PURLIN
ROOF CURB SUPPORT CHANNEL FIELD CUT AND NOTCH
TRIPLE BEAD TAPE SEALANT CONTINUOUS
PURLIN

CFR ROOF PANEL (LOWER)

STEP 3
CURB INSTALLATION - CONTINUED

FIELD CUT TO LENGTH AND REMOVE FOAM TO LAP CURB BASE

FIELD CUT TO LENGTH AND REMOVE FOAM TO LAP CURB BASE

FASTENER #43L
1/4-14 X 1 1/4" SD LL DP2
W/ 1 1/8" O.D. WASHER AT HIGH MEGAS

ENDLAP BUTYL TAPE SEALANT AT PANEL RIB SIDE LAP

TRIPLE BEAD TAPE SEALANT

FILL CAP CELL W/ URETHANE SEALANT AND FASTEN USING
(4) 1/4-14 X 1 1/8" LL SD W/WASHER PER SIDE

FILL ALL VOIDS W/ URETHANE SEALANT

PURIN

PURIN

STEP 4
CURB INSTALLATION - CONTINUED

STEP 5

PURLIN

CFR ROOF PANEL (LOWER)
ROOF PENETRATION - PIPE BOOT INSTALLATION

- Lap sealant or high grade sealant
- Continuous bead of lap sealant (see install guide)
- Field fabricated metal hood by others (req’d)
- Pre-molded pipe flashing
- Stainless steel clamping ring (see install guide)
- .090 platinum EPDM membrane
- Membrane sealant
- 12" form flash
- Continuous bead of lap sealant (see install guide)
- Bonding adhesive

Insulated metal panel
ROOF PENETRATION - PIPE BOOT INSTALLATION

NOTE:

FOR ROOF PITCHES GREATER THAN 4:12 CONSIDER USING NEXT LARGER SIZE BOOT. (DO NOT INSTALL OVER PANEL RIBS)

STEPS FOR INSTALLING PIPE BOOT FLASHING:

1. CUT PIPE BOOT TO PIPE DIAMETER MARKED ON THE CONE (INCHES AND MILLIMETERS). ALLOW 1/2" [13] STRAIGHT COLLAR AGAINST THE PIPE FOR MAXIMUM SEALING.
2. CLEAN AREA FLASHING IS TO BE INSTALLED AGAINST THE PANEL THOROUGHLY.
3. SLIDE BOOT OVER PIPE TO BE FLASHED.
5. PRESS FLASHING TO CONTOURS OF ROOF PANEL. A BLUNT TOOL MAY BE USED TO PRESS BOOT INTO PLACE IN SHARPLY ANGLED AREAS.
6. FASTEN FLASHING AS DESCRIBED IN DETAIL. WHILE FASTENING INSPECT BASE FOR GAPS BETWEEN THE PIPE BOOT BASE AND ROOF PANEL. TOOL EXCESS POLYURETHANE SEALANT INTO THE EDGE OF THE BOOT BASE.
7. USE 3/16" DIA. BULB-TITE RIVETS OVER NAILBASE INSULATION
Typical Rake and Ridge Closures Installation

This section describes the installation of the rake and ridge closures for a typical roof with standard rake, ridge or high eave conditions.

Ridge conditions shown, high eave conditions are similar.
**Rake Closure Sealant Application**

1. Determine the rake closure location on the starting and finish panels. The rake closure must set fully on a high or low mesa rib and must be positioned so the rake closure attachment screws will properly engage the rake structural. Note: The specific rake closure location may be shown on the job's installation drawings.

2. Mark the location for the rake closures face with a chalk line stretched from the eave end to the ridge end of the starting and finish panels.

3. Apply flashing sealant continuously from the eave end to the ridge end of the panel. Align the edge of the sealants paper backing with the chalk mark on the panel.

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**Caution**

The sealant must be its full thickness. Do not use flattened, pinched or stretched sealant.
Rake Closure Installation

1. To provide watershed laps at the rake closure splices, install the rake closures from the ridge to the eave. Start and finish the closures flush with the ridge and eave ends of the panel. Field cut the last closure to the required length.

2. Set the rake closure on the flashing sealant with the closure's face flush with sealant's edge.

3. Secure the rake closure with thru-panel fasteners located at the splices and at 12" o.c. Check that the fasteners penetrate through the center of the sealant and engage the rake structural.

