Disclaimer
This guide is intended to be used in conjunction with the project’s installation drawings. The installation drawings should identify the applicable roof conditions, specify the components and the required arrangement of the components. Specific building design and construction conditions may require variations from the information in this guide.

Metl-Span does not guarantee and is not liable for the quality of installation. Metl-Span is not responsible for defects that may be attributed to improper installation, the negligence of other parties, or for materials not provided by Metl-Span.

All safety procedures including but not limited to fall protection and material handling are the exclusive responsibility of the installing contractor.

Unless specified in writing, Metl-Span makes no expressed or implied warranties pertaining to the fitness of the panels or components for any particular purpose, 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.

Metl-Span does not warrant any product or material as meeting the ordinances, laws or regulations of any particular state or local municipality, and Metl-Span is not responsible for conformance by the owner or contractor to such ordinances, laws or regulations.
1. INTRODUCTION

Welcome to Metl-Span, the dynamic industry innovator dedicated to manufacturing and marketing the highest quality insulated building panel products. Since our origination in 1968, we have been pioneers in research, design, production and sales of state-of-the-art insulated metal panels and building materials serving the commercial, industrial and cold storage industries.

Our mission is clearly defined: Deliver the highest quality energy-efficient solutions to insulate and protect our world.

This installation guide is designed to provide step by step instructions for the CFR standing seam insulated metal roof panel.

For more information regarding proper panel installation, please contact Metl-Span Technical Services:

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Lewisville, Texas 75057
TEL: (972) 221-6656
Fax: (972) 436-7028
E-mail: info@metlspan.com
Website: www.metlspan.com
1. INTRODUCTION

Installation Drawings

Installation drawings (also known as shop drawings) are usually prepared by the installation contractor, Metl-Span or some other party depending on preferences or contractual requirements.

Installation drawings must be “approved” by the customer or customer's representative before they are to be used for construction. It is critical that the approved installation drawings are in agreement with the final architectural and structural drawings as well as all addenda. It is the responsibility of Metl-Span’s customer to review the architect’s comments and sign off on the approved installation drawings.

Approved installation drawings (labeled “for construction” or “for production”) must be available at the job site during the preparation, installation and inspection of the roof support framing, roof panels, flashings and other related construction.

The installation drawings must be reviewed for differences with field conditions, and discrepancies should be resolved before proceeding with panel installation.

- In case of conflict between this guide and “for construction/for production” installation drawings, the drawings govern.

CFR Unique Features

Our roof system is provided with extensive factory preparation and installation aids, making it the most installer friendly insulated metal panel standing seam on the market.

- factory cut-back panel ends for eaves and endlaps
- factory notched and swaged panel ends for endlaps
- integral panel backer plates for endlaps, ridge and high eave assemblies
- fastener template for endlaps
- factory clamps for panel sidejoints and endlap assembly
- die formed metal ridge closures for ridge and high eaves
- profiled sealant tapes for panels and flashing
- optional factory installed interior joint sealant
1. INTRODUCTION

Safety

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 wall 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.

All safety procedures are the responsibility of the panel installation contractor. If the installer determines that they cannot safely install the panels in accordance with the installation drawings or this guide, it is their responsibility to determine appropriate alternative procedures.

Owner’s Responsibilities

“Owner” as used throughout this guide refers to the project’s owner and/or his representatives, such as the project’s architect, design engineer and general contractor. These parties are responsible for determining the following:

• Selection of a competent installer who is qualified and experienced in the proper installation of insulated metal panels and related construction.

• Installer has reviewed and understands the project’s installation drawings and this guide prior to installation.

• Panels and related components are installed in accordance with the project’s installation drawings and the applicable portions of this guide.

• Panels are suitable for the purpose intended.

• Project’s structural framing is properly designed and in satisfactory condition to accept the installation and design loads imposed by the panels.

• Location of interior and/or exterior panel joint and perimeter seals are properly specified for the project’s moisture and vapor control requirements.

• Panels and related components are installed in compliance with the applicable codes, regulations, service conditions and good engineering and construction practices.
2. CFR PANEL PROFILES

CFR

2", 2 1/2", 3", 4", 5", 6"

30", 36", 42"

2"
3. FRAMING ALIGNMENT

3.1 Framing alignment should be checked before panels are installed.

3.2 Compare structural and panel installation drawings to ensure roof supports are in correct location. Field measure support spacing and overall building dimensions.

**WARNING:** RESOLVE ALL DIMENSIONAL DIFFERENCES BETWEEN BUILDING AND DRAWINGS BEFORE PANEL INSTALLATION BEGINS!

3.3 All supports not in alignment must be corrected by the responsible party before panel installation begins.

3.4 Standard framing tolerances are as follows:
- Roof plane flatness: ± 1/8" in 5', ± 1/4" in 20' and ± 1/2" over the entire roof area
- Length: ± 2" rake to rake
- Width: ± 1" eave to ridge/high eave
- Eave, endlap and ridge straightness: ± 1/2"
- Out of square: ≤ 1/4" sawtooth between adjacent panels

**WARNING:** ABOVE TOLERANCES ALLOW FOR PROPER INSTALLATION, BUT EXTREMES MAY RESULT IN OBJECTIONABLE AESTHETICS.

**WARNING:** IMPROPER FRAMING ALIGNMENT CAN CAUSE DIFFICULTY WITH PANEL ENGAGEMENT AND RIPPLING OR BUCKLING OF THE PANEL FACES.
4. RECEIVING

4.1 Proper off-loading equipment must be on site *prior to arrival of panels and accessories*. All bundles and crates are packaged for side unloading by forklift or by crane. Maximum bundle weight is 5,000 lbs.

4.2 Check all materials immediately upon arrival for freight damage. Inspect for strap damage, forklift damage or packaging/bundle wrap damage.

4.3 Verify that the order number, quantities and descriptions of all bundles, crates and pallets on the bill of lading match those on the truck.

4.4 List all visible damages and/or shortages on the bill of lading, obtain the signature of the truck driver and an authorized representative of the Metl-Span customer.

