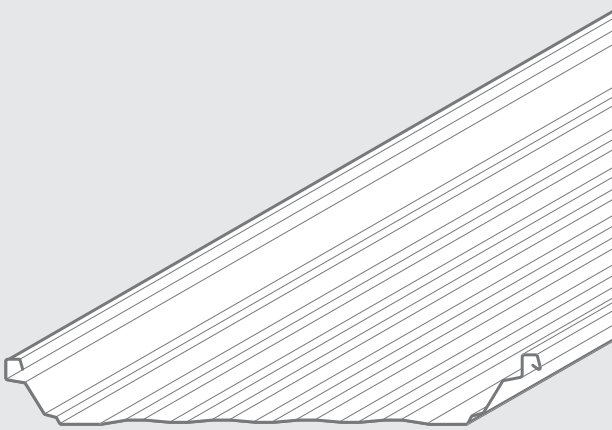
MUELLER, INC.
METAL BUILDINGS, ROOFING & COMPONENTS

MTL - PANEL MANUAL



METAL ROOFING INSTALLATION GUIDE

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1.1. Purpose of the Installation Guide

This installation guide is provided to customers and their erectors as the recommended procedure for the correct assembly of the Standing Seam Roof System.

This guide is intended to be used in conjunction with the erection drawings to help plan and organize the installation of the Standing Seam Roof System. The erection drawings govern specific part arrangement and identify the applicable roof conditions. The instructions will help you identify parts, establish the installation sequence, demonstrate correct assembly, and point out any areas or procedures requiring special emphasis or attention.

This installation guide applies to the standard Standing Seam Roof System. Custom roof conditions, including custom details and instructions, will be covered by the erection drawings. In case of conflict between this installation guide and the erection drawings, the erection drawings will take precedence.

1.2. Customer's Responsibility

The customer is responsible for proper installation of the roof in accordance with the erection drawings and this installation guide, and in accordance with good engineering and construction practices.

The customer must take the responsibility for selecting a competent erector, insist that the work be performed by qualified and experienced standing seam metal roof installers, insist that the erector take time to study and understand this guide, then assure that the erector correctly follows the guide's instructions.

Mueller does not guarantee and is not liable for the quality of erection. Mueller is not responsible for building defects that may be attributed to improper erection or the negligence of other parties.

Clarification concerning Mueller roof installation should be directed to the Mueller Customer Service Manager.

2. SAFE ROOF INSTALLATION

2.1. Erector's Responsibility

The erector of the roof system is responsible for the safe execution of this installation guide. These instructions are intended to describe the sequence and proper placement of parts. They are not intended to prescribe comprehensive safety procedures.

If the erector cannot safely assemble the roof in accordance with these instructions, it is the responsibility of the erector to stop the work and contact to determine alternate assembly procedures.

2.2. OSHA

The Occupational Safety and Health Act (OSHA) has promulgated many regulations applicable to the installation of this or any other roof system. These regulations, identified as Part 1926, Safety and Health Regulations for Construction, are available from any government bookstore. The objective of the OSHA standards is to protect the worker from injury or illness. These OSHA regulations should be recognized as job site requirements and fully complied with.

Failure to do so may result in substantial fines in the event of an OSHA inspection. Safe installation practices may be further defined and made mandatory by state or local ordinances.

Maintaining good housekeeping on the job site is recognized as being important to both OSHA compliance and to successful job completion.

2.3. Walking & Working on Roof Panels

A. PLACING PANEL BUNDLES ON THE STRUCTURE

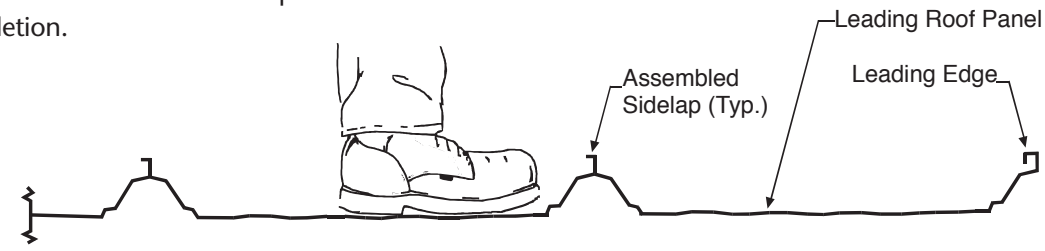
Do not place bundles of panels on the roof structure without first verifying the structure will safely support the concentrated weight of the panels and the weight of the installation crew. Some roof structures may not be designed to support the weight of a full panel bundle without additional structural support.

B. WALKING ON ROOF PANELS

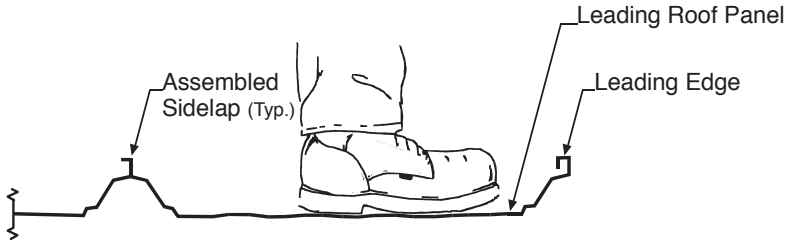
An approved and safe walking platform should be used in high traffic areas to prevent the roof panel from being deformed, scratched, or scuffed. **Do not use a roof panel as a working platform.** An unsecured panel could collapse under the weight of a person standing between purlins or at the panel end.

Do not walk on the last installed panel run as the unsecured edge could collapse under a person's weight. When installing clips or making endlap connections, etc., stand where the roof structural will support a worker's weight.

An approved and safe walking platform should be used in high traffic areas to prevent the roof panel from being deformed, scratched, or scuffed.



CORRECT
Step ONLY on secured roof panels.



CAUTION -- INCORRECT
DO NOT step on leading (unsecured) roof panel.

C. SAFETY EQUIPMENT

The use of safety equipment for the roof panel installation is recommended at all times during the installation process. However, when using lanyards, ensure that the clasp, belt hooks and wire cables are covered in such a manner that they will not scratch the panel surface if accidentally dragged along the panel.

D. CREW SIZE

The length of the individual roof panels should be considered when determining the crew size. It is recommended that under normal conditions, there be one person for every eight to ten feet of panel length, plus one.

E. PANEL OVERHANG

Do not stand on the end of unsupported (cantilevered) panels at the eave or ridge. Standing on the cantilever portion may result in panel collapse.

F. POINT LOADS

When properly supported by the structurals, 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 heavy equipment, ladder or platform feet, etc., may cause panel deformation or even panel collapse.

G. SLICK SURFACES

Panel surfaces and structural steel surfaces are hard, smooth, and non-absorbent, and as a result tend to be very slick when wet or covered with snow or ice. Even blowing sand or heavy dust can make these surfaces difficult to walk on without slipping.

Unpainted panel surfaces are often coated with oil to accommodate the panel- fabrication process.† Although designed to wash away or evaporate during normal weather, the oil on newly uncrated panels can be extremely slick, especially during periods of light rain or dew. Caution must be exercised to prevent slipping and falling onto the roof surface or even sliding off the roof. Non-slip footwear is a necessity and non-slip working platforms are recommended.

H. ELECTRICAL CONDUCTANCE

Metal panels are excellent electrical conductors. A common cause of injury is the contact of metal panels with power lines during handling and installation. The location of all power lines must be noted and, if possible, flagged. The installation process must be routed to avoid accidental contact with all power lines and high voltage 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.

I. FALSE SECURITY OF INSULATION

Blanket and board insulation blocks the installer's view of the ground below the roof. Serious injury can occur when the installer gets a false sense of security because they cannot see the ground and steps through the insulation.

J. 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.

K. HANDLING ROOF MATERIALS IN STRONG WINDS

Do not attempt to move panels in strong winds. Wind pressure can easily cause a person to lose balance and fall. Strong wind uplift on a panel can lift the weight of the man carrying the panel.

Loose, wind borne panels are very dangerous and can cause severe injury and damage.

Secure stacks of panels with banding or tie-downs so wind will not blow the panels off the roof. Clamp individual unsecured panels to the roof structurals. Clamp or block panel bundles and accessory crates to prevent them from sliding down the roof slope.

†The standard coating for the MTL roof system is Galvalume Plus ®, which has an acrylic coating and does not require oil being applied to the surface.

3. CHECKING THE STRUCTURE

3.1. Completed and Braced

Before placing materials and workers on the roof structure to start roof installation, it must be confirmed that the structure is designed to accommodate the material and erection loads as well as the appropriate live loads and wind uplift loads. It also must be determined that the structure is complete and structurally sound with all structural connections and bracing in place and secure.

3.2. Lateral Stability

The sliding clip method of attaching the roof panels to the roof structurals provides only limited lateral stability and diaphragm bracing to the secondary structurals. Before placing materials on the roof and starting the roof installation, confirm that the necessary roof bracing and sag angles, strapping, or bridging is in place and secured.

3.3. Alignment

Prior to installation, roof structurals should be checked for overall dimensions and evenness of plane. The roof structurals should also be checked to verify the roof system could be installed without interference. Also, roof structurals nearest the panel endlaps, ridge, or high eave should be checked for correct location to properly accommodate the roof components.

3.4. Tolerances

To assure the roof system's correct fit-up and designed weather tightness, the structure must be aligned within the following tolerances:

A. OUT OF SQUARE

The roof system can accommodate 1/4" of sawtooth of the roof panel ends at the eave, ridge and panel splices. The allowable out of square of the rake line to the eave line and ridgeline is 1/4" for each 40' foot of rake run.

B. STRUCTURE LENGTH AND RAKE STRAIGHTNESS

The roof system is designed to accommodate ±2" of overall structure length error or ±1" of rake straightness error at each rake. To assure that the accumulation of structure length error and rake straightness error does not exceed the roof system's tolerance, the structure length should be measured from rake line to rake line at each eave, at the ridge, and at each point where there is a significant error or change in rake straightness (this usually occurs at an end rafter splice).

C. STRUCTURE WIDTH AND EAVE STRAIGHTNESS

The roof system is designed to accommodate ±2" of overall structure width error or ±1" of eave straightness error at each eave. To assure that the accumulation of the structure width error and eave straightness error does not exceed the roof system's tolerance, the structure width should be measured from eave line to eave line at each rake, at the first frame line from each rake, and at each point where there is a significant error or change in eave straightness (this usually occurs at a frame line or at a wind column).

D. MEASURING

Structure length and width may be measured with a steel measuring tape from the face of the eave or rake member to the face of the opposite eave or rake member. The measuring tape must be parallel to the eave or rake line and must be stretched taut. Eave and rake straightness may be determined by measuring deviations from a string line, which is stretched taut above the eave or rake line.

E. AESTHETIC ACCEPTANCE

Although these structure alignment tolerances will allow for reasonable roof component fit-up and ease of installation, the extremes of these tolerances may be aesthetically objectionable and should be confirmed with the customer before starting the roof installation.

F. CORRECTIONS

Any structure alignment error, which exceeds the above stated tolerances, must be corrected before roof installation can begin. If it is decided that the structure alignment errors cannot be corrected, alternate roof details may have to be developed. The alternate details may require additional materials, modified parts (with additional cost, fabrication and delivery time) and additional installation time. Mueller cannot assure the performance of such alternate details.

4. RECEIVING & HANDLING ROOF MATERIALS

4.1. Equipment for Unloading and Lifting

Hoisting equipment is necessary to unload and position the panels and accessory crates for site storage and installation. The equipment must have sufficient capacity and reach to place the material where it is required for efficient installation.

Slings will be required to minimize panel damage. The recommended slings are nylon straps of 6" minimum width and of sufficient length to accommodate the panel bundle girth.

A spreader bar will be required for the longer panel crates to assure correct sling spacing and uniform lifting. The spreader bar must be large enough to handle the maximum panel bundle weight and length. A forklift is handy for unloading and placing shorter panel and accessory crates.

4.2. Material Inventory

Your material is carefully inspected and crated before leaving the plant and accepted by the transportation company as being complete and in satisfactory condition. It is the carrier's responsibility to deliver the shipment intact. It is the consignee's responsibility to inspect the shipment for damages 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 avoid stopping installation later because of such shortage or damage.

It is imperative 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 Mueller immediately of any conflicts. Mueller will not be responsible for shortages or damages 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.

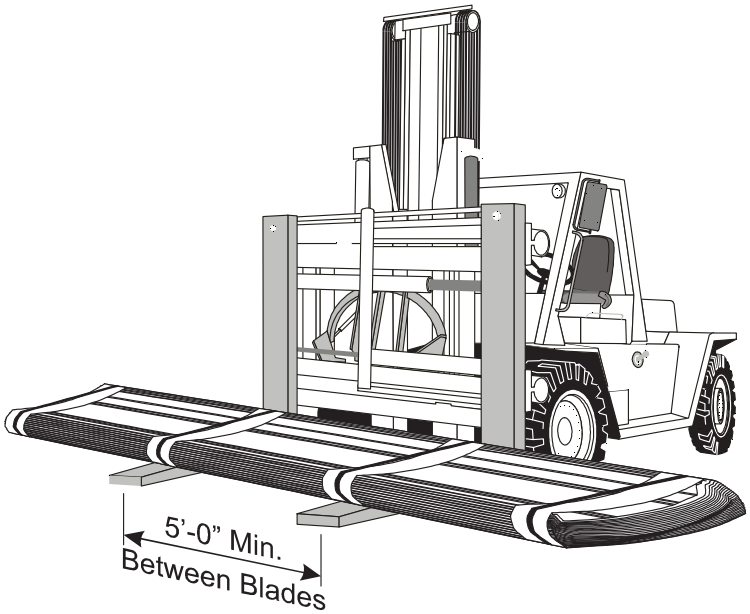
Mueller must be notified of any shortages or concealed damage within 14 days of delivery.

4. RECEIVING & HANDLING ROOF MATERIALS

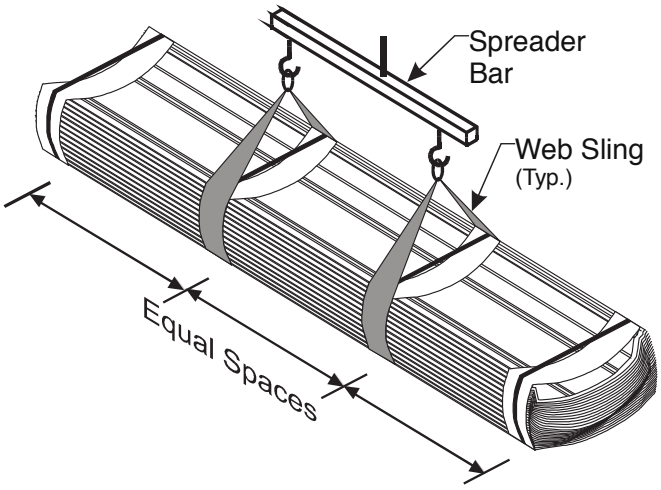
4.3. Lifting Roof Panel Bundles

Under normal conditions, panel crates less than 35' long can be lifted with two slings spaced at third points. Panel crates longer than 35' can be lifted with three slings located at quarter points using a spreader bar to achieve correct sling spacing for uniform lift. Panel crates less than 25' long may be lifted with a forklift only if the forks are spread at least 5' apart and blocking is used to prevent panel damage by the forks.

Slings should be the wide web type and be located under the cross boards. Loads should always be checked for secure hook-up, proper balance, and lift clearance. Tag lines should be used if necessary to control the load during lifting, especially if operating in the wind.



Lifting Bundles With Forklift



Lifting Bundles With Crane

4.4. Field Storage of Roof Materials

Upon acceptance of the shipment, the customer or his representative is responsible for proper handling, storage, and security of the roof materials. Mueller is not liable for damage or loss of materials at the job site.

The roof panel bundles should be stored on the job site in accordance with the following recommendations:

A. Store panels in a protected area, out of standing water and drifting snow, etc.

B. Elevate panels with blocking to allow air circulation under the bundle.

C. Slope panels for drainage of moisture from the panels.

D. As necessary, cover panels with waterproof tarp, allowing for air circulation (do not wrap tarp under panel crate or restrict air movement).

E. Inspect panels daily for moisture accumulation.

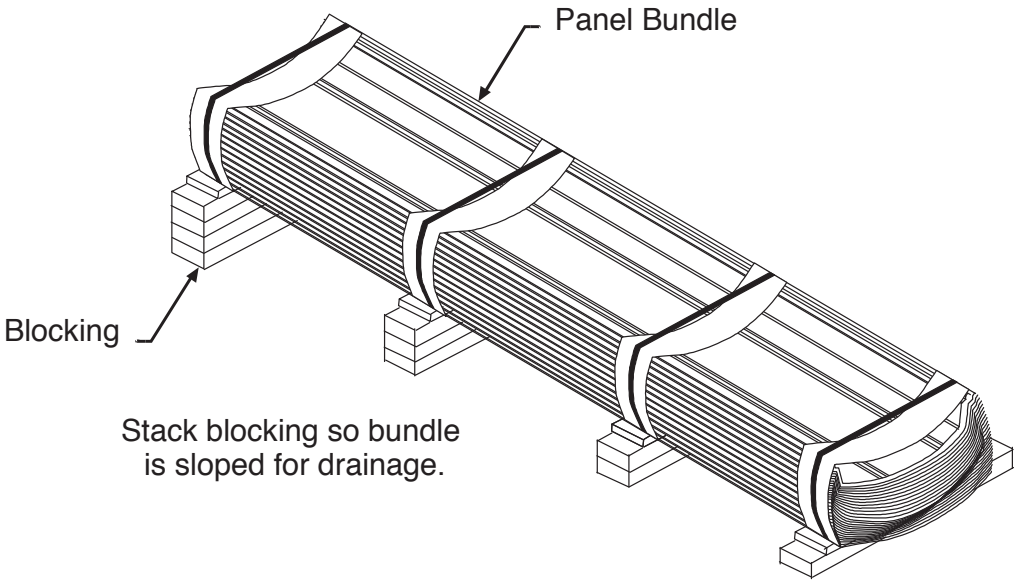
F. If panel bundles contain moisture, the panels should be dried and re-stacked. Use care in re-stacking to avoid damage to panels.

G. Opened or re-stacked panel bundles should be secured to prevent wind damage.

When moving panel bundles, extreme caution should be taken to prevent damage to the panel edges. Uncrated panels should be supported at each end and at 8' spaces.

All bundles or loose panels on the roof should be banded to the roof structurals at the end of each workday. On steep roofs, provisions should be taken to prevent panels and panel crates from sliding off the roof. Be sure to set panel bundles on the roof in the proper direction for the installation sequence.

Trim and accessories should be stored in a secure area and protected from damage, weather, and theft. Fasteners, sealants, closures, etc. should be stored out of the weather and protected from contamination.

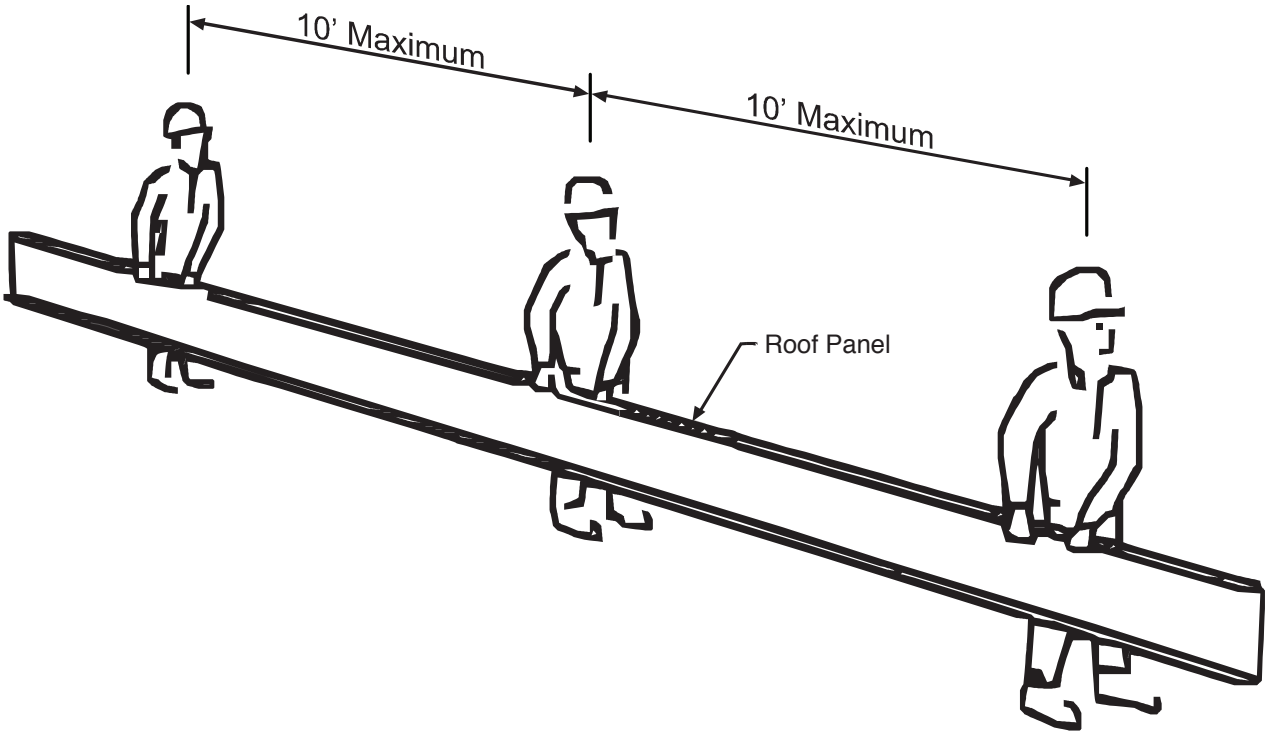


4. RECEIVING & HANDLING ROOF MATERIALS

4.5. Handling Individual Roof Panels

To lift individual panels, lift one side of the panel by the seam, letting it hang naturally to prevent buckling. Pick-up points should not be more than 10' apart. Do not pick up panels by the ends or in a flat position.

If the individual panels are to be lifted to the roof by hand line, the common method is to use vice grip "C" clamps. Position the clamps on the flat of the panel, as close as possible to one edge so the panel is lifted in a vertical position. The jaws of the vice grips must be padded to prevent damage to the panel surface. The clamps should be uniformly spaced, no more than 10' apart and the hand lines must be pulled in unison so that uneven lifting does not buckle the panel. Be sure the clamps are tight on the panel and the line is secure to prevent dropping the panel, which can result in personal injury and property damage.



5.1. Proper Tools

Before starting paneling, be sure that the proper equipment and tools are on hand. The tools required for installing the Mueller Standing Seam 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.

Tools that are improperly operated, too few tools, inadequate power source, or other equipment deficiencies slow down the installation process. The cost of inefficient working is usually greater than the cost of providing good equipment.

5.2. Equipment List

The following tools and equipment should be considered for efficient installation of the standing seam panel. Actual tools and equipment required may vary due to variations in building type and construction.

This list should not be interpreted as a limitation to your inventory of installation equipment.

Unless otherwise noted, these tools **ARE NOT** furnished with the roof system from: Mueller

1. MTL Rib Clamp -- Min. of (4) required
2. MTL Seam Clamp -- Min. of (2) required
3. MTL Motorized Seaming Machine – If the project requires any QuadLok™ seamed zones, two different machine seamers will be required to complete the project.
4. MTL Manual Seaming Tool
5. Screw Guns -- designed for use with self-drilling screws
6. Socket Extensions -- 6" extension for screw gun
7. Hex Socket Heads -- 5/16" and 3/8", magnetic
8. Drill Motor -- 1/4" capacity
9. Drill Bits – assortment
10. Sheet Metal Cutter -- power shears or nibbler
11. "C" Clamps -- vise grip type
12. Pop Rivet Tool -- 1/8" capacity
13. Sheet Metal Shears -- left and right cut
14. Hack Saw with metal cutting blade
15. Steel Measuring Tapes -- 12', 50', 100'
16. Nylon String
17. Chalk Line
18. Brooms
19. Marking Pen
20. Caulk Guns for 1/10 gallon sealant tubes
21. All-Weather spray adhesive -- for application to flexible membranes and thermal blocks, if required on individual job.
22. Power Source and Extension Cords capable of handling the total equipment requirements, including 20-amp seamer machine, without power drop due to extension cord length

5.3. Sealants

A. TEMPERATURE EFFECTS

Temperature extremes must be considered during installation of the roof due to the sensitivity of sealants. The recommended installation temperature range is 20°F to 120°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 20°F. 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 actual use.

B. CONTAMINATION

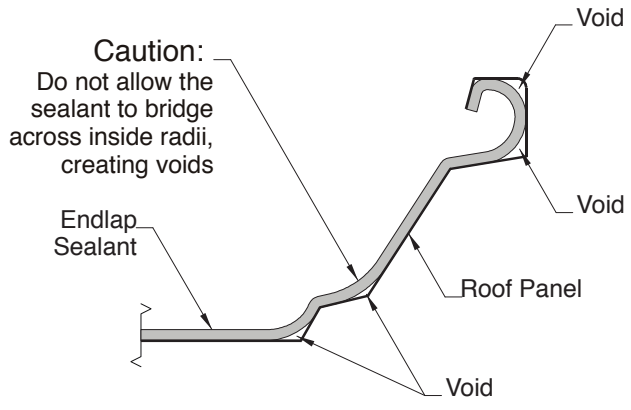
To assure proper adhesion and sealing, the sealant must have complete contact with the adjoining surfaces. Contaminants such as water, oil, dirt, and dust prevent such contact. The panel and flashing surfaces must be dry and thoroughly cleaned of all contaminants. Before applying tape sealant, the sealant should be checked for contaminants. If the sealant surfaces are contaminated, it must not be used. During cool weather, condensation or light mist can accumulate on the panel and flashing surface and not be easily noticed. It is recommended that 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 protective paper to reduce contamination. Incomplete removal of the protective paper will prevent the sealant's adhesion to the panel or flashing surfaces. Always check that the protective cover is completely removed immediately before the panel or flashing is installed over the sealant.

C. COMPRESSION

To assure proper adhesion and seal, the tape sealant must be compressed between the panel and 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. However, the tape sealant's resistance to pressure becomes greater in cold weather. During cold weather, the fasteners must be tightened slowly to allow the sealant time to compress. If the fasteners are tightened too fast, the fastener may strip out before the sealant compresses adequately, or the panel or flash 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.

D. INSIDE CORNERS

An inside radius, such as where the panel flat meets a rib, is usually the most critical area to seal. A common mistake for the installer is to bridge the sealant across the inside radius. When the lapping panel or flash 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 radius, it is recommended that the sealant be folded back on itself, then push the sealant fold into the radius.



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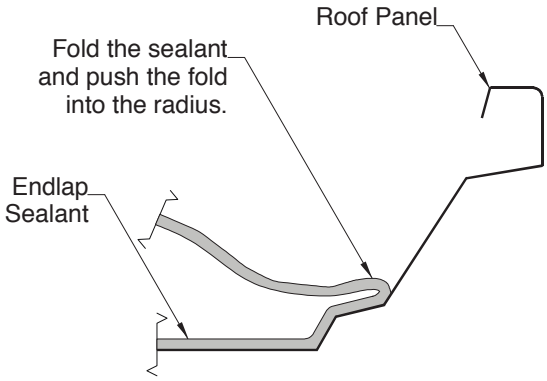


CORRECT

5.4. Fasteners

A. SCREW GUN

Use torque control screw guns for driving self-drilling screws. 2000-2500 RPM screw gun speeds are necessary to attain efficient drilling speeds. High tool amperage (4 to 7 AMP) is required to achieve the proper torque for secure fastening.

B. SOCKETS

Use good quality magnetic sockets. Good fitting sockets reduce wobble and stripping of the screw heads, especially the alloy and capped 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.

C. SOCKET EXTENSION

A 4" or 6" socket extension is 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 socket extensions are slow to wear out, it is usually more cost effective to purchase socket extensions and good quality sockets rather than purchase sockets with builtin extensions.

D. 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 standoff condition, or the drill tip may be broken or split. Screws must always be held perpendicular to the panel/flash surface during starting and driving.

For proper seating of the fastener-sealing washer, the panel or flash 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 dome. The recommended procedure is to tighten the fastener until the sealing washer just starts to visually bulge from under the metal dome.

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.

5.5. Field Cutting Panels and Flashing

A. ABRASIVE SAW PROBLEMS

Abrasive saws (circular saws with friction disks) are not recommended for cutting roof panels or flashing. Abrasive saws create high heat that may burn away the protective cladding from the panel edges causing the edge to rust.

Also, abrasive saw dust contains fine, hot steel particles, which accumulate on panel and flashing surfaces where they rust and can cause staining and rusting of those surfaces.

Rust caused by abrasive saw damage or abrasive dust particles may be excluded from warranty claims.

B. SHEARING METHODS

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

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" cutout provides clearance to smoothly cut long flats and the clearance to work the shears around tight corners. When making repetitive cuts (such as cutting panels at a hip condition) it is recommended that a template be made from a piece of drop-off panel or flash to provide fast and accurate marking of 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.

C. MARKING PANELS

Avoid marking the panels for cutting, etc., in a manner that will leave visible markings, stains, etc., on the finished roof surface. Use chalk or felt tip ink markers. **Do not use graphite pencils on unpainted panel surfaces**, the graphite can cause rusting of the surface.

6. ROOF PANEL LAYOUT

6.1. Sheeting Direction and Modularity

Although this guide illustrates the MTL roof system being installed from left to right, this system may be installed from either direction.

The recommended 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 allow the insulation to be installed immediately ahead of each panel run.

During installation of the roof, considerations must be made for maintaining panel modularity. 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 of parts, etc.

For proper fit-up between the panel, sealant, and closures, or endlap parts, the panels must be held to the width dimension of the panel as designated on the erection drawings within a 1/16" width tolerance per panel. The accumulated coverage (start panel to finish panel) tolerance 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 location penetrations, parapets, fire walls, etc., the accumulated panel coverage may require tighter tolerances for proper fit-up and weather tightness of the roof system.

6.2. Layout & Checking for Coverage

Recommended for all roofs, but a must for large or complex roofs, is to make a layout of the actual structure (field measured as described in section 3.3) so that the roof panel start and stop dimensions can be laid out to accommodate any structural misalignments. When the optimal start and finish dimensions are determined, a string line should be set to precisely locate the leading edge of the start panel. After the start panel is secured and engaged with the next panel, the start panel seam will be the reference line for checking accumulated panel 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. This will assure that the panels are maintaining a straight line and proper coverage is being maintained. If the panels are off module, they should be corrected by equal adjustments of the next four to six panel runs.

6.3. Appearance Considerations

Although the above stated coverage tolerance will provide for reasonable ease of installation and water tightness, such visible conditions as non-parallel panel seams, dogleg of the panel seam at end splices, nonparallel finish panel width, and mismatch of panel seams across the ridge, may be objectionable and should be confirmed with the customer before continuing roof installation.

7. INSPECTION OF ROOF ASSEMBLY DURING INSTALL

7.1. Importance of Inspection

During the roof installation, all areas of the roof system assembly must be frequently inspected to by installer to ensure the correct assembly in accordance with the erection drawings and this installation guide. Failure to assemble the roof system correctly will result in roof performance problems that may require costly corrective work, roof replacement and performance and damage claims, etc. Also, incorrect installation may void the performance and material warranties.

7.2. Inspection List

A. SHOP DRAWINGS

- ❒ Erection drawings are available at the job site and have been reviewed for differences with both the actual job conditions and this installation guide.
- ❒ Drawings are the latest issue, with the latest revisions and additions.

B. ROOF LAYOUTS

- ❒ Roof start and finish dimensions have been correctly determined, based on the erection drawings and the actual structural conditions.

C. BEFORE INSTALLING ROOF PANELS

- ❒ Structural misalignments were corrected in accordance to Section 3.0 of this installation guide.
- ❒ Necessary eave and rake plates, eave trim, sealants and roof insulation are in place before installing the roof panels.

D. PANEL LENGTH

- ❒ Installed roof panel has both the correct overhang at the eave, and hold back at the ridge or high eave, in accordance with the erection drawing.

E. EAVE SEAL

- ❒ Eave sealant along the vertical legs of the panel seams is correctly placed.
- ❒ Tape sealant along the eave plate is in position and the proper fasteners are used.
- ❒ Eave fasteners penetrate the center of the eave sealant and into the eave plate.
- ❒ Fasteners are not loose or stripped.
- ❒ Eave sealant is in complete contact with the roof panel and eave trim, without any voids or gaps.
- ❒ Roof panel and eave trim are clean and dry during installation
- ❒ Sealant is not wet or otherwise contaminated.

F. ENDLAP SEAL

- ❒ Roof panel endlaps are correctly assembled
- ❒ Lapping panels are tightly nested, without visible gaps.
- ❒ Sealant is in the correct position and is in complete contact with the lapped panels, without any voids or gaps, especially at the radius between the panel flat and the vertical legs of the panel.
- ❒ Panels are clean and dry during installation
- ❒ Sealant is not wet or otherwise contaminated.
- ❒ Pigtail sealant is in the correct position and seals the endlap seam notches.
- ❒ Cinch strap fasteners penetrate through the center of the sealant and into the back-up channel.
- ❒ Fasteners are not loose or stripped.
- ❒ Endlap assembly is not bowed down, causing water ponding and debris accumulations.

G. RIDGE SEAL

- ❒ End dam assembly is correctly assembled.
- ❒ Sealant is in the correct position and is in complete contact with the closure and the roof panel, without any voids or gaps.
- ❒ Closures and roof panels are clean and dry during installation

INSPECTION OF ROOF ASSEMBLY DURING INSTALL

- ❒ Sealant is not wet or contaminated.
- ❒ Closure fasteners penetrate through the center of the sealant and into the back-up channel.
- ❒ Fasteners are not loose or stripped.
- ❒ Tube sealant is installed along the back of the closure as necessary to seal any voids around the panel seam area.

H. RAKE SEAL

- ❒ Termination zee is correctly assembled with the termination zee splices correctly oriented for downhill watershed.
- ❒ If there are roof panel endlaps, check that the endlap sealant contacts the termination zee sealant or that a pigtail sealant is applied for that purpose.
- ❒ Sealant is in the correct position above and below the roof panel.
- ❒ Termination zee sets fully on the sealant, and the sealant is in complete contact with the roof panel and the zee, without any voids or gaps.
- ❒ Roof panel and zee are clean and dry during installation and that the sealant was not wet or contaminated.
- ❒ Termination zee fasteners penetrate the center of the sealant and into the rake plate.
- ❒ Fasteners are not loose or stripped.

I. PANEL CLIP ATTACHMENT

- ❒ Panel clips are correctly fitted to the panel, without any distortion or damage of the clip tab.
- ❒ Clip tab is centered on the clip base between the centering tabs.
- ❒ Clips are located along each panel sidelap at each roof structural or at the locations specified on the erection drawings.
- ❒ Panel clip fasteners are of the type, size, length, finish, and quantity-per-clip as specified on the erection drawings.
- ❒ Panel clip fasteners are not loose or stripped.
- ❒ In the case of multi-layered construction, verify that the fasteners penetrated and engaged the specified structural member.

J. SIDELAP

- ❒ Factory installed sidelap sealant is in the correct position, without voids or interruptions, and is not damaged, wet, or otherwise contaminated.
- ❒ Full length of each sidelap seam is correctly seamed.
- ❒ Panel coverage is within tolerance per panel, and the accumulated coverage will allow proper fit and assembly of the finish rake condition or any other critical fit conditions such as penetrations, parapets, etc.

K. FLASHING AND PENETRATIONS

- ❒ All flashing (including penetrations) are correctly assembled and tightly fitted.
- ❒ Required sealants are correctly positioned and in complete contact with the adjoining surfaces, without voids or interruptions.
- ❒ Sealants and adjoining surfaces are clean and dry during installation.
- ❒ Flashing splices are correctly lapped, sealed, and fastened.
- ❒ Flashing is sufficiently pitched to shed water and eliminate ponding areas, especially at the critical splices, endlaps, and corners.
- ❒ Fasteners are of the specified type, size, length, finish, and spacing.
- ❒ Fasteners are not loose or stripped.
- ❒ Sealing washers are in full contact with the flashing surface and not distorted, split, or otherwise damaged.
- ❒ Along the rakes, high eave transitions, fixed penetrations, etc., the flashing is not constrained and will allow for the roof's expansion/ contraction movement.

7. INSPECTION OF ROOF ASSEMBLY DURING INSTALL

L. SURFACE CONDITIONS

- ❒ Damaged roof system surfaces are subject to corrosion and performance problems and may void the material and performance warranties.
- ❒ Panel and flashing 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, or contact with abrasive materials or residue, etc.
- ❒ Panel and flashing surfaces are not being subjected to exposed metal objects and materials left on the roof, such as: tools, material drop-off, fasteners, wire, staples, drill and nibbler chips, saw and file particles, etc. In the process of rusting, these materials will absorb the panel's protective coating, thus leaving the panels exposed to rusting.
- ❒ Panels and flashing are not being subjected to long term wet conditions, such as: standing water, consistent sources of steam, mist, spray, dripping or runoff, wet debris, wet insulation, or other moisture holding materials.
- ❒ 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.
- ❒ Graphite pencils were not used to mark on unpainted surfaces. The graphite marks can cause rusting.
- ❒ Roof materials are not subjected to heat sources such as: cutting torches, abrasive saws, etc.

M. UNSPECIFIED MATERIALS

- ❒ Use of the wrong materials may cause installation and performance problems and may void the performance and material warranties.
- ❒ All installed roof system materials, especially sealants and fasteners, are only those which are provided or specified by Mueller for your specific project, and are used only as specified on the erection drawings and this installation guide.
- ❒ Mueller cannot be responsible for the performance of roof materials that are not provided, specified or approved by Mueller. Installation may void the performance and material warranties.

8. ROOF INSTALLATION DETAILS

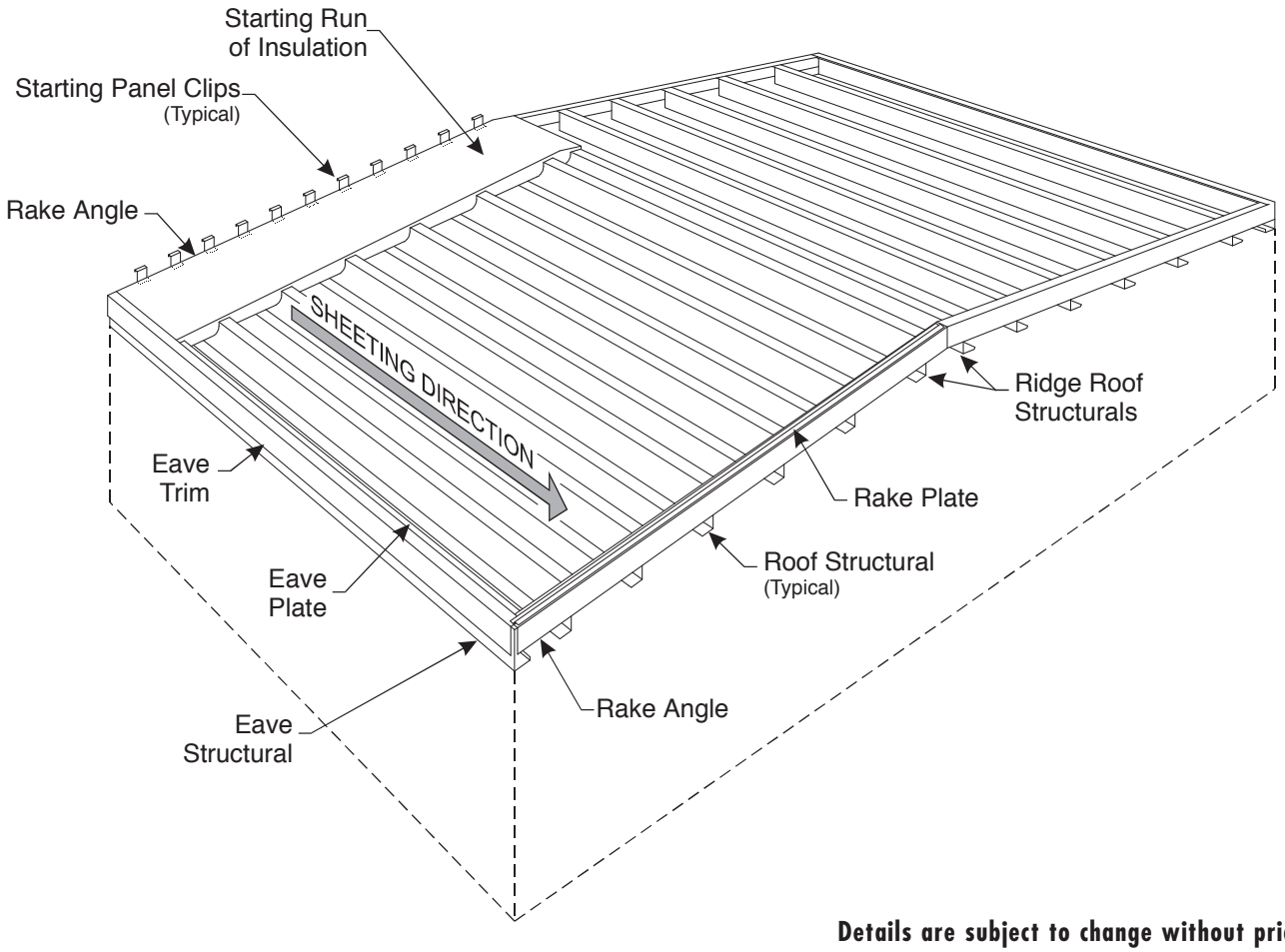
8.1. General

The following details provide graphic illustration of the roof assembly steps. The purpose is to instruct the erector in correct and efficient assembly of the roof system. Because of the many variations in conditions, it is important that you review the job to identify and isolate the specific installation details required for your job. Review the erection drawings for differences with these details. If differences exist, the erection drawings have precedence. These details are arranged in a step-by-step sequence. Following this sequence ensures correct assembly and ensures that the part to be worked on will be readily accessible for the next assembly step. Do not shortcut this sequence without careful consideration of the possibility of incorrect or omitted assembly and the resulting corrective rework. To minimize confusion, the details are always oriented so that the view is from eave to ridge, with the starting rake at the left and finish rake at the right. To help ensure weather tightness, 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.

8.2. Preparation For Roof Panel Installation

Roof System Installation Overview

The details in this section will show the installation of the eave plate, rake plate, start clips, eave trim, eave sealant, and the first run of insulation. These parts must be installed before the roof panel installation can begin. This view shows the roof system oriented for a left-to- right sheeting direction. For right-to-left sheeting, reverse the parts orientation. On this view, the starting rake is shown with starting clips (for a starting panel) and the finish rake is shown with a rake plate (for a termination panel). Some buildings may require a rake plate at the starting rake. Refer to the erection drawings for the required rake conditions.