4. Tighten fasteners as necessary to assure uniform and complete contact of sealant to the panel and rake closure surfaces.

5. See following Rake closure Splice Assembly detail.
**Rake Closure Splice Assembly**

1. Apply the splice pigtail on the end of the upslope rake closure. Use a 4” and a 2” long strip of seam sealant for the pigtails.
2. Position the edge of the pigtail 1/8” beyond the rake closure’s end. Marry the bottom of the pigtail with the flashing sealant on the panel.
3. Compress the splice with seam clamps. In cold weather, close the clamp slowly to allow the sealant to flow and to avoid distortion of the closure.
4. Install a thru-panel fastener and a lap fastener through the splice. Install the lap fastener so its head and sealing washer are on the weather side of the rake closure.
**Preparation For Ridge Closure**

*ridge shown, high eave similar*

1. Use the manual seaming tool (as shown above) to close the ridge end of the panel seams.

2. Check that the roof panel ends are at 1"±1/2" from the centerline of the ridge (or at the dimension specified on the project's installation drawings). If the panel ends are not within this tolerance, a special width ridge flashing may be required.

3. Check that the panel ends are aligned within 1/4" of each other. If the panels ends are not within this tolerance, alignment marks must be laid—out on the panels (as shown above) to guide the placement of the ridge closure sealant.

4. If alignment marks are required, use a chalk line to establish a uniform line of marks on the panel at 4" from the centerline of the ridge (or at the dimension specified on the project’s installation drawings).
Ridge Closure Sealant Application

ridge shown, high eave typical

1. If the roof panel ends are within the specified tolerance (see previous page), use the endlap assembly gauge to guide the sealant placement. If the panel ends are not within tolerance, use the alignment marks to guide the placement of the sealant.

2. Apply endlap sealant continuous across the roof panels, and wrap the sealant completely around the panel ribs. Install the pigtail sealant to cover any exposed area of the panel’s factory notch.

3. At this time, check that all the panel’s backer plates are in position. See Standard Roof Panel Description detail.
Ridge Closure Installation

1. Tilt the ridge closure so its stepped end will slide under the roof panel's seam. Spring the panel rib outward to ease the installation of the closure. Check that the sealant is not displaced during the closure installation.
2. Align the face of the closure with the alignment marks. Check that the closure sits fully on the sealant. Use clamps to pull down and hold the closure during fastening.
3. Install the fasteners through each hole in the bottom flange of the closure. Check that the fasteners penetrate through the sealant and into the roof panel's backer plates. Tighten the fasteners as necessary to assure uniform and complete contact of the sealant to the closure and panel surfaces.
4. Fasten the closure to the seam with a blind rivet.
5. At the rakes, field cut and tab the end of the ridge closure to fit with the rake closure. Fasten the tab to the rake closure with blind rivets.

Note: Check for gaps between the closure and the panel ribs and seam. Seal these gaps with flashing caulk applied at back side of closure.
Typical Trim and Flashing Installation

This section describes the installation of the ridge flashing, rake trim, eave trim and eave gutter.

Installation of high side eave trim is similar.

See Transition Flashing Installation section for rake transition and high eave transition flashing installation.

For clarity of details, filler insulation is not shown. Refer to the job's installation drawings for filler insulation requirements.
**Ridge Flashing Installation**

1. Apply flashing sealant along the top of ridge closures. At the rakes, apply the pigtail sealant on top of the rake closure.

2. Center the ridge flashing over the ridge closures. Use a string line to assure a straight ridge run.

3. Set the ridge flashing in position and clamp to the ridge closures. Check that the flashing is set at a pitch 1/2:12 greater than the roof pitch. This will assure that the flashing will not sag during cold weather contraction.

4. Fasten the ridge flashing edges to the ridge closures with flashing fasteners at 12" O.C. Check that the fasteners penetrate the sealant.

5. At splices, lap the ridge flashings 2". Apply flashing sealant and pigtails to seal the splice and fasten with flashing fasteners at 2" O.C. Check that the splice is secured at its proper pitch to prevent sagging of the finished splice.
Rake Flashing Installation

1. To assure water shed of the rake trim splices, install the rake trim from the eave to the ridge.

2. Apply flashing sealant continuously along top of rake closure.

3. Align the ends of the rake trim flush with the eave and rake ends of the rake closure. Plumb and level the rake trim. Use string lines to assure a straight rake trim run.