4.5 Keep a copy of the marked-up bill of lading and send it with digital photos of the damage to Metl-Span Customer Relations.

4.6 Concealed damages/shortages must be reported to Metl-Span within 15 days of delivery.
4. RECEIVING

4.7 The panel bundling and accessories report lists the specific contents of each bundle, crate and pallet listed on the bill of lading.

![Panel Bundling Report](image)

<table>
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<tr>
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<th>Weight</th>
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<td>4</td>
<td>Rake Closure/Right</td>
<td>10' Box</td>
<td>NV-4</td>
</tr>
</tbody>
</table>
4. RECEIVING

4.8 Every bundle and trim/accessory crate has a shipping label that contains information on the contents.

![Image](image_url)

*Figure 4.8*
5. MATERIAL HANDLING - Bundles

Forklifts

5.1 Identify and mark off unloading area prior to material delivery.

5.2 Verify adequate material handling equipment with the proper reach and capacity is on site. Bundle weights are listed on the bill of lading, and have a maximum weight of 5,000 lbs.

5.3 Pre-determine the panel storage area prior to material delivery. It must be secure, flat, well-drained and reasonably level.

5.4 Panels are shipped via flatbed trailer, and can be off-loaded from the side of the trailer using forklifts.

5.5 Guidelines for off-loading are as follows:

<table>
<thead>
<tr>
<th>Panel thickness</th>
<th>Bundle length</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-2.5” thick</td>
<td>&lt;36’ = 1 forklift</td>
</tr>
<tr>
<td>3” thick</td>
<td>&lt;40’ = 1 forklift</td>
</tr>
<tr>
<td>4-6” thick</td>
<td>&lt;48’ = 1 forklift</td>
</tr>
</tbody>
</table>

5.6 Tape foam blocks on forks to prevent over-engagement of panel bundles.

**WARNING:** USE PADDING OR BLOCKING ON FORKLIFT MASTS TO PROTECT PANEL EDGES AND PREVENT OVERENGAGEMENT INTO ADJACENT BUNDLES!

*Figure 5.6a*  
*Figure 5.6b*  
*Figure 5.6c*  
*Figure 5.6d*
5. MATERIAL HANDLING - Bundles

Forklifts

5.7 Forklift blades must be level and centered under the weight of the bundle.

![Figure 5.7](image)

**WARNING:** LIFT ONE BUNDLE AT A TIME

5.8 Longer bundles are pre-marked with two lift points at the factory. Each forklift should straddle one lift point (see figure 5.8)

![Figure 5.8](image)

5.9 Inspect travel route to make sure path is reasonably level, compacted and free of ruts. Move bundles into position as required for efficient installation.

5.10 Secure open bundles with straps before moving with forklifts. Spread forks as far as possible and center under the load. Use caution to prevent excessive bending as damage to panels may result. Avoid bumpy terrain.

**WARNING:** USE EXTREME CARE WHEN MOVING OPEN BUNDLES, ESPECIALLY THOSE WITH 2-3 INCH PANELS LONGER THAN 20'.

**WARNING:** WHEN RELOADING BUNDLES, MAKE SURE THE END MARKED "BACK" FACES THE BACK OF THE TRAILER. USE DUCT TAPE TO REPAIR TEARS IN THE BUNDLE WRAP.
5. MATERIAL HANDLING - Bundles

Lifting by crane

5.11 Use wood spreaders (1.5” minimum thickness, width as required for straps) on top and bottom of bundles at all pick points.

![Figure 5.11](image1.png)

5.12 Place foam blocks on sides of bundles at all sling locations as shown in figure 5.12.

5.13 Bundles under 4,000 lbs. and less than 44’ may be lifted as shown in figure 5.12.

![Figure 5.12](image2.png)
5. MATERIAL HANDLING - Bundles

Lifting by crane

5.14 Bundles over 4,000 lbs. and less than 44’ may be lifted as shown in figure 5.14

5.15 Bundles over 4,000 lbs. and/or over 44’ may be lifted as shown in figure 5.15
5. MATERIAL HANDLING - Individual Panels

Manual Lifting

5.16 Lift panels from the bottom skin... NOT from the top skin...

5.17 Rotate panels onto the leading edge (side with clip shelf) before carrying. Use foam blocks (from bundles) to prevent panel edge damage.

WARNING: TO AVOID SCRATCHING, DO NOT SLIDE PANELS OFF BUNDLES – ALWAYS LIFT THEM.

5.18 Carry panels on edge with one worker at each end, plus a worker at 10' maximum intervals.
5. MATERIAL HANDLING - Lifting Panels to Roof

5.19 Individual panels should be lifted to the roof using a vacuum lifter with outriggers (see below). Alternative methods include the use of clamps and slings.

5.20 Panel bundles may be lifted to the roof using a crane with spreader bars as needed (see steps 5.13 - 5.15).

5.21 Panel bundles placed on roof must be secured to roof framing members. Panels in opened bundles must be secured to prevent sliding off the roof.

5.22 Set bundles on roof in the proper orientation for the erection sequence.

**WARNING:** PICKING PANELS FLAT OFF THE BUNDLE SHOULD ONLY BE DONE WITH THE USE OF VACUUM LIFTING EQUIPMENT AND PROPER OUTRIGGERS.

**Vacuum Lifting**

5.23 Panel installation time is typically reduced when using vacuum lifting equipment. Equipment must be designed for panel lengths, weights and profiles to be lifted - verify the requirements of your specific project with your lifting equipment supplier.

**WARNING:** VERIFY THAT BUILDING STRUCTURE WILL SUPPORT WEIGHT OF PANEL BUNDLES PRIOR TO PLACING ON THE ROOF. VERIFY EXACT LOCATION(S) WHERE BUNDLES ARE ALLOWED TO BE PLACED!