8. ROOF INSTALLATION DETAILS

Install Eave Plates

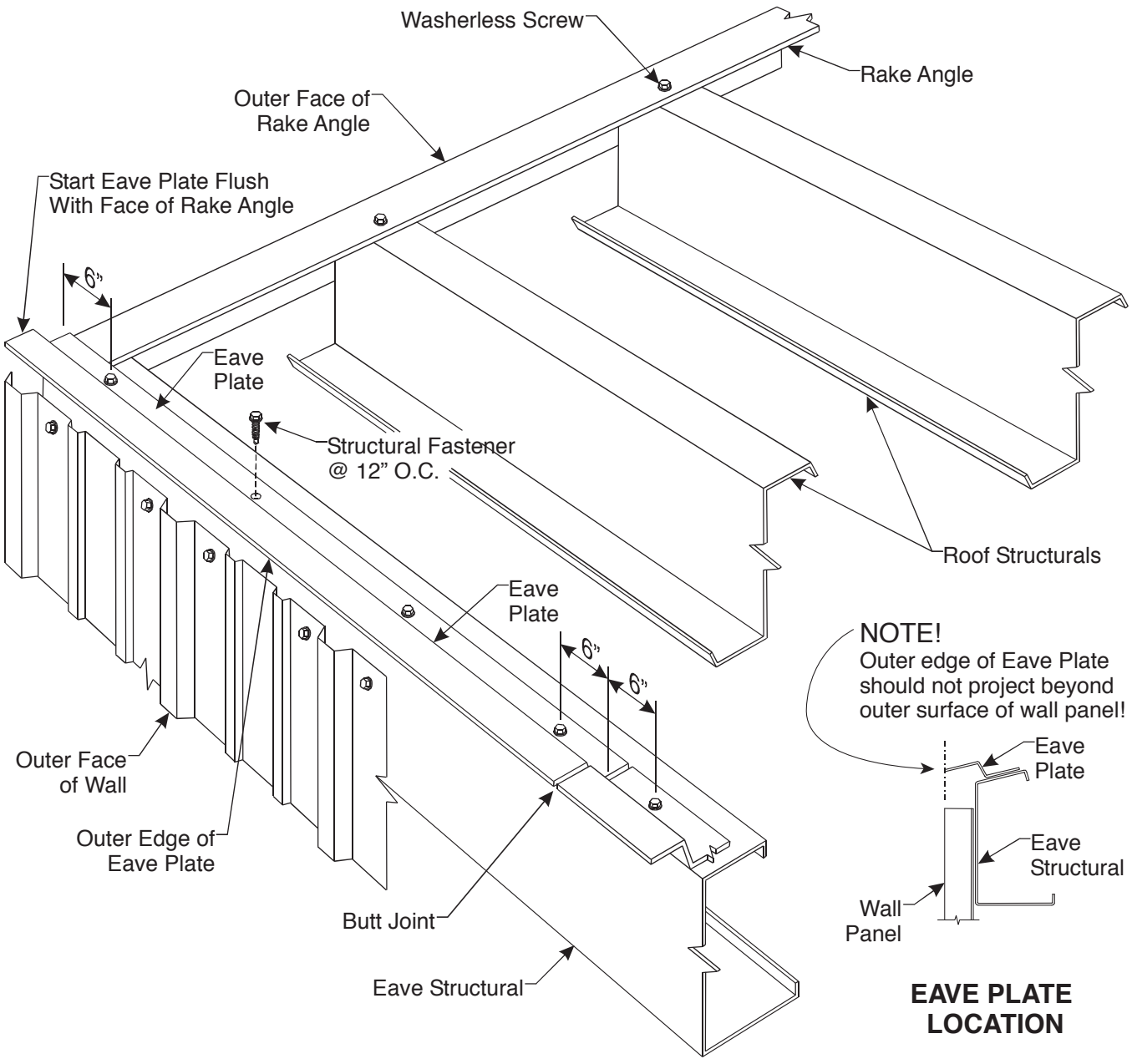
The eave plate provides a solid attachment surface for the roof panel. The eave plate must be installed before the insulation is placed over the structurals.

Before installing the eave plate make sure the eave structural members are in a straight alignment from endwall to endwall. Shim the eave plate as necessary to provide a level roof line.

Install the starting end of the first eave plate flush with outer face of rake angle.

The outer edge of the eave plate is to be flush with the outside edge of the wall panel

Be sure to tightly butt eave plates and fasten to the eave structurals as shown.



Install Start Clips

Start clips are the same clips that are used to attach the panels elsewhere on the roof.

Check the panel erection drawings for the start clip location on your specific building.

The position of the start clips establishes the first panel run alignment. It is very important that the start clips are installed perpendicular to ridgeline.

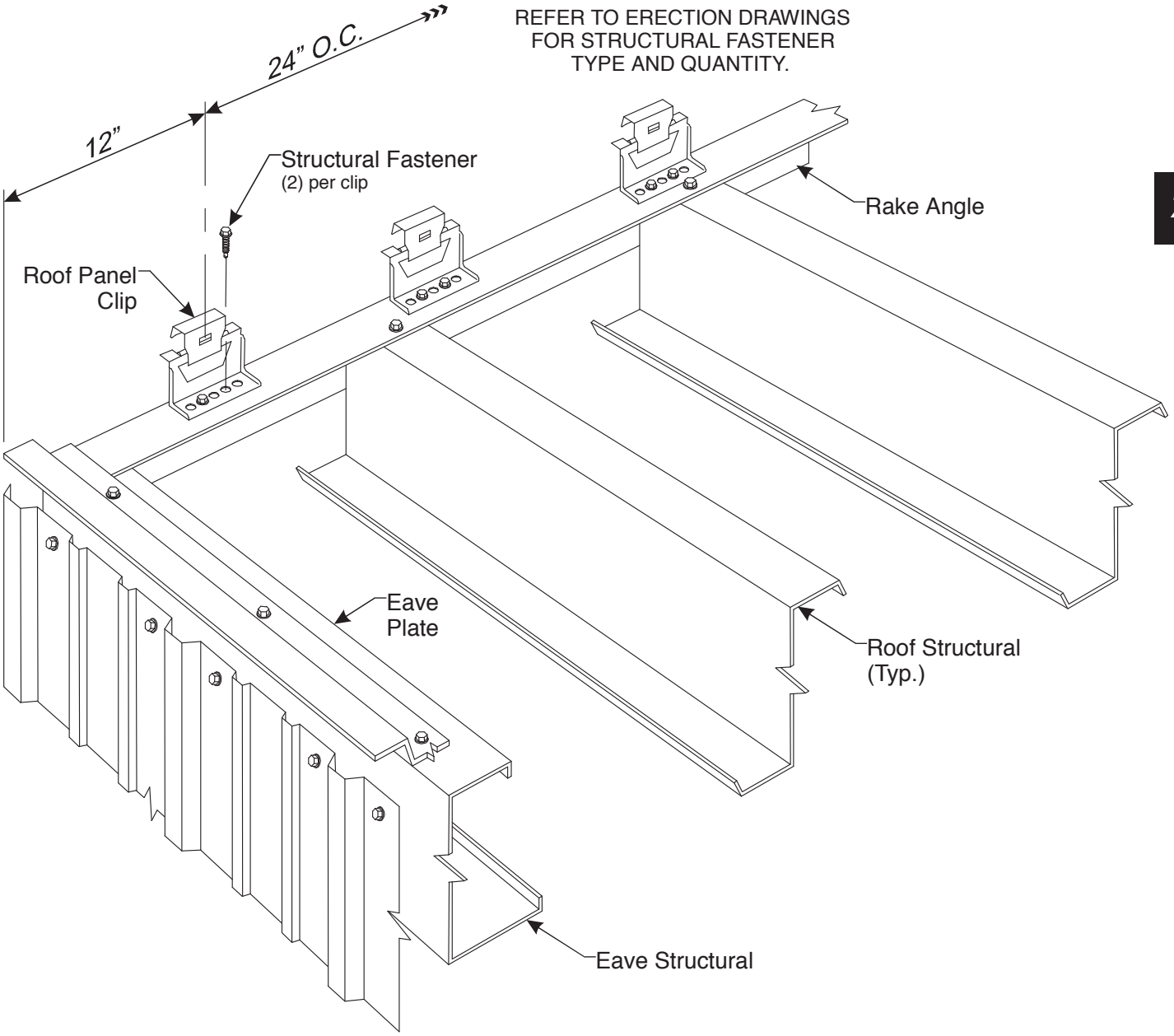
If the structurals have been installed true and square, the edge of the rake angle can be used to align the start clips.

If the rake angle is not true and square, then a chalk line should be snapped to guide the installation of the start clips.

Locate the start clips at the spacing shown and fasten to the rake angle as shown.

NOTE

REFER TO ERECTION DRAWINGS FOR STRUCTURAL FASTENER TYPE AND QUANTITY.



8. ROOF INSTALLATION DETAILS

Rake Plate Position

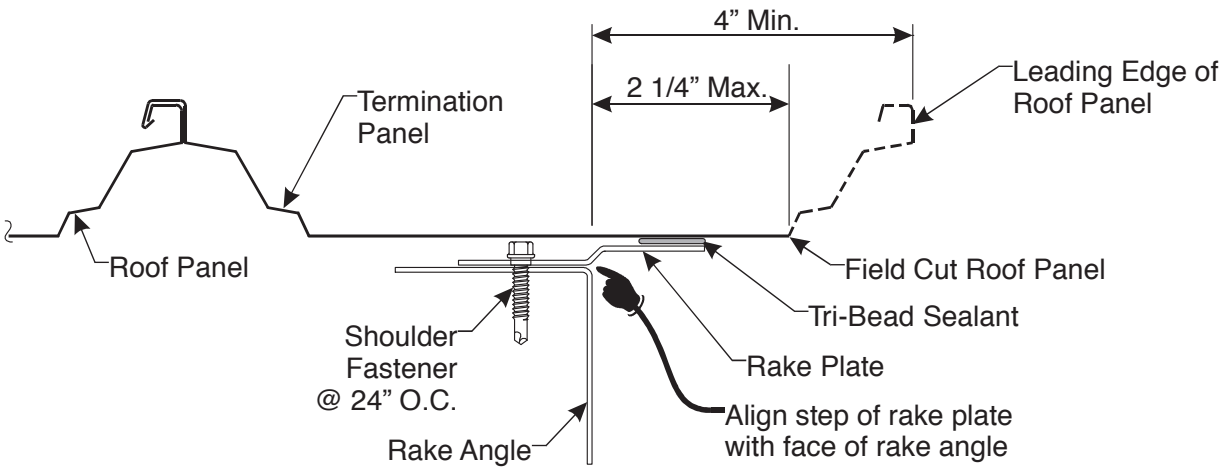
The erector must determine in which position to place the rake plate. The position of the rake plate will depend on the location of the leading edge of the last panel run, or the rake condition. The above illustrations show the two positions of the rake plate.

If the leading edge of the finish panel extends more than three inches (4") beyond the rake angle, install the rake plate in the standard position.

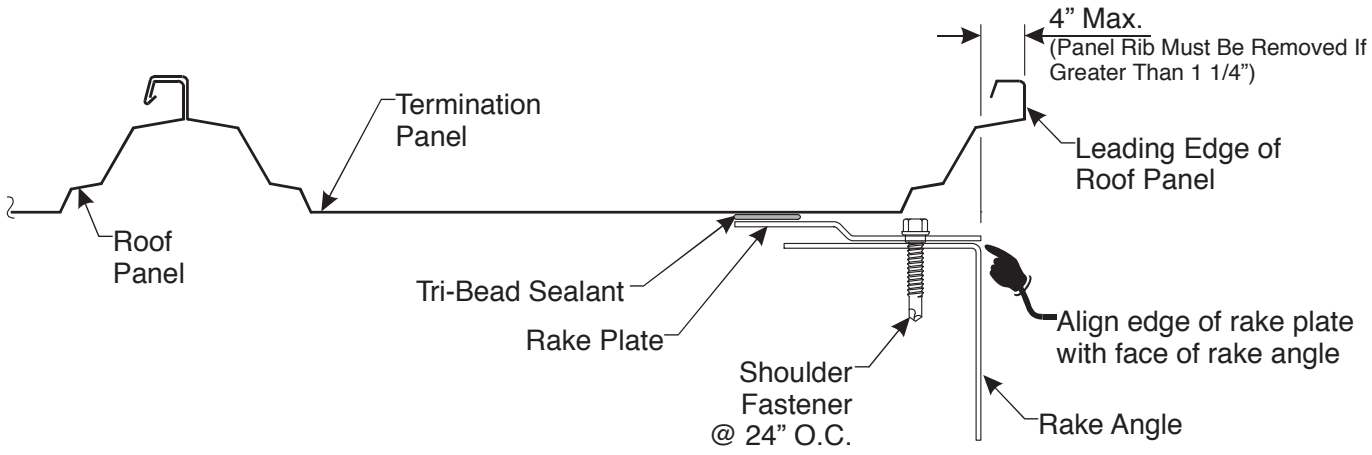
If the leading edge of the finish panel extends less than three inches (4") beyond the rake angle, install the rake plate in the alternate position.

If the rake condition requires transition flashing, install the rake plate in the alternate position, and refer to erection drawings for spacing from the face of the transition surface.

These instructions assume that the rake plate is to be installed in the standard position.



STANDARD RAKE PLATE POSITION



ALTERNATE RAKE PLATE POSITION

Rake Plate Installation at Eave

It is important that the rake plate is installed in a straight line and perpendicular to the building ridgeline.

If the rake angles have been installed straight and true, the edge of the rake angle can be used to align the rake plate.

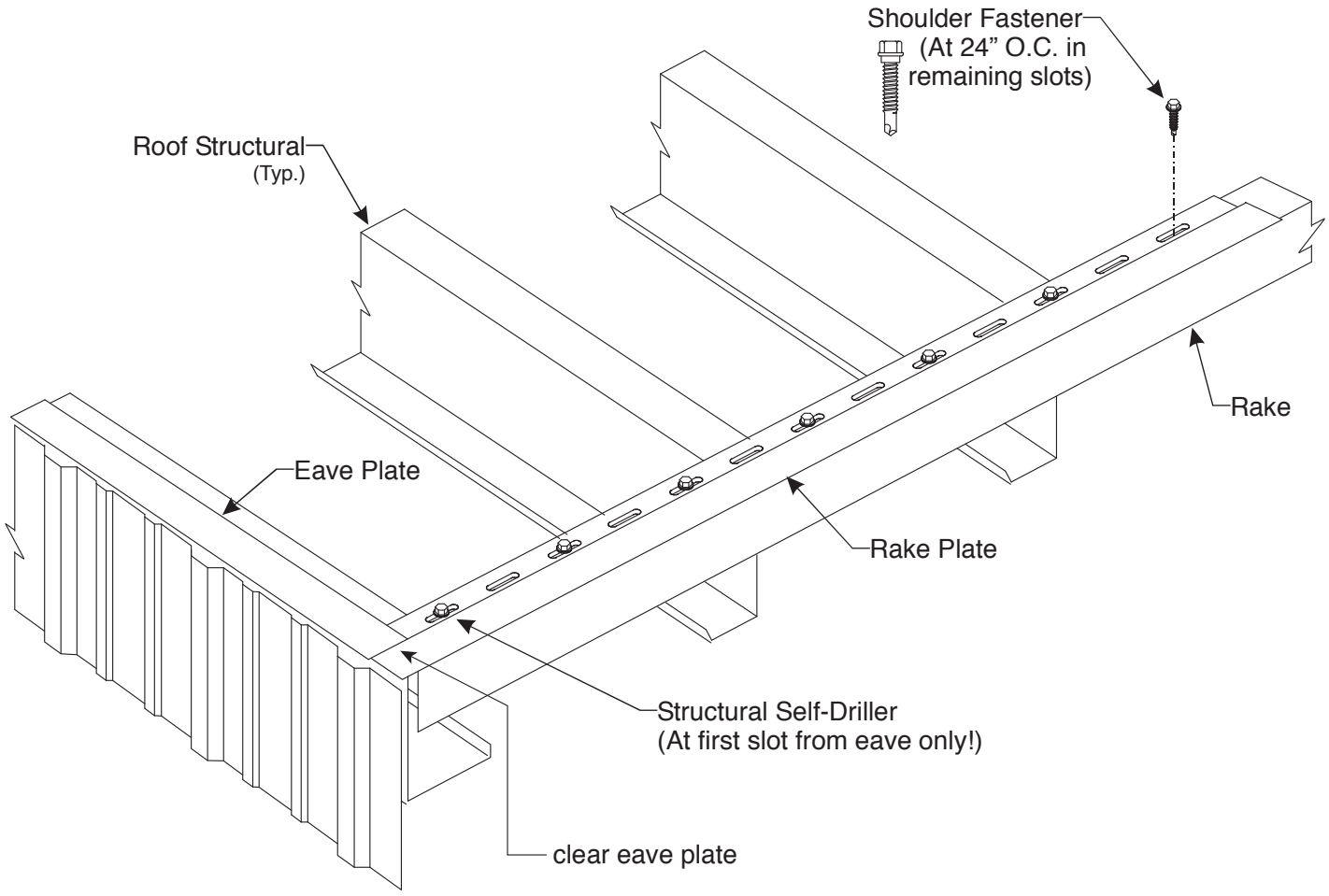
If the rake angle is not true and square, a chalkline should be used to guide the installation of the rake plate.

Start the lower end of the rake plate flush with the lower edge of the eave plate. The down-slope end of the rake plate must be notched to clear the lower leg of the eave plate.

Attach the down-slope end of the eave plate with one (1) structural fastener.

Use shoulder fasteners placed on 24" centers to attach the remaining portion of the rake plates.

The shoulder fasteners must be installed in the centers of the remaining slots in the rake plate, spaced at 24" on center, to allow for expansion and contraction of the roof panel.



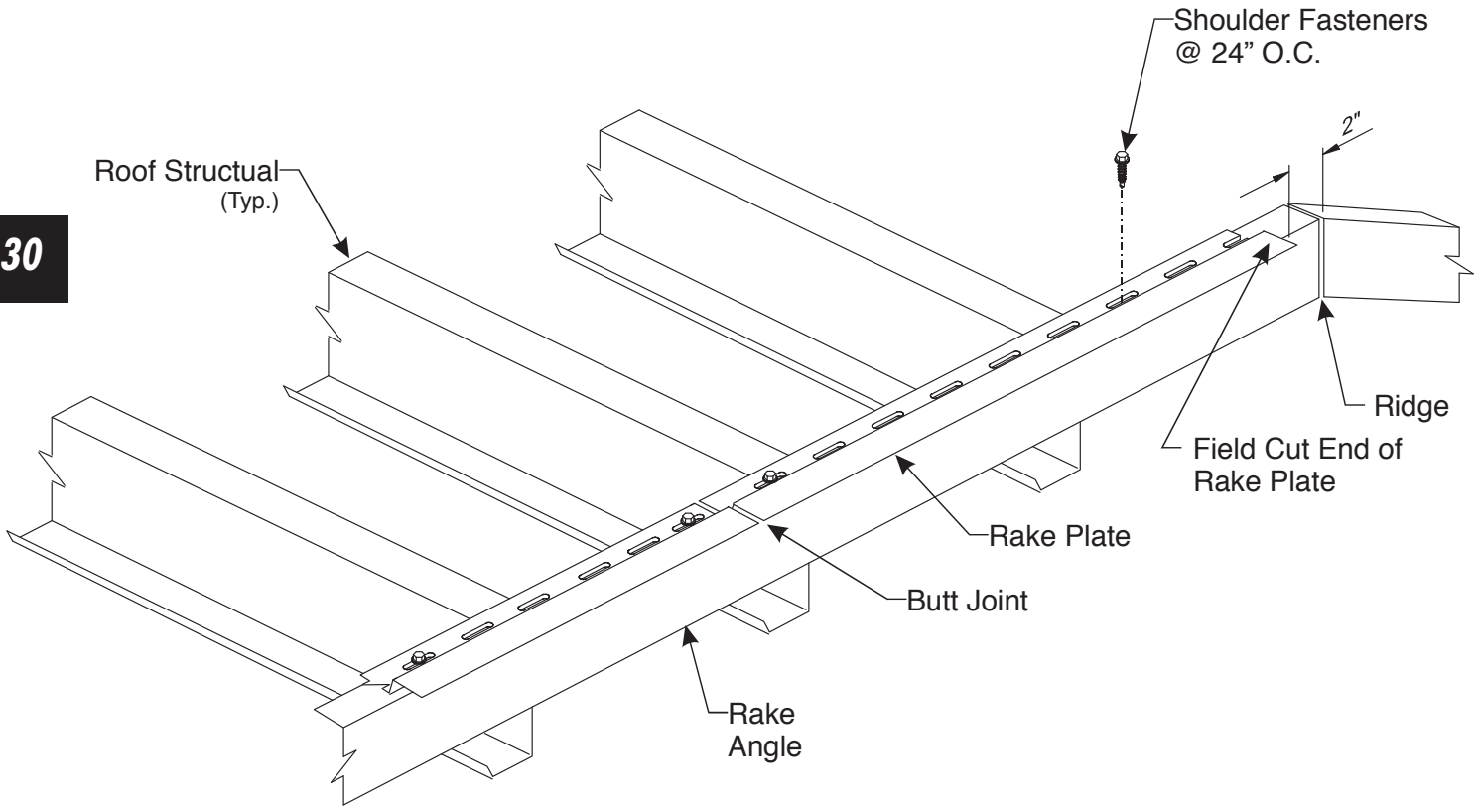
8. ROOF INSTALLATION DETAILS

Rake Plate Installation at Ridge

Butt the ends of the rake plate along the rake angle. Place shoulder fasteners in centers of the slots on either side of the butt joints.

Attach rake plates with shoulder fasteners located in the centers of the slotted holes, two feet on centers.

Field cut the last rake plate two inches (2") from the ridge or high edge of roof.



Install the Eave Trim

Place the upper lip of the eave trim over the eave plate as shown and align the face of the eave trim with the face of the wall panel.

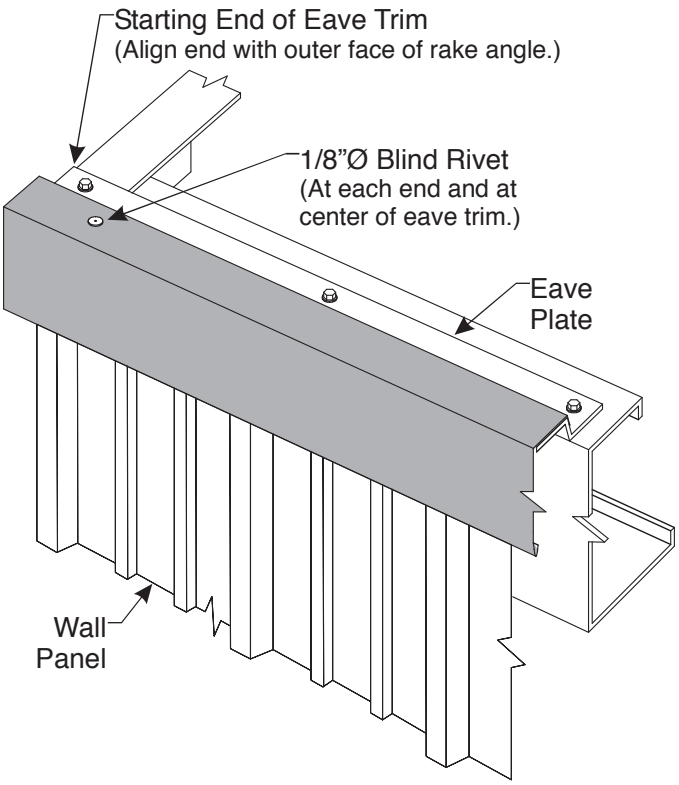
Install the starting and finish ends of the eave trim flush with the ends of the eave plate.

The eave trim provides a water seal between the roof panel and the wall panels. All laps of the eave trim must be sealed to minimize water entry.

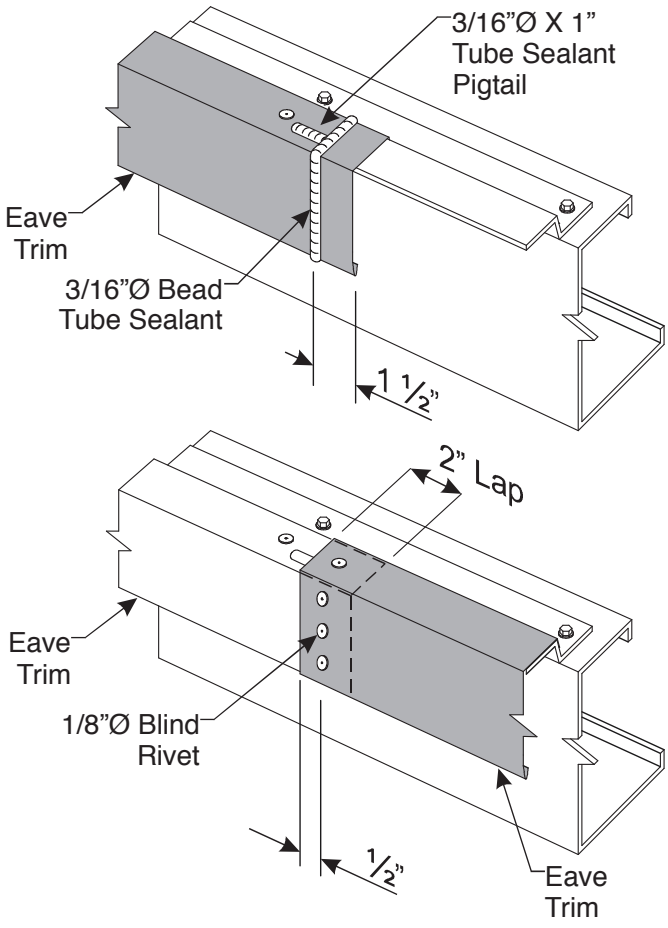
Fasten the eave trim in position with three blind rivets. The rivets will hold the trim in position until the roof panels are placed over the trim.

***** NOTE *****

Eave Trim configuration will vary from job to job. Refer to individual job's erection drawings for actual eave trim placement.



STARTING EAVE TRIM



EAVE TRIM SPLICE

8. ROOF INSTALLATION DETAILS

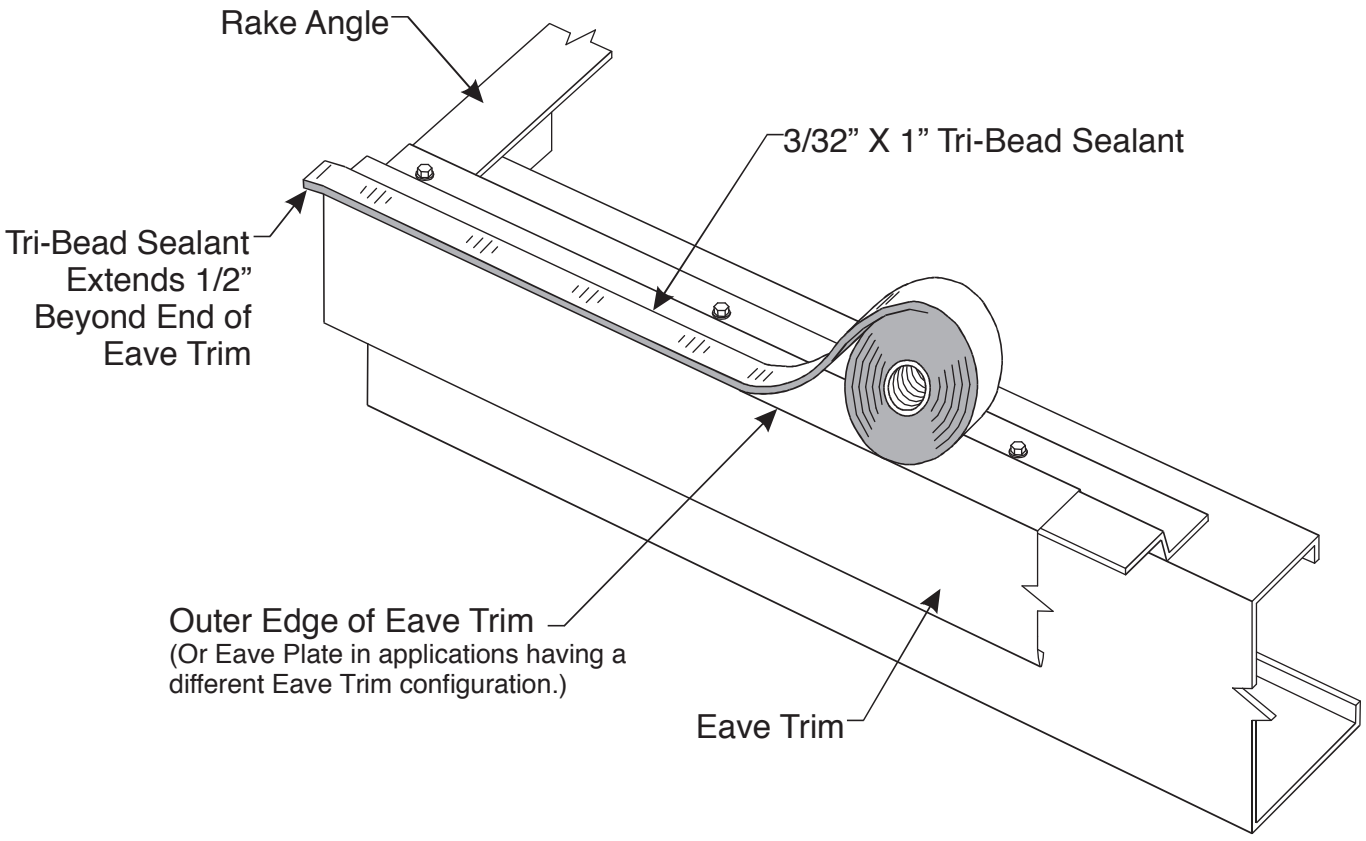
Place Eave Sealant

Apply a continuous strip of tape sealant along the top edge of the eave trim.

Align the outer edge of the sealant flush with the outer edge of the eave trim.

Do not remove the paper backing from the tape sealant at this time.

Until the roof panels are installed, the eave sealant is vulnerable to damage from foot traffic or dragging material over the eave. Do not step on or otherwise damage the sealant.



Install the First Run of Insulation

Refer to the erection drawings to determine the specific insulation required for the project. In all cases refer to the insulation manufacturer's instructions for proper insulation installation and vapor seal assembly. This detail shows fiberglass blanket insulation, which is the most commonly used insulation for metal standing seam roofs.

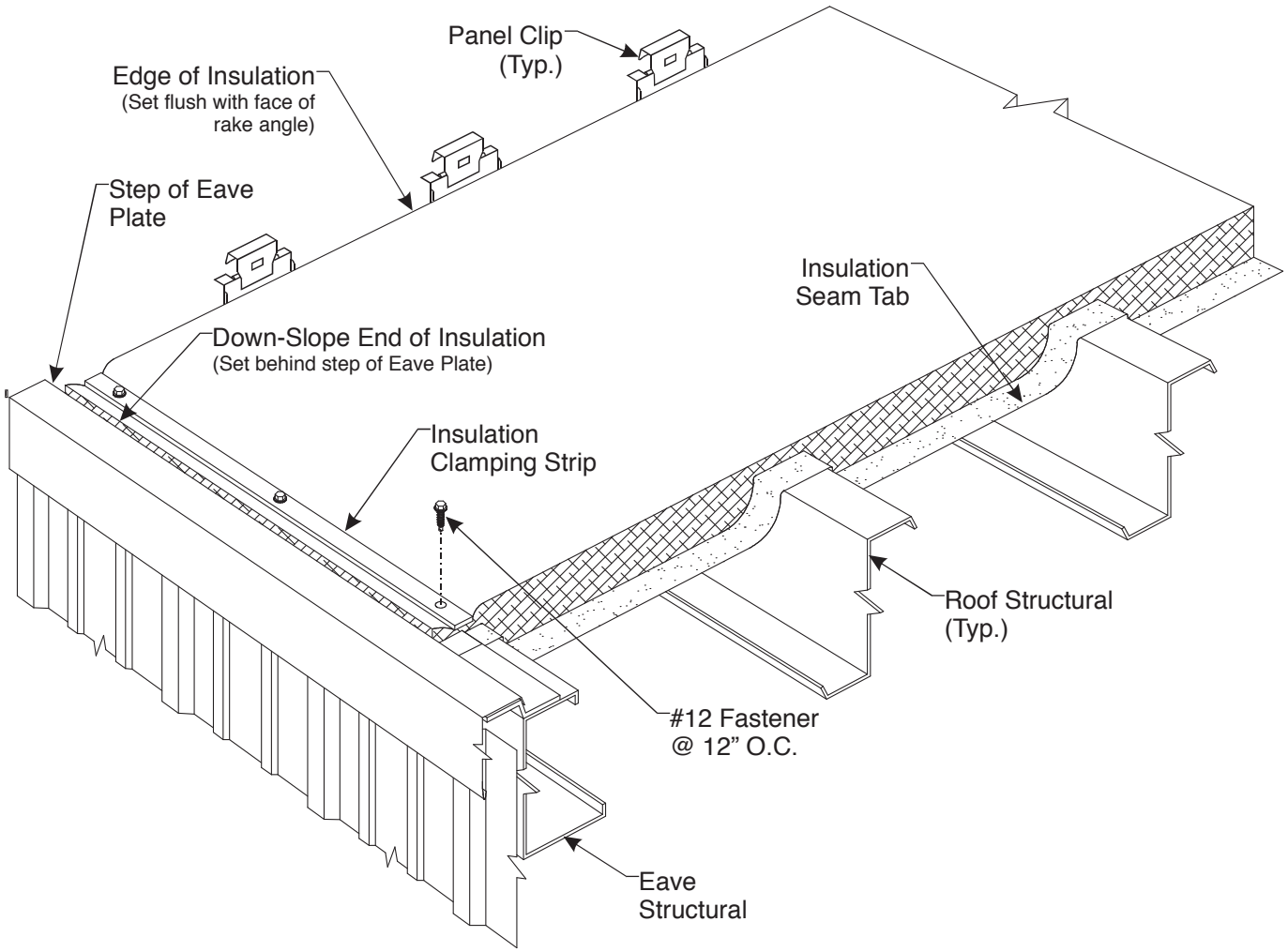
The leading edge of each insulation run should extend approx. 12" beyond the leading edge of the roof panel. This will allow for easy assembly of the vapor barrier seal between insulation runs.

With either four-foot or six-foot wide insulation, the first run should be installed to only cover three feet or five feet, respectively. The extra foot of width can be cut or lapped over the rake.

Use double-faced tape along the backside of the eave strut and along the rake angle to hold the insulation in place until the roof panel is installed.

In high wind areas or when using insulation thickness greater than four inches (4"), hold the insulation in place along the eave strut with a metal strap.

Do not extend the end of the insulation over the high flange of the eave plate and the eave sealant.



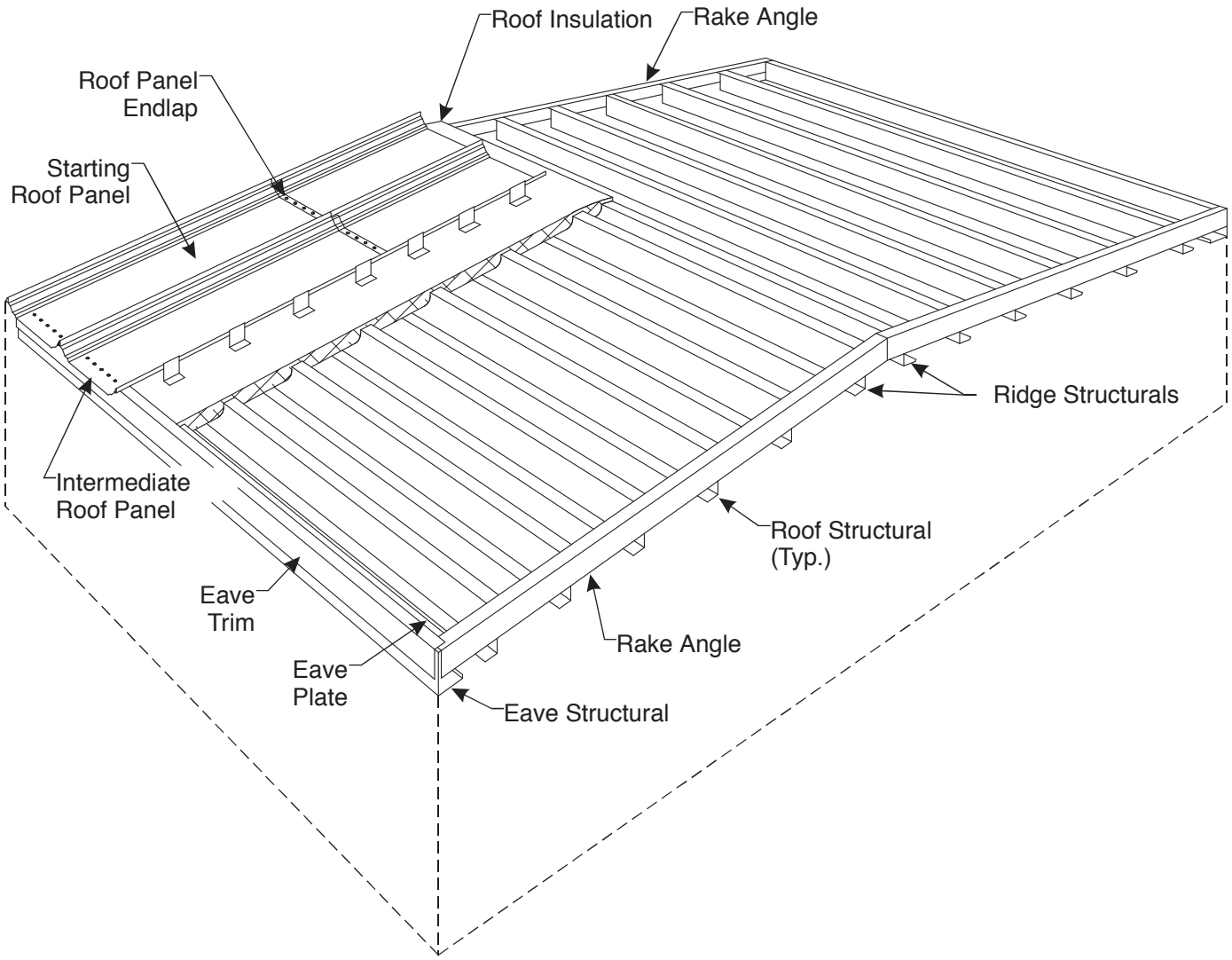
8. ROOF INSTALLATION DETAILS

8.3. Installation of Panels

The details in this section show the installation of the starting and intermediate roof panels.

The roof panel endlap details are shown as an integral part of the roof panel installation. If the project does not require roof panel endlaps, the endlap details are clearly identified, and can be deleted.

The termination roof panels require specific installation and are shown in a later section.

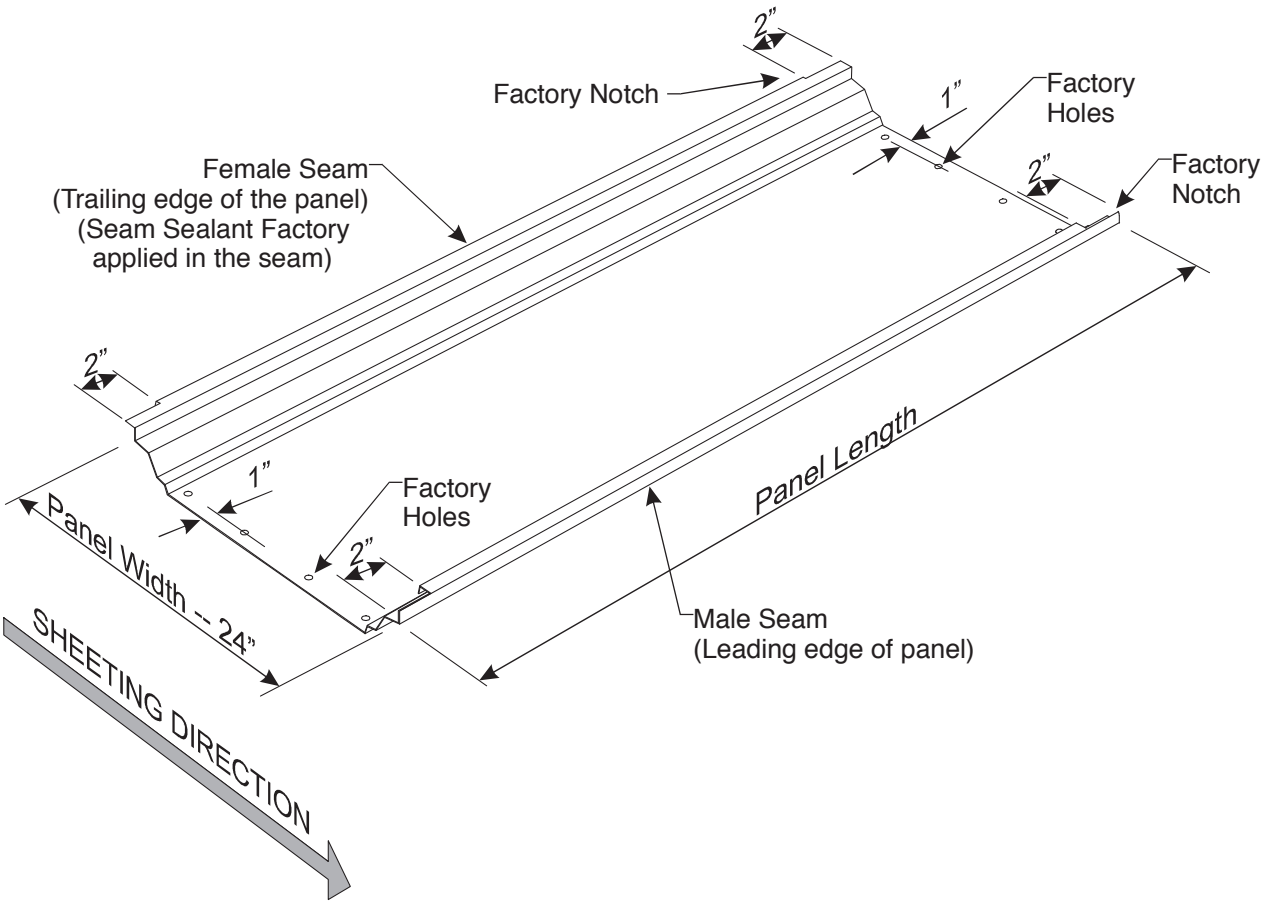


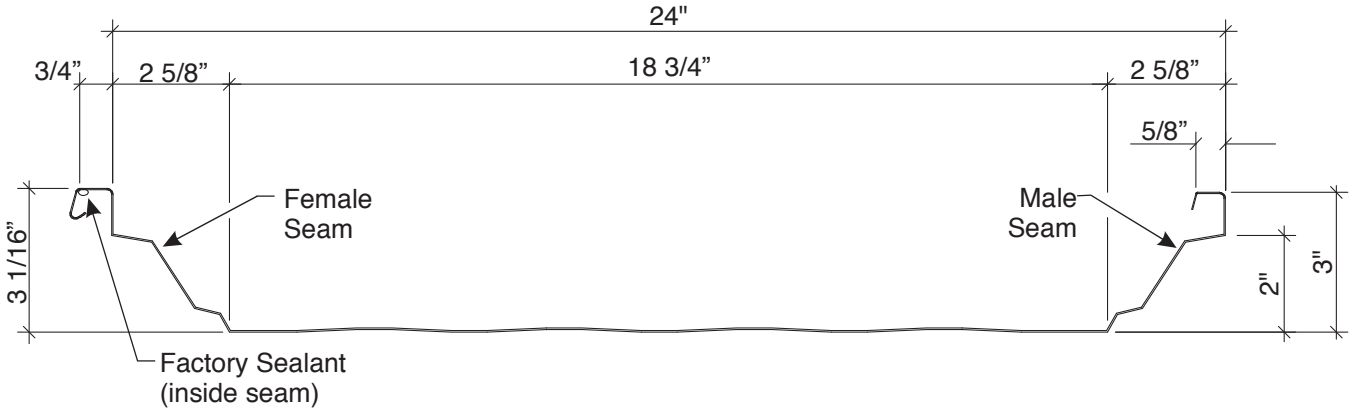
A. PANEL DESCRIPTION & NOMENCLATURE

Throughout these instructions, the references to the panel will be made using the terms shown on the below illustration.