4. Fasten the rake trim to the rake closure with flashing fasteners at 12” O.C. Check that the fasteners penetrate the sealant.

5. At the rake trim splices, lap the rake trims 2”. Seal and fasten the splice with flashing caulk and blind rivets.
1. If gutter is to be used, notch eave trim’s lip to clear gutter end cap.
2. Apply flashing sealant continuously along top of eave trim. Align edge of sealant’s paper backing with outer edge of eave trim.
3. Align end of eave trim with outer face of wall. Plumb the eave trim and temporarily clamp to roof panel.
4. Fasten the eave trim to the wall panels with flashing fasteners. Install the fasteners at 3” on center. Attach the eave trim to the roof.
5. At eave trim splices, lap the trim 2”. Seal with flashing caulk and fasten with blind rivets.
Eave Gutter Installation

1. Lift the gutter into position under the eave trim and fasten the gutter and eave trim to the roof panel with LapTek fastener at each high mesa.
2. Plumb the outer face of the gutter perpendicular to the roof pitch. Use a string line to assure a straight gutter run.
3. Install the gutter straps at each panel rib. Fasten the strap to the panel rib and the gutter’s outer lip.
Gutter End and Splice Assemblies

1. At the rakes, align the face of the gutter end cap flush with the face of the rake closure. Seal and fasten the end stops to the gutter.

2. Field cut rake closure drop-off to be used as the bird stops. Seal and fasten the bird stop to the top of the gutter end cap and to the rake closure.

3. At gutter splices, lap the gutters 2". Field notch the overlapping gutter's hem to clear the lap.

4. Seal and fasten the gutter assemblies with flashing sealant and blind rivets.
Corner and Peak Cap Assemblies

1. For roofs without eave gutter, field modify and install the end cap to fit inside the eave end of the rake trim.
2. For roofs with eave gutter, install the corner cap inside the eave end of the rake trim and over the end of the gutter.
3. For roofs with a ridge condition, install the peak cap over the ridge ends of the rake trim.
4. Seal and fasten assemblies with flashing caulk and blind rivets.
Typical Transition Flashing Installation

This section describes the installation of the high side transition flashing and rake transition flashing.

For clarity of details, filler insulation is not shown. Refer to the job's installation drawings for filler insulation requirements.
High Side Transition Flashing Installation

1. Apply flashing sealant along the top of the ridge closures. At the rakes, apply the pigtail sealant on top of the rake closure.

2. Set the transition flashing in position and clamp to the ridge closures. Check that the flashing is set at a pitch 1/2:12 greater than the roof pitch. Temporarily fasten the top edge of the flashing to the wall.

3. Fasten the flashing to the ridge closures with flashing fasteners at 12" O.C. Check that the fasteners penetrate the sealant.

4. At splices, lap the ridge flashings 2". Apply flashing sealant and pigtails to seal the splice and fasten with flashing fasteners at 2" O.C. Check that the splice is secured at its proper pitch to prevent sagging of the finished splice.

Important
Install transition flashing with a pitch 1/2:12 greater than the roof pitch.
Rake Transition Flashing Installation

1. Apply flashing sealant along the top of the ridge closure. At the ridge or high side condition, continue the sealant over the end of the ridge or high side flashing.

2. Set the rake flashing in position and clamp to the ridge closure. Check that the flashing is set at a 1/2:12 pitch. Temporarily fasten the top edge of the flashing to the wall.

3. Fasten the ridge flashing to the ridge closures. Check that the fasteners penetrate the sealant.

4. At splices, lap the ridge flashings 2". Apply flashing sealant and pigtail to seal the splice and fasten with flashing fasteners at 2" O.C. Check that the splice is secured at it’s proper pitch to prevent sagging of the finished splice.
Reglet Installation

1. Use chalk line to lay out reglet groove along the wall at 1/2" above the transition flashing.
2. Field cut a continuous 1/8" wide x 1" deep groove into the walls outer face. Cut groove to angle upward at 30° from horizontal.
3. Fill the groove completely with flashing caulk.
4. Apply flashing sealant along the top edge of the transition flashing.
5. Insert the reglet's top edge into the groove.
6. Fasten the reglet to the wall with flashing fasteners.
7. Apply a bead of flashing caulk along the top of the reglet to wall junction. Tool and feather this bead to form a watershed.

Note: Details shown are for a metal faced foam core wall. For other wall types refer to the job's installation drawings.