REMINDER - CFR PANELS ARE PACKAGED SO THAT EVERY OTHER PANEL IS FLIPPED.
PANELS EXPOSED TO DIRECT SUNLIGHT MAY EXHIBIT THERMAL BOW WHICH CAN PREVENT PROPER ENGAGEMENT. MOVE PANELS TO SHADED AREA OR LEAVE FOAM INTERLEAF IN PLACE UNTIL INSTALLATION.
6. STORAGE AND STAGING

6.1 Panels should be stored in secure location(s), on level ground that is well drained and free from standing water.

6.2 Elevate one end of panel bundles to provide adequate drainage - use graduated blocking under bundle bearing pads as required (figure 6.2).

6.3 Slit bottom wrapping as shown for ventilation (figure 6.3).

![Figure 6.2](image)

6.4 Opened bundles should be covered at the end of the workday with a tarp, and banded with straps to protect the finish and guard against wind.

![Figure 6.3](image)

6.5 Items on bundle report match panel callouts on Metl-Span installation drawings. Use this info to stage panels.

![Figure 6.4](image)

**WARNING:** DO NOT OVERTIGHTEN STRAPS AS DAMAGE TO PANELS MAY OCCUR. USE PROTECTIVE EDGE PADS.

**WARNING:** KEEP PANELS A SAFE DISTANCE FROM OTHER TRADES THAT ARE TORCHING, CUTTING, WELDING OR PAINTING. IF INTERIOR PANEL JOINT IS FACTORY CAulked PROTECT EXPOSED SEALANT ON OPEN BUNDLES.

![Figure 6.5](image)
7. PANEL CUTTING

7.1 Personnel cutting panels should always wear safety glasses, gloves and long sleeve shirts.

7.2 Panel cutting should take place prior to installation when possible.

7.3 Use the following cutting tools to avoid panel damage:

- Circular saw with carbide tipped metal cutting blade
- Insulated metal panel saw
- Band saw with metal cutting blade

7.4 Use care when using reciprocating saws to avoid panel delamination; make sure the blade is sharp and let the saw cut at its own pace - do not force.

7.5 Do NOT use abrasive saws to cut panels.

- Abrasive saws

**WARNING:** USE OF ABRASIVE SAWS/GRINDER BLADES WILL DAMAGE THE PAINT FINISH AND THE METAL FACINGS!

7.6 For small penetrations, cut each panel face with a portable router, then cut the foam with a serrated knife.

7.7 Metal flashings may be cut with power snips, nibblers or hand snips.
7. PANEL CUTTING

7.8 Place the panel on padded sawhorses with the interior side up.
7.9 Wipe mud and debris off panel face to be cut with clean rag.
7.10 Mark cut line with chalk or washable felt tip marker (figure 7.10).
7.11 Masking tape may be applied on both sides of cut line to minimize panel scratching.
7.12 Recheck measurements and cut with appropriate tool per 7.3, 7.4.
7.13 Remove burrs at cut edges with deburring tool.

**WARNING:** TO PREVENT DAMAGE TO THE PAINT FINISH REMOVE ALL METAL SHAVINGS FROM PANEL SURFACES AFTER CUTTING!

**WARNING:** TO AVOID HAND INJURIES WEAR PROTECTIVE GLOVES WHEN HANDLING AND CUTTING PANELS AND TRIMS.
7. PANEL CUTTING

Penetrations

7.14 For panels where 50% or more of width is removed:

- a. mark cut lines on BOTH panel faces
- b. drill 1/4" holes at corner locations
- c. cut the exterior face to a depth of 1/4"
- d. flip panel over and cut interior face to a depth of 1/4"
- e. cut all the way through panel sidejoints at the framed opening area
- f. lift panel into place on roof
- g. cut foam with serrated knife and remove panel section
- h. engage panel and secure with fasteners
- i. de-bur and remove metal shavings

Figure 7.14a

CUT METAL FACINGS ONLY - DO NOT CUT FOAM CORE UNTIL PANEL IS LIFTED INTO PLACE!

Figure 7.14b
8. PANEL SEALANT

**WARNING:** THE TYPICAL AIR/VAPOR BARRIER LOCATION FOR COMMERCIAL/INDUSTRIAL PROJECTS IS THE LINER (INTERIOR) SIDE JOINT. HOWEVER, THE PROJECT ARCHITECT IS RESPONSIBLE FOR DETERMINING THE ACTUAL VAPOR BARRIER LOCATION, WHICH MAY VARY FROM THE DETAILS SHOWN IN THIS GUIDE.

8.1 Joint must be clean and before applying sealant.

8.2 Apply continuous non-curing (non-skinning) butyl sealant to the interior panel joint with a bead size of approximately 1/4” as shown in figure 8.2. Sealant should provide continuous seal between the tongue and groove, but not overflow onto panel faces.

![Figure 8.2](image)

COLD WEATHER = STORE BUTYL IN A WARMING BIN UNTIL READY FOR USE
HOT WEATHER = STORE BUTYL IN THE SHADE AND OUT OF DIRECT SUNLIGHT

8.3 Inspect factory applied butyl sealant (if any) for consistent 1/4" bead size and add sealant as required. Replace contaminated sealant.

REMOVE SEALANT FROM PANEL FACES BY USING WD-40 OR MINERAL SPIRITS APPLIED WITH A CLEAN COTTON RAG.
9. PANEL FASTENERS

**WARNING:** REFER TO PROJECT INSTALLATION (SHOP) DRAWINGS FOR FASTENER TYPES AND REQUIRED FASTENING PATTERNS!

9.1 Self-drilling fasteners contain a built-in drill point, and do not require pre-drilling. They are the quickest and easiest way to attach insulated metal panels to light-medium gauge supports.

![Figure 9.1](image)

9.2 “B” point self-tapping fasteners are used to attach panels to medium-heavy gauge supports that are difficult or not possible to drill with self-drilling type fasteners. They require a two-step operation:

1. pre-drill holes through panels and structure
2. insert fastener and tighten

![Figure 9.2](image)

Suggested fastener driving speeds:

Carbon, Zinc Plated and 410 Stainless Steel: 1,800 rpm
304 Stainless Steel: 1,000 rpm

Suggested fastener driving speeds:

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<th>Type</th>
<th>Threads per inch</th>
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<td>14 gauge (.075)</td>
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<td>12 gauge (.105)</td>
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<td>14</td>
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Pilot Hole Sizes for ¼” diameter B point fasteners:

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10. CLEANING

10.1 Metal shavings from cutting and drilling should be removed as panels are erected using a soft bristle brush or clean cotton rag.