The leading edge of the roof panel is the edge towards the sheeting direction. ***On the MTL roof panel, the male seam is always the leading edge.***

Before loading the panels onto the roof structurals, orient the panels so that the male seam is the leading edge.





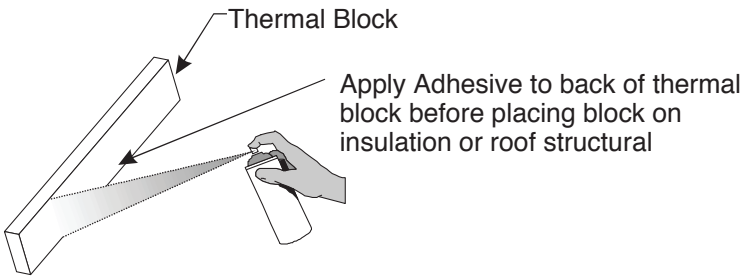
8. ROOF INSTALLATION DETAILS

B. FIRST PANEL RUN

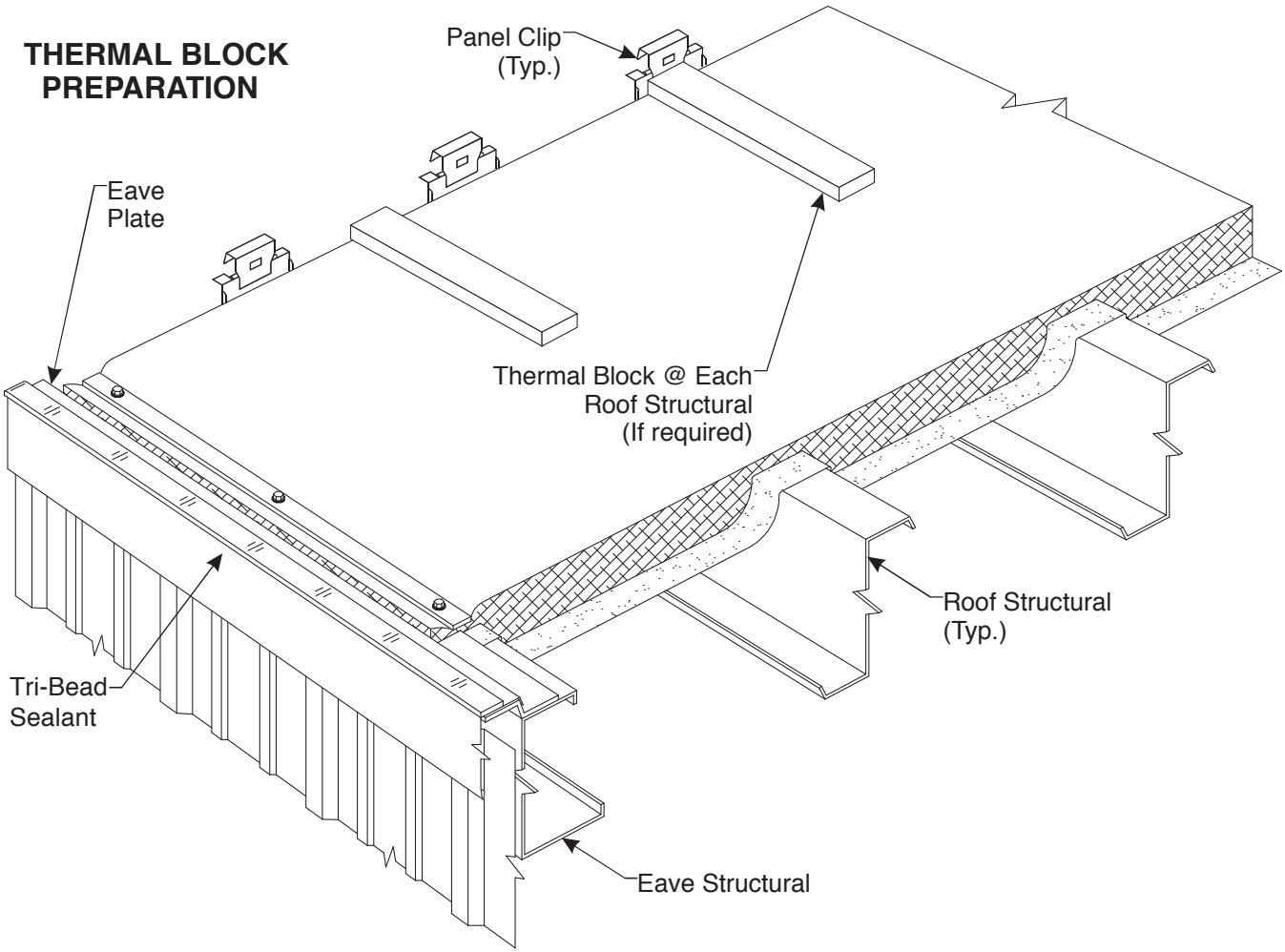
Thermal Block Placement

If thermal blocks are required, place them over each roof structural as shown above.

Applying a small amount of an adhesive to the bottom of the thermal blocks will help keep them in place until the roof panel is placed on top of them.



THERMAL BLOCK PREPARATION



First Roof Panel Placement

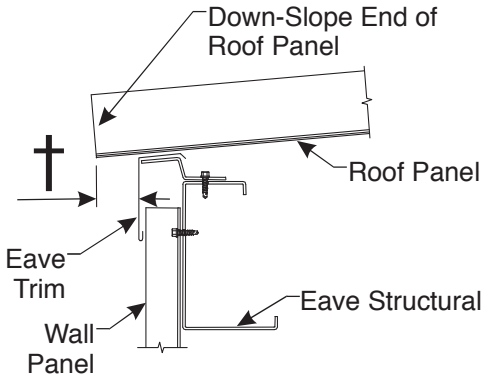
IMPORTANT: The overhang dimension is very critical, as it establishes the location of endlaps and ridge flashing attachment points.

Refer to the erection drawings for roof panel overhang dimensions required by your specific project.

Position the edge of the panel over the start clips and position the end of the panel beyond the face of the eave trim according to the start dimension given in the erection drawings.

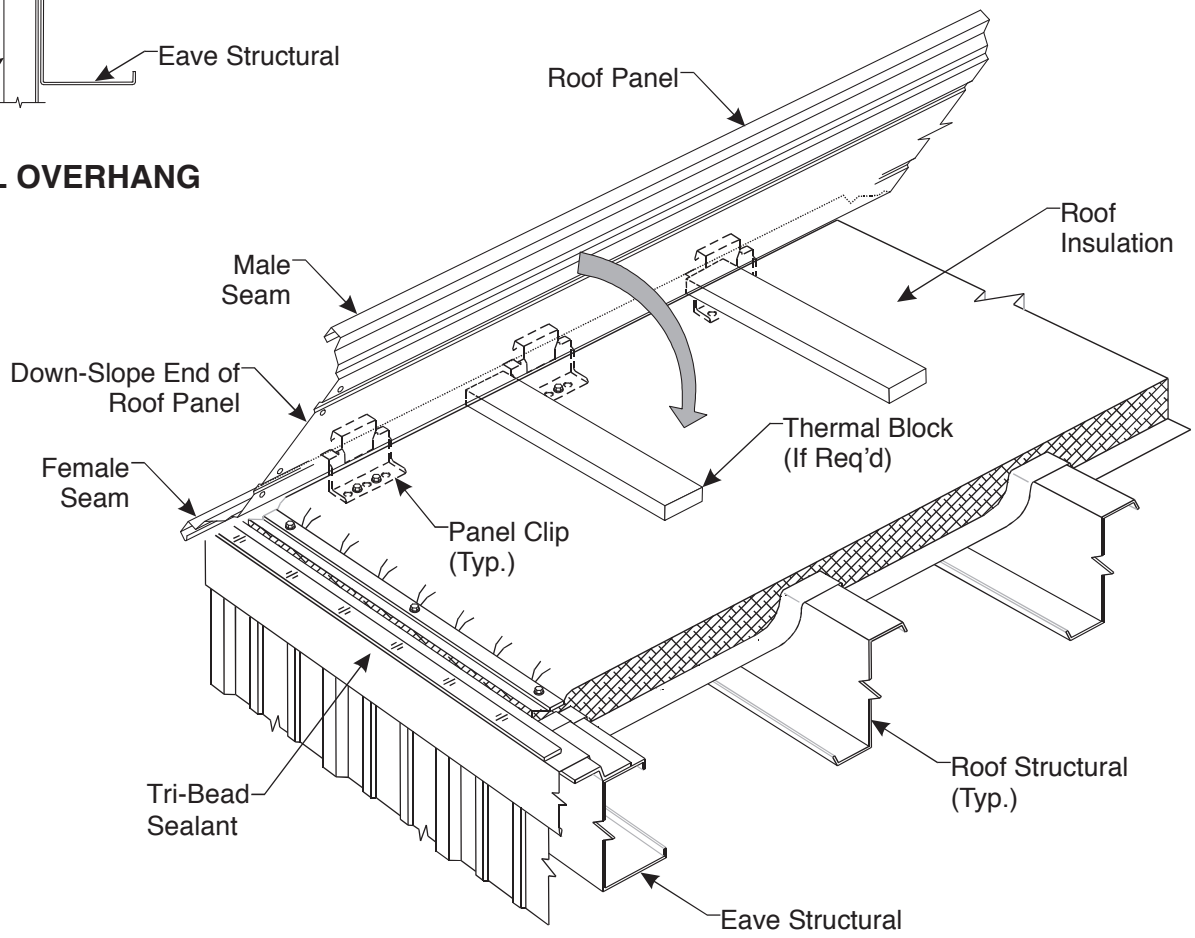
Tilt the panel as shown, so the female seam can be hooked over the start clips. Check that each clip is hooked inside of the seam.

Rotate the panel down to rest on the spacer blocks or insulation ***Do not remove the eave sealant's protective paper at this time.***



† NOTE
REFER TO ERECTION DRAWINGS FOR PANEL OVERHANG DIMENSION

PANEL OVERHANG



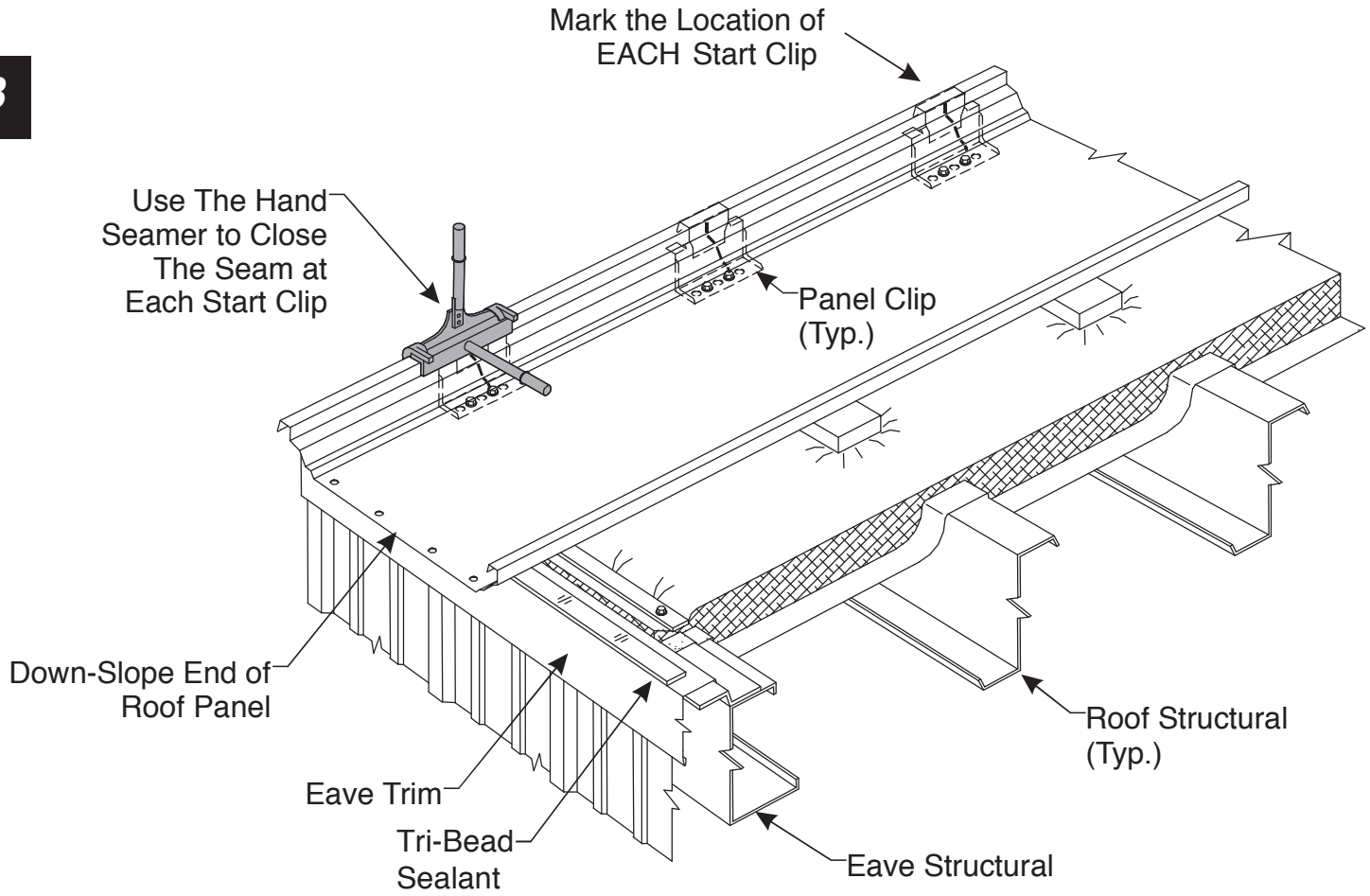
8. ROOF INSTALLATION DETAILS

Hand Seam the First Panel to the Start Clips

Before hand seaming the panel over the start clips, verify that the panel overhang dimension has not changed and is correct. Also verify that the panel is aligned with the building structure.

Using the hand seamer, crimp the female lip of the roof panel at each clip. This procedure will hold the panel in place until the rake trim is installed and a fastener can be placed through the rake trim, panel, and clip.

Mark the roof panel along the vertical leg at each start clip location. This will guide the later installation of the rake trim fasteners.



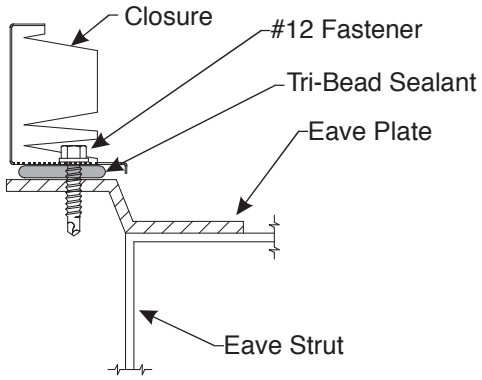
Install Eave Closure

Prepare the corrugation closures by applying tri-bead sealant along the top surfaces as shown in the above illustration, and remove the protective paper.

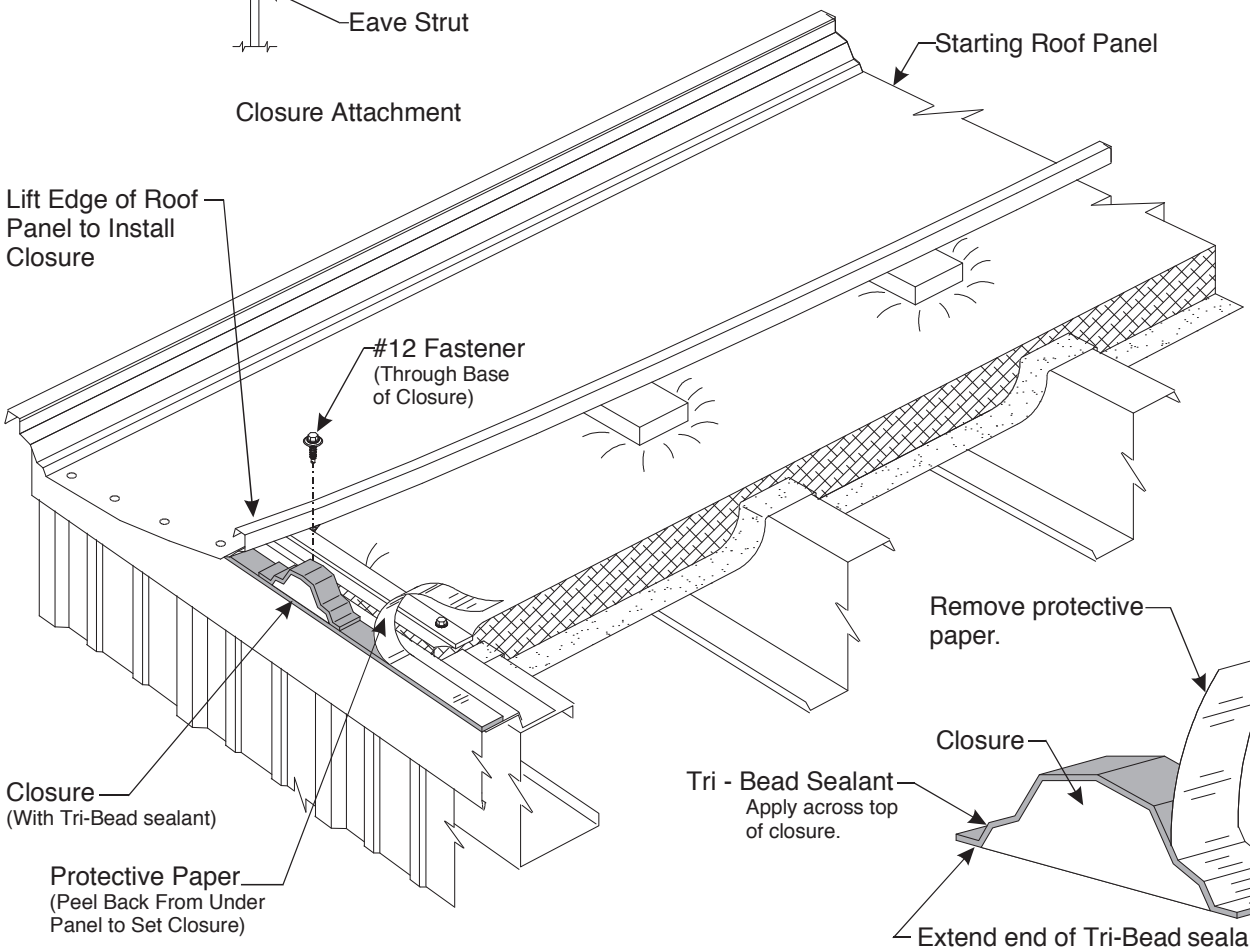
Peel back the paper backing from the eave sealant as shown.

Pick up the corner of the panel over the eave plate and place the closure against the panel corrugation and on top of the eave sealant.

Attach the closure with one #12 self drilling screw installed through the factory punched hole in the base of the closure.



Closure Attachment



CORRUGATION CLOSURE INSTALLATION

CLOSURE SEALANT

8. ROOF INSTALLATION DETAILS

Fasten First Panel

Before fastening the roof panel to the eave plate and fastening the leading edge of the panel with the panel clips, check that the panel coverage is correct and the leading edge of the panel is straight and parallel to the trailing edge.

Install four (4) roof fasteners at 6" on center through the panel at the eave. Position the fasteners to penetrate through the center of the sealant, through the eave trim and into the eave plate.

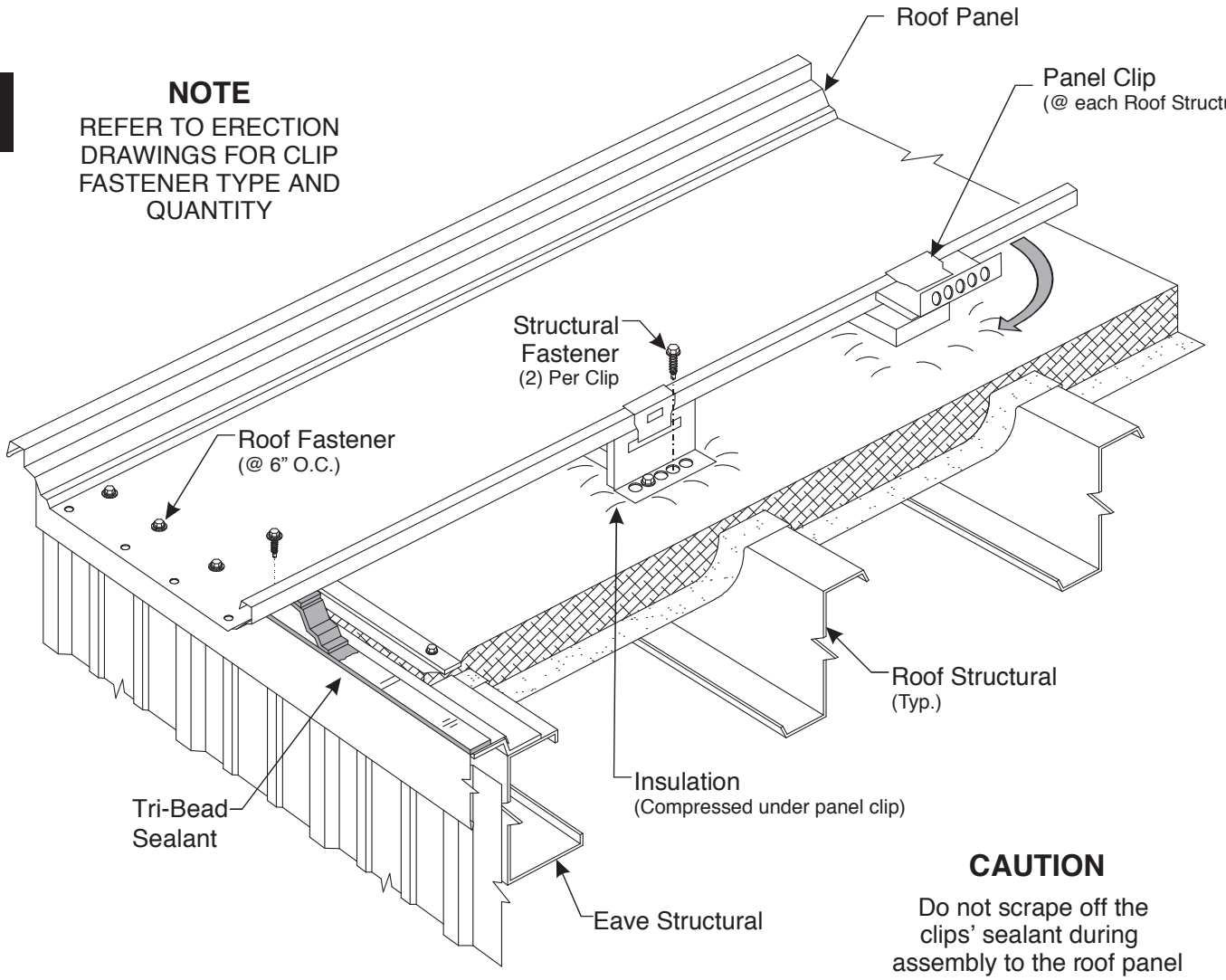
Install roof panel clips to the leading edge of the roof panel, at each roof structural. Panel clips are not required at the eave structural.

To install the clips, tilt the clip so that it's tab can be hooked over the edge of the roof panel's male seam, then rotate the clip down into the vertical position. Position the clip's base so that the clip fasteners can be installed through the holes in the base and into the roof structural.

When fiberglass roof insulation is used, the panel clips normally set on top of the insulation and the insulation is compressed between the clip's base and the top of the roof structural. In all cases, refer to the erection drawings to determine the required insulation assembly and the relationship of the panel clips to the insulation.

Specific clip installation instructions are on the following page.

NOTE
REFER TO ERECTION DRAWINGS FOR CLIP FASTENER TYPE AND QUANTITY



CAUTION
Do not scrape off the clips' sealant during assembly to the roof panel

Panel Clip Installation

Panel clips are available as either floating or fixed clips, and are available in different stand-off heights. Refer to the erection drawings to determine which clips are to be installed on your specific roof.

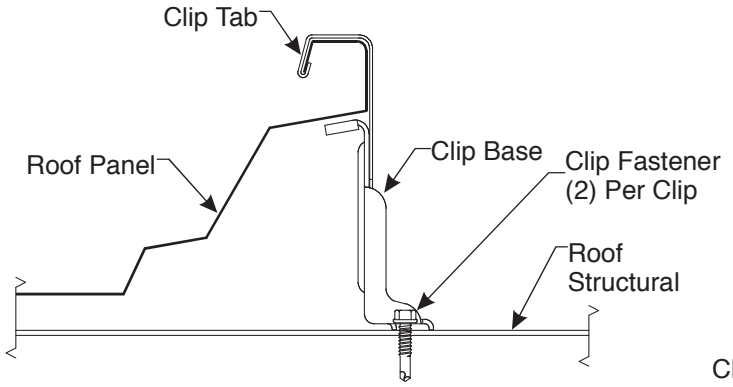
Install panel clips along the male edge of the panel at each purlin location.

Check that the panel clip's tab is seated tightly around the roof panel's seam and that the panel clip's hook has captured the panel's lip.

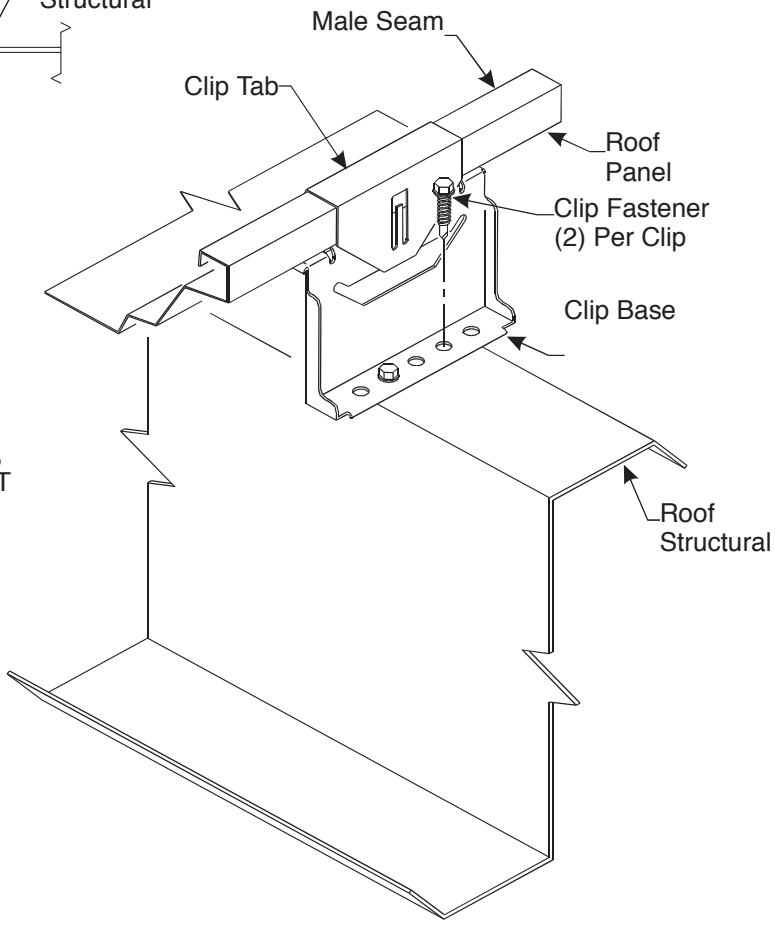
Check that the clip's base is vertical and that the base is set square and firmly over the roof structural.

Panel clip fastener type and quantity vary according to the roof structural material and roof load requirements. Refer to the erection drawings for the required type and quantity of panel clip fasteners.

Check that the clip fasteners are equally spaced through the clip base holes and are securely engaged into the roof structural.



VIEW ALONG PANEL RIB



***** NOTE *****

FOR CLARITY OF DETAIL, ROOF INSULATION IS NOT SHOWN

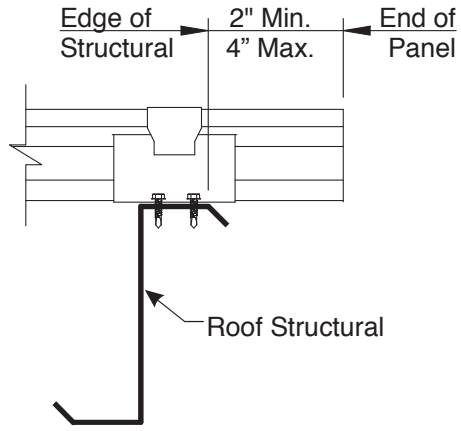
8. ROOF INSTALLATION DETAILS

Verify Panel Overhang at Purlin

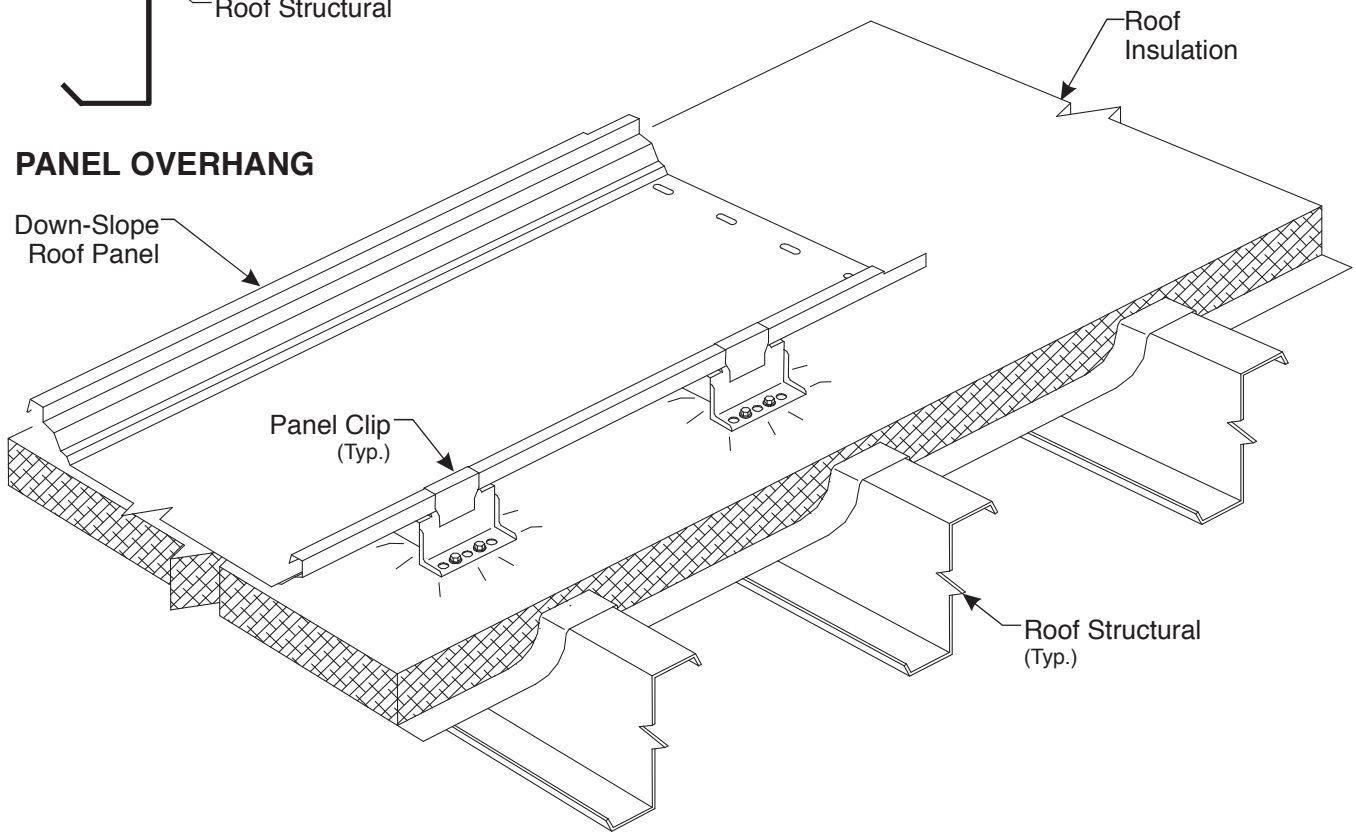
With the roof panel attached to the eave plate, measure the panel overhang at the purlin (see illustration).

The panel should extend 2" to 4" up-slope from the edge of the purlin or joist.

If the panel overhang is not within this range, call Mueller Building Systems before proceeding with the installation of roof panels.



PANEL OVERHANG



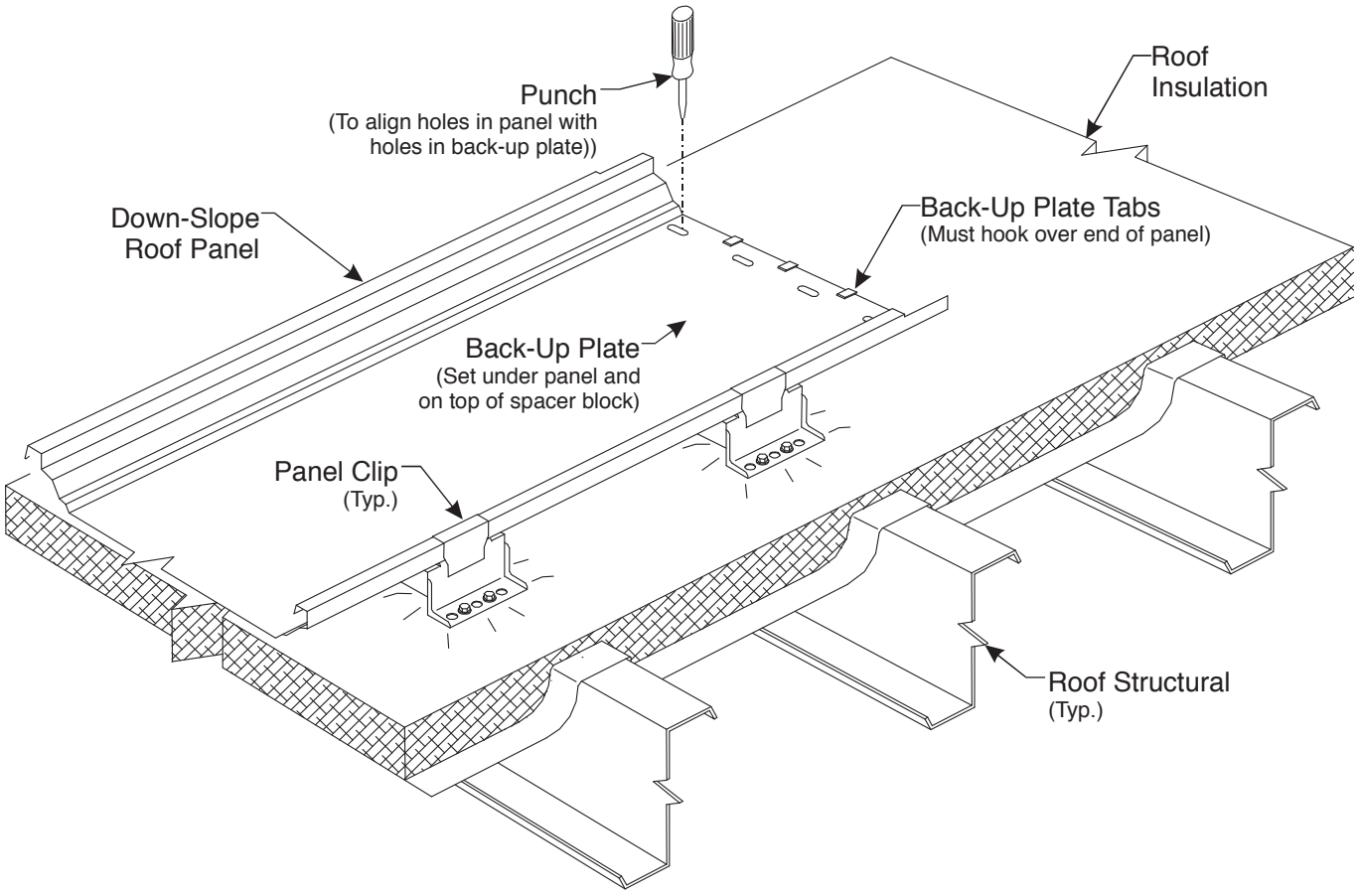
Install back up plate

Slide the back-up plate over the end of the panel, as shown.

The downslope edge of the back-up plate must rest over the top of the roof sturctural. If spacer blocks are used, the back-up plate must be set over the spacer block.

The back-up plate's tabs must hook over the end of the roof panel.

Be sure the factory punched holes in the back-up plate are aligned with the factory punched holes in the roof panel.^



8. ROOF INSTALLATION DETAILS

Place Endlap Tri-Bead Sealant

The proper placing of the endlap sealant is very critical to the water resistance of the roof endlaps.

Before installing the Tri-Bead sealant, the roof panel's surface must be wiped clean and dry.

Install a continuous strip of Tri-Bead sealant along the end of the roof panel, as shown.

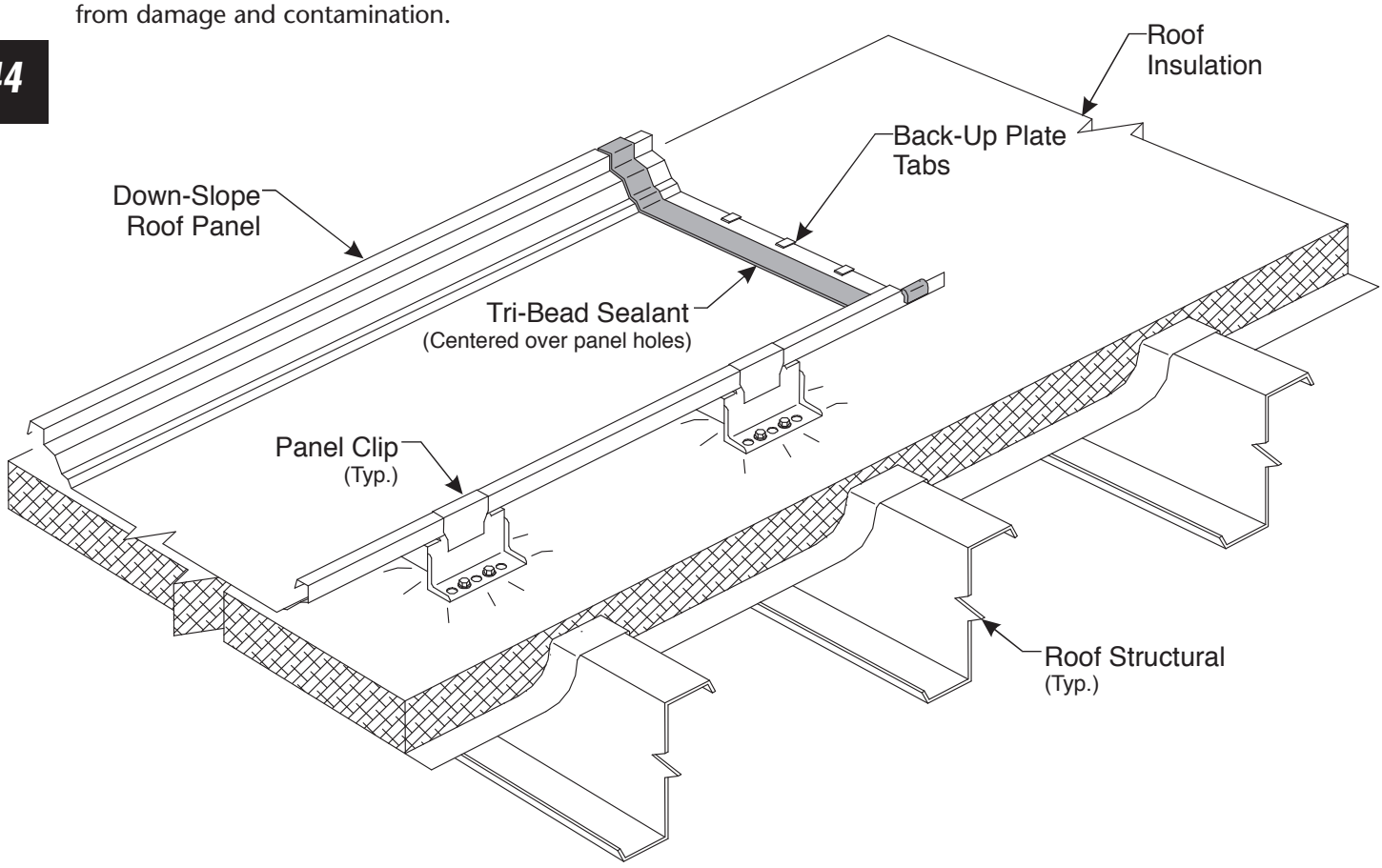
Position the sealant so that it is centered over the factory punched holes in the end of the roof panel.

Check that the sealant fully contacts the roof panel's surface and that it is completely fitted into the panel corners and around the seams.

The sealant's protective paper helps to retain the sealant's shape during installation and protects the sealant's surface from damage and contamination.

Do not remove the protective paper from the sealant until immediately before the installation of the up-slope roof panel.