10.2 For general cleaning, use a low pressure power wash with plain water. If necessary, use carwash soap or a 5% solution of mild laundry detergent (such as Tide). Use a clean cotton rag, sponge or soft bristle brush as required. Rinse thoroughly.

10.3 Sealants, grease, tar and wax can be removed from panels and trim by using WD-40. Apply to a clean cotton rag, and avoid smearing over a large area. Follow up with general cleaning instructions per 10.2.

10.4 For rust stains, remove the source (typically metal filings), then clean the affected area using one of the following methods: soap and water, Soft Scrub® or Rid O'Rust®.

10.5 Concrete/mortar splatter must be washed off immediately with a high pressure wash and mild detergent.

11. TOUCH-UP

11.1 Contact Metl-Span Customer Relations for color matched touch-up paint with applicator brush.

11.2 Touch-up paint is for minor scratches only. For deep scratches or larger areas of repair, contact Customer Relations for detailed instructions.

11.3 Clean affected area with a clean cloth, dampened with isopropyl alcohol.

11.4 Air and panel temperatures must be above 50°F before attempting repairs.

11.5 Apply touch-up in the scratch using an artist brush.

11.6 Allow 30-45 minutes for tack free and 24 hours for complete drying.

11.7 For more information regarding touch-up refer to the Owner’s Maintenance Manual (available online at metalspan.com).
12. ROOF SAFETY REMINDERS

Before beginning panel installation, please note the following reminders:

12.1 Follow all federal, state and local laws regarding the proper use of safety equipment.

12.2 Hooks, wire cables and hardware used as tie-offs should be covered so that they do not scratch panel and trim surfaces.

12.3 Use an approved and safe walking platform in high traffic areas to prevent damage to roof panels.

12.4 Do not use panels as working platforms. Unsecured panels can slide or collapse under the weight of workers and equipment. Do not stand on the end of unsupported cantilevered panels, as this may result in panel collapse.

12.5 Avoid point loads (concentrated loads in small areas). Heavy equipment, ladders, platform feet etc. may cause panel damage that could result in collapse.

12.6 Rain, snow, ice or sand can create unsafe footing on roof panels. Exercise caution and use nonslip footwear and/or working platforms.

12.7 Do not install panels in high winds or other unsafe working conditions.

12.8 Secure all loose panels with banding or tie-downs to prevent blowing off the roof. Use roof clamps as necessary to hold panels in place until fastening is complete.

12.9 Use extreme caution on high pitched roofs - use adequate safety measures to prevent materials, equipment and workers from sliding off.

12.10 Avoid panel and lifting equipment contact with electrical power lines, equipment and services.

12.11 Verify that the roof structure is complete and properly aligned, with all connections and bracing in place and secured.
13. PANEL INSTALLATION - INTERIOR RIDGE TRIM

13.1 Apply bead of butyl sealant on top of rake structural support. Attach interior ridge trim to ridge purlins using 1/8" painted stainless steel pop rivets as necessary. Align the end of the trim flush with the outer edge of the rake structure.

13.2 Trim hems 2", apply two rows of urethane sealant, lap and fasten 3" on center with 1/8" painted stainless steel pop rivets.
13. PANEL INSTALLATION - PANEL LAYOUT

13.3 Determine the desired width of the first (starter) panel using figure 13.3 below. The first and last panel should be of equal width.

NOTE: FIRST PANEL DIMENSION MAY BE SHOWN ON THE INSTALLATION DRAWINGS.

13.4 Measure the starting dimension from the outer face of the rake angle and mark the dimension on the eave strut and the interior ridge trim. Snap a chalk line between these marks.
13. PANEL INSTALLATION - PERIMETER, ENGLAP SEALS

13.5 Apply a 3/8" continuous bead of butyl sealant along the rake and eave structural supports and interior ridge trim.

**WARNING:** TO ENSURE PROPER PERIMETER SEAL AND PREVENT SEALANT CONTAMINATION, APPLY BUTYL IMMEDIATELY BEFORE INSTALLING PANELS.

13.6 Seal structural gaps using sheet metal or strips of adhesive membrane (not by Metl-Span) and butyl sealant.

*Figure 13.5*

*Figure 13.6a*

*Figure 13.6b*
13. PANEL INSTALLATION - PERIMETER, ENDLAP SEALS

13.7 Install 2.5" tape to seal gap between support members over topside of purlin/support angle at panel endlap locations. Add two rolls of butyl sealant on top of tape.

**Figure 13.7a**

**Figure 13.7b**

PERIMETER AND ENDLAP BUTYL BEADS ARE CRITICAL IN CREATING THE PROPER ROOF AIR/VAPOR BARRIER.
13. PANEL INSTALLATION - ATTACHMENT

**WARNING:** PROPER PANEL INSTALLATION SEQUENCE IS REQUIRED IN ORDER FOR PANELS TO LAP CORRECTLY. FAILURE TO FOLLOW THESE RECOMMENDATIONS WILL VOID METL-SPAN'S CFR ROOF WARRANTY.

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13. PANEL INSTALLATION - ATTACHMENT

13.8 Field cut the starter panel P1 to the required width. Apply butyl sealant to interior joint as required by installation drawings (see figure 8.2).

13.9 Position the leading edge of panel P1 along the previously laid chalk line (step 13.3).

13.10 Align panel P1 so that the top skin overhangs 2" beyond the outer face of the wall panels at the eaves, and 1" inboard of the outer face of the wall panels at the rakes.

13.11 Top edge of panel P1 should be centered on endlap support location.

13.12 Use "C" clamps to temporarily hold the cut edge of the panel to the rake angle.

13.13 Attach panel P1 to purlins within 1" of outside edge of wall using using 1/4" hex head fasteners with sealing washers.
13. PANEL INSTALLATION - ATTACHMENT

13.14 Apply clip butyl tape to underside of panel clips and extend beyond clips as shown.

13.15 Remove paper backing from butyl tape and position clip over male leg of panel. Align clip over top purlin flange to allow use of three fasteners.

13.16 Hold clip tight against panel’s edge and push clip base into foam core. Fasten with 1/4" hex washer head through fasteners. Additional fastener may be required based on fastener type and support gauge.

**WARNING:** DO NOT INSTALL CLIPS AT ENDLAP LOCATIONS AT THIS TIME!

13.17 Crimp clip tab around male leg of panel with the manual seaming tool.
13. PANEL INSTALLATION - ATTACHMENT

13.18 Cut upper course of panel P2 to match width of starter panel P1.

13.19 Apply 2.5" wide endlap tape on P1. Position so that lower edge of tape aligns with lower edge of notch. Run tape up and over vertical male leg.
13. PANEL INSTALLATION - ATTACHMENT

13.20 Verify endlap backup plates are present at **upslope** end of panel P1 (factory pre-installed). **Install** missing plates (if any).

**WARNING:** CHECK UPSLOPE END OF ALL LOWER COURSE PANELS FOR ENDLAP BACKUP PLATES!

13.21 Place panel P2 into position. Align leading edge using seam clamp. Attach cut edge of panel P2 to purlins using 1/4" hex washer head through fasteners with sealing washers.

**WARNING:** INSPECT GAP BETWEEN THE FOAM CORE OF P1 AND P2 TO ENSURE A TIGHT FIT.
13. PANEL INSTALLATION - ATTACHMENT

13.22 Set endlap assembly gauge on the end of panel P2. Place gauge with short lip down against the edge of panel P2. Mark the panel through each hole using a washable felt tip marker.

13.23 Stand on panel P2 to firmly seat endlap and install 1/4"-14 Type 2 fasteners with 1-1/8" sealing washers through marks at every high mesa into endlap backup plates.
13. PANEL INSTALLATION - ATTACHMENT

13.24 Install two clips at endlap. Position so that each clip is secured with two 1/4" hex washer head through fasteners. Crimp both clips with manual seaming tool.

**WARNING:** CRIMP BOTH CLIPS WITH MANUAL SEAMING TOOL BEFORE INSTALLING NEXT COURSE OF PANELS!
13. PANEL INSTALLATION - ATTACHMENT

13.25 Apply continuous butyl tape to sidelap seam.

13.26 Apply butyl tape pigtail to vertical leg of panel P1 at eave, marry to seam sealant.

WARNING: TO KEEP TAPE CLEAN, LEAVE PROTECTIVE PAPER ON UNTIL READY TO INSTALL NEXT PANEL.

13.27 Apply butyl sealant marriage beads at eaves, endlaps and ridge conditions.
13. PANEL INSTALLATION - ATTACHMENT

13.28 Verify paper backing is removed from all butyl tapes.

13.29 Position panel P3 as shown, hook female lap over male leg of panel P1 and rotate into position.

13.30 Use rib clamps to pull panel sidelaps together.

Figure 13.29a

Figure 13.29b

Figure 13.30
13. PANEL INSTALLATION - ATTACHMENT

13.31 Install clips on panel P3 (except at endlaps). Crimp clips with manual seaming tool.

13.32 Apply butyl tape at endlap of panel P3 as shown. Align with panel notch.
13. PANEL INSTALLATION - ATTACHMENT

13.33 Position panel P4 as shown, hook female lap over male leg of panel P2 and rotate into position.

13.34 Use rib clamps to pull panel sidelaps together.

13.35 Set endlap assembly gauge on the end of panel P4, with short lip down. Mark panel P4 through each hole using a washable felt tip marker.

13.36 Stand on panel P2 to firmly seat endlap and install 1/4"-14 x 1-1/8" Type 2 fasteners with sealing washers through marks at every high mesa into endlap backup plates.
13. PANEL INSTALLATION - ATTACHMENT


13.38 Install two clips at endlap. Position so that each clip is secured with two 1/4" hex washer head through fasteners.

**WARNING:** CRIMP BOTH CLIPS WITH MANUAL SEAMING TOOL BEFORE INSTALLING NEXT COURSE OF PANELS!
13. PANEL INSTALLATION - ATTACHMENT

13.39 Apply continuous butyl tape to sidelap seam.

13.40 Apply butyl tape pigtail to vertical leg of panel P1 at eave, marry to seam sealant.

**WARNING:** TO KEEP TAPE CLEAN, LEAVE PROTECTIVE PAPER ON UNTIL READY TO INSTALL NEXT PANEL.

13.41 Apply butyl sealant marriage beads at eaves, endlaps and ridge conditions.
13. PANEL INSTALLATION - ATTACHMENT

13.42 Check panel module every three panels - verify tape measure is parallel to panel ends. To maintain module (30", 36" or 42"), adjust rib clamp pressure as required.

**WARNING:** DO NOT ATTEMPT MORE THAN + 1/8" OR - 1/16" MODULE CORRECTION PER PANEL.

13.43 Repeat steps 13.29 through 13.42 until all roof panels are installed.

13.44 Attach cut side of last panel to purlins within 1" of edge using 1/4" hex head through fasteners with sealing washers.
13. PANEL INSTALLATION - SEAMING

13.45 Use manual seamer to crimp seams for 12"-18" at ridge, eaves and endlaps.

13.46 Use electric seamer on remaining roof areas.

**WARNING:** REFER TO INSTRUCTIONS PROVIDED WITH SEAMER FOR OPERATING, MAINTENANCE AND SAFETY INFORMATION!
14. PERIMETER FLASHING INSTALLATION - RAKES

14.1 Determine rake closure location on starting and finish panels:
   a. closure must set on high or low mesa, but not both.
   b. align so that attachment screws will engage rake structural support.