Refer to the next page for specific details of the Tri-Bead sealant placement.^



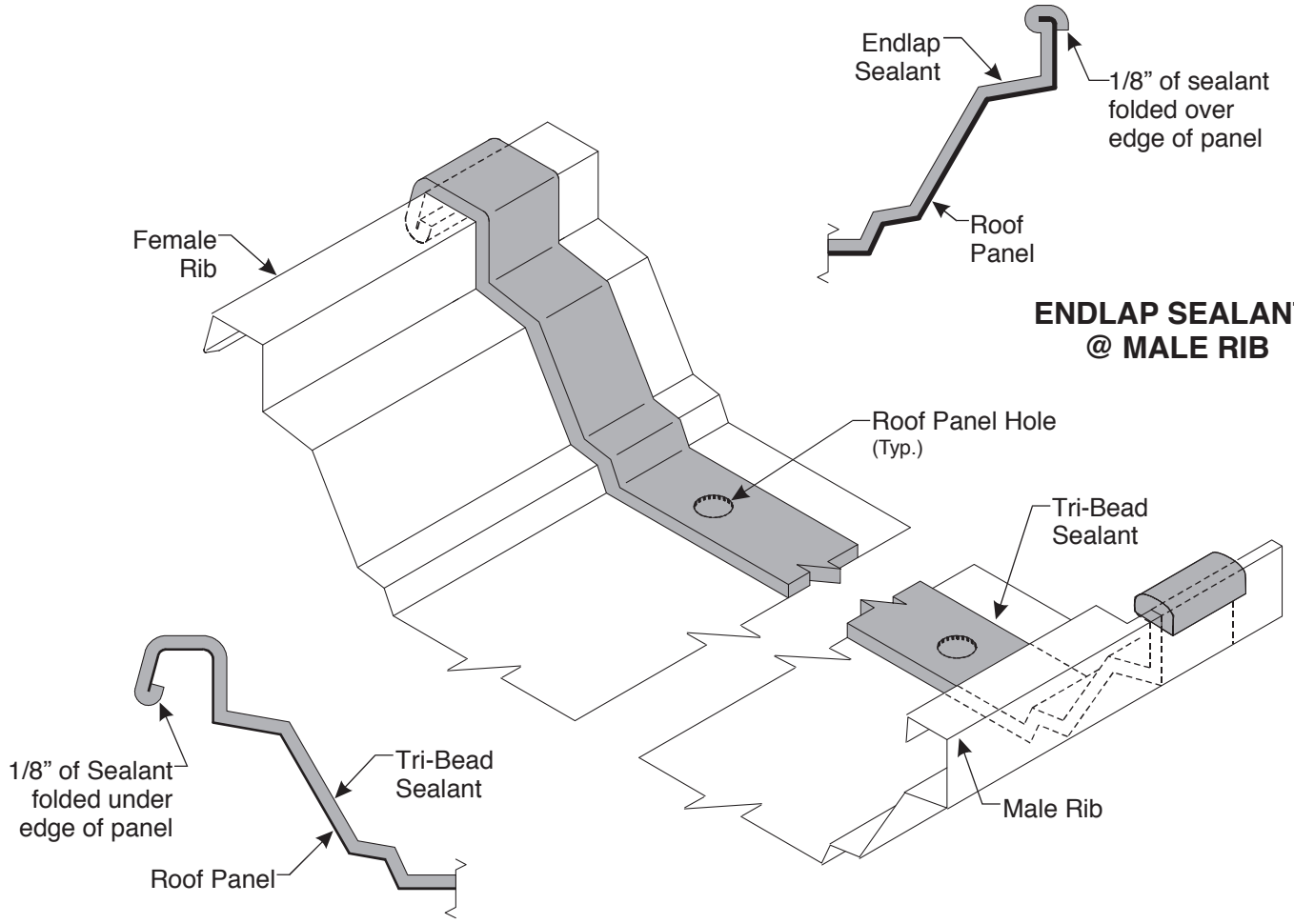
Tri-Bead Sealant Placement Details

Cut the Tri-Bead sealant to be fitted around the roof panel's seams, as shown.

Check that the 1/8" ends of the sealant are correctly folded around the roof panel's edges.

Excess selant in the roof panel seams will cause difficult panel assembly. Remove any excess sealant.

After the sealant is correctly positioned, uniformly press the sealant against the roof panel's surface to assure adhesion. Do not use excessive pressure, which can thin the sealant.



ENDLAP SEALANT @ MALE RIB

ENDLAP SEALANT @ FEMALE RIB

8. ROOF INSTALLATION DETAILS

Up-Slope Panel Placement

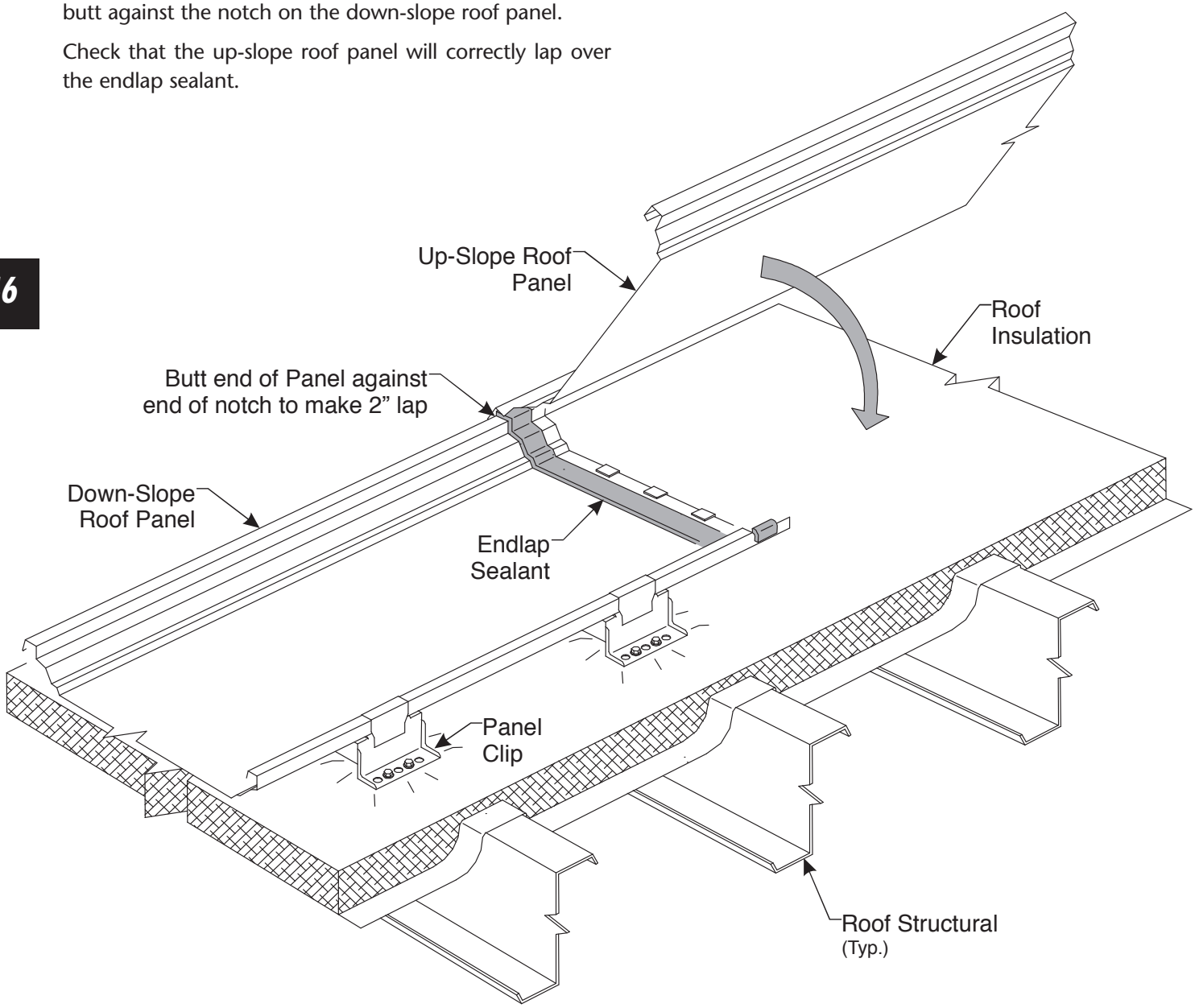
Make sure the underside of the up-slope panel has been wiped dry and clean.

Remove the protective paper from the installed Tri-Bead sealant.

Position the up-slope roof panel to make a 2" lap over the down-slope roof panel.

At the seams, the end of the up-slope roof panel should butt against the notch on the down-slope roof panel.

Check that the up-slope roof panel will correctly lap over the endlap sealant.



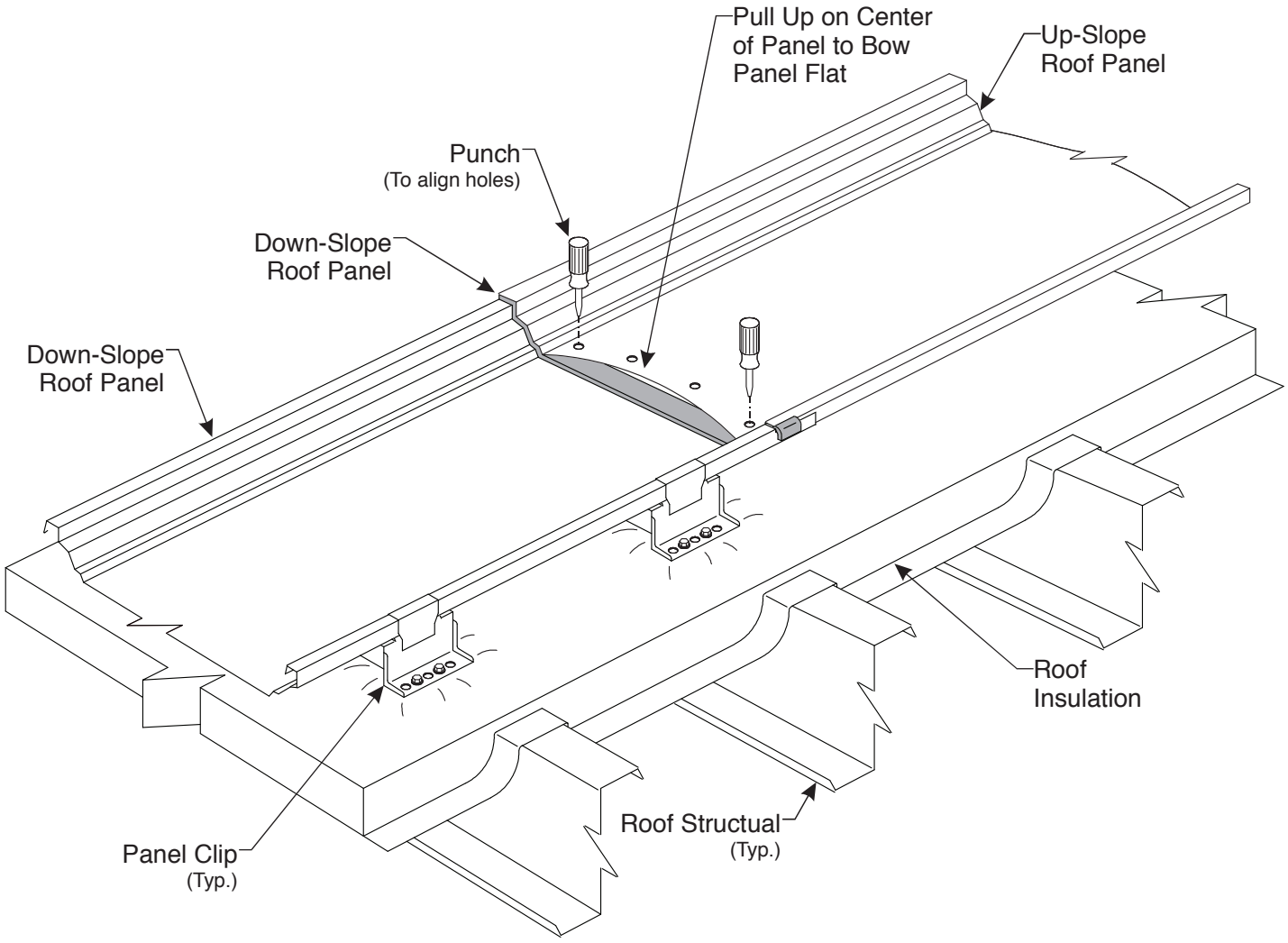
Panel Endlap Alignment

Lower the up-slope roof panel to lap onto the downslope roof panel.

While lowering the up-slope roof panel, bow the end of the panel by pulling up on it's center. This will allow the panel to more readily nest into the down-slope panel.

Use punches to align the factory punched holes of the lapping panels. The punch will have to penetrate through the endlap sealant and into the holes in the back-up plate. Do not disturb the position of the sealant while inserting and removing the punch.

Do not remove the punches from the roof panel holes until after the seam clamps have installed, as shown on the following page.



8. ROOF INSTALLATION DETAILS

Clamp the Seams

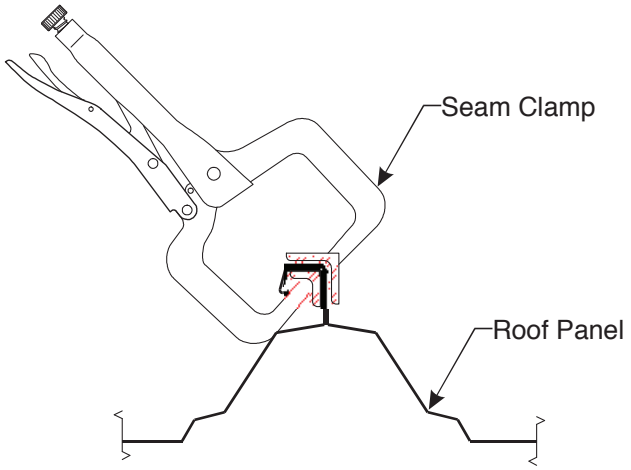
Use the seam clamps to draw the lapping panel seams together, as shown.

Check that the clamp jaws are correctly aligned to the seam before closing the clamp. Misaligned clamps can distort and damage the roof panel seams.

Slowly close the clamp to allow the sealant to flow between the lapped seams.

With the seam clamps installed, uniformly press down on the up-slope panel to close the panel lap and to assure adhesion to the endlap sealant.

Do not remove the seam clamps until after the endlap cinch strap has been installed.

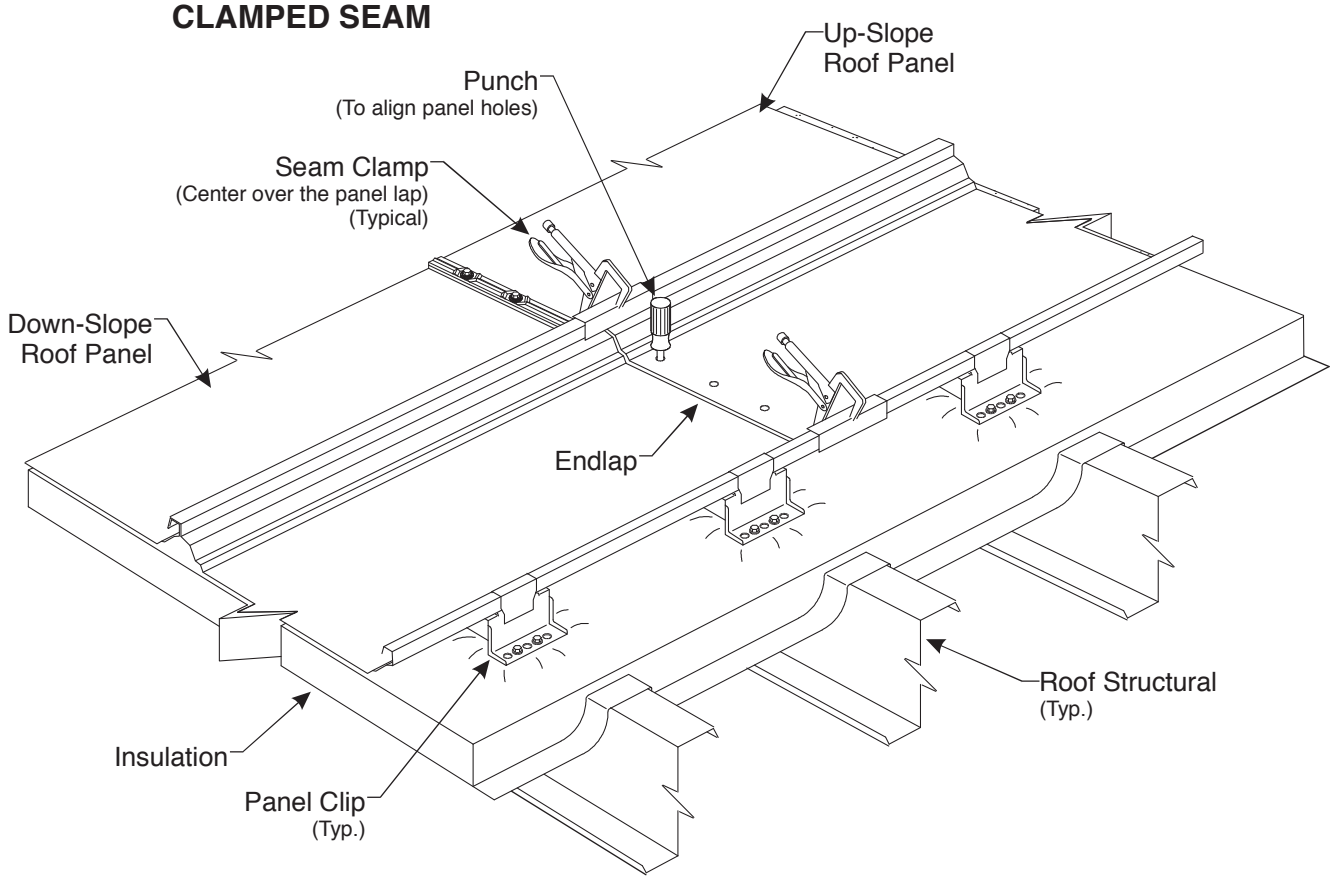


CLAMPED SEAM

****** NOTE ******

The seam clamping procedure illustrated in this section is an optional method for maintaining proper panel module.

This procedure should only be required during very cold weather conditions, when the panel rib sealant may be less pliable.



Install Cinch Strap

A cinch strap is not required on all roof applications. Refer to your erection drawings to determine if a cinch strap is required.

If a cinch strap is not required, use the following procedures but without placing the cinch strap. Fastener spacing is the same as required at the eave.

If a cinch strap is required, position the cinch strap so the factory punched holes align with the factory punched holes in the panel.

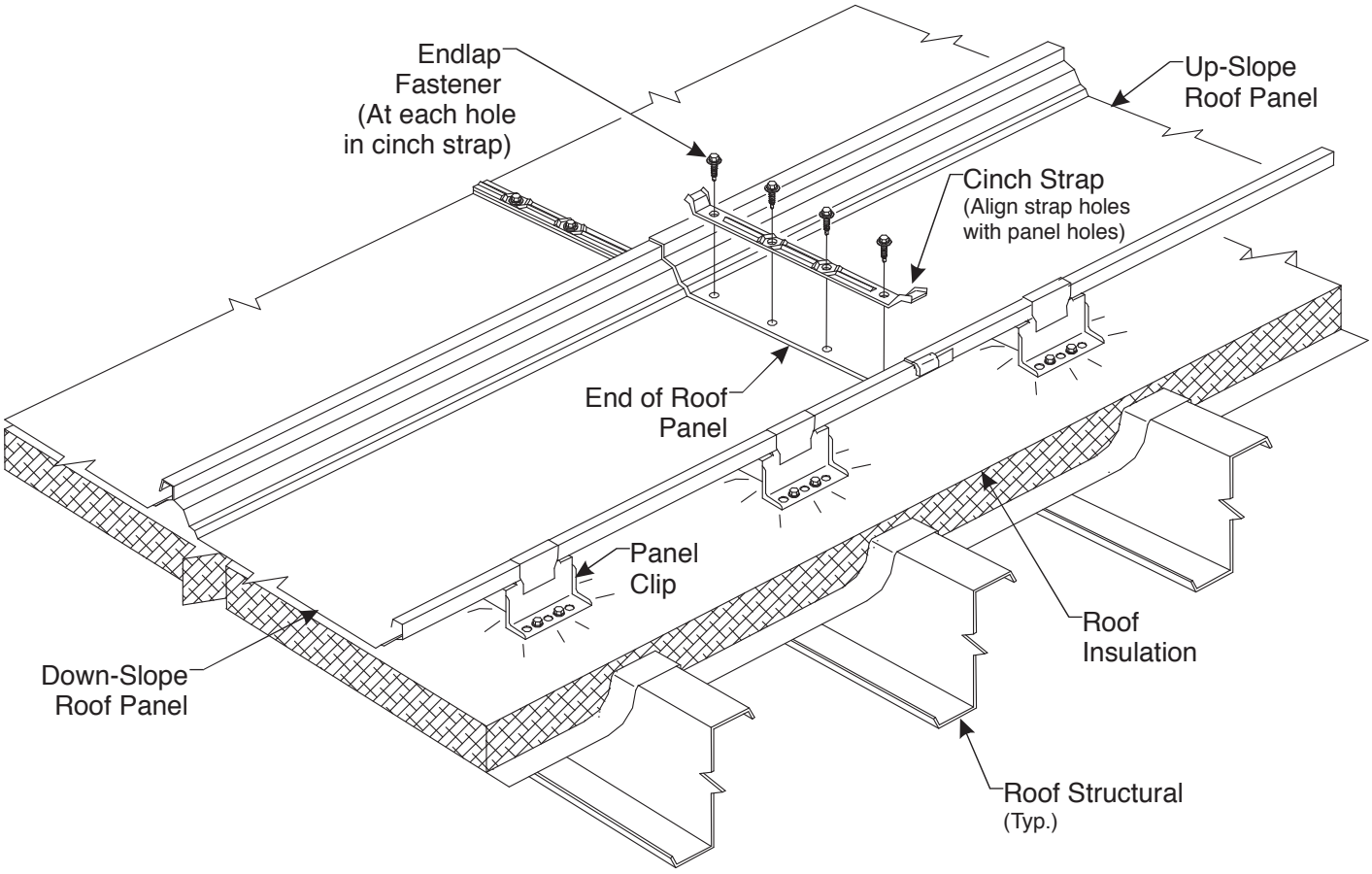
Use a short punch to align the factory punched holes in the cinch strap, panel, and back-up plate.

Install endlap screws at each end of the cinch strap, next to the panel legs. Next, install fasteners in the remaining holes.

IMPORTANT

Be sure the endlap screw engages both roof panels and the back-up plate so a tight compression of the endlap sealant is achieved

Specific endlap details are shown on the following page.

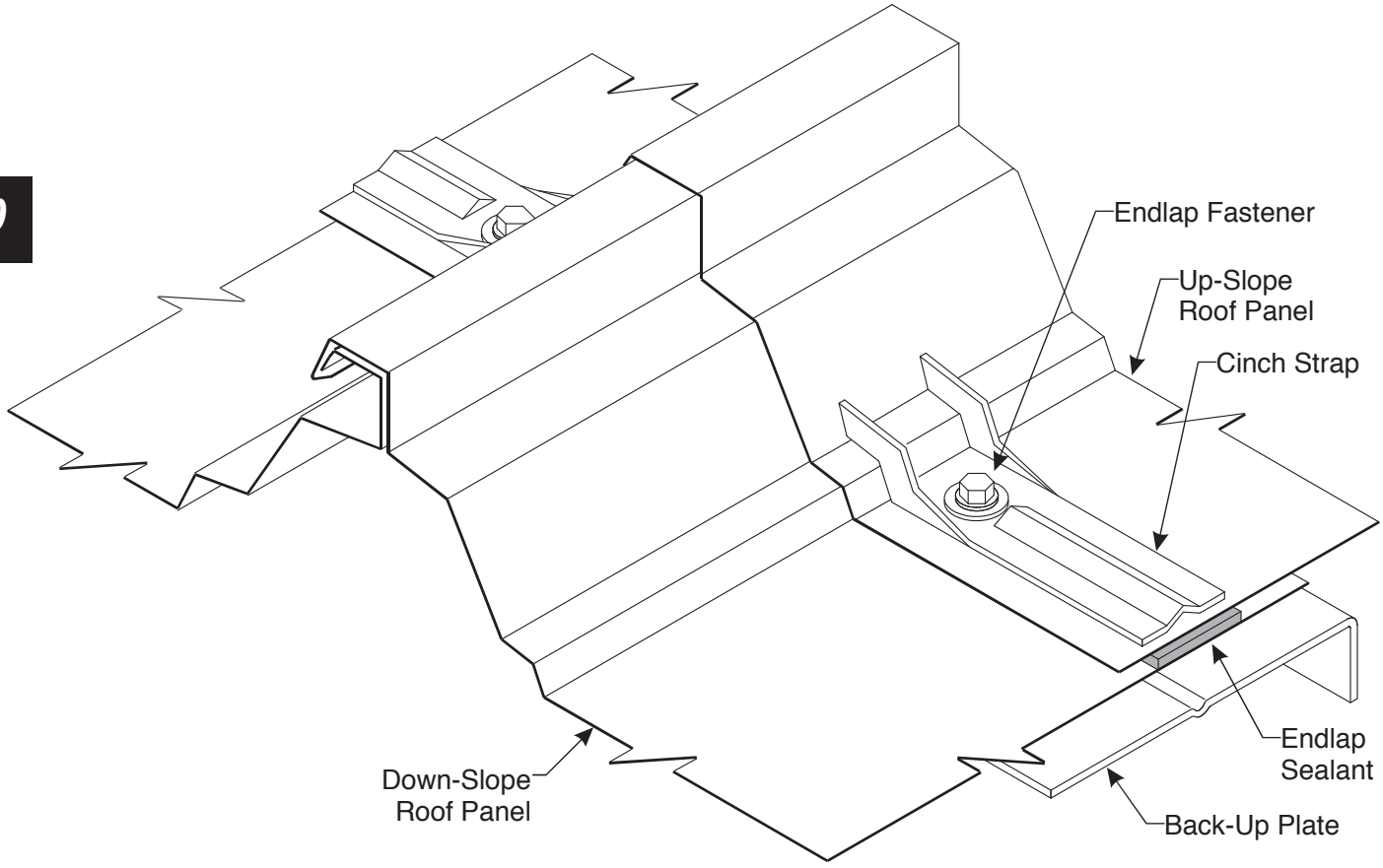


8. ROOF INSTALLATION DETAILS

Properly Assembled Endlap Detail

The below illustration shows a properly installed cinch strap and back-up plate.

Check that there are no unsealed voids between the lapped panels, especially at the critical corner areas.

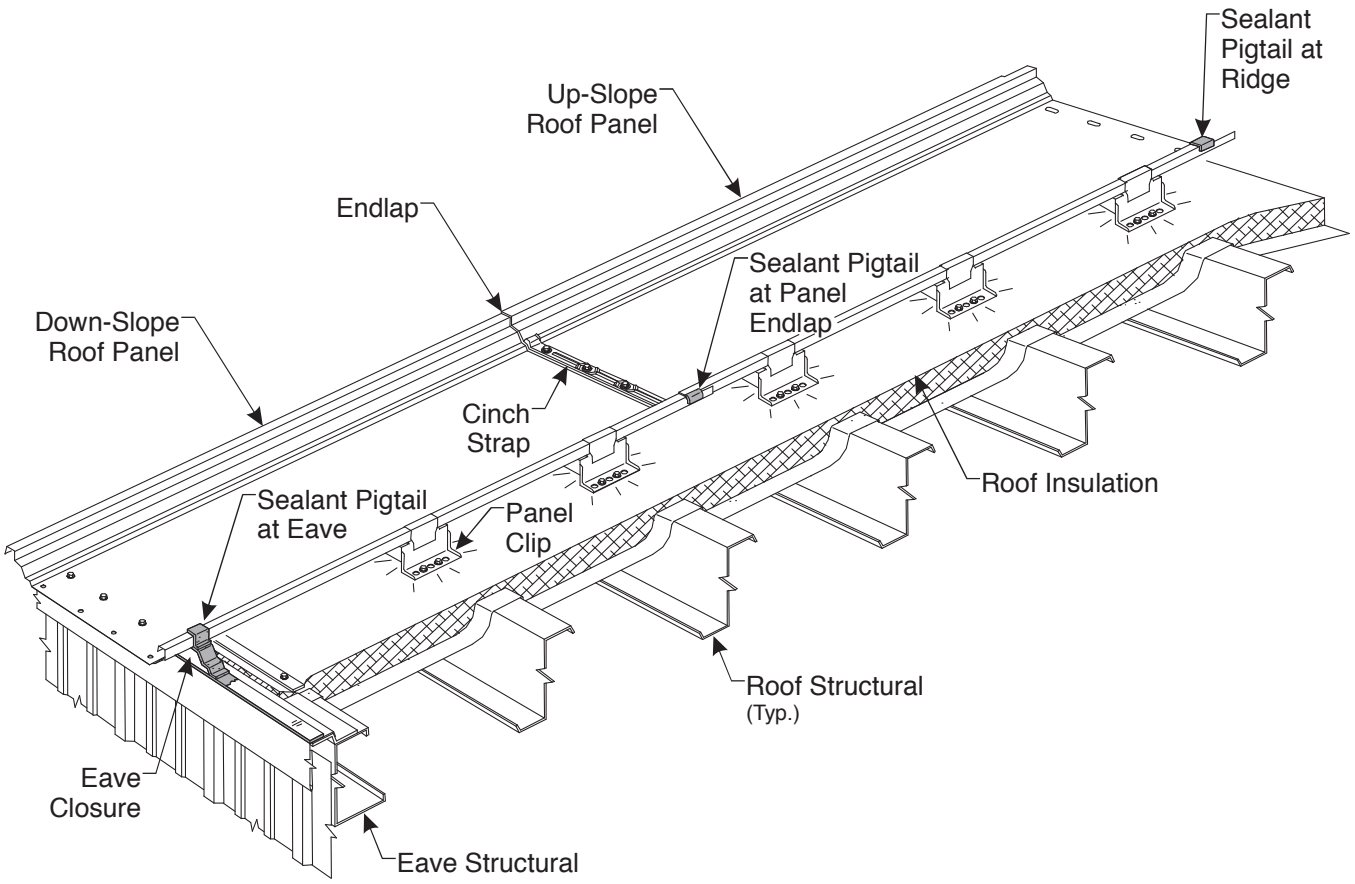


Install Sealant Pigtails

The sealant pigtails must be correctly installed before the next roof panel run can be installed.

Install the eave, endlap, and ridge pigtails on the leading edge of the roof panel, as shown.

Be sure to place the sealant pigtails as shown. If pigtails are left out, the joint will not be water resistant.



8. ROOF INSTALLATION DETAILS

Tri-Bead Sealant Pigtail Placement at Eave and Ridge

Cut the Tri-Bead Sealant pigtails to be fitted around the roof panel's seam as shown above.

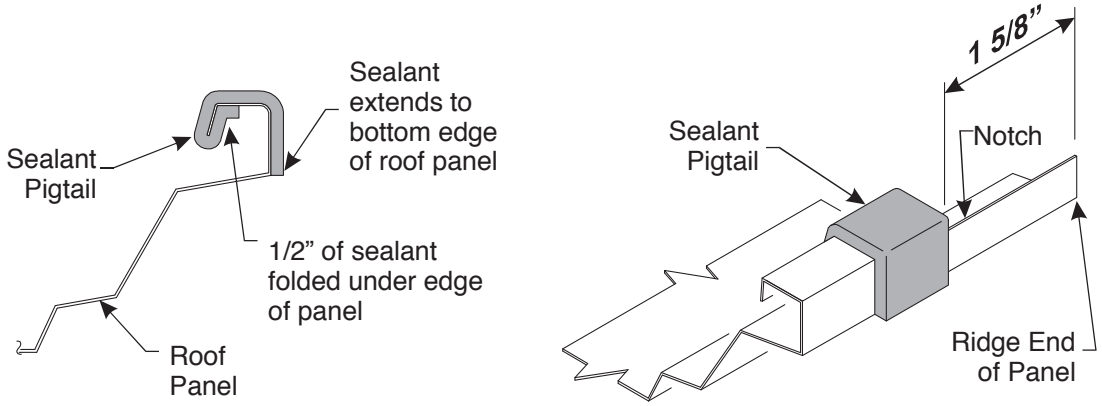
At the eave, lap a 1/4" piece of the sealant onto the corrugation closure's sealant. Cut the other end of the sealant pigtail so 1/8" can be folded under the edge of the roof panel.

At the ridge, position the sealant pigtail so it's edge is 1 5/8" from the end of the roof panel. The sealant must lap over the edge of the roof panel's notch.

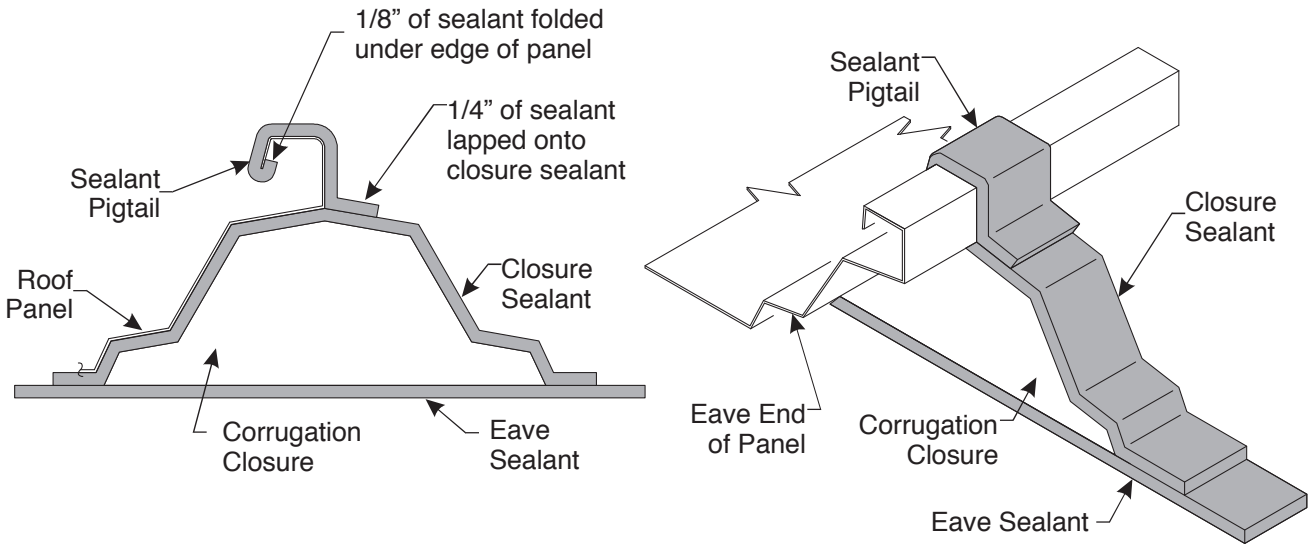
Fold 1/2" of the ridge sealant pigtail under the edge of the roof panel. Cut the other end of the sealant so it sets flush with the bottom edge of the roof pane's seam.

Excess sealant in the seams will cause difficult roof panel assembly. Remove any excess sealant.

After the sealant pigtail is correctly placed, uniformly press the sealant against the panel's surface to assure adhesion.



DETAIL OF RIDGE
TRI-BEAD SEALANT PIGTAIL



DETAIL OF EAVE
TRI-BEAD SEALANT PIGTAIL

Endlap Pigtail Placement

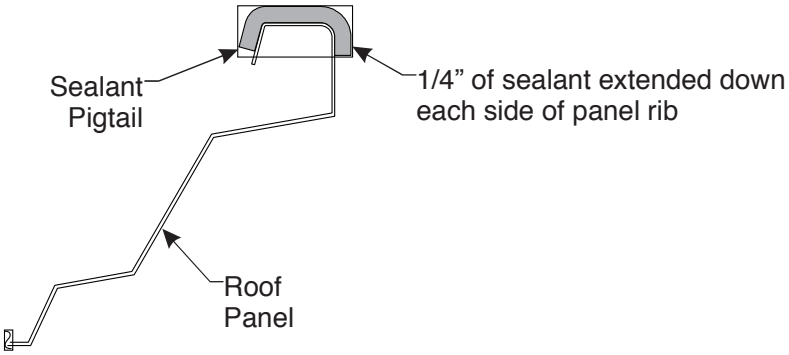
Cut the Tri-Bead Sealant pigtail to a 3" length and fit it around the roof panel's seam as shown.

Position the sealant pigtail to lap 1/8" beyond the down-slope end of the roof panel's notch.

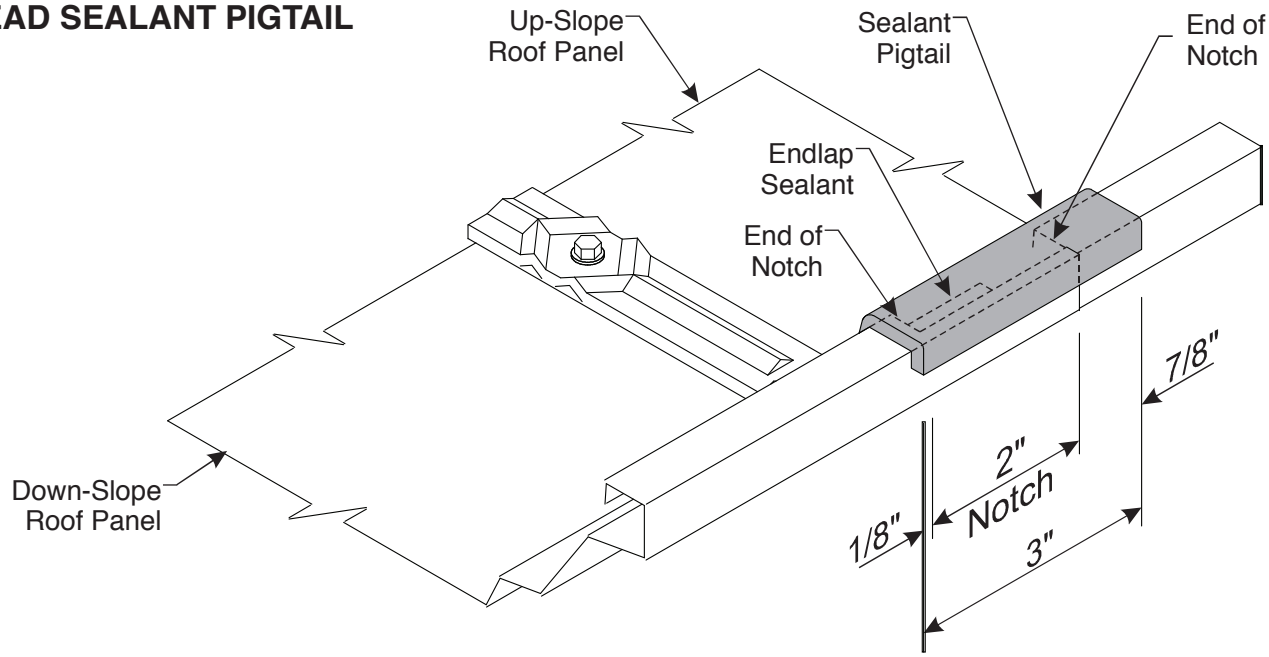
Center the sealant over the roof panel's seam. Fold the edges of the sealant down, over the sides of the seam.

Excess sealant in the seams will cause difficult roof panel assembly. Remove any excess sealant.

After the sealant pigtail is correctly placed, uniformly press the sealant against the panel's surface to assure adhesion.



DETAIL OF ENDLAP
TRI-BEAD SEALANT PIGTAIL



8. ROOF INSTALLATION DETAILS

C. INTERMEDIATE PANEL RUN

Place the Second Eave Panel

Be sure the sealant pigtail on the vertical leg of the previous panel at the eave is in place.

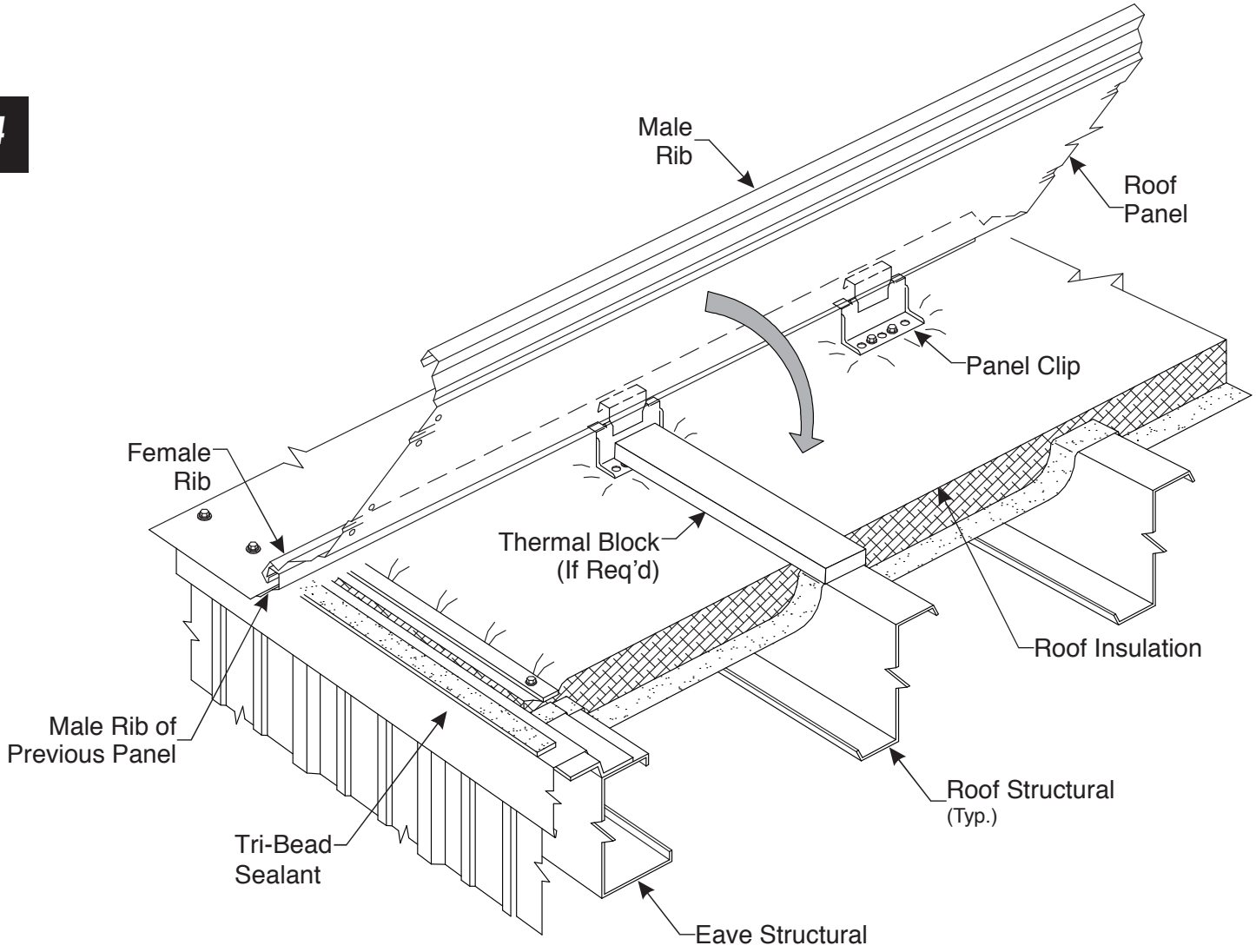
Remove just enough paper backing from the Tri-Bead sealant along the eave to allow the installation of one panel.