14.2 Mark rake closure location with chalk line strung from ridge to eave.
14.3 Apply butyl tape sealant along chalk line.
14.4 Install top rake closure on top of tape and secure with 1/4” hex washer head through fasteners at 12” on center.

14.5 Apply butyl tape at downslope end of rake closure as shown in figure 14.5.
14.6 Place downslope closure over splice and align using seam clamp. Install 1/4” hex washer head through fasteners at 12” on center.

14.7 Remove seam clamp and:
   a. install 1/4” hex washer head through fastener at bottom flange of splice.
   b. install 1/4”-14 x 7/8” hex washer head Type 1 lap screw through splice with tip pointing outwards.
14. PERIMETER FLASHING INSTALLATION - RIDGE

14.8 If panel ends are within ± 1/4" of a straight line, use assembly gauge to guide application of butyl tape sealant. If not, then measure 4" (or as indicated on installation drawings) from center of ridge and mark panels with chalk line. Apply tape uphill of marked line, and up and around seams.

![Figure 14.8a](image1)

14.9 Field cut and tab left end of first ridge closure to fit up with rake closure. Right side of ridge closures should tuck underneath panel ribs.

14.10 Secure bottom uphill flange of closure through panel facing into back-up plates under high mesas with 1/4"-14 x 1-1/2" hex washer head Type 2 fasteners. Secure tabs on left side of closures to high ribs with 1/8" painted pop rivets. **Placement of tape sealant over ridge closure not shown.**

![Figure 14.8b](image2)

![Figure 14.8c](image3)

![Figure 14.10](image4)
14. PERIMETER FLASHING INSTALLATION - RIDGE

14.11 Fill void at ridge using expandable foam (not by panel manufacturer).

14.12 Attach exterior ridge trim using 1/4"-14 x 7/8" hex washer head Type 1 fasteners (with neoprene washers) at 6" on center.

**WARNING:** IF USING COMPRESSIBLE INSULATION IN LIEU OF EXPANDABLE FOAM, FILL ENTIRE RIDGE CAVITY UP TO BOTTOM OF EXTERIOR RIDGE TRIM.
14. PERIMETER FLASHING INSTALLATION - EAVE (NO GUTTERS)

14.13 Install expandable foam insulation at intersection of wall and roof panels.

14.14 Apply continuous butyl tape along top and bottom of eave trim.

14.15 Attach eave trim to bottom side of roof panels using 1/4"-14 x 7/8" hex washer head Type 1 fasteners (with neoprene washers) at each high rib.

14.16 Attach bottom of eave trim to wall with same type fastener at 8" on center.
14. PERIMETER FLASHING INSTALLATION - GUTTERS

14.17 Attach bottom of eave trim to wall with 1/4"-14 x 7/8" hex washer head Type 1 fasteners (with neoprene washers) at 8" on center.

14.18 Attach top leg of eave trim and back leg of gutter to panel overhang using same type fasteners through every high mesa. Attach gutter straps at each high rib - two fasteners into top of ribs and one into outside leg of gutter.

14.19 Attach gutter straps at each high rib using 1/4"-14 x 1-1/2" hex washer head Type 1 (with neoprene washers). Fasten through the vertical leg of the seam. Attach hangar to interior gutter supports with three 1/4"-14 x 7/8" hex washer head Type 1 fasteners.

GUTTER HANGAR @ EVERY PANEL SEAM

1/4-14 x 1-1/2" HWH TYPE 2, W/WASHER @ EACH SIDE LAP

GUTTER HANGAR

LL 1/4-14 x 7/8" HWH TYPE 1, SELF DRILLING LAP SCREWS W/BN WASHERS

42" CFR PANELS REQUIRE INTERMEDIATE GUTTER SUPPORTS WHEN USING NORTHERN GUTTER.

EAVE TRIM WITH NORTHERN GUTTER DOES NOT HAVE DRIP EDGE AT TOP.
14. PERIMETER FLASHING INSTALLATION - EAVES

14.20 Lap gutter sections by 2", use two rows of urethane sealant and fasten with 1/8" painted stainless steel pop rivets.

14.21 Install gutter endcaps using urethane sealant and 1/8" painted stainless steel pop rivets.
14. PERIMETER FLASHING INSTALLATION - RAKE, CORNERS, PEAK

14.22 Attach bottom edge of rake trim to wall panels and top edge to rake closures using 1/4"-14 x 7/8" hex washer head Type 1 fasteners (with neoprene washers) at 8" on center. Begin at eave and work upwards towards ridge. Laps should be "shingled" 2", using butyl tape sealant and 1/8" painted stainless steel pop rivets.

14.23 Install end cap in rake trim using 1/8" painted stainless steel pop rivets.

14.24 For roofs with gutters, install corner boxes using urethane sealant and 1/8" painted stainless steel pop rivets.

14.25 Attach peak box to rake and ridge flashing. Use butyl sealant tape and 1/8" painted stainless steel pop rivets as required. (It may be necessary to field build peak box from section of rake trim - refer to project installation drawings).

Refer to project installation drawings for more details on corner trims. Some projects may require field fabrication of corner and end caps.

Check installation drawings - some projects may require field fabrication of peak box.
15. GENERAL DETAILS

**WARNING:** THIS CHAPTER CONTAINS GENERAL DETAILS ONLY - REFER TO PROJECT INSTALLATION (SHOP) DRAWINGS FOR PROJECT SPECIFIC DETAILS!

**PANEL JOINT**

This chapter contains general details only. Refer to project installation (shop) drawings for project specific details!