If required, position the thermal blocks on top of the insulation, as shown for the starting panel run.

Position the panel so the eave end is flush with the previously installed eave panel, and the trailing edge is over the leading edge of the previous panel.

Tilt the panel up as shown, so the female seam can be hooked over the male seam of the previous roof panel

Specific roof panel sidelap assembly details are shown on the following page.



Panel Sidelap Assembly

It is easier to hook the roof panel seams together if the roof panel is first tilted up to the vertical position.

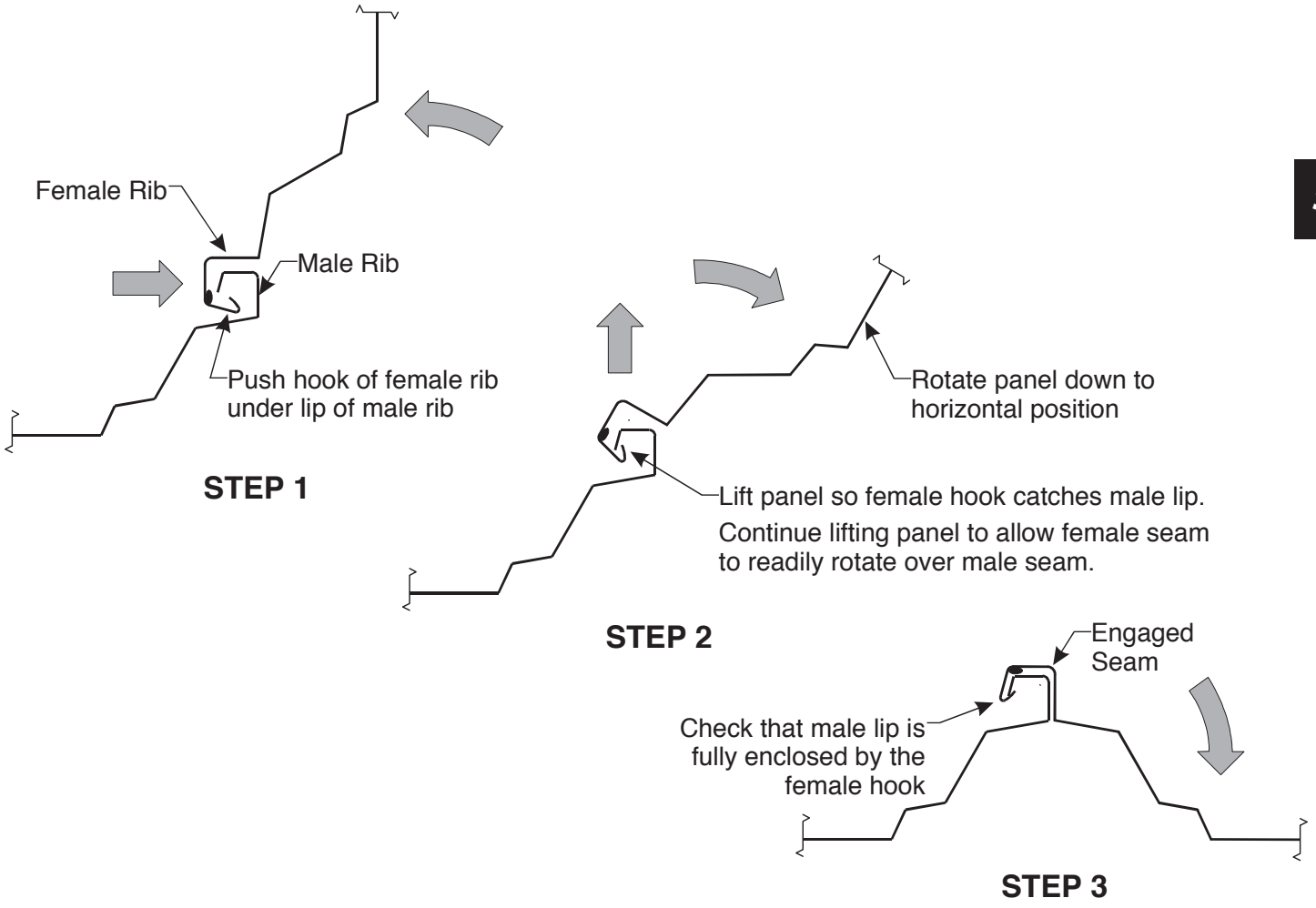
With the roof panel in the vertical position, align it's female rib to slide under the male rib of the previous roof panel.

With the female rib under the male rib, lift up the roof panel so the female rib's hook catches the lip of the male rib.

While continuing to lift up on the roof panel, rotate the panel down to rest on the insulation or thermal blocks.

IMPORTANT

Check that the female hook has enclosed the male lip along the entire length of the roof panel. If not, the roof panel sidelap must be correctly reassembled before installing the next roof panel.



8. ROOF INSTALLATION DETAILS

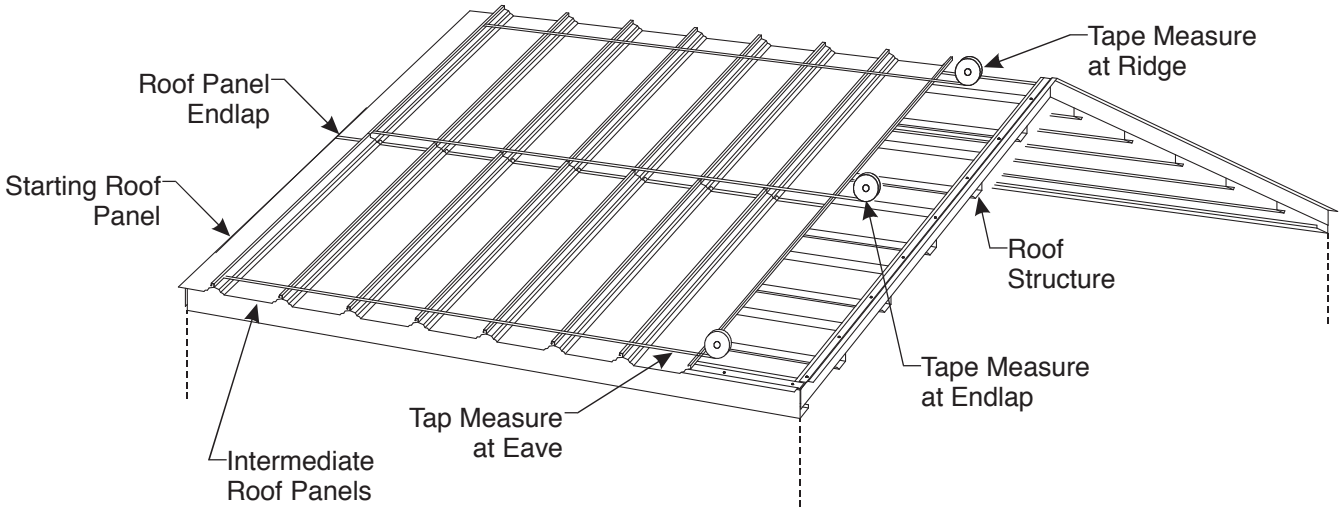
Check Panel Coverage

For proper fit-up of the roof panel sidelap assembly and the fit-up to the closures, flashing, curbs, etc., it is critical that the roof panel coverage is checked frequently and any coverage error be corrected before it accumulates.

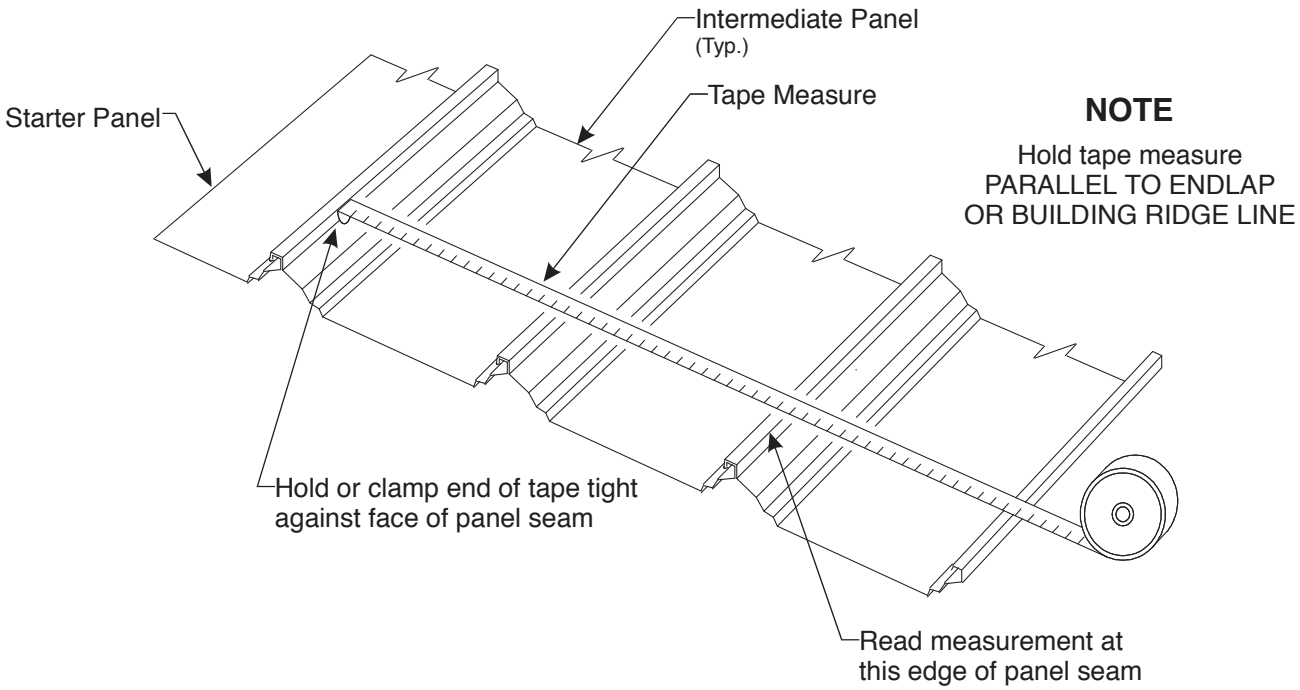
Coverage must be checked at the eave, ridge, and at every endlap.

To avoid accumulation of errors, the coverage measurement should always be from the rake line or the starting roof panel's seam.

To avoid measurement error, the tape measure must be free and taut, and must be parallel to the ridge line or endlap.



CHECKING PANEL COVERAGE



PANEL COVERAGE MEASUREMENT

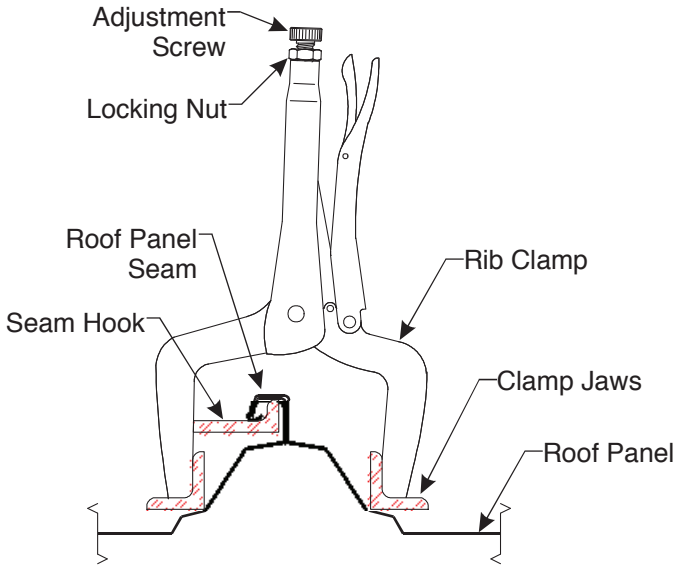
Adjust Panel Coverage

The most common coverage error is the spreading of the roof panels, especially at the panel ends. This can cause excess panel coverage along the eave, endlaps, and ridge.

To correct excess roof panel coverage, use rib clamps to squeeze together the panel ribs, as shown.

The rib clamps can be adjusted and locked, so that they will squeeze the panel ribs to provide a consistent coverage width.

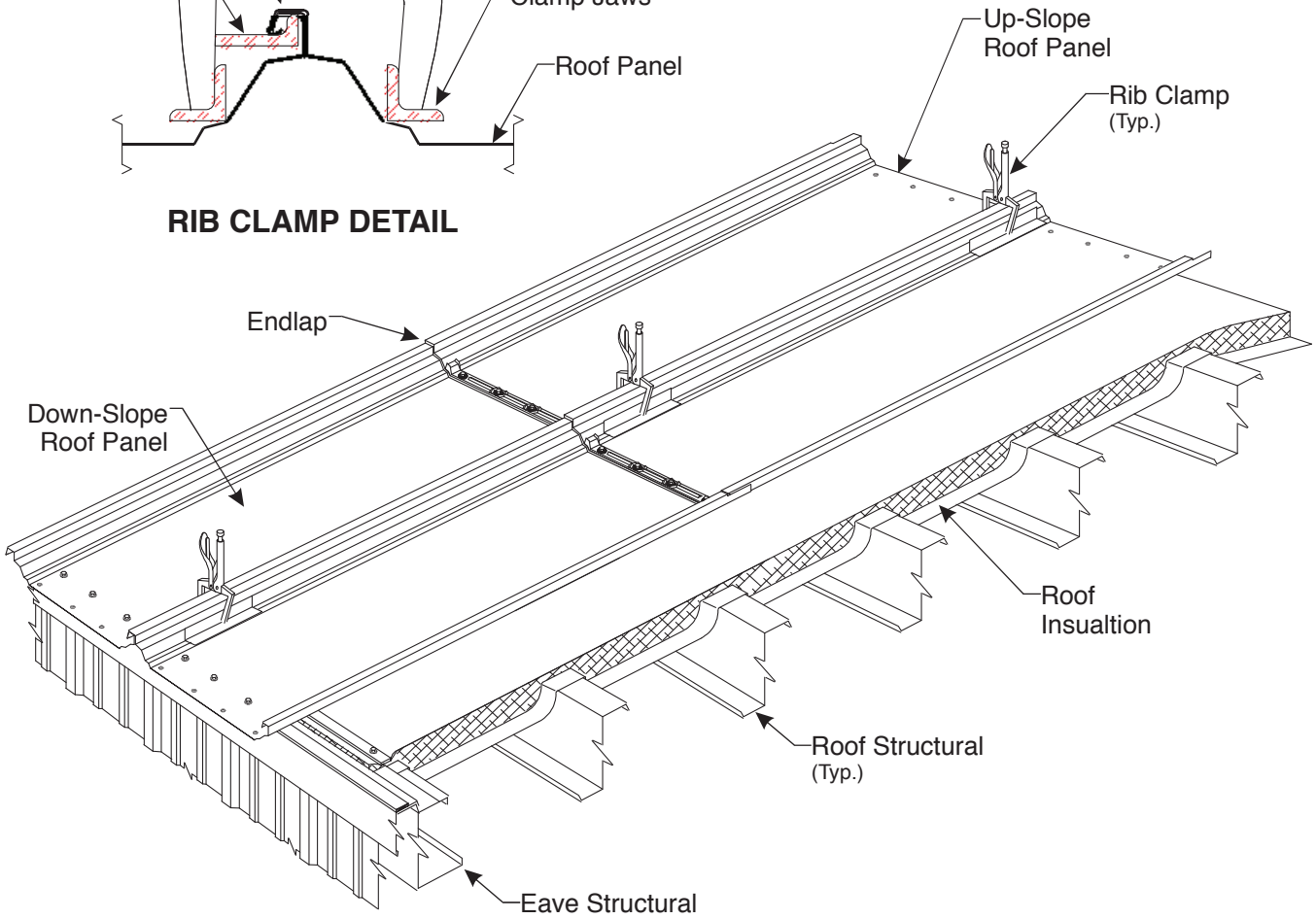
If excessive coverage has accumulated over several panel runs, do not try to correct all of the error at one time. Corrected roof panel coverage must not be greater than 1/8" per panel. Correct accumulated coverage error by making the correction over several panel runs.



RIB CLAMP DETAIL

****** NOTE ******

The rib clamping procedure illustrated in this section is an optional method for maintaining proper panel module.

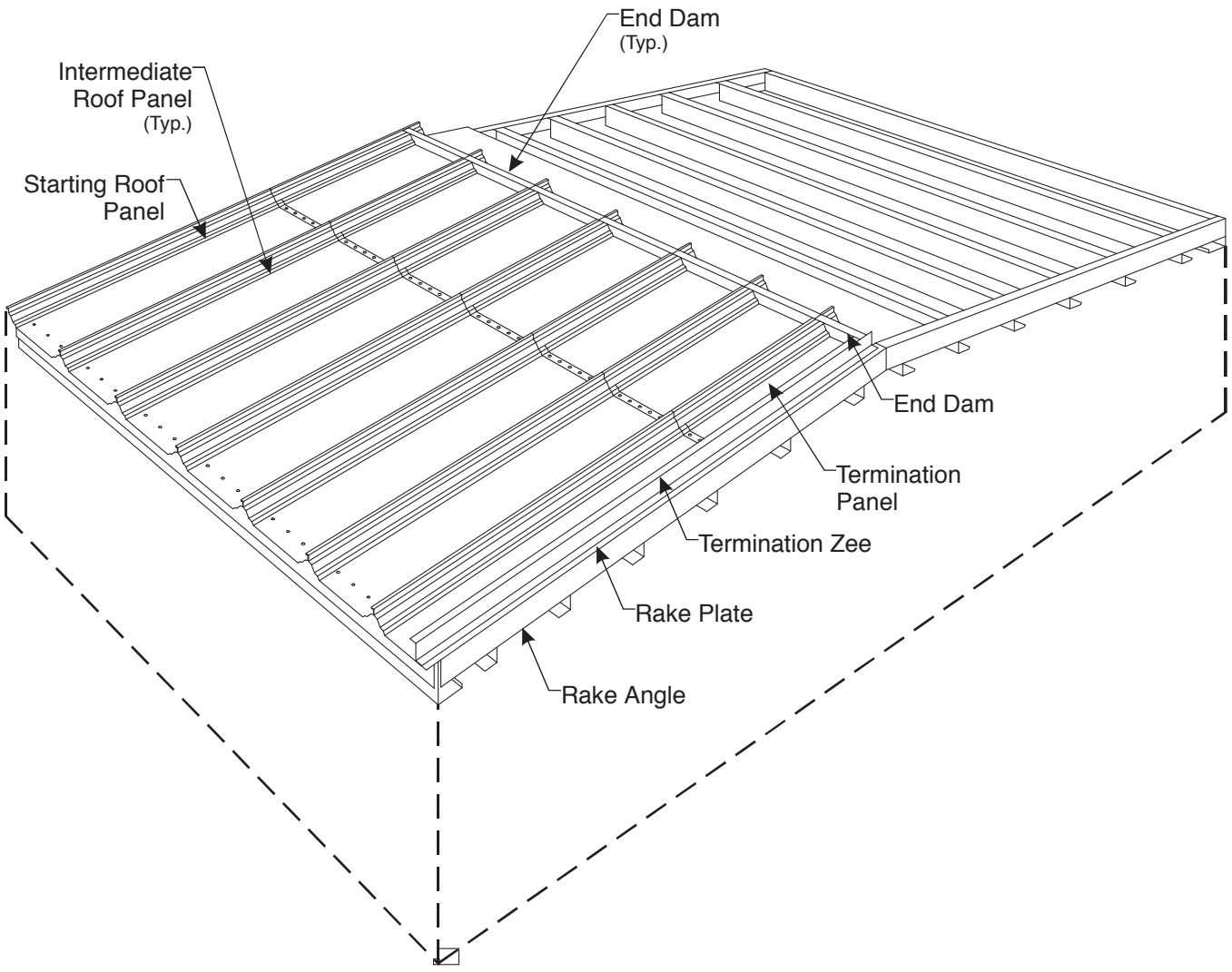


8. ROOF INSTALLATION DETAILS

D. FINISH PANEL INSTALLATION

The details in this section show the installation of the termination roof panel and the termination zee.

The details show the termination roof panel installed at the finish rake. The installation of the termination panel at the starting rake is similar.

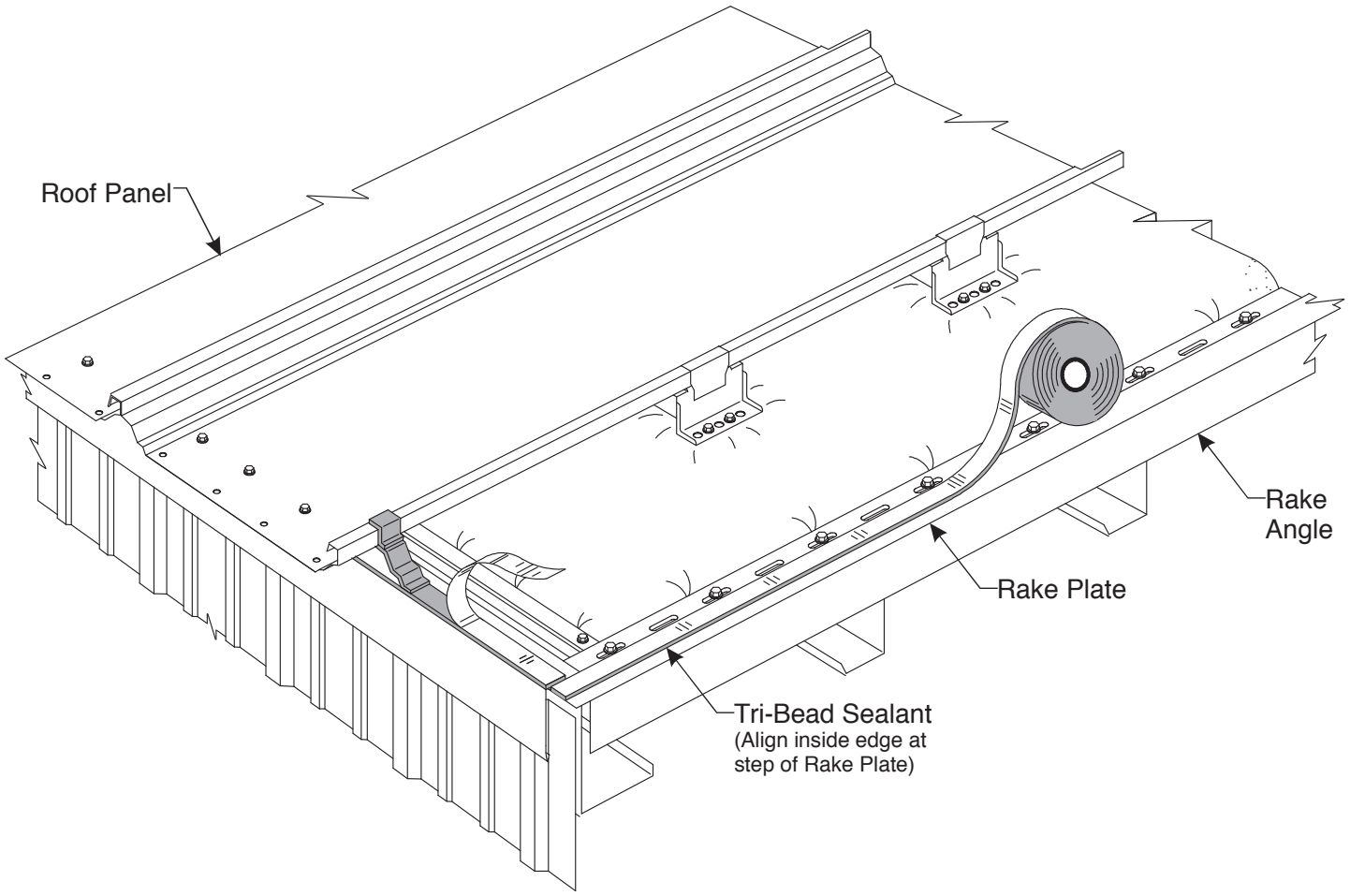


Install Rake Plate Sealant

Install endlap sealant along the top flange of the rake plate as shown.

Position the edge of the sealant flush with the inside edge of the rake plate. At the eave, lap the end of the sealant on top of the eave sealant.

Do not remove the protective paper until immediately before installing the termination roof panel.



8. ROOF INSTALLATION DETAILS

Finish Panel Installation at the Eave

Measure the distance from the leading edge of the previous roof panel leg to the outer edge of the rake plate.

Field cut the panels for the last run one inch (1”) wider than the distance from the last panel leg to the leading edge of the rake plate.

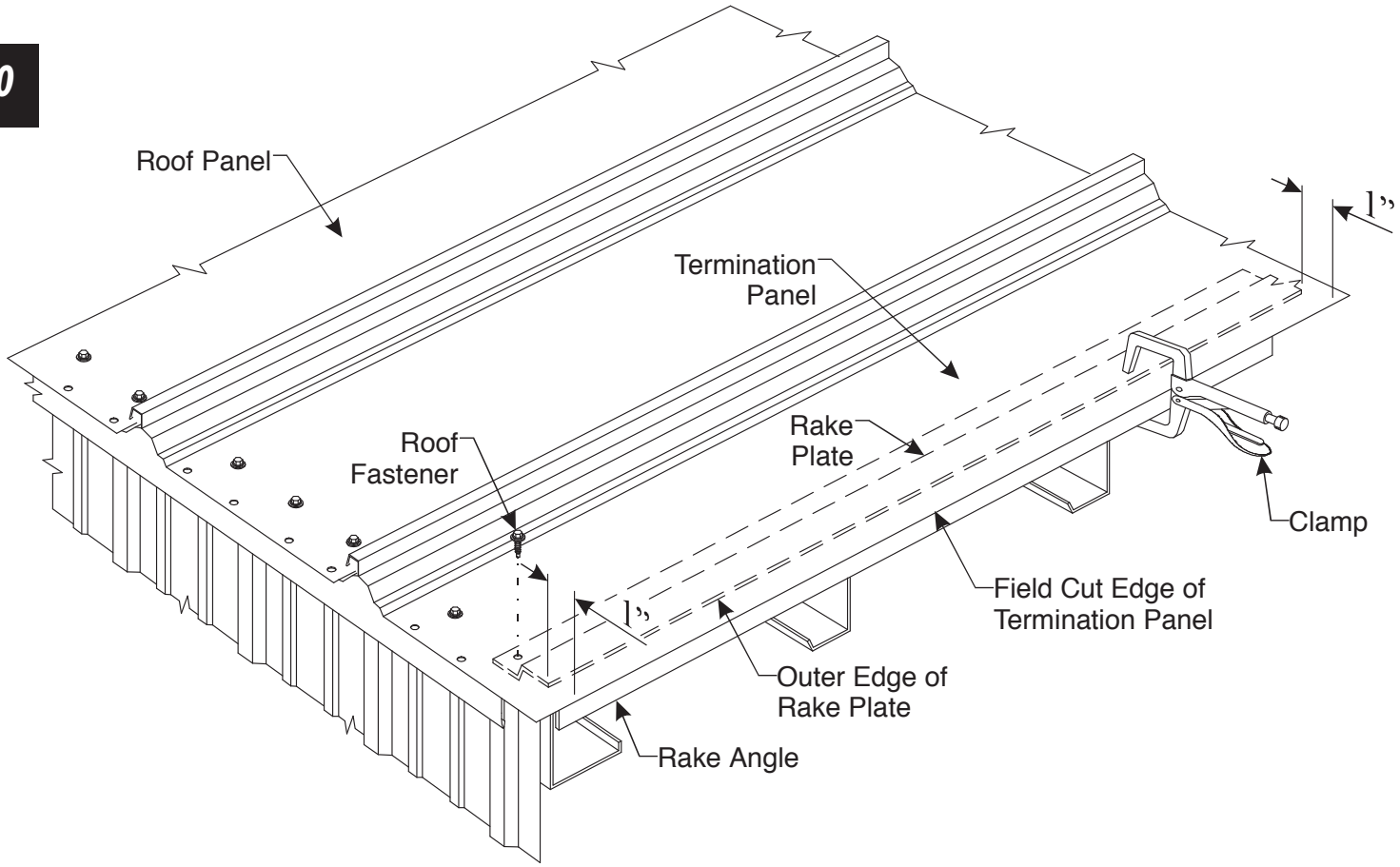
Along the cut edge of the termination roof panel, wipe the underside clean and dry.

Remove the protective paper from the eave sealant and rake plate sealant.

Install the termination panel into position as shown.

Clamp the panel in position using vice-grip Cee clamps.

Install the eave fasteners. Be sure the eave fasteners penetrate the eave sealant and engage the eave plate.^



Install Termination Zee Tri-Bead Sealant

Along the cut edge of the termination roof panel, wipe the top surface clean and dry.

IMPORTANT

The tape sealant that seals the bottom of the termination zee must be located directly over the upper leg of the rake plate. Mark the location using a chalk line.

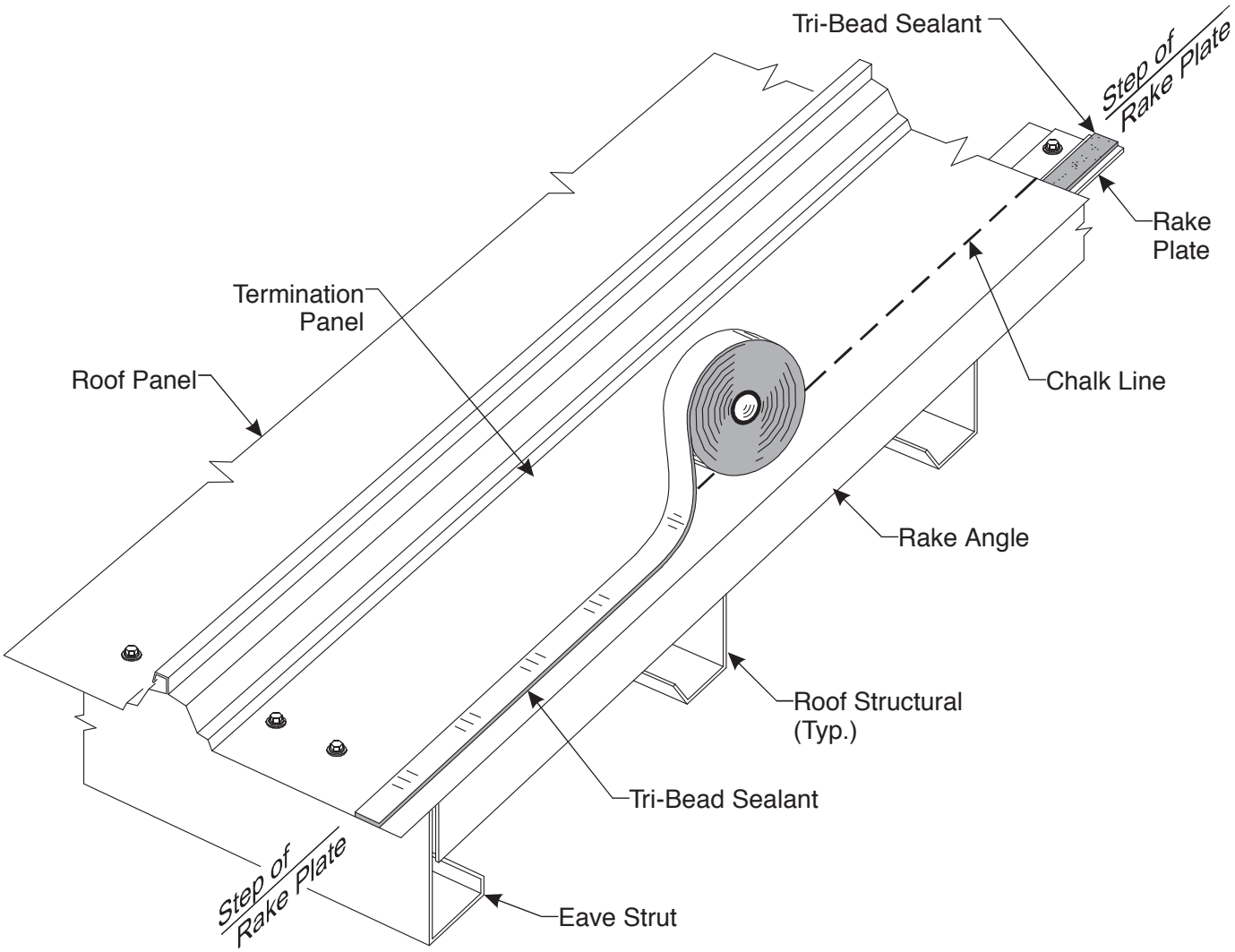
Measure the distance from the vertical leg of the last panel to the step portion of the rake plate.

Snap a chalk line mark along the top of the panel indicating the step location of the rake plate.

Position the edge of the sealant on the chalk line. Start and finish the ends of the sealant flush with the ends of the roof panel.

Check the entire length of the sealant to assure that is correctly positioned and that there are no voids or thinned areas.

After the sealant has been correctly installed, lightly press the sealant against the roof panel to assure adhesion. Do not use excess pressure, which can thin the sealant.



8. ROOF INSTALLATION DETAILS

Termination Zee Installation at Ridge

IMPORTANT

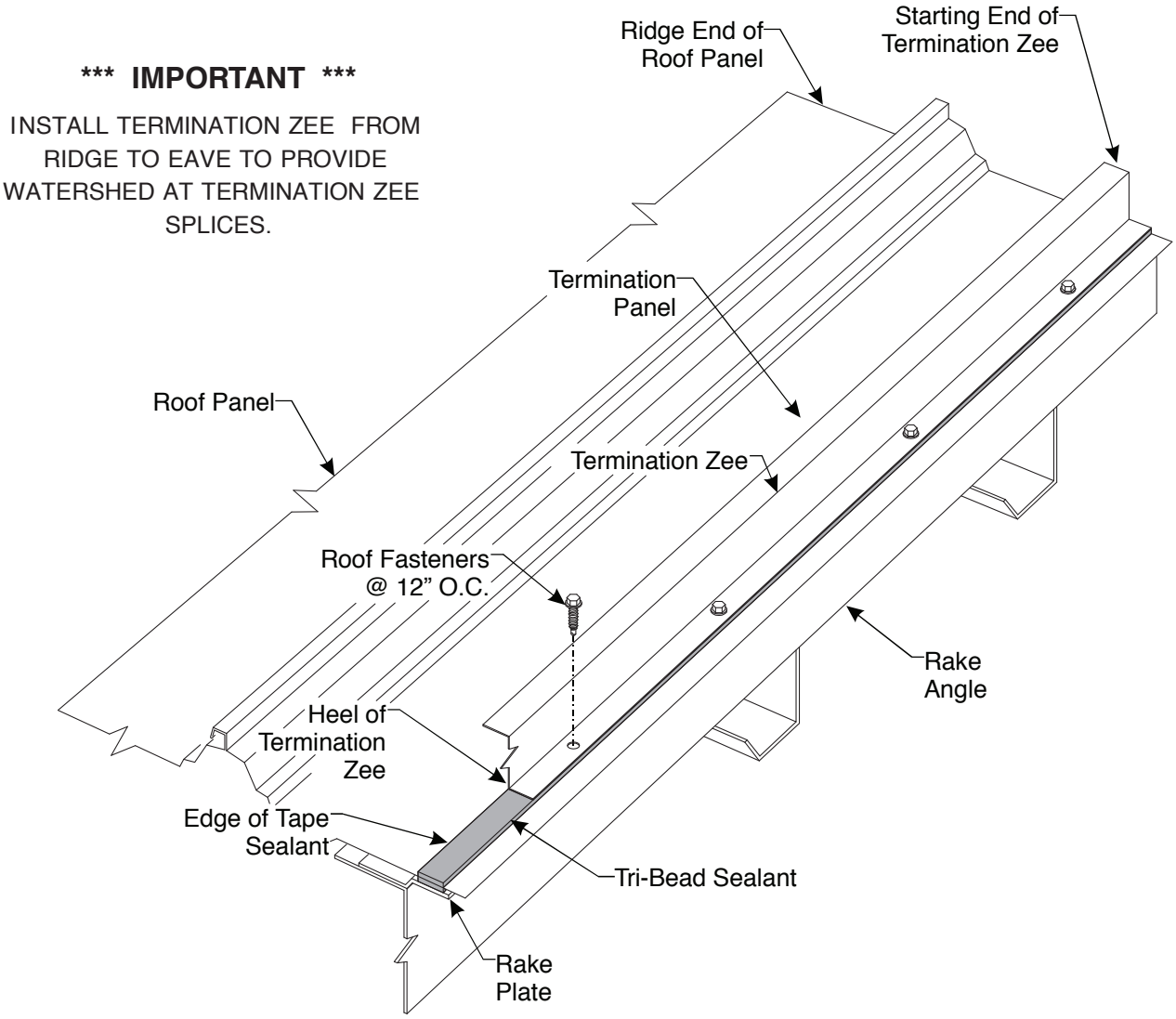
Always start installing the termination zee from the ridge. Starting installation at the ridge allows watershed where the termination zees lap down-slope.

Position the termination zee over the tape sealant as shown, with the upper lip facing toward the panel vertical leg, and the inside edge of the lower lip flush with the inside edge of the tape sealant.

The up-slope end of the termination zee should be flush with the ridge end of the roof panel.

Uniformly press the zee against the tape sealant to assure adhesion.

Attach the termination zee with roof fasteners spaced 12" on center. Make sure that the fasteners penetrate the center of the sealant, and securely engage the rake plate.



Termination Zee Installation at Eave and Splice

Apply two 3/16" beads of tube sealant along the lower edge of the termination zee as shown.

Position the next termination zee, overlapping the previously installed closure by two inches (2").

Clamp the lapped zee while installing the fasteners.

Make sure the closure is positioned over the Tri-Bead sealant.

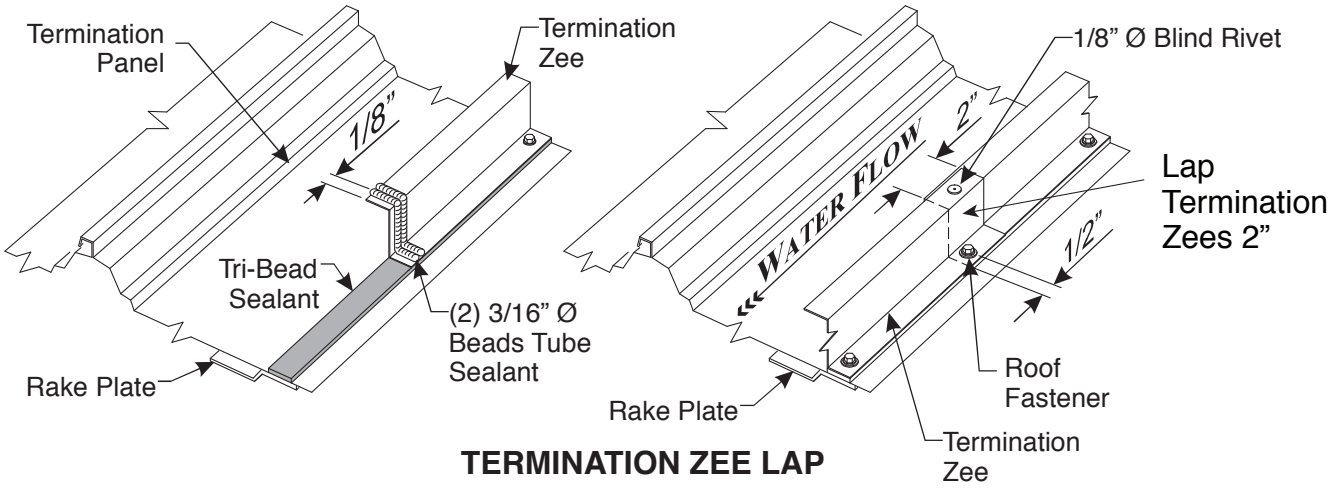
Install roof fasteners to attach the lower leg of the termination zee. The first fastener should be installed through the lapped bottom flanges.

Install a 1/8" pop rivet through the upper legs of the lapped zees.

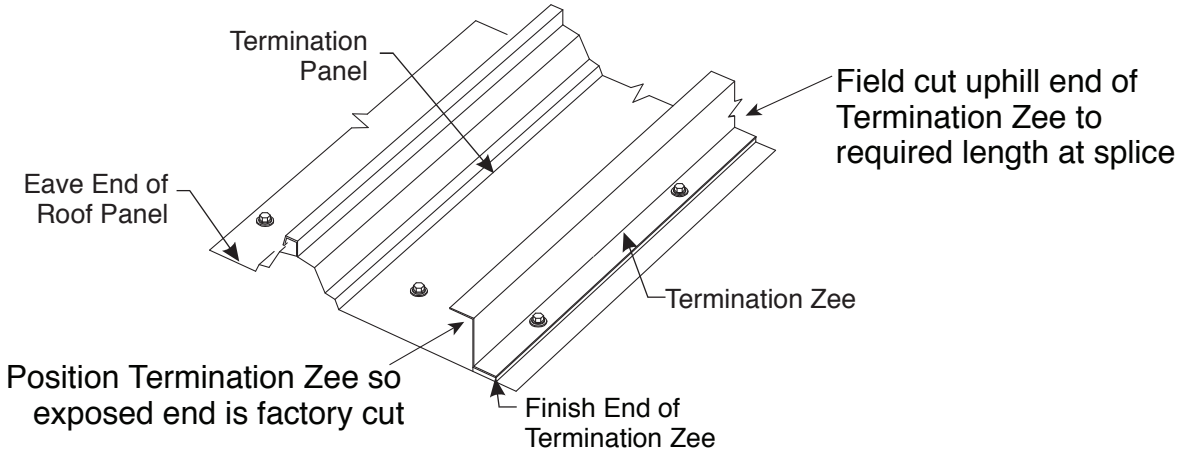
Position the last termination zee so the lower end is flush with the eave end of the roof panel.

Mark the up-slope end of the lower termination zee, where it laps the previously installed termination zee by two inches (2").

Field cut the up-slope end at the mark and install as previously described.