**PANEL CLIP BASE**

**BUTYL SEALANT**

**PURLIN** (NOT BY METL-SPAN)

**1/4” HWH FASTENERS**

**DIRECTION OF INSTALLATION**

**ENLARGED PANEL JOINT FOR CLARITY**

**CONTINUOUS BUTYL TAPE SEALANT**

**CONTINUOUS BUTYL TAPE SEALANT**

**OVER PANEL AND UNDER CLIP**

**EXTEND PAST EACH SIDE OF CLIP**

**CI-CFR-JT-01 PANEL JOINT**
15. GENERAL DETAILS

1. SET PANEL IN PLACE
2. INSTALL CFR CLIP W/ BUTYL TAPE SEALANT
3. SECURE TO PURLINS W/ 1/4" HEX HEAD FASTENERS
4. HAND "CRIMP" THE STANDING RIB/CLIP ASSEMBLY AT EACH CLIP LOCATION
5. INSTALL CONTINUOUS BUTYL TAPE SEALANT ON TOP OF MALE STANDING SEAM
6. TILT NEXT PANEL TO BE INSTALLED AT 45 DEGREE ANGLE. ROTATE INTO POSITION.
7. USE CLAMPS TO ENSURE PROPER PANEL ENGAGEMENT
8. HAND CRIMP AT RIDGE, ENDLAP AND EAVES
9. INSTALL RIDGE, RAKE AND EAVE COMPONENTS, THEN MECHANICALLY SEAM ROOF
15. GENERAL DETAILS

1. Add wall panel thickness (both ends) plus out to out dimensions of rake structural supports.

2. Divide result by panel module (30", 36" or 42") to determine number of panels required.

3. Divide fractional panel remainder (if any) by 2 to determine starting panel width. If result is less than 12", then cut starter panel to remove interior joint only – last panel will need to accommodate the remainder (layout will be assymetrical).
15. GENERAL DETAILS

CI-CFR-AT-01
INTERMEDIATE ATTACHMENT

FASTENER NOTE:
The number of fasteners per clip are based on the following criteria:
- Self drilling, self-tapping screws
  - 3 /clip if purlin is less than 12 gauge.
  - 2 /clip if purlin is greater or equal to 12 ga.
- Type B self-tapping screws - 2 /clip

CI-CFR-EL-01
ENDLAP ATTACHMENT

FACTORY INSTALLED BACK-UP PLATE @ EACH HIGH MESA, 4" O.C.
CONTINUOUS BUTYL TAPE SEALANT
WITH MARRIAGE BEAD TO PANEL JOINT SEALANT
FACTORY INSTALLED BACK-UP PLATE @ EACH HIGH MESA, 4" O.C.
CONTINUOUS BUTYL TAPE SEALANT
WITH MARRIAGE BEAD TO PANEL JOINT SEALANT

LL 1/4-14 x 1 1/4" HWH TYPE 2 SELF DRILLING SCREW W/1.125" BONDED WASHER @ EACH BACKUP PLATE
BUTYL TAPE SEALANT
CFR PANEL W/ NOTCHED & SWEDGED EXTERIOR SKIN
BUTYL TAPE SEALANT
FR PANEL CLIP @ EACH PANEL SIDELAP
BUTYL TAPE SEALANT
CLIP SEALANT
2 1/2" MINIMUM PANEL BEARING SURFACE
1/4" HWH FASTENERS (SEE FASTENER NOTE)
ROOF PURLINS (NOT BY PANEL MANUFACTURER)
2-1/2" MINIMUM PANEL BEARING SURFACE
1/4" HWH FASTENERS (SEE FASTENER NOTE)
ROOF PURLINS (NOT BY PANEL MANUFACTURER)
15. GENERAL DETAILS

CI-CFR-EL-02 ENDLAP ATTACHMENT - EXPLODED VIEW

CI-CFR-EL-03 ENDLAP STRUCTURAL SEALANT
15. GENERAL DETAILS

**CI-CFR-EL-04 ENDLAP LOWER PANEL**

- **BUTYL TAPE SEALANT**
- **FACTORY NOTCH**
- **PANEL CLIP**
- **DOWNSLOPE ROOF PANEL**
- **ROOF STRUCTURAL (TYP.)**
- **ENDLAP SUPPORT STRUCTURAL**
- **CONTINUOUS BUTYL SEALANT**
- **DO NOT INSTALL PANEL CLIP AT THIS LOCATION UNTIL AFTER UPSLOPE PANEL IS INSTALLED**

**CI-CFR-EL-05 ENDLAP LOWER PANEL**

- **BUTYL TAPE SEALANT**
- **FACTORY NOTCH**
- **PANEL CLIP**
- **DOWNSLOPE ROOF PANEL**
- **ROOF STRUCTURAL (TYP.)**
- **ENDLAP SUPPORT STRUCTURAL**
- **BUTYL TAPE SEALANT (ALIGN WITH FACTORY NOTCH)**
15. GENERAL DETAILS

CI-CFR-EL-06 ENDLAP LOWER PANEL
BUTYL TAPE SEALANT (2 OF 2)

CI-CFR-EL-07 ENDLAP UPPER PANEL
15. GENERAL DETAILS

**ENDLAP CONDITIONS**

- **SINGLE ROOF PANEL LAYOUT**
  - WITH NO ENDLAPS

- **TWO PANEL LAYOUT**
  - WITH ENDLAPS

- **THREE PANEL LAYOUT**
  - WITH ENDLAPS

(*) **ADD WALL PANEL THICKNESS TO PANEL LENGTH**
15. GENERAL DETAILS

**CI-CFR-EV-01 LOW EAVE W/TRIM**

- **CLIP SEALANT**
- **1/4" HWH FASTENERS**
- **CONTINUOUS BUTYL SEALANT WITH MARRIAGE BEAD TO PANEL JOINT SEALANT**
- **1/4" HWH FASTENERS**
- **14 GA. 4 HOLE CF CLIP**

**CI-CFR-EV-G1 LOW EAVE W/NORTHERN GUTTER**

- **CLIP SEALANT**
- **1/4" HWH FASTENERS**
- **CONTINUOUS BUTYL SEALANT WITH MARRIAGE BEAD TO PANEL JOINT SEALANT**
- **1/4" HWH FASTENERS**
- **14 GA. PANEL CLIP**

*N.B.: CFR 42" PANELS WITH NORTHERN GUTTER REQUIRE INTERMEDIATE SUPPORTS*
15. GENERAL DETAILS

GUTTER HANGER @ EVERY PANEL SEAM

1/4-14 x 1-1/2" HWH TYPE 2, W/WASHER @ EACH SIDE LAP

LL 1/4-14 x 7/8" HWH TYPE 1, SELF DRILLING LAP SCREW W/BN WASHER (2) PER GUTTER HANGER @ GUTTER SUPPORT

CI-CFR-EV-G2 LOW EAVE NORTHERN GUTTER HANGAR

BUTYL TAPE SEALANT @ SIDEJOINTS

LL 1/4-14 x 7/8" HWH TYPE 1, SELF DRILLING LAP SCREW W/BN WASHER @ EACH HIGH MESA

GUTTER SUPPORT

CLIP SEALANT

LL 1/4-14 x 7/8" HWH TYPE 1, SELF DRILLING LAP SCREW W/BN WASHER (3) PER SUPPORT

1/4" HWH FASTENERS

CONTINUOUS BUTYL SEALANT WITH MARRIAGE BEAD TO PANEL JOINT SEALANT

CI-CFR-EV-G3 LOW EAVE W/STANDARD GUTTER

1/4-14 x 7/8" HWH TYPE 1, SELF DRILLING LAP SCREW @ 8" O.C.

FLASHING SEALANT TAPE

FLUTE PLUG STRIP (1) PER PANEL (IF REQUIRED) SET IN URETHANE SEALANT

EAVE SUPPORT (NOT BY PANEL MANUFACTURER)

1/4" HWH FASTENERS

14 GA. PANEL CLIP
15. GENERAL DETAILS

CI-CFR-EV-G4 LOW EAVE STANDARD GUTTER HANGAR

- LL 1/4-14 x 7/8" HWH TYPE 1, SELF DRILLING LAP SCREW W/BN WASHER @ 6" O.C.
- BUTYL TAPE SEALANT
- RIDGE CLOSURE
- CLIP SEALANT
- CFR PANEL CLIP @ EACH PANEL SIDELAP
- 1/4" HWH FASTENERS
- CONTINUOUS BUTYL SEALANT WITH MARRIAGE BEAD TO VERTICAL PANEL JOINT SEALANT
- 1/4" HWH FASTENERS
- 14 GA. PANEL CLIP
- EAVE SUPPORT (NOT BY PANEL MANUFACTURER)
- BUTYL TAPE SEALANT @ SIDE JOINTS
- EXPANDABLE FOAM INSULATION (NOT BY PANEL MANUFACTURER)
- BACK-UP PLATE FACTORY INSTALLED @ EACH HIGH MESA, 4" O.C.
- 1/4-14 x 1-1/2" HWH TYPE 2, W/OUT WASHER @ EACH BACK-UP PLATE 4" O.C.
- HIGH EAVE TRIM
- 1/4-14 x 7/8" HWH TYPE 1, SELF DRILLING LAP SCREW @ 8" O.C.
- FLASHING SEALANT TAPE
- FLUTE PLUG STRIP (1) PER PANEL (IF REQUIRED) SET IN URETHANE SEALANT

CI-CFR-EV-02 HIGH EAVE
15. GENERAL DETAILS

CI-CFR-RK-01 RAKE WITH HIGH PROFILE TRIM

CI-CFR-RG-01 RIDGE
15. GENERAL DETAILS

* NUMBERS REFER TO SEQUENCE OF INSTALLATION
15. GENERAL DETAILS

CI-CFR-RG-03 RIDGE CLOSURE ASSEMBLY (1 of 2)

CI-CFR-RG-04 RIDGE CLOSURE ASSEMBLY (2 of 2)
15. GENERAL DETAILS

**CI-CFR-RG-05 RIDGE FLASHING ASSEMBLY**

**CI-CFR-TR-01 TRANSITION WALL TO ROOF RAKE**
15. GENERAL DETAILS

CI-CFR-TR-02 TRANSITION STACK JOINT TO ROOF RAKE

CI-CFR-TR-03 TRANSITION CONTINUOUS WALL TO ROOF RAKE
CI-CFR-TR-04 TRANSITION WALL TO HIGH EAVE

15. GENERAL DETAILS

CI-CFR-TR-05 TRANSITION STACK JOINT TO HIGH EAVE
15. GENERAL DETAILS

CI-CFR-TR-06 TRANSITION CONTINUOUS WALL TO HIGH EAVE

CI-CFR-TR-07 TRANSITION MASONRY WALL TO TO HIGH EAVE
15. GENERAL DETAILS

CI-CFR-TR-08 TRANSITION MASONRY WALL TO RAKE

CI-CFR-VL-02 VALLEY ROOF PLAN
## 15. GENERAL DETAILS

**SEQUENCE OF INSTALLATION:**

1. STRUCTURAL VALLEY SUPPORT PLATE
2. CEE SHAPED SECURED TO VALLEY PLATE
3. FILL VOID W/RIGID INSULATION
4. INSTALL VALLEY TRIM
5. APPLY SEALANT TAPE
6. FIELD CUT ROOF PANELS. REMOVE CUT BACK
7. FASTEN ASSEMBLY

**NOTE:** NOT FOR DORMER CONDITIONS – CONTACT METL-SPAN FOR MORE INFORMATION
16. TOOLS, HARDWARE AND SUPPLIES

ROOF INSTALLATION TOOLS

- **rib clamps**
- **seam clamp**
- **endlap assembly gauge**
- **hand seamer**
- **electric seamer**
16. TOOLS, HARDWARE AND SUPPLIES

CUTTING AND BENDING TOOLS

- circular saw w/carbide tip blade
- panel saw
- bread knife
- Dremel kit
- power shears
- nibbler
- snips
- seamer/bender
- duckbills

FASTENERS, CLIPS

- TEK (self-drilling, self-tapping fastener)
- pancake fastener
- stitch screw
- pop rivets
- panel clip (std.)
- panel clip (diaphragm)

SEALANTS

- butyl tape

MISCELLANEOUS

- level
- caulking gun (electric)
- power drill
- Philips head bit
- #2, #3 square drive bits
- hex head socket set
- deburring tool
- scraper
- tape measure
- pop rivet tool
- pop rivet tool (electric)