TERMINATION ZEE LAP



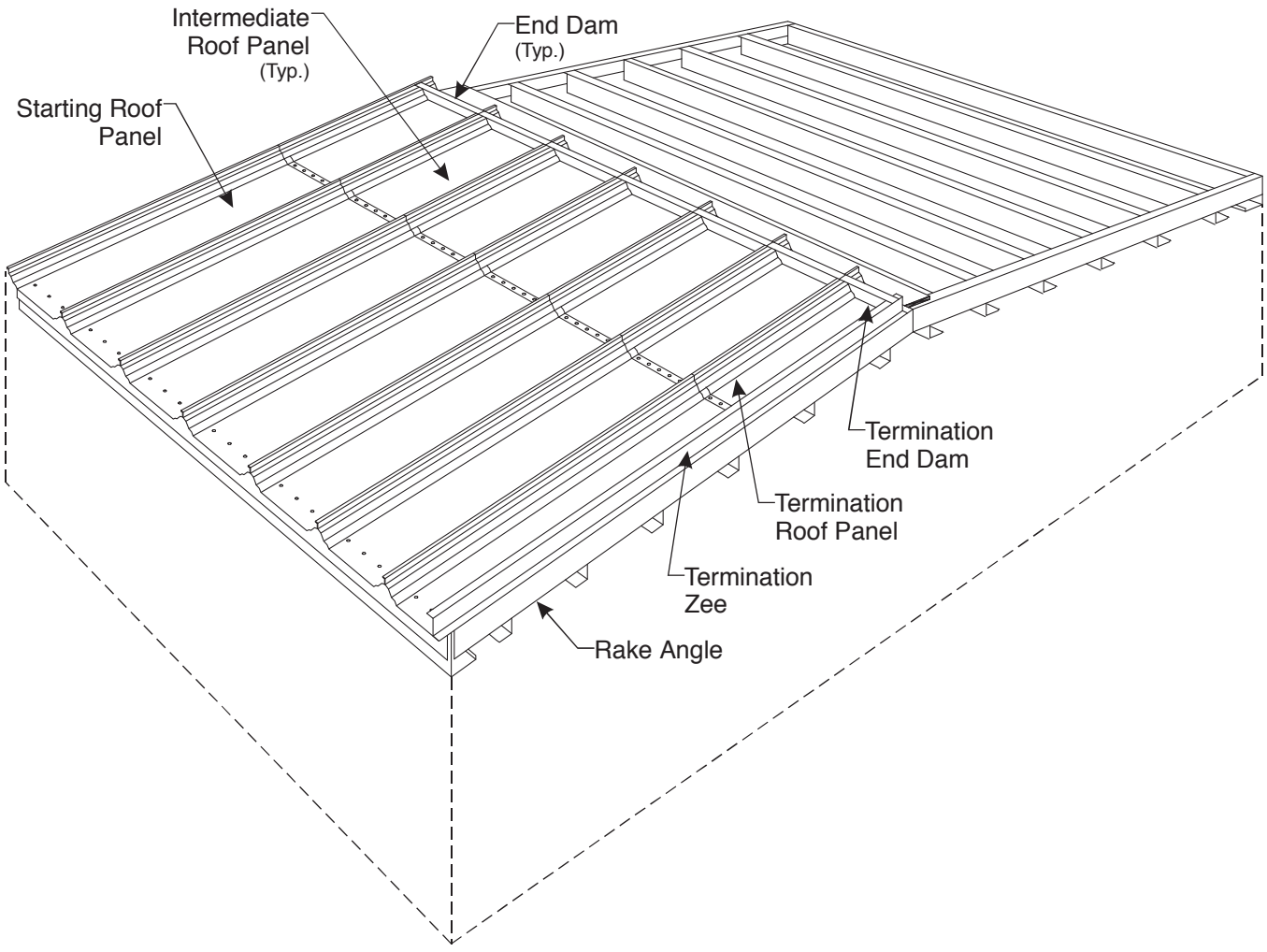
TERMINATION ZEE AT EAVE

8. ROOF INSTALLATION DETAILS

E. END DAM INSTALLATION

Metal end dams are used to close the ends of the roof panels at the ridge, high eave, and high eave transition contitions.

The details in this section will show the installation of the end dams and the prepartaion of the roof panels for this installation.



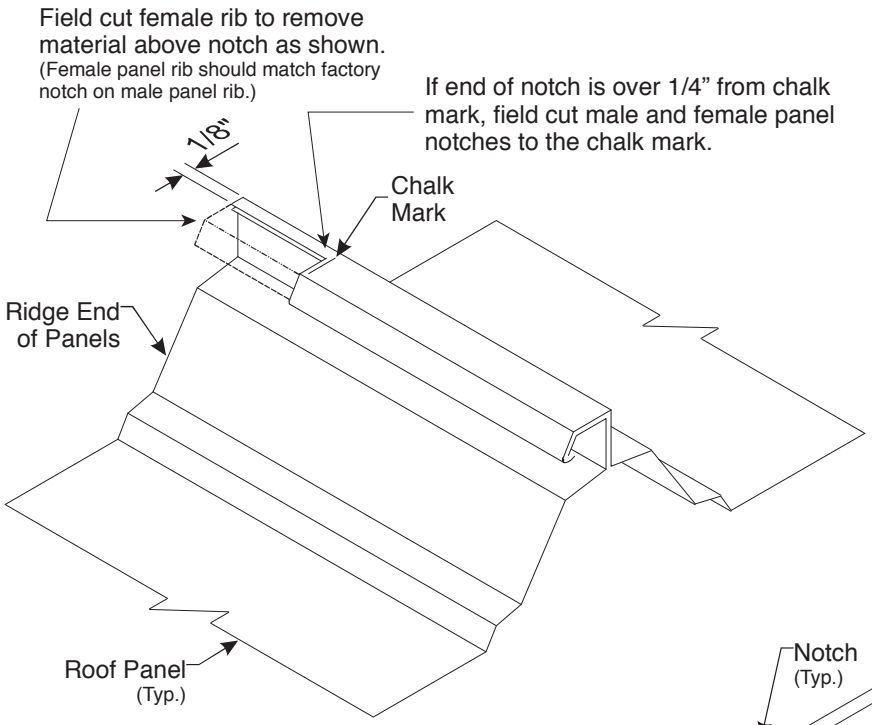
Preparing the Ridge

The end dams should be installed as each roof panel run is completed, and the seam must be machine formed prior to installation of the end dams.

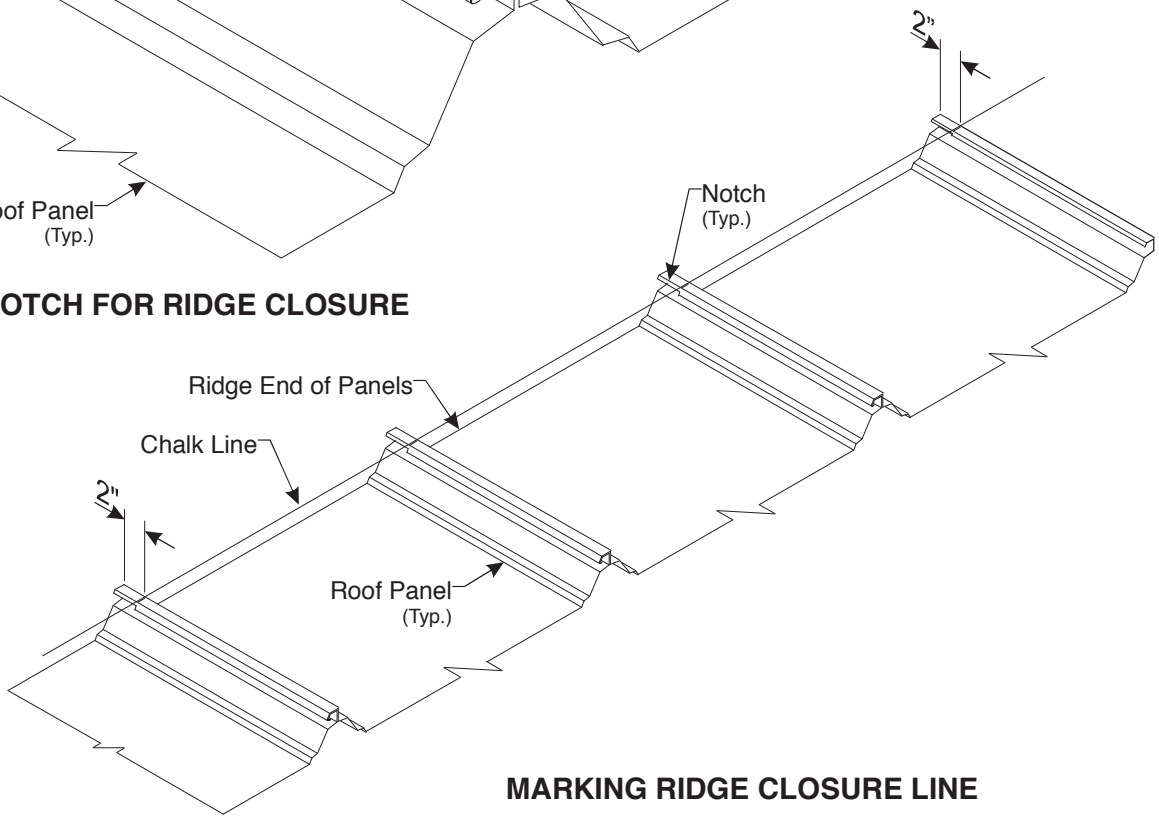
Installation of the end dams helps maintain the correct roof panel coverage at the ridge. If the end dams are installed after the roof panels are all in place, roof panel coverage error may prevent proper installation of the end dams.

Check the alignment of the roof notches along the ridge. If the notches are staggered more than 1/4", use a chalk line to establish a straight notch line. Position the chalk line so no notch extends below the line.

Using the end of the factory notch (or chalk marks) as a guide, field cut the additional notching in both male and female portions of the seam, as shown.



NOTCH FOR RIDGE CLOSURE



MARKING RIDGE CLOSURE LINE

8. ROOF INSTALLATION DETAILS

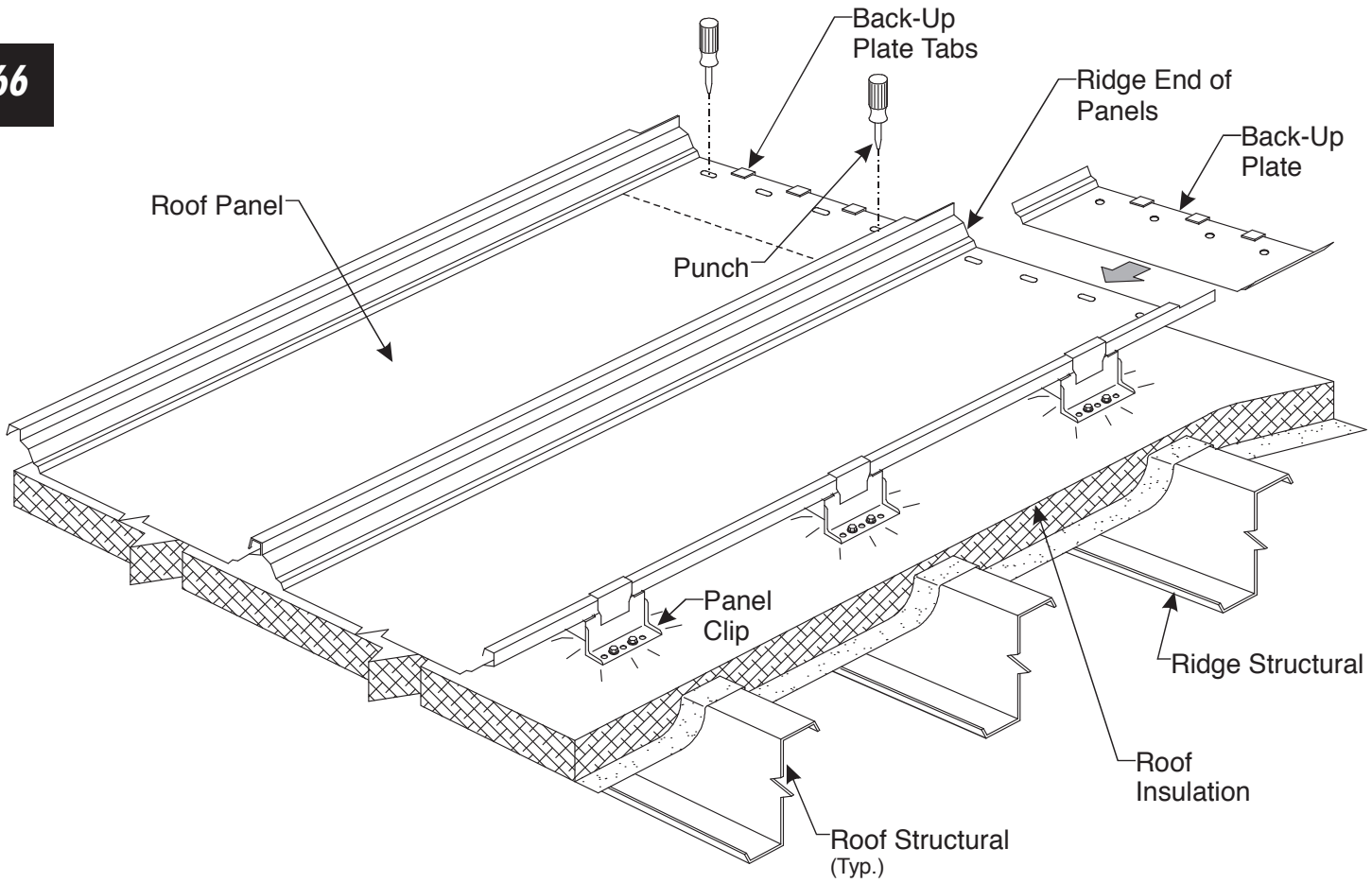
Install Back-Up Plate at Ridge

Slide the back-up plate under the roof panel at the ridge, as shown.

The back-up plate's tabs must hook over the end of the roof panel. Use punches to align the holes in the back-up plate with the holes in the roof panel.

If the ridge purlin is located too far down-slope for the back-up plate to rest on the purlin, use a Cee clamp to hold the back-up plate in position until fasteners can be installed through the end dam and the back-up plate.

Be sure to align the holes in the back-up plate with the holes in the ridge panel before clamping the back up plate in place.^



Ridge Tri-Bead Sealant Application

Before installing the Tri-Bead sealant, the roof panel's surface must be wiped clean and dry.

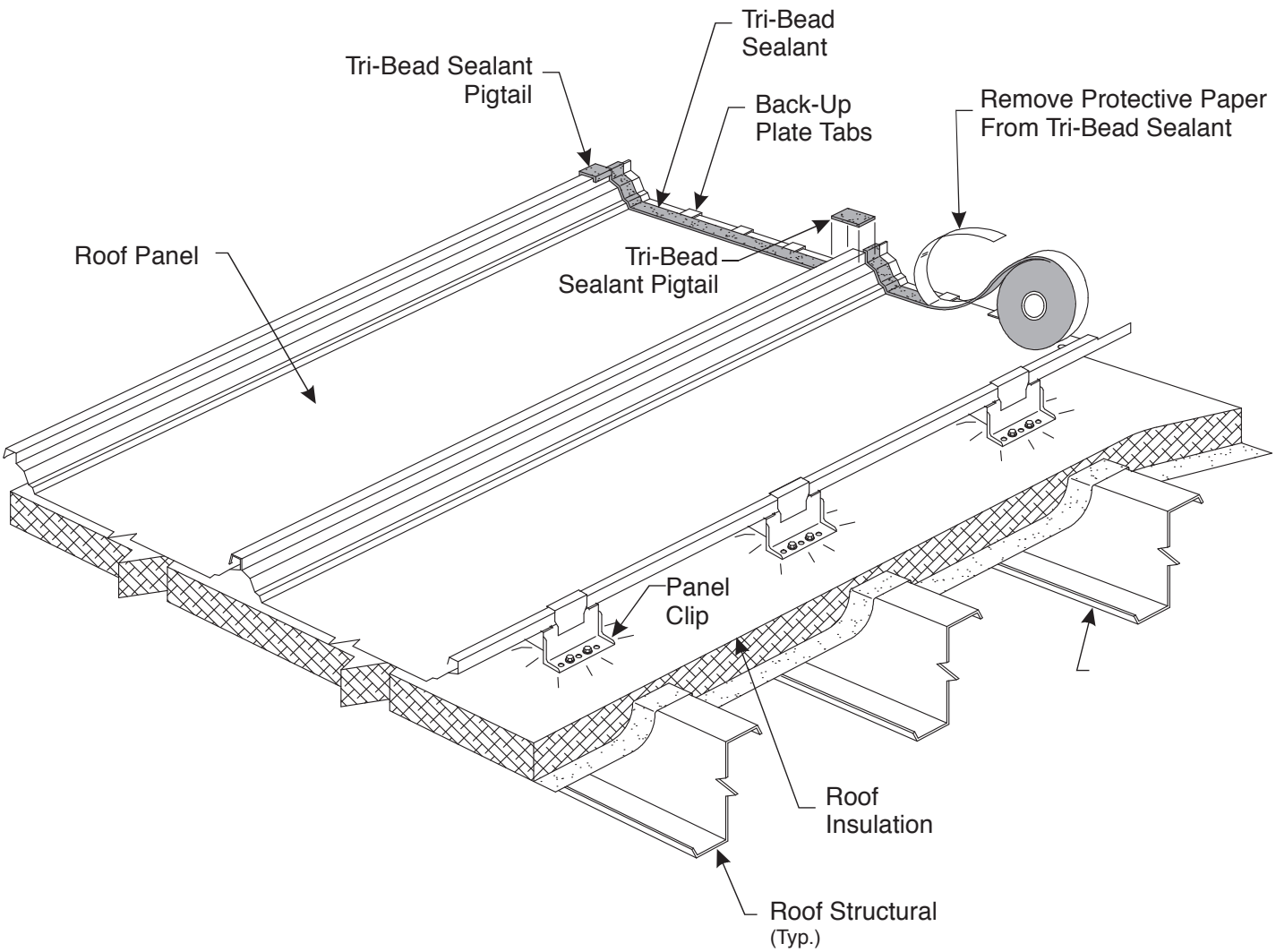
Apply a continuous strip of Tri-Bead sealant along the ridge of the roof panels as shown.

The sealant must be centered over the roof pane's factory punched holes.

Make sure that the sealant fully contacts the roof panel's surface, and that it is completely fitted into the panel corners and around the seams.

Cut a strip of Tri-Bead sealant and install as the sealant pigtail, as shown.

Specific Tri-Bead sealant details are shown on the following page.



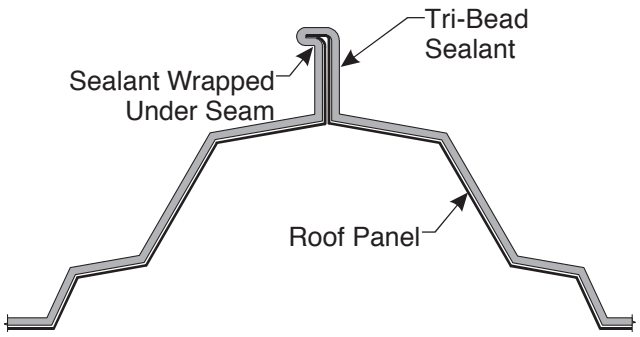
8. ROOF INSTALLATION DETAILS

Ridge Tri-Bead Sealant Installation Details

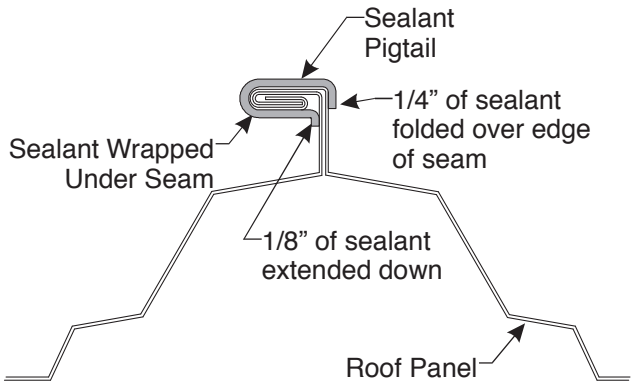
The correct installation of the Tri-Bead sealant is critical to the weather resistance of the roof system.

Be sure to verify that the sealant is installed as shown above before installing end dams.

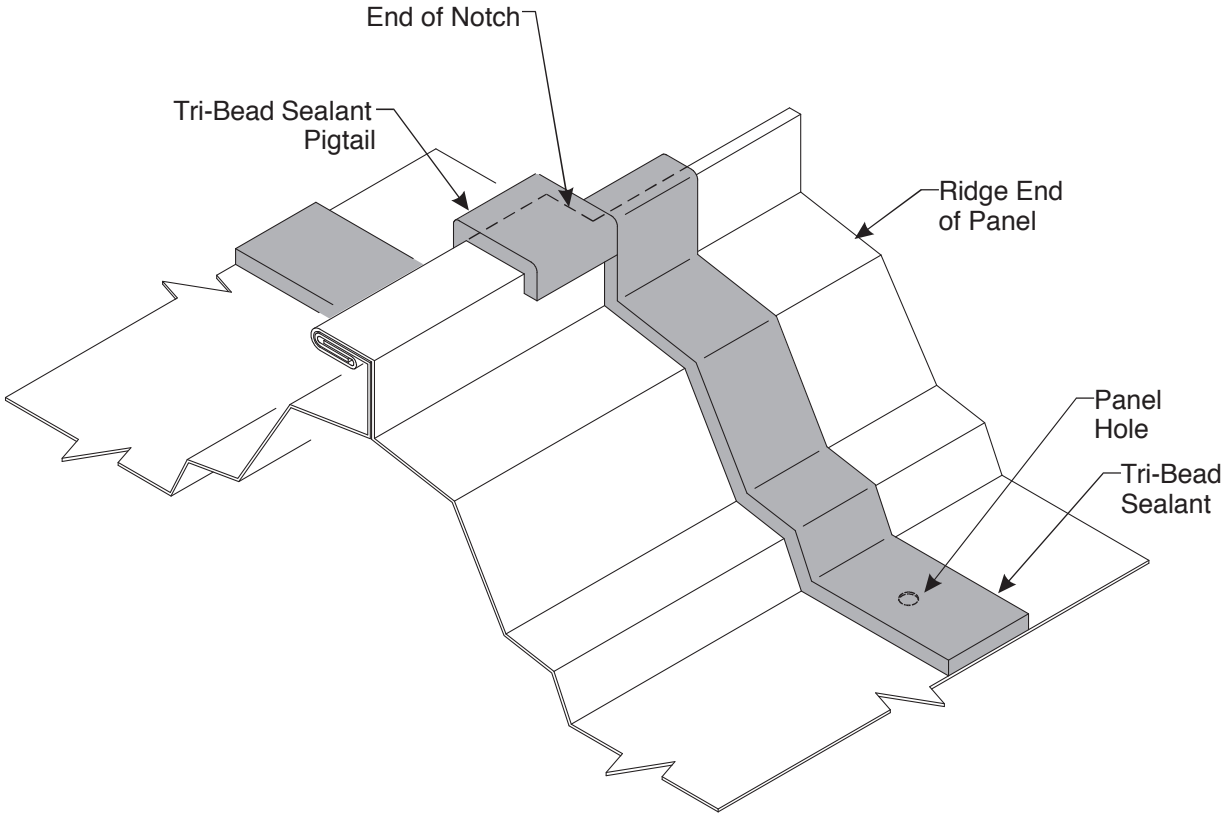
After the Tri-Bead sealant is correctly positioned, uniformly press the sealant against the roof panel's surface to assure adhesion. Do not use excessive pressure, which can thin the sealant.



TRI-BEAD SEALANT LAP AT NOTCHED SEAM



TRI-BEAD SEALANT PIGTAIL AT RIDGE



End dam Installation

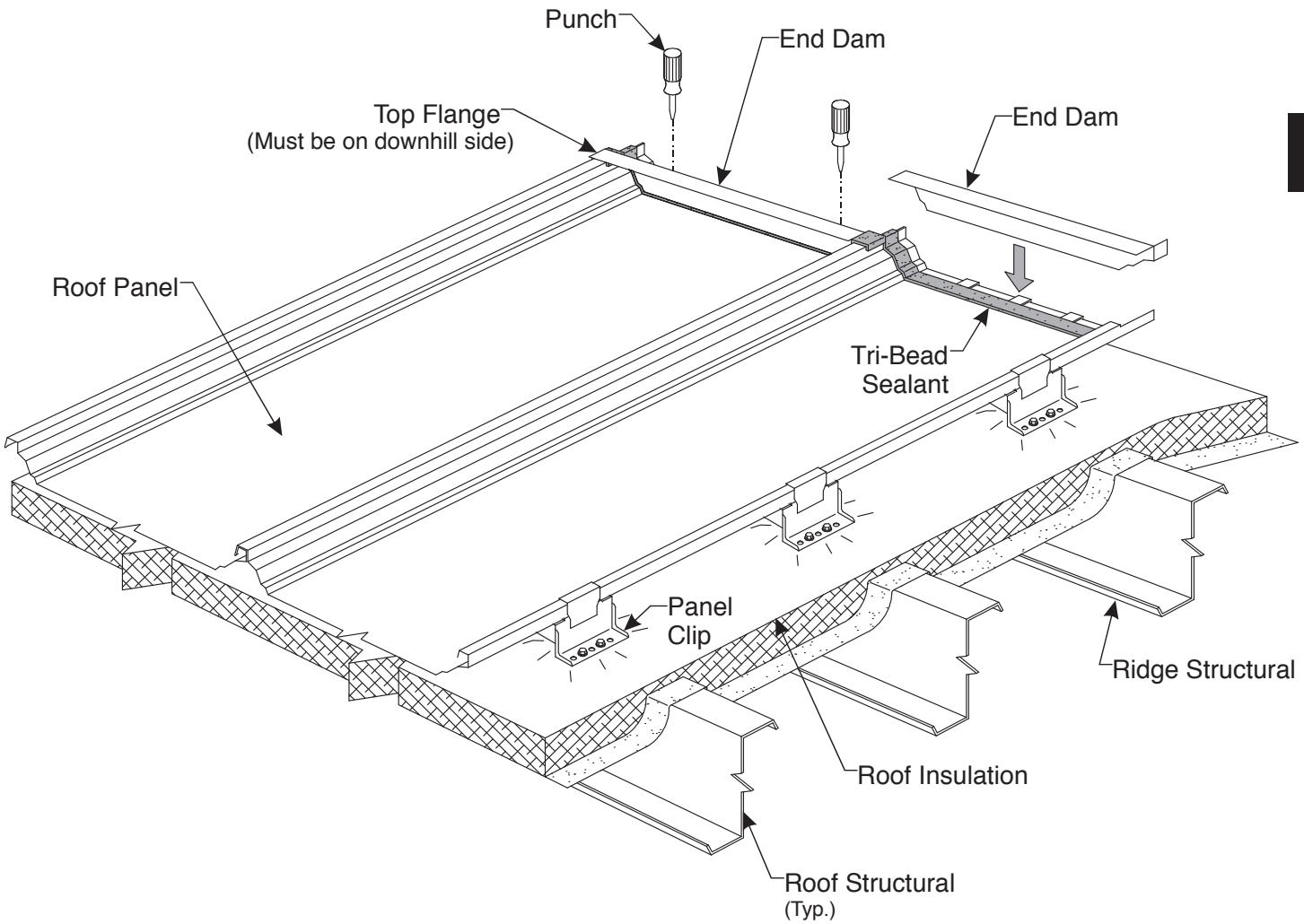
Wipe dry and clean the underside surface of the end dam flanges.

Remove the protective paper from the installed Tri-Bead sealant.

Position the end dam so it's bottom flanges are turned up-slope and it's top flange is down-slope.

Position the end dam's bottom flange directly over the Tri-Bead sealant and use punches to align the holes in the end dam with the holes in the roof panel and back-up plate.

Be careful not to displace or damage the sealant while installing the end dam and punches.



8. ROOF INSTALLATION DETAILS

End dam Attachment

While the matching holes are aligned by the punches, uniformly press the end dam into the Tri-Bead sealant to assure adhesion. Use a clamp to hold the assembly together while installing the fasteners.

Install endlap fasteners through the holes in the end dam's bottom flange.

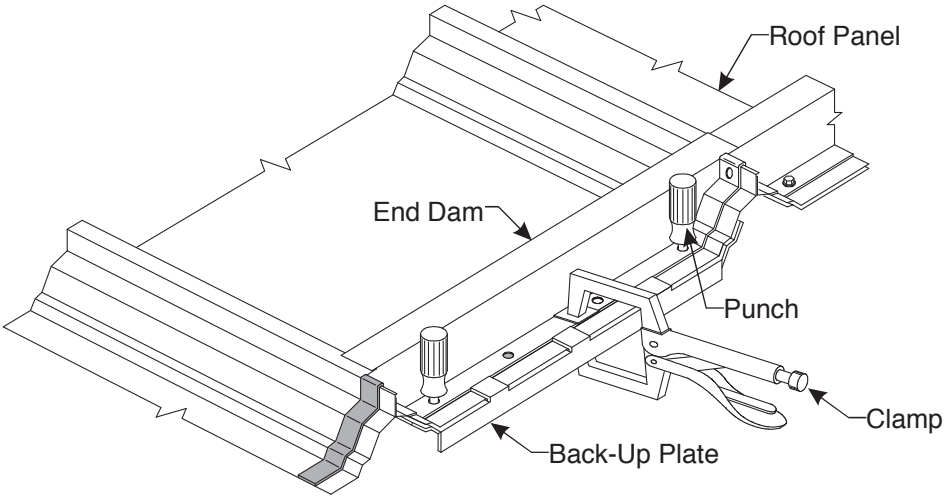
Check that the fasteners penetrate through the center of the Tri-Bead sealant and are securely engaged into the back-up plate.

Check that the face of the end dam is perpendicular to the roof panel and aligned with the previously installed end dams. If not, push the top of the end dam into the correct position.

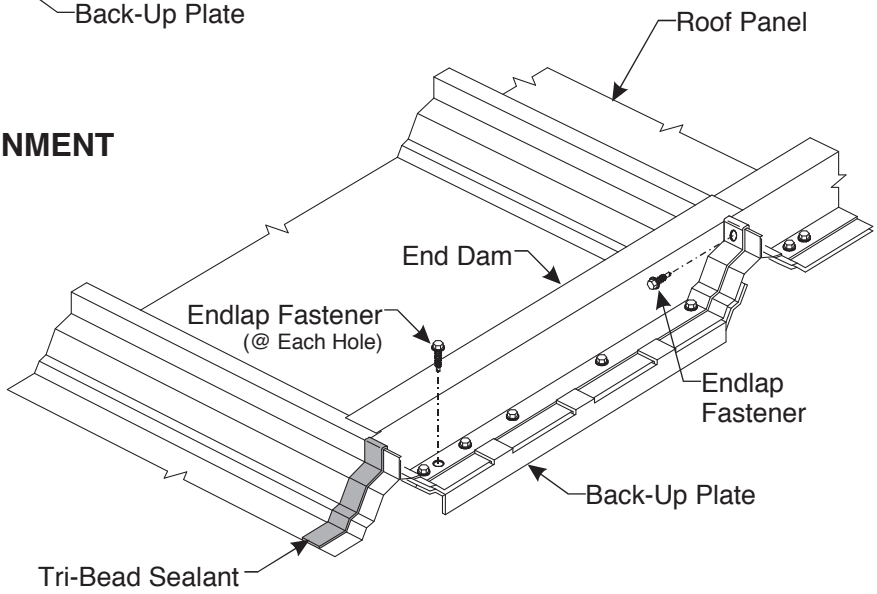
Install an endlap fastener through the hole at the top of the end dam, through the roof panel seam and into the hole in the opposite end dam.

IMPORTANT

Overtightening this fastener will squeeze the roof panel sidelap assembly together and effect the roof panel's coverage width. Carefully tighten the fastener only as necessary to maintain the correct panel width.



END DAM ALIGNMENT

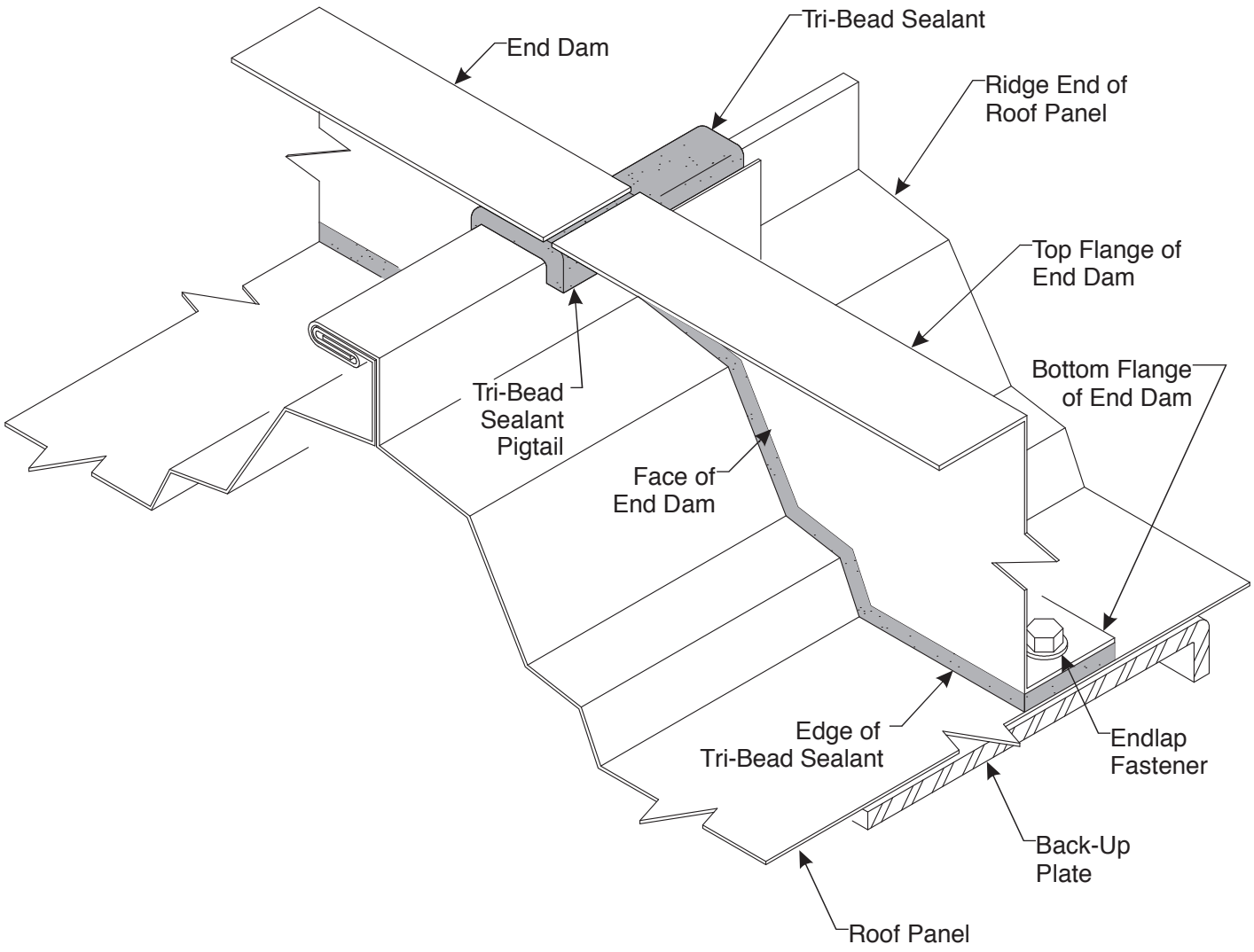


END DAM ATTACHMENT

End dam Inspection Details

Verify that the end dam is correctly assembled as shown.

Check that there are no un-sealed voids between the roof panel and the end dam, especially in the critical areas around the roof panel ribs and seams.



8. ROOF INSTALLATION DETAILS

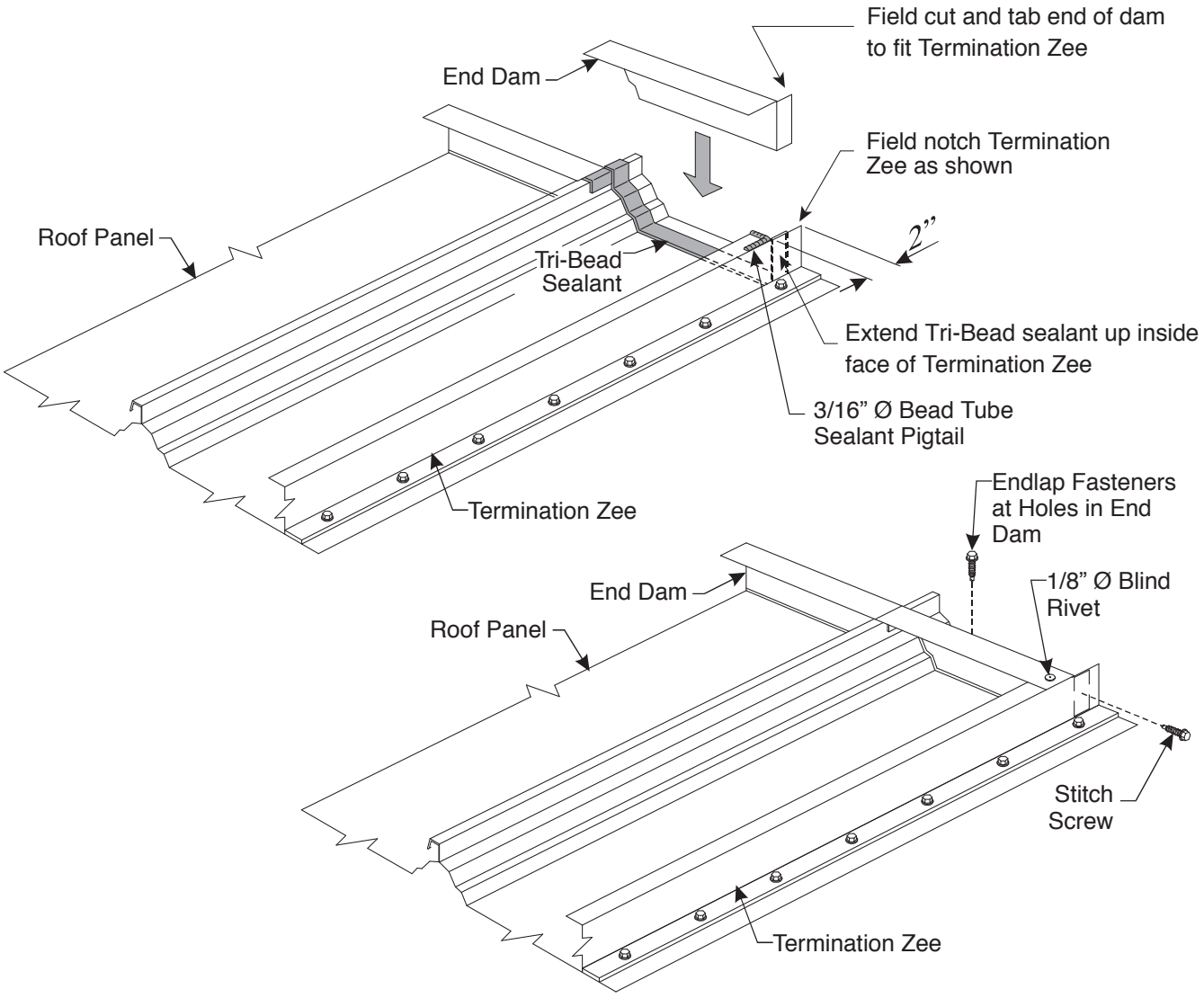
End dam Installation at Finish Panel

If the last panel run requires field cut panels, the end dam must be field modified to fit between the last panel seam and the termination zee.

Install the Tri-Bead sealant to extend up the face of the termination zee, as shown.

Field modify the closure as shown above and install as shown.

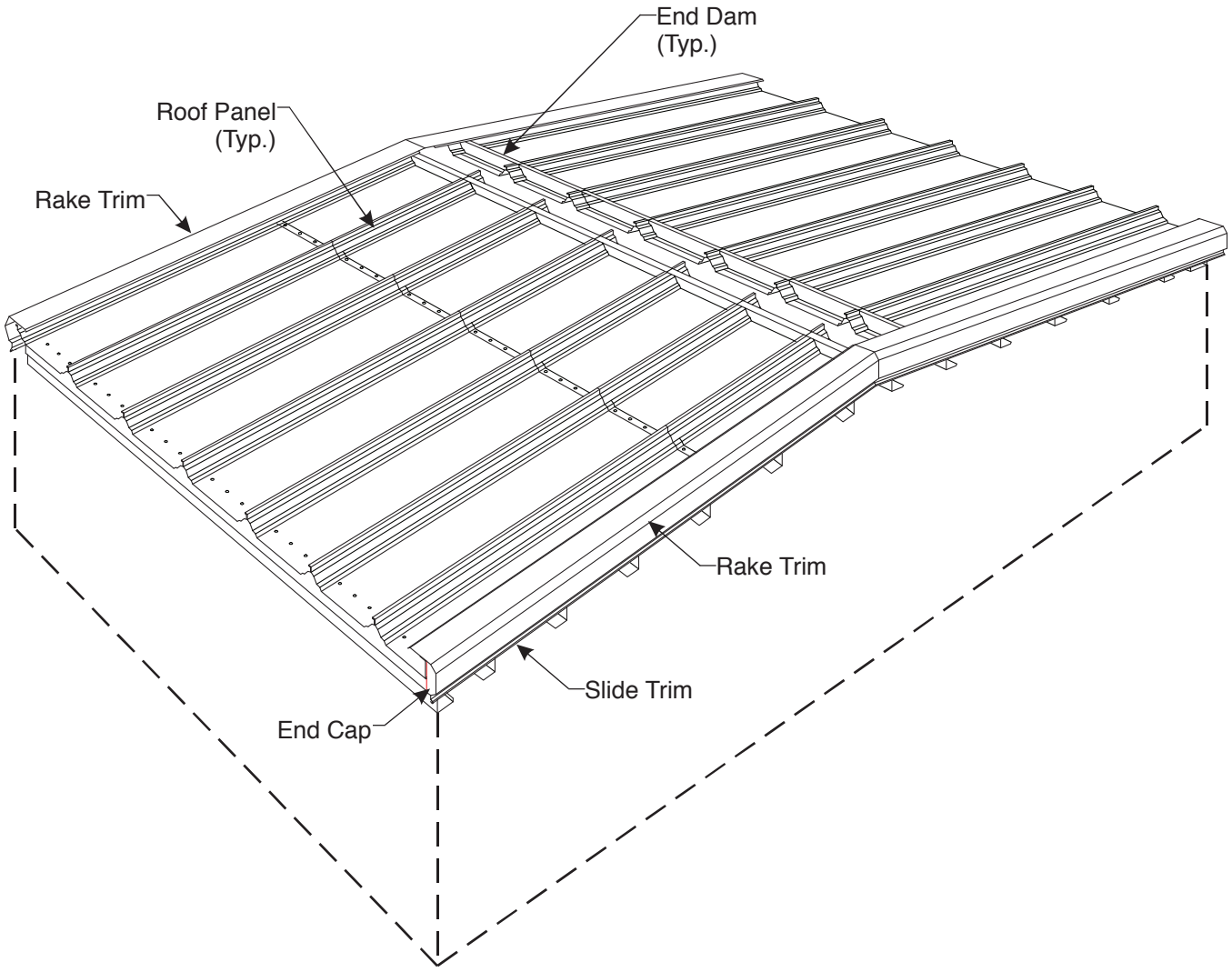
Be sure Tri-Bead sealant fills the corner of the closure where vertical leg is field bent.



8.4. Trim and Flashing

A. RAKE TRIM INSTALLATION

The details in this section show the installation of the rake trim at a termination roof panel condition. The details at a starting roof panel condition are similar.



8. ROOF INSTALLATION DETAILS

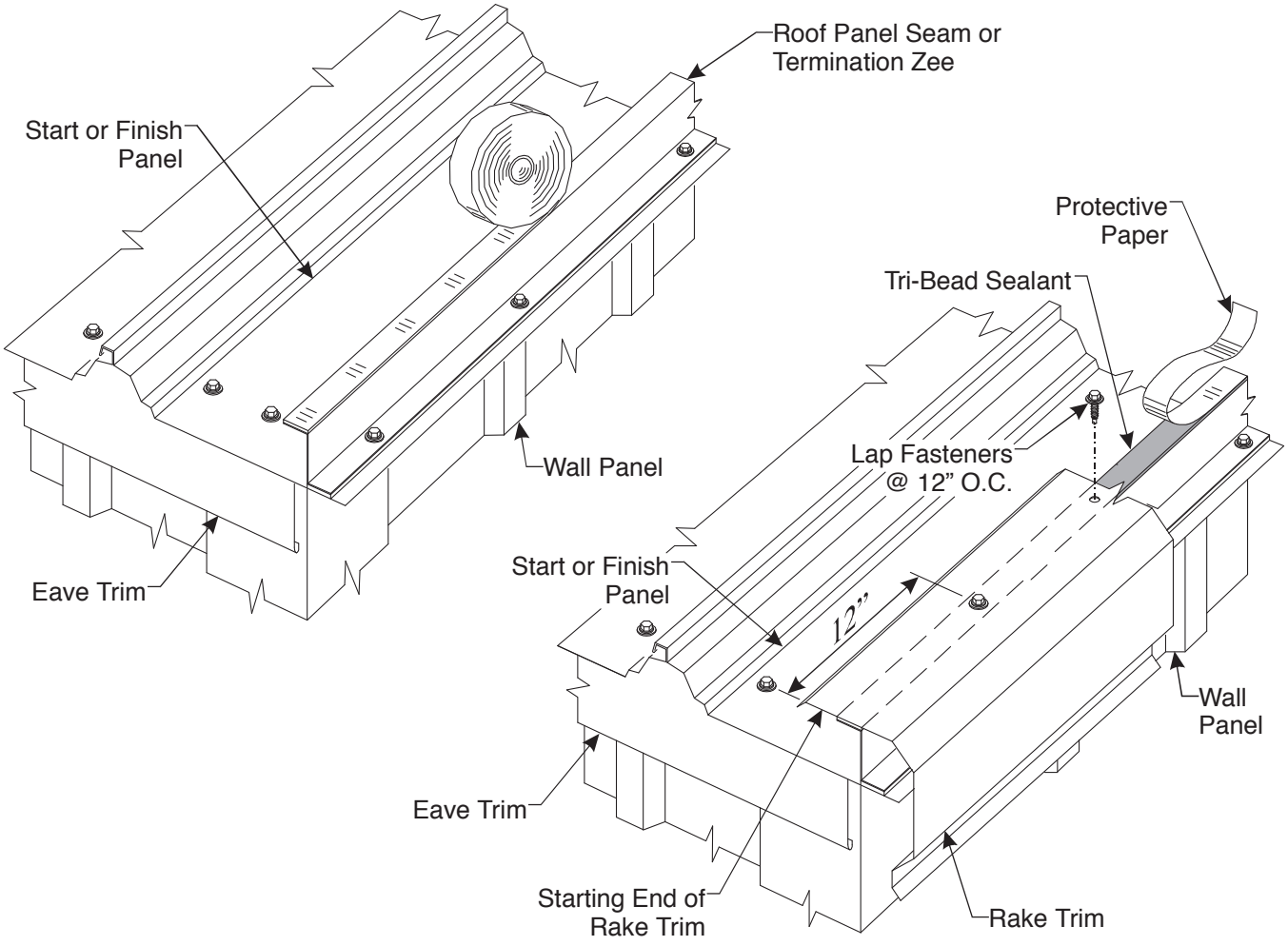
Rake Trim Placement

Apply a continuous strip of Tri-Bead sealant along the top flange of the termination zee.

Start rake trim installation at the eave. Place the first trim section so the down-slope end is flush with the end of the termination zee.

Attach the rake trim with stitch screws spaced 12″ on center.

Be sure the fasteners are located over the center of the top flange of the termination zee.



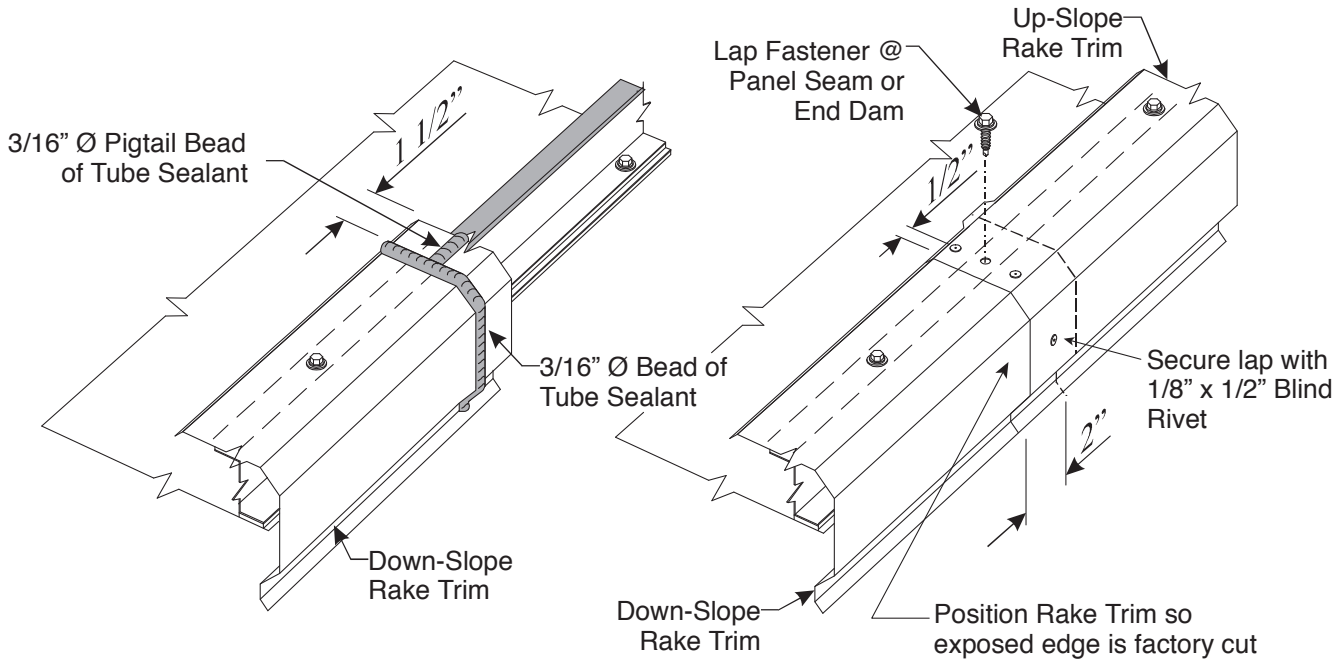
Rake Trim Splice and Ridge Installation

Apply a 3/16" continuous bead of tube sealant along the rake trim splice.

Be sure to place a sealant pigtail as shown to prevent water from entering behind the sealant bead.

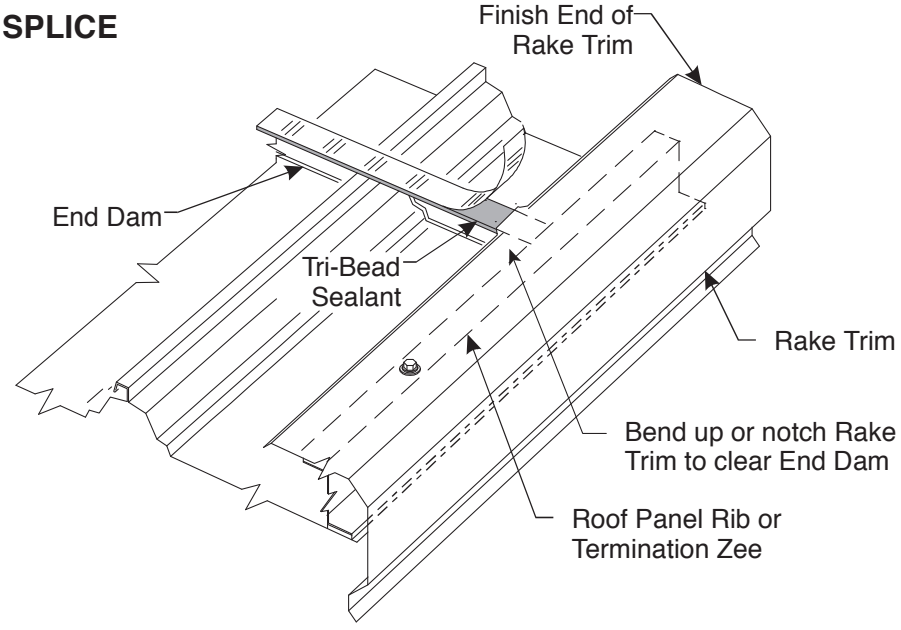
At the end dam notch the lip of the rake trim so it will clear the flange of the termination zee.

Install 1/8" dia. Blind rivets as required to make a tight lap.



RAKE TRIM SPLICE

****** NOTE ******
Refer to
Ridge Cap -- Preparation
for information about field coping the bottom edge of floating rake trim at the ridge.



RAKE TRIM AT RIDGE

8. ROOF INSTALLATION DETAILS

Rake Slide Trim Installation

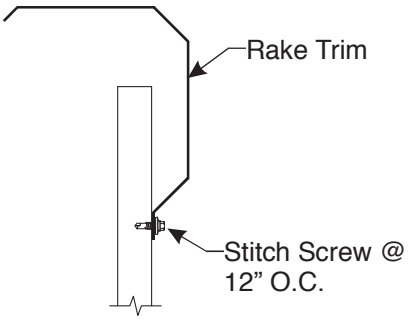
Note: If the rake trim run is longer than 25', the rake trim should not be attached to the wall panels with fasteners.

The rake slide trim will allow the rake trim to expand and contract with the roof panel.

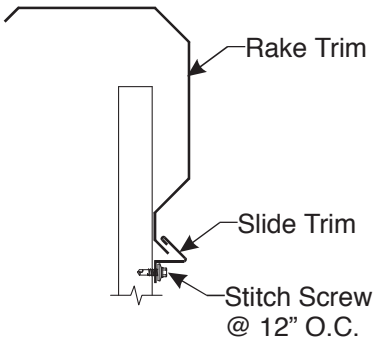
Be sure the rake slide trim is installed in a true line. A chalk line may be used to indicate the location of the slide trim that will provide a true line from eave to ridge.

IMPORTANT

See Peak Box Installation Details for terminating Rake Trim at Ridge.



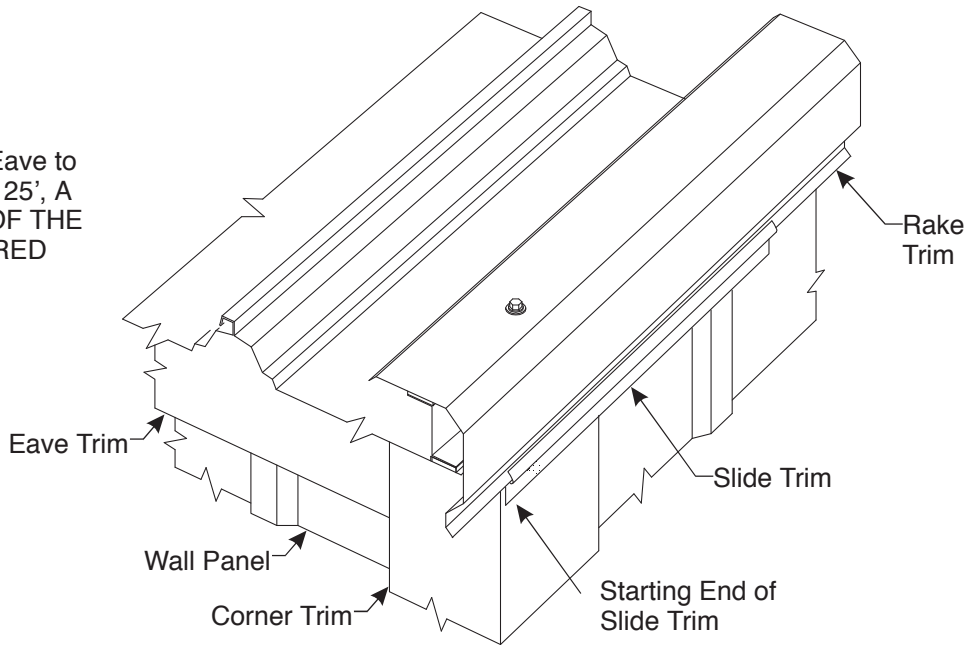
FIXED ATTACHMENT



FLOATING ATTACHMENT

***** NOTE *****

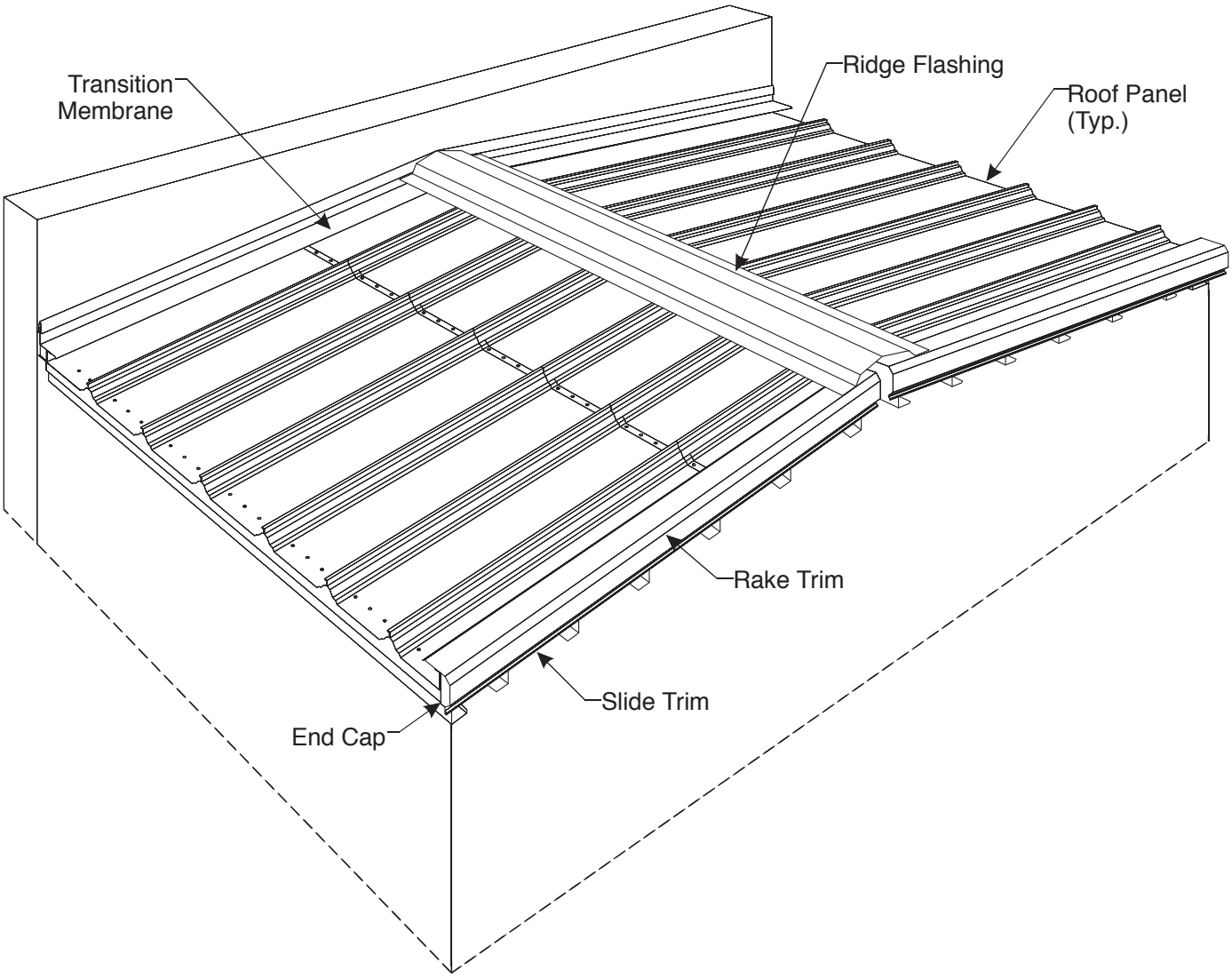
FOR RAKE LENGTHS (Eave to Ridge) GREATER THAN 25', A SLIDING ATTACHMENT OF THE RAKE TRIM IS REQUIRED



B. RIDGE COVER INSTALLATION

The details in this section show the installation of the ridge cover.

The ridge cover can start or finish at either a rake trim condition or a rake transition condition.



8. ROOF INSTALLATION DETAILS

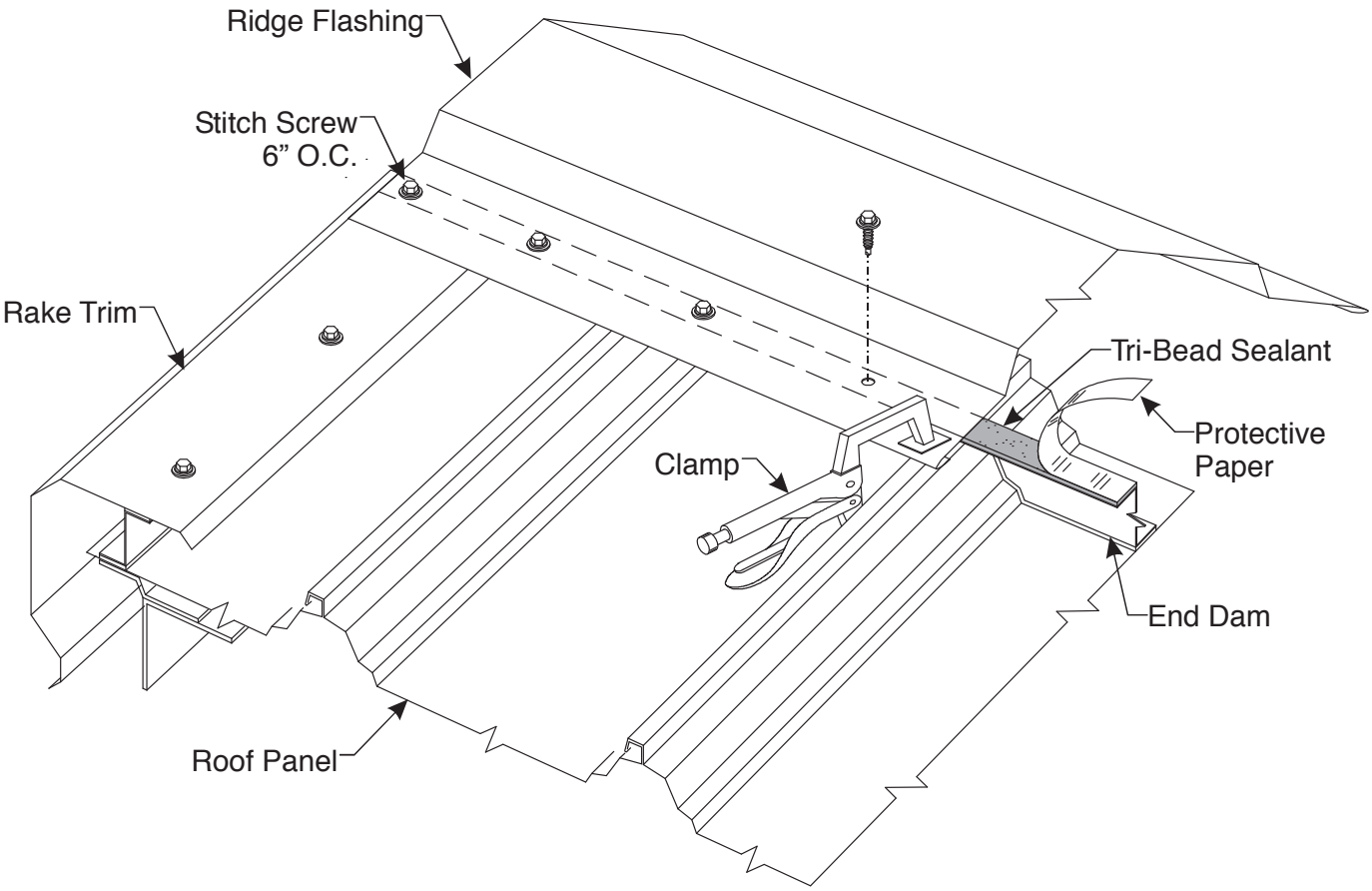
Ridge Cover Installation at Rake Trim

Install Tri-Bead sealant on top of the end dams along both sides of the building peak.

Set end of ridge cover flush with outer edge of the top leg of the rake trim.

Hold ridge cover in place using vice-grip "C" clamps as shown.

Attach ridge cover using stitch screws.

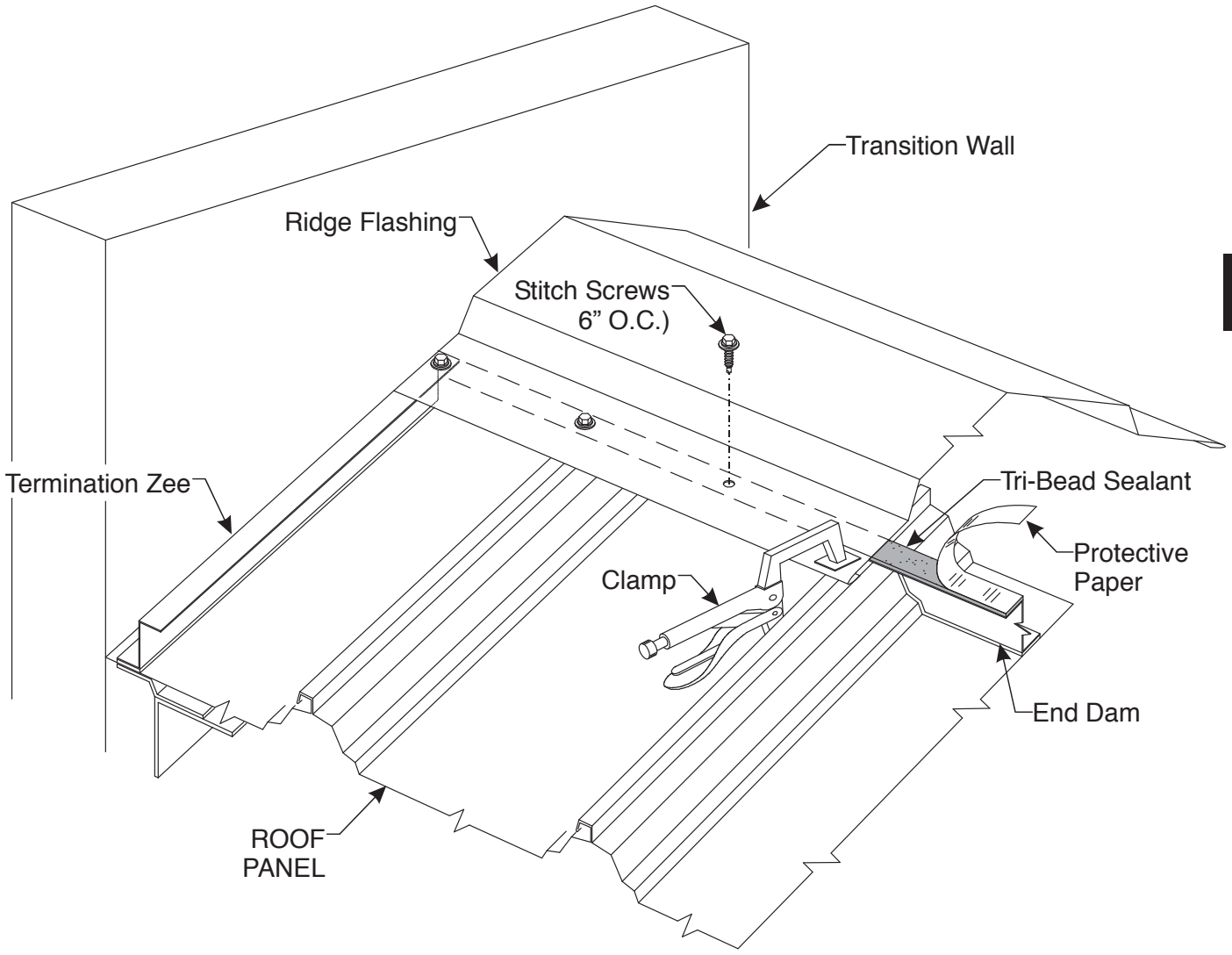


Ridge Cover Installation at Transition Flashing

Set end of ridge cover flush with face of termination zee.

Hold ridge cover in place using vice-grip "C" clamps as shown.

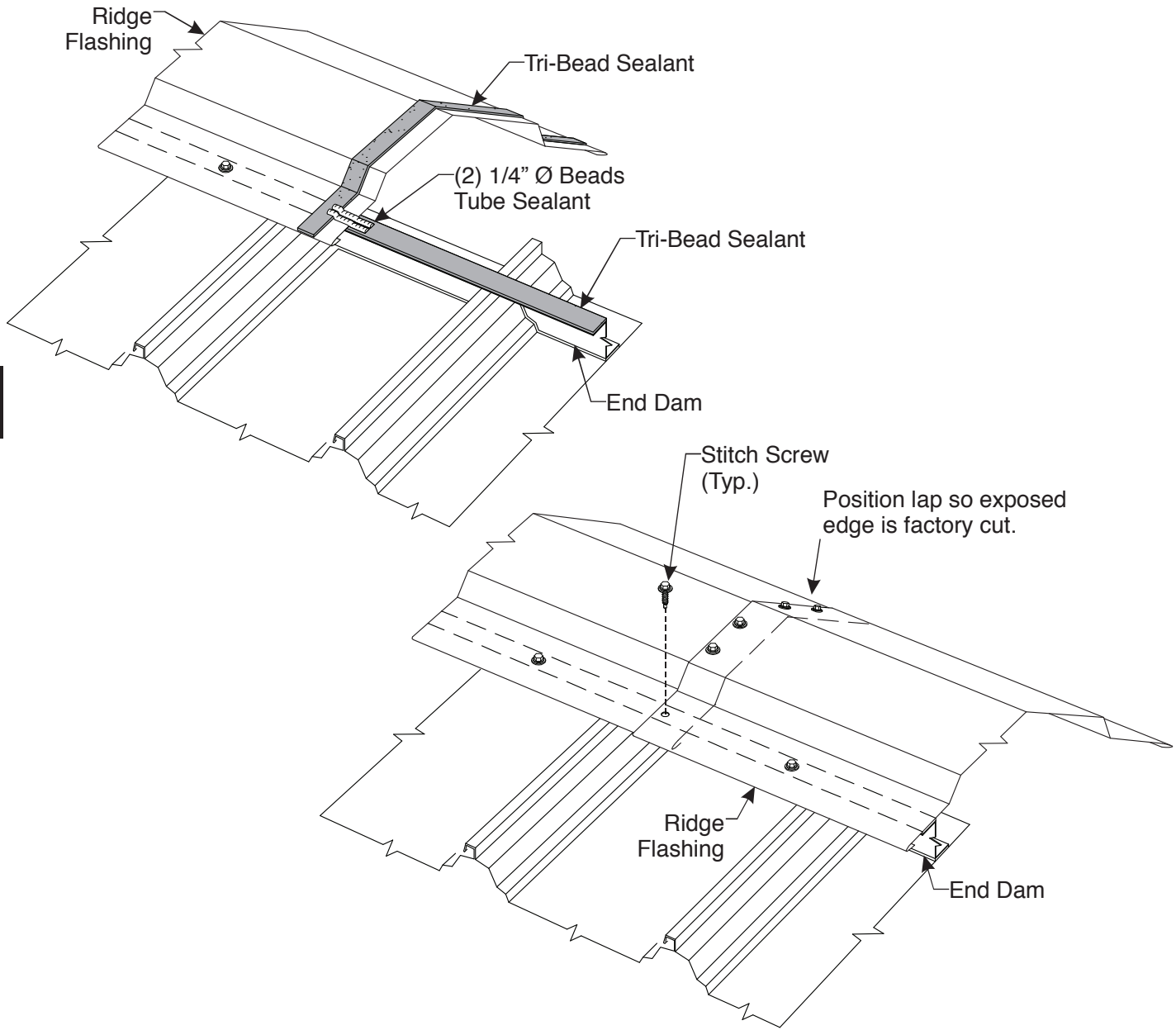
Attach ridge cover using stitch screws.



8. ROOF INSTALLATION DETAILS

Ridge Cover Splice Detail

Use Tri-Bead sealant to seal ridge cover end splice.



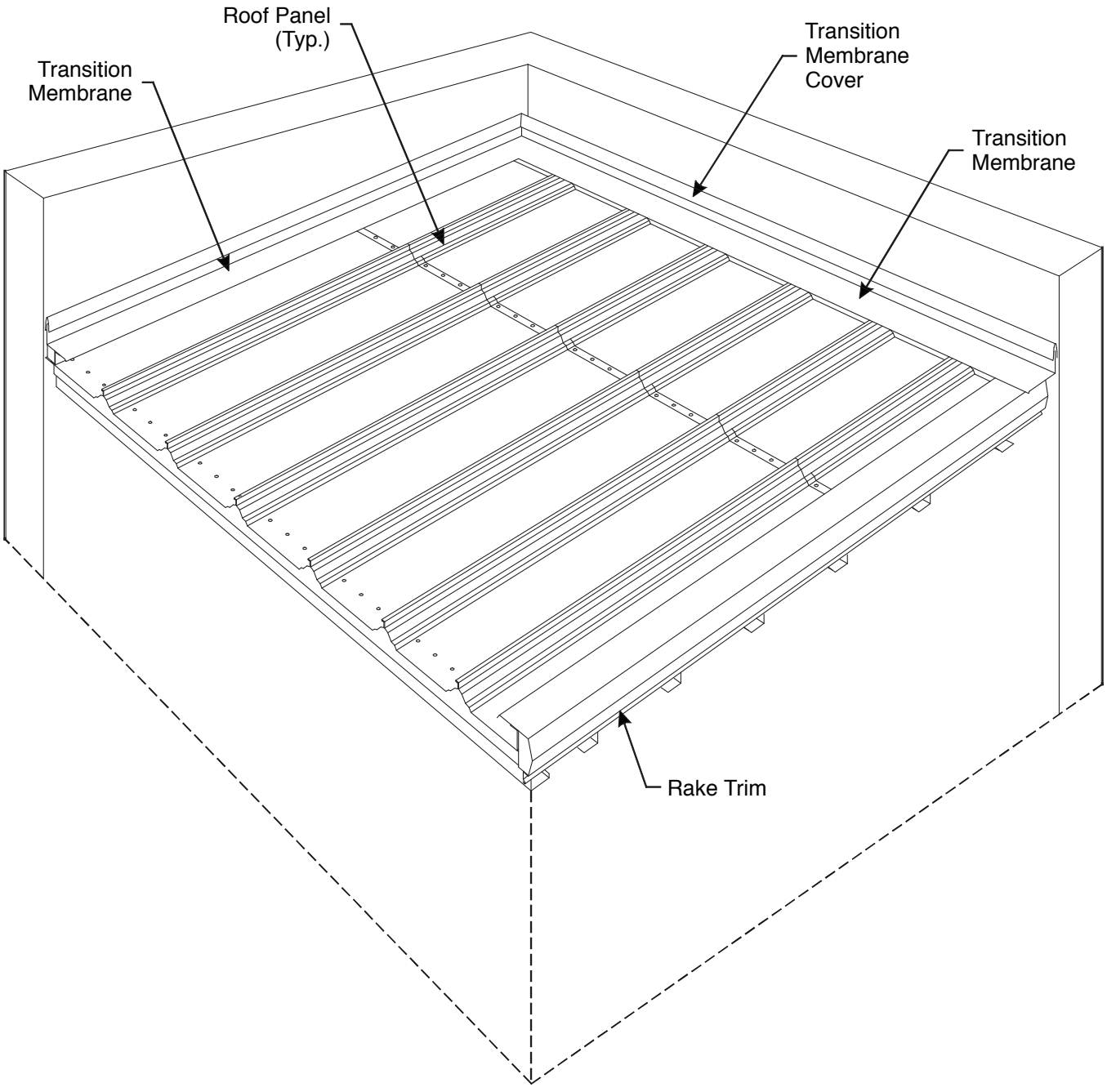
C. ROOF TRANSITIONS

Rake transition flashing requires a termination zee if the transition flashing is located at the start rake.

The rake transition flashing will require the rake plate to be placed in the alternate position along the termination rake.

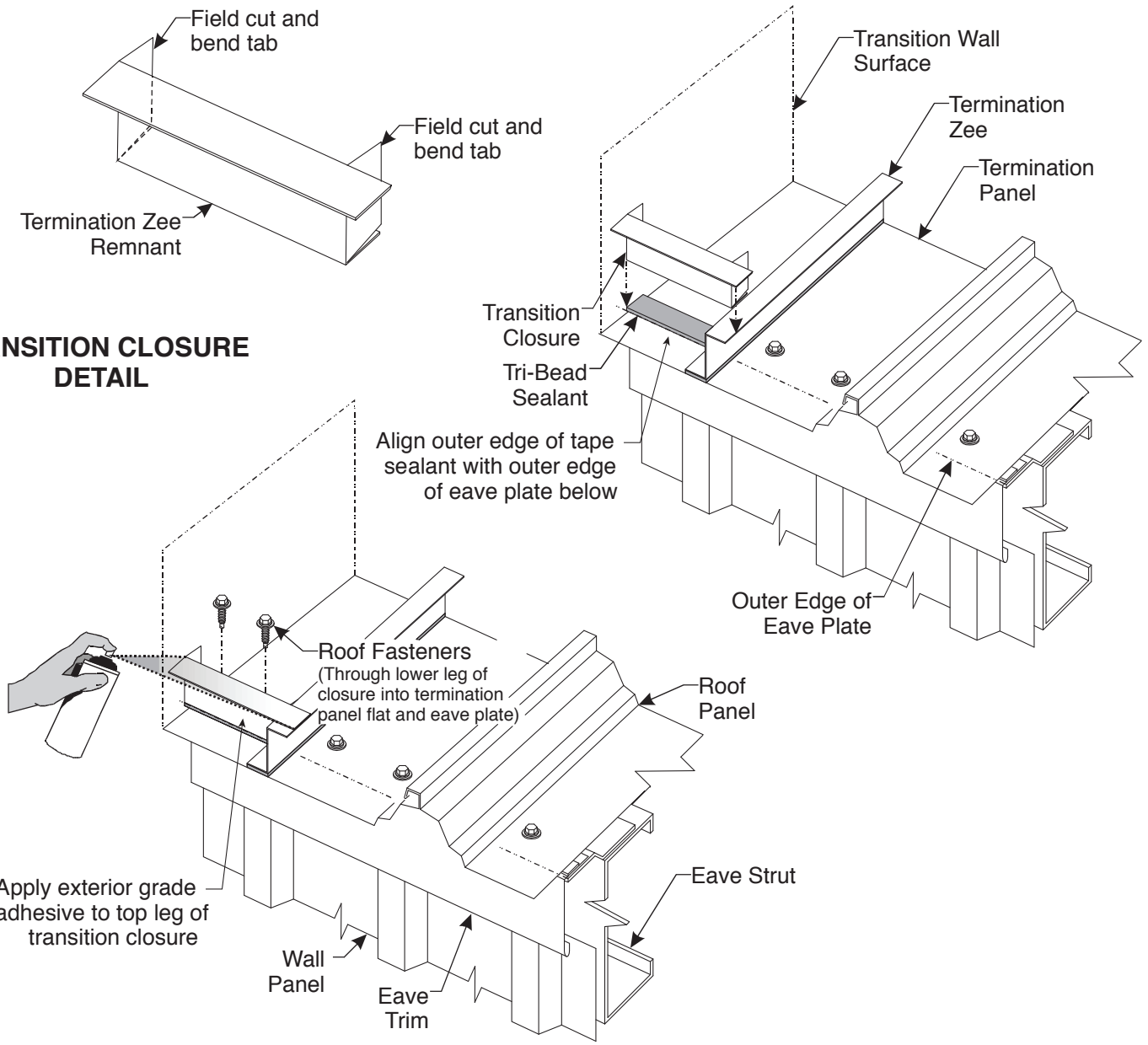
The high eave transition flashing is installed using the same procedure as the rake transition membrane.

The high eave condition can terminate at rake trim or at a rake transition as shown on the roof above.



8. ROOF INSTALLATION DETAILS

Rake Transition Closure Installation

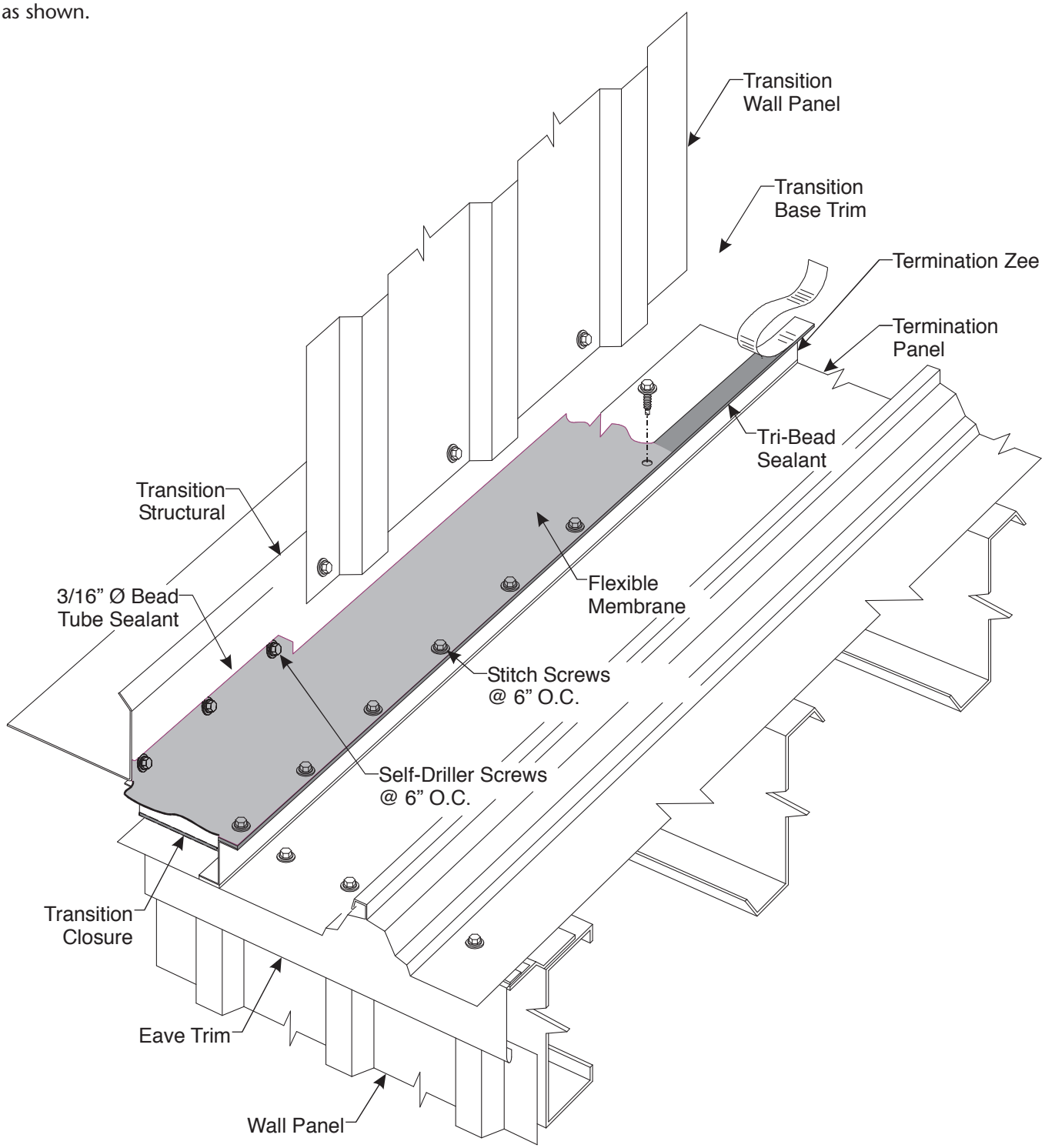


TRANSITION CLOSURE DETAIL

Transition Membrane Installation at Rake

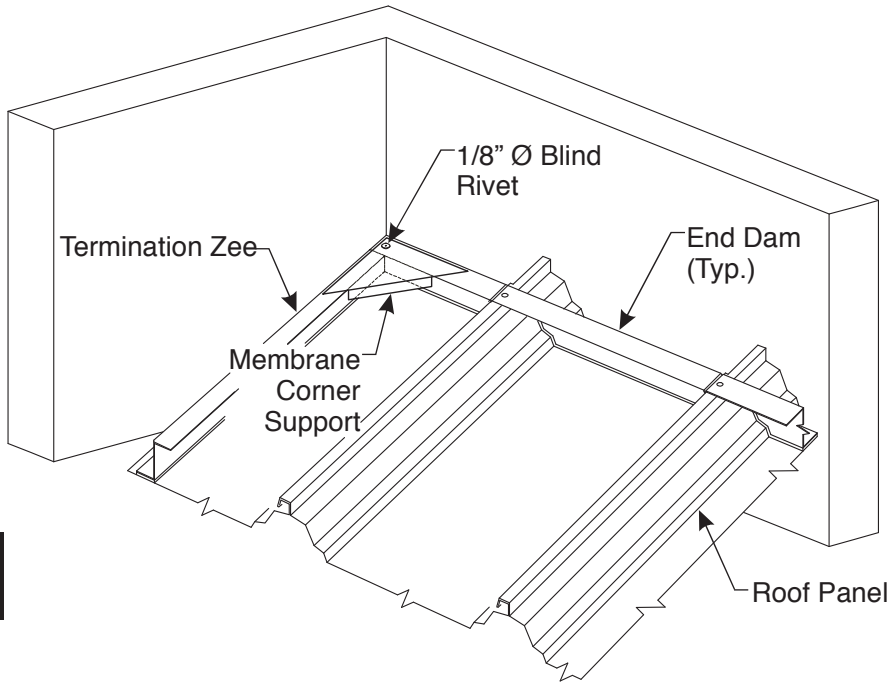
Apply a continuous strip of Tri-Bead sealant along the top of the termination zee.

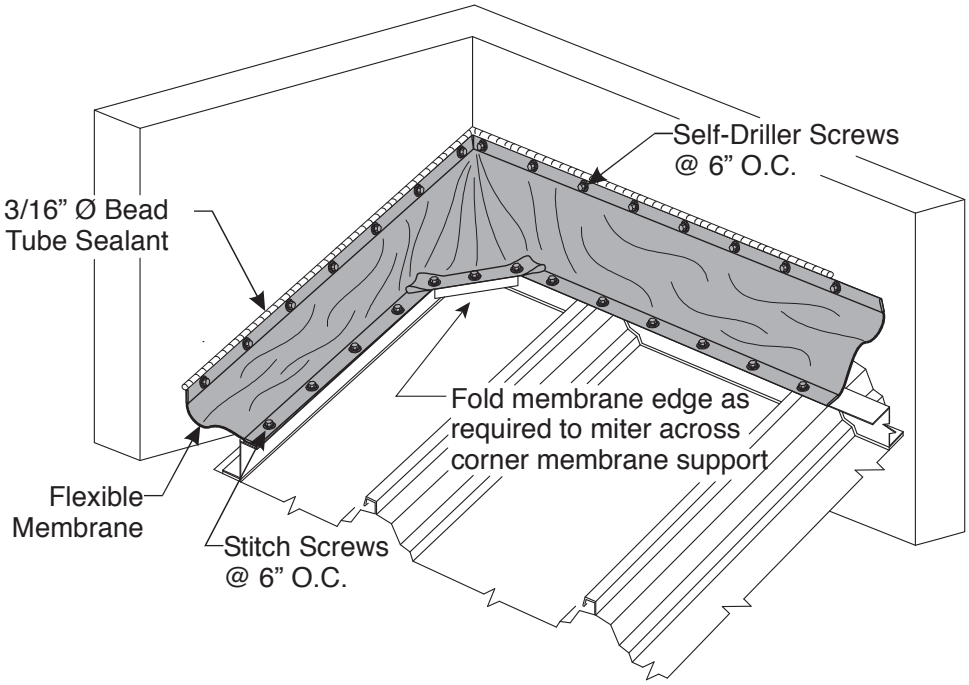
Position the transition membrane over the termination zee as shown.



8. ROOF INSTALLATION DETAILS

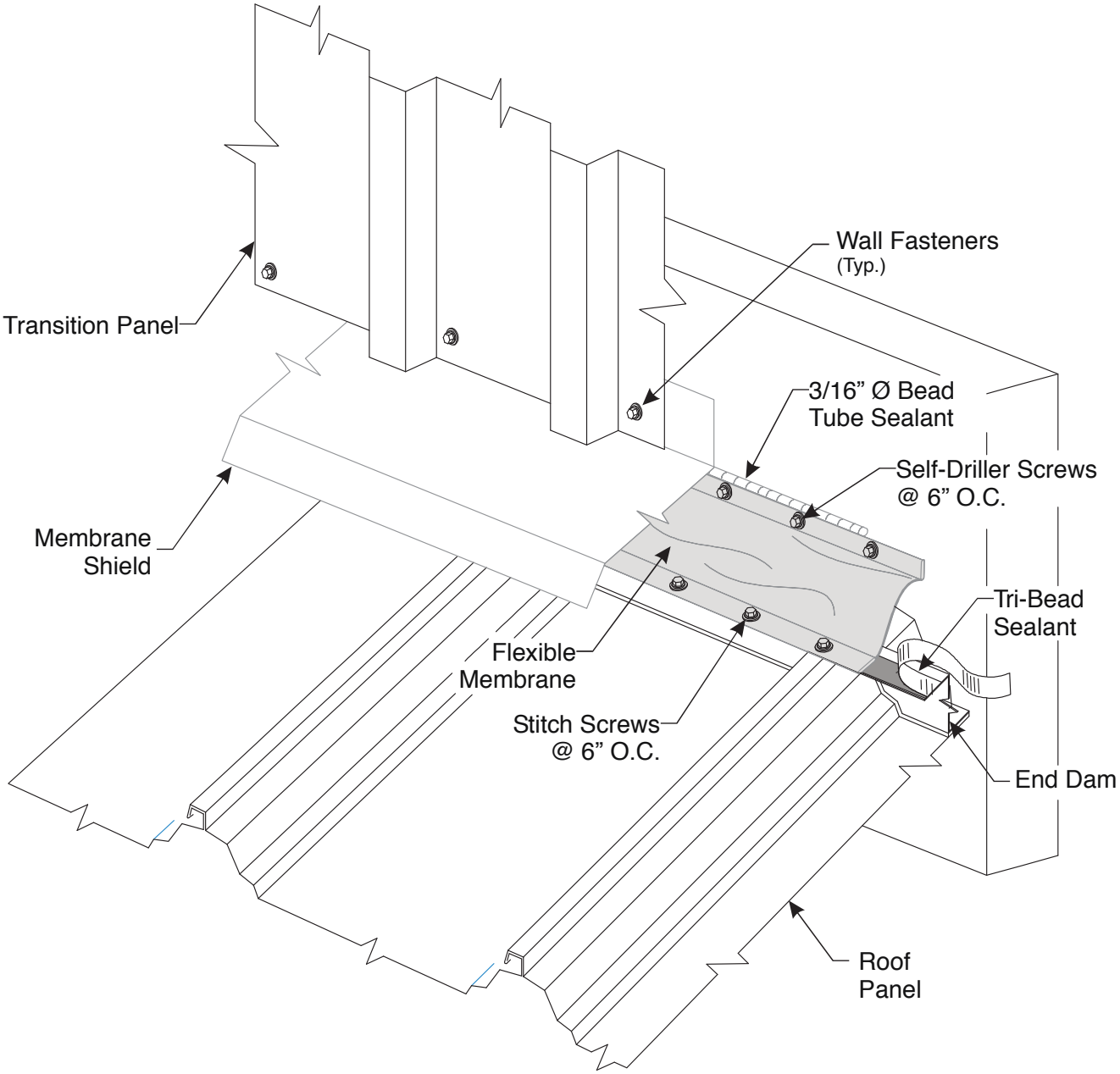
Transition Membrane Corner





Transition Membrane Installation at High Side

Apply continuous strip of Tri-Bead sealant along the top of the end dams along the transition.



8. ROOF INSTALLATION DETAILS

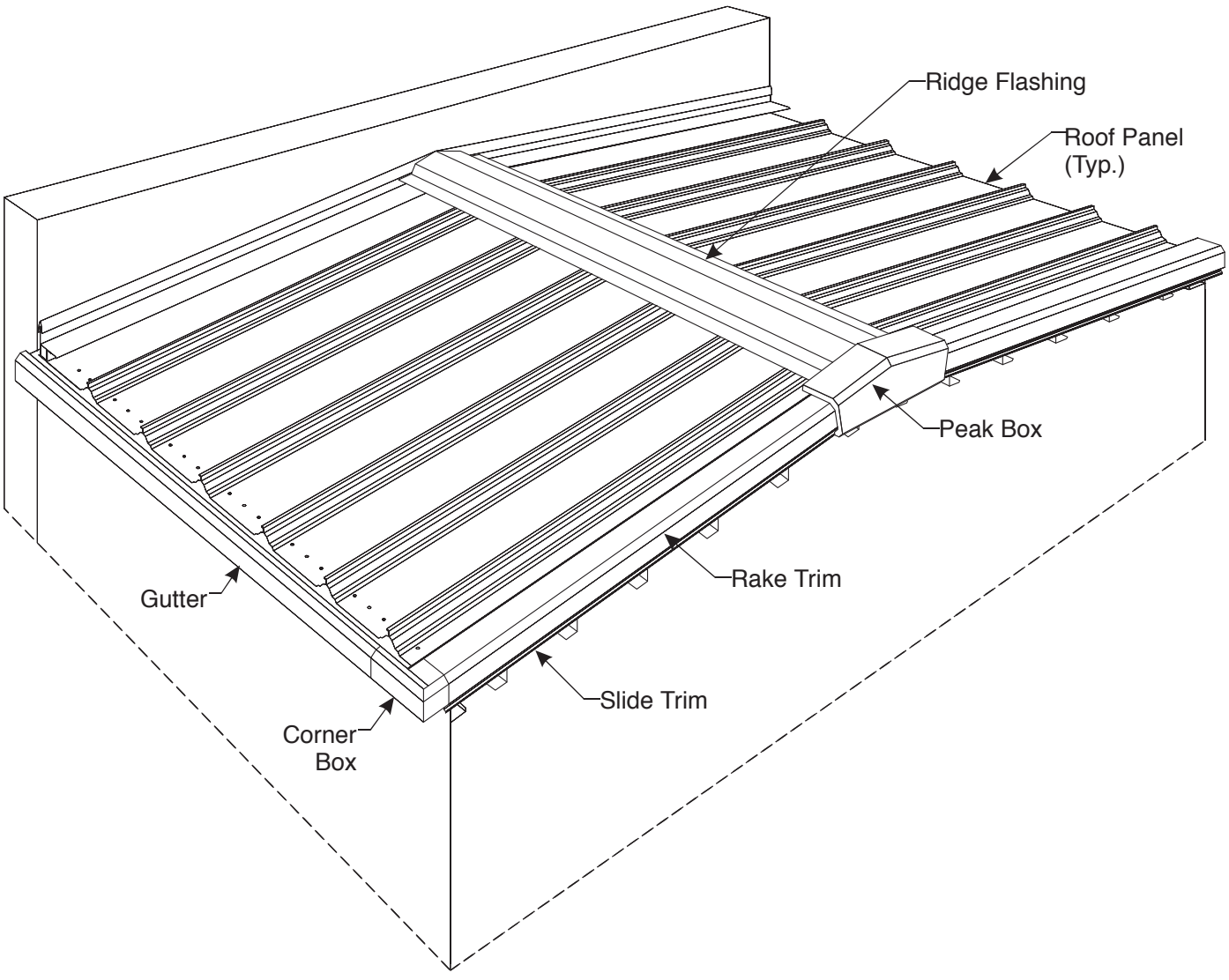
D. GUTTER, CORNER BOX, AND PEAK BOX

Assembly of the gutter should be accomplished with great care given to the final appearance of the sections. The appearance of the gutter will have a critical effect on the appearance of the project.

Determine from which direction the building is most often viewed.

Install gutter sections with gutter laps facing away from the most often viewed direction.

Start installation from one end of the building roof.^

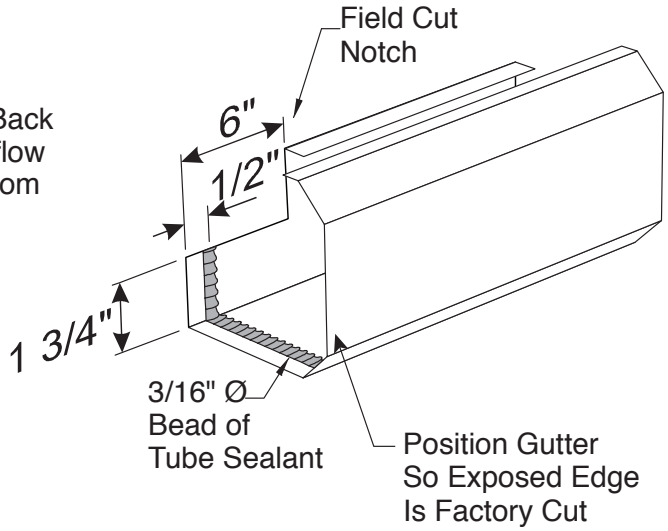


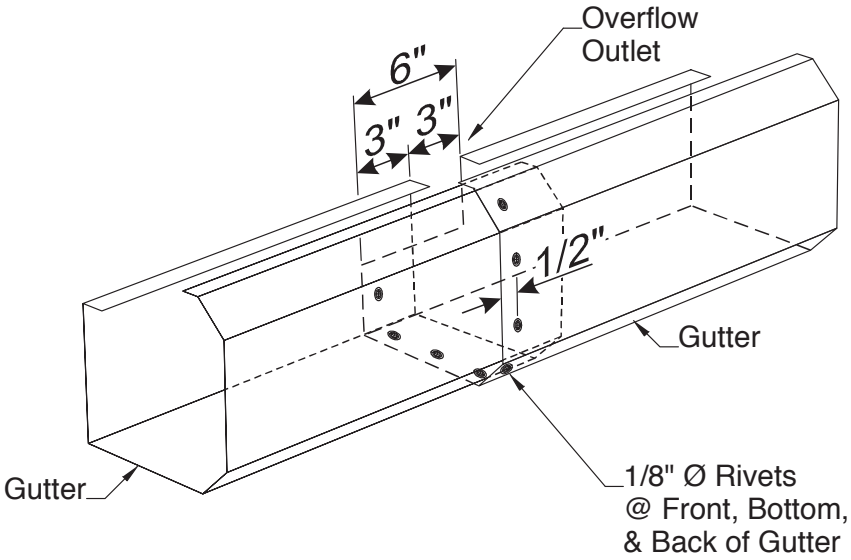
Eave Gutter Assembly

Field notch the back lip of the gutter at each gutter section endlap.

Apply tube sealant as shown.

**** NOTE ****
Field Cut Similar Notches in Back of Gutter For Controlled Overflow Outlets in Locations Away From Entrance/Exit Doors.





8. ROOF INSTALLATION DETAILS

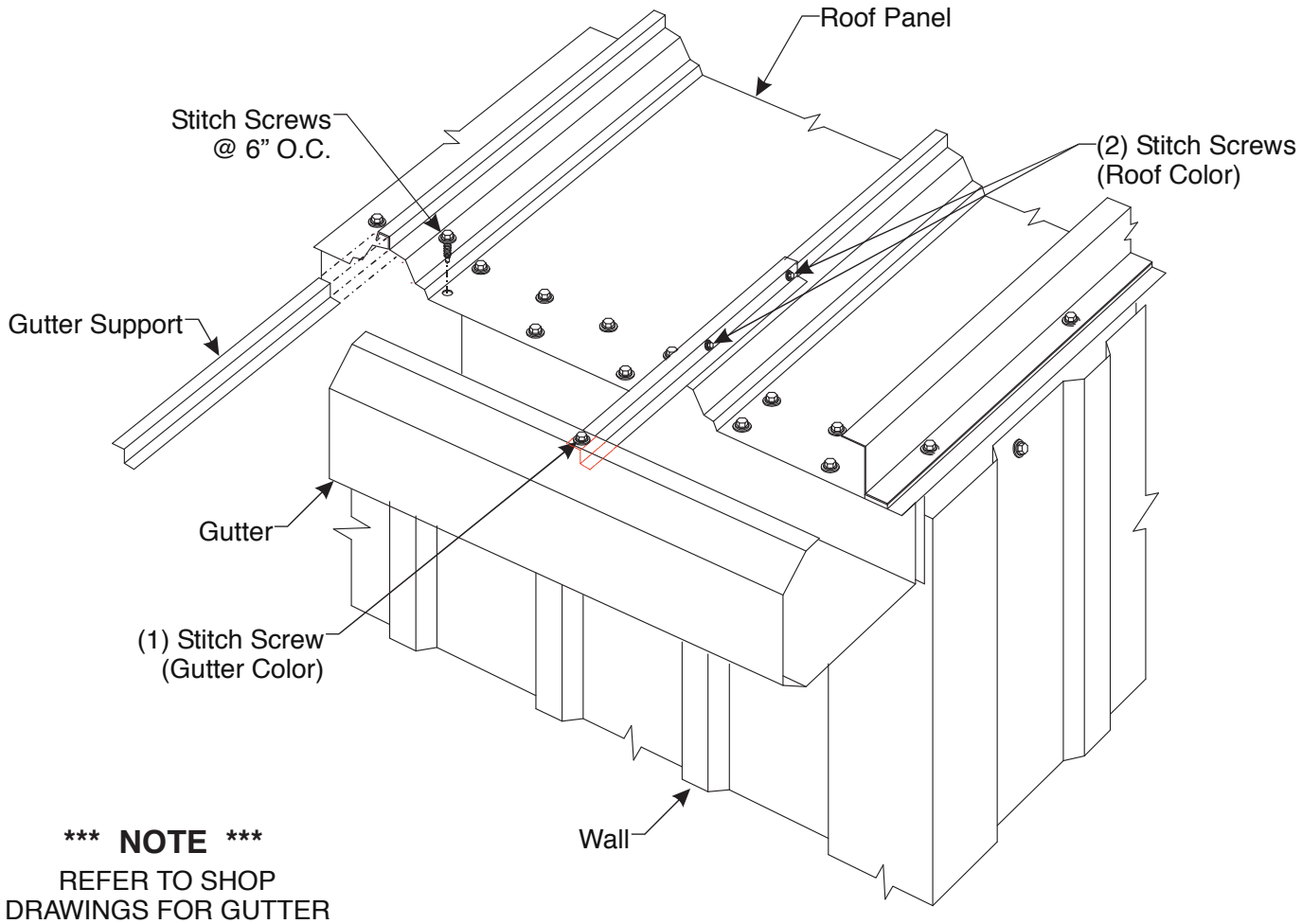
Eave Gutter Installation

Clamp gutter in place using vice grip "C" clamps to hold the gutter lip to the end of the roof panel.

Place a gutter strap over the panel rib.

Install two stitch screws through gutter brackets and into the panel rib.

Install a stitch screw through the outer gutter lip into the gutter strap.



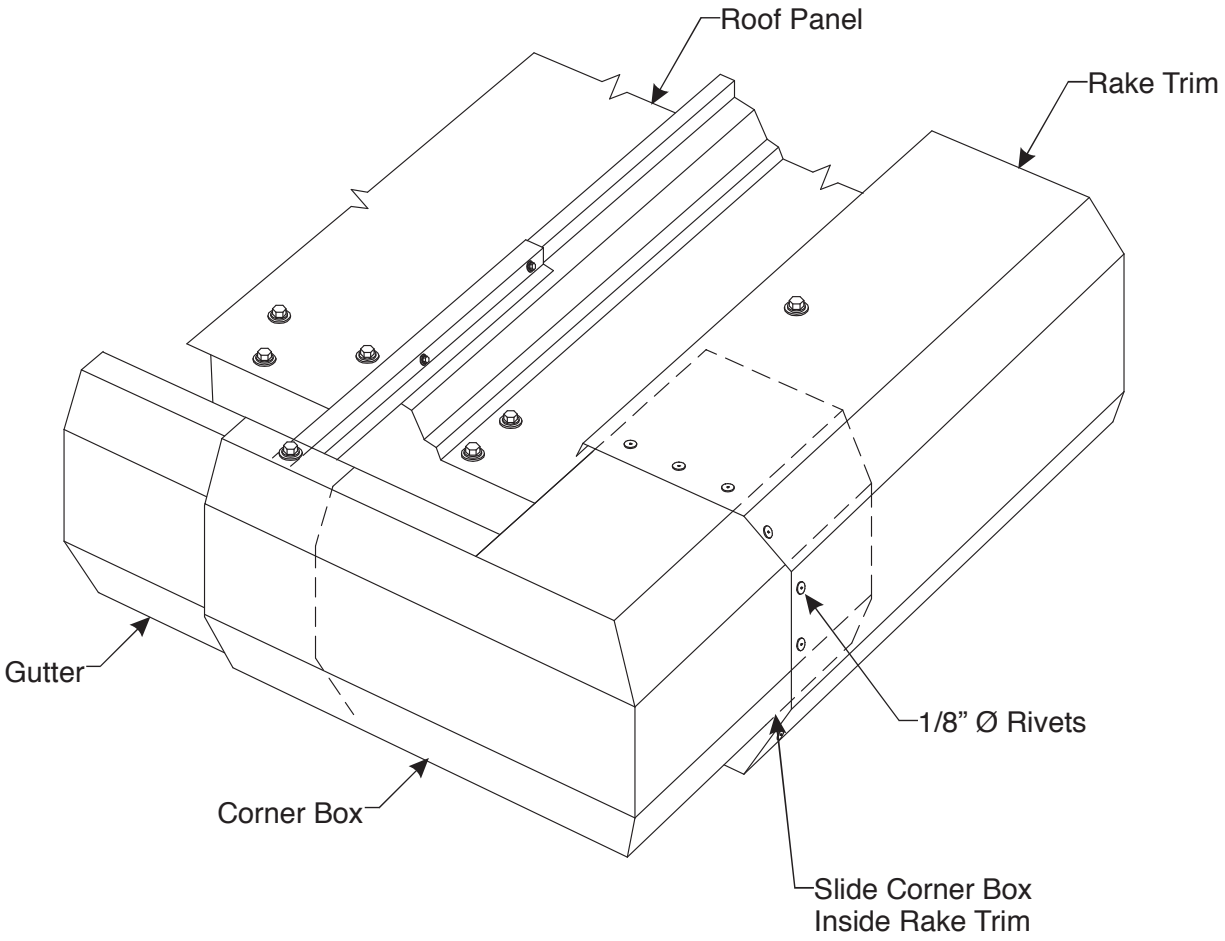
***** NOTE *****

REFER TO SHOP DRAWINGS FOR GUTTER SUPPORT SPACING

Gutter Corner Box

Prepare the gutter portion of the corner box for lapping with the gutter as instructed for standard gutter laps.

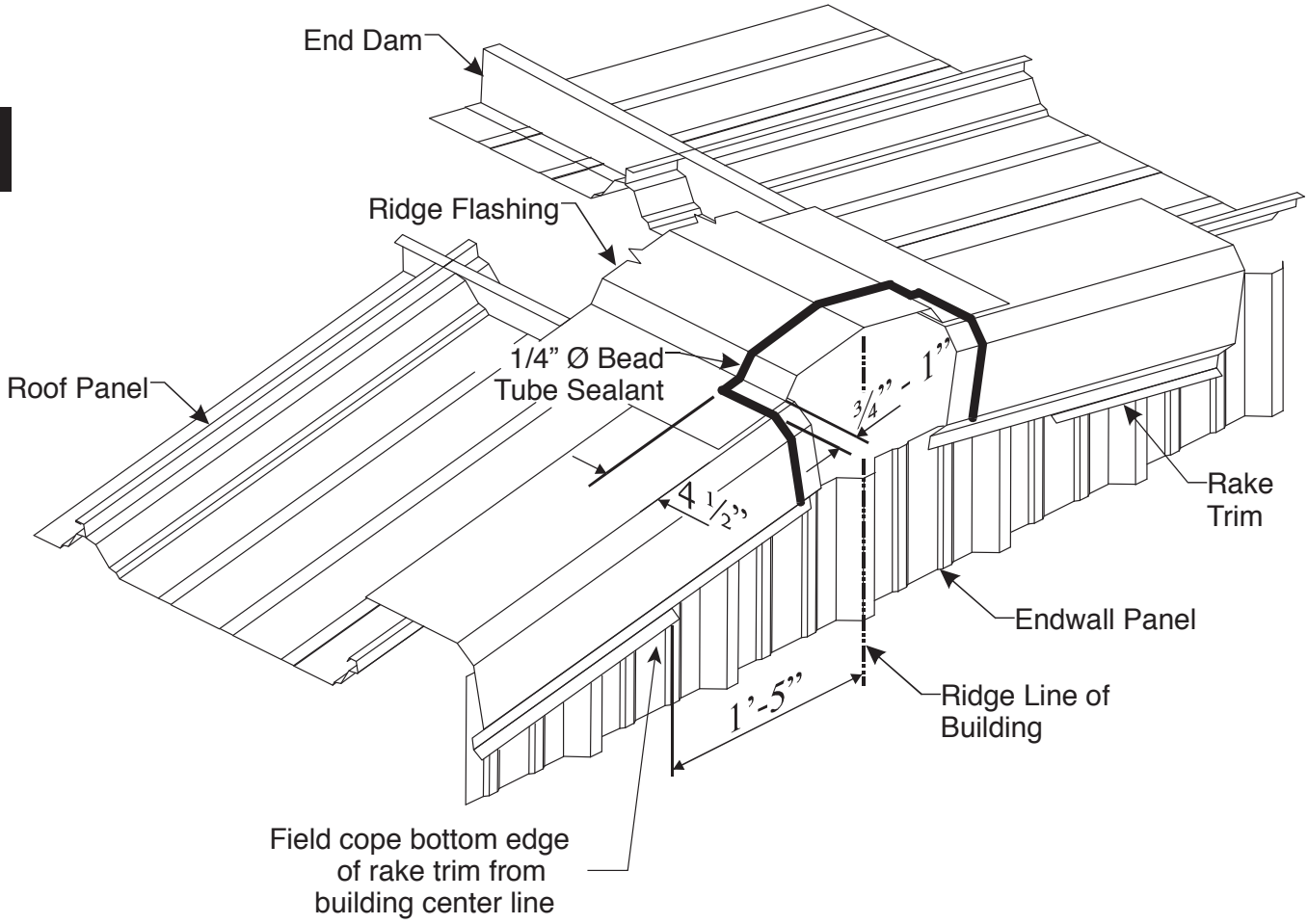
The rake portion of the corner box will be lapped as a standard rake trim lap.



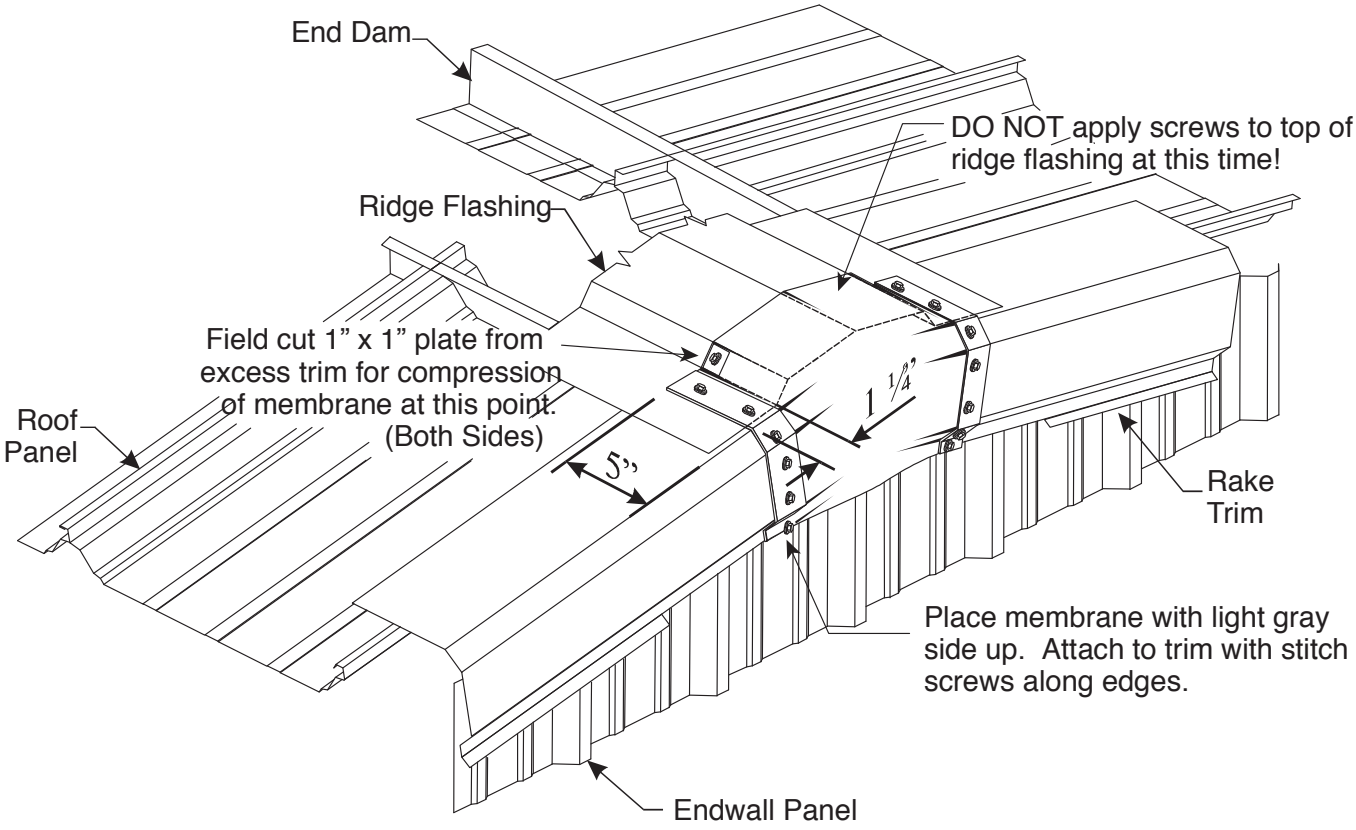
8. ROOF INSTALLATION DETAILS

Peak Box – Preparation

Apply 1/4" bead of tube sealant to the rake trim and ridge flashing as shown.



Peak Box -- Membrane Installation

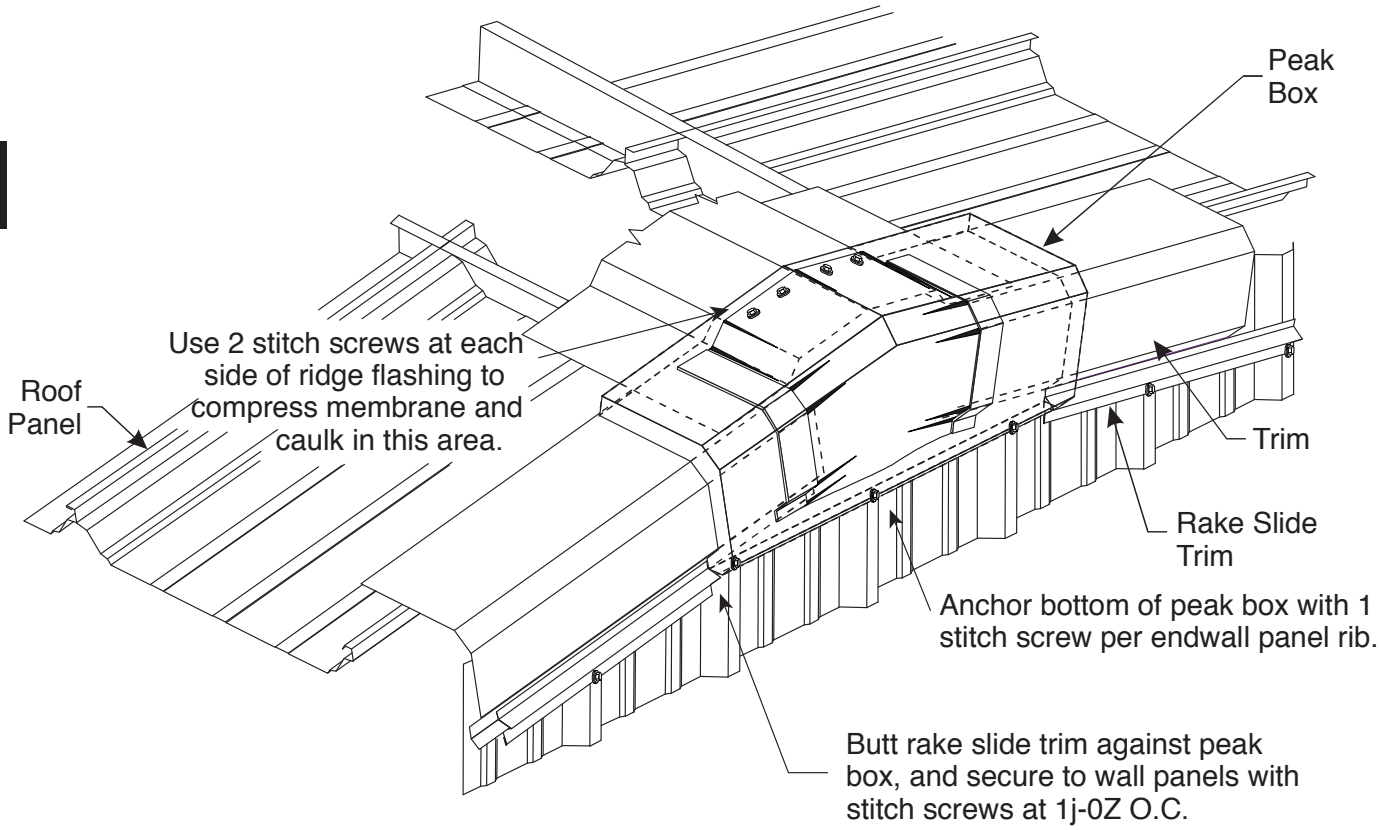


8. ROOF INSTALLATION DETAILS

Peak Box – Installation

Note: The peak box is not attached to the rake trim with fasteners.

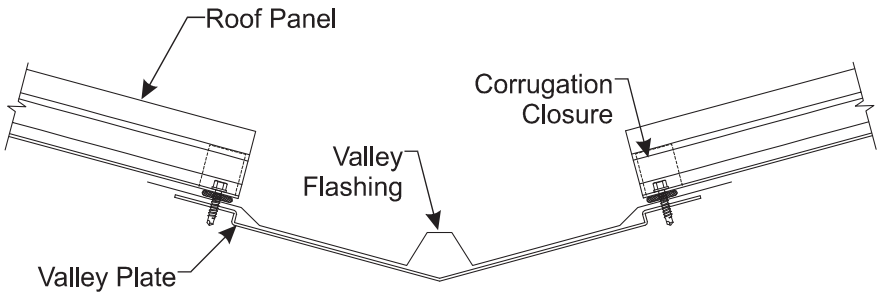
Attaching the peak box this way allows the rake trim to expand and contract freely.



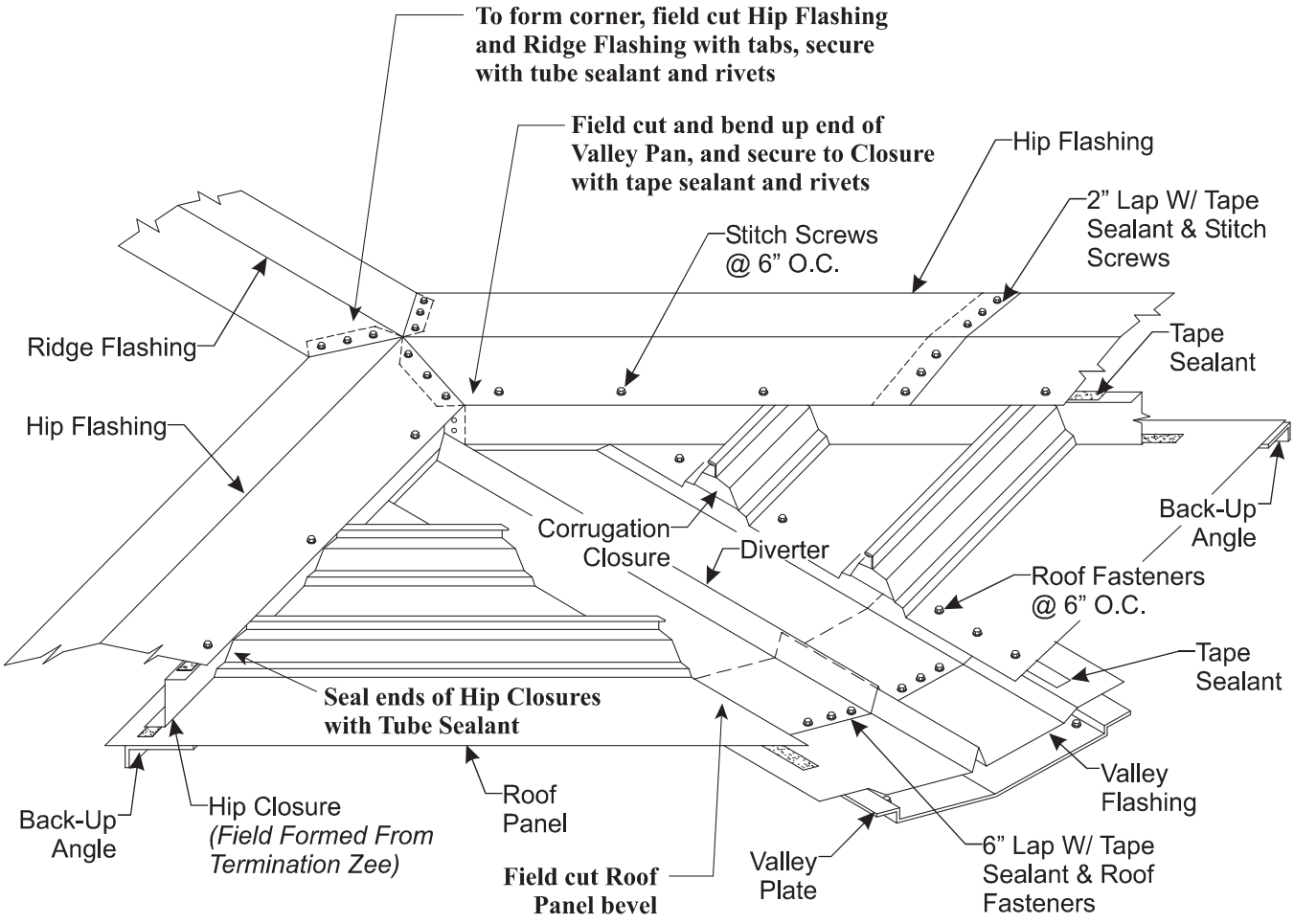
E. HIP AND VALLEY DETAILS

The above details show typical hip and valley details.

Refer to erection drawings provided with the roof shipment for details of a specific roof.



SECTION AT VALLEY



9. SEAMING THE ROOF

This section is provided to Mueller Building Systems customers and erectors as the recommended procedures for the correct seaming of the Mueller Building Systems Standing Seam Roof System.

This section is intended to be used with the project's erection drawings. The erection drawings govern the specific seam requirements. In case of conflict between this installation guide and the erection drawings, the erection drawings will take precedence.

The customer is responsible for proper seaming of the roof in accordance with the erection drawings and this installation guide, and in accordance with good engineering and construction practices.

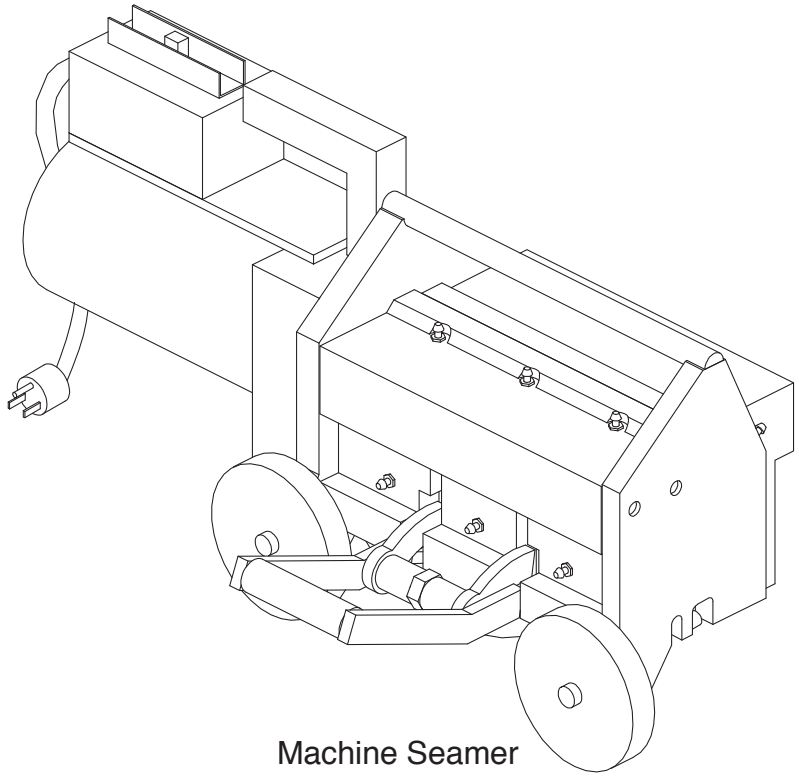
The customer must take the responsibility for selecting a competent erector, insist that the work be performed by qualified and experienced standing seam metal roof installers, insist that the erector take time to study and understand this guide, then assure that the erector correctly follows the guide's instructions.

Mueller Building Systems does not guarantee and is not liable for the quality of erection.

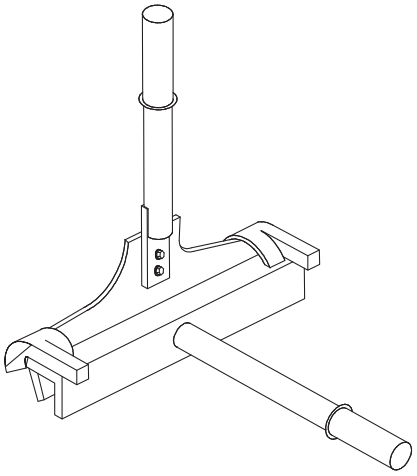
Mueller Building Systems is not responsible for building defects that may be attributed to improper erection or the negligence of other parties. Clarification concerning the

Mueller Building Systems roof installation and seaming should be directed to the

Mueller Building Systems Customer Service Manager.



Machine Seamer



Manual Seamer

9.1. SEAM TYPES

A. GENERAL

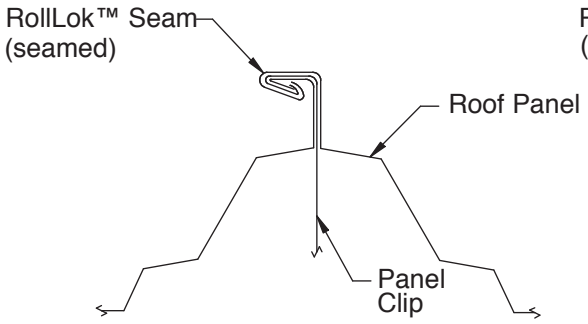
The MTL Standing Seam Roof System has three seam type options. The project's design and roof performance requirement's govern which seam type is required.

Different seam types may be required on specific areas of the roof. In all cases, refer to the erection drawings to determine the required seam type and location

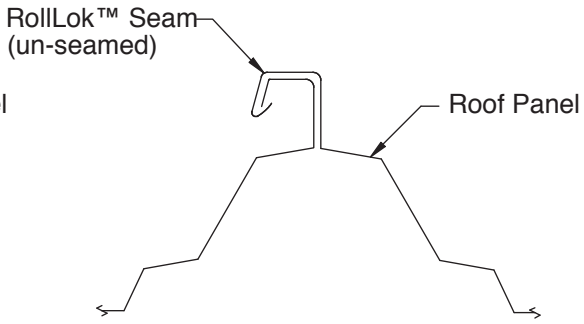
B. ROLLLOK™ SEAM

The RollLok™ Seam requires seaming the roof panels with the manual seaming tool only at the panel clips and at the eave and ridge ends of the roof panel and at the endlaps. The motor seaming machine is not required for RollLok™ seaming.

The RollLok™ Seam is only for use as a temporary placement until machine seaming can be properly performed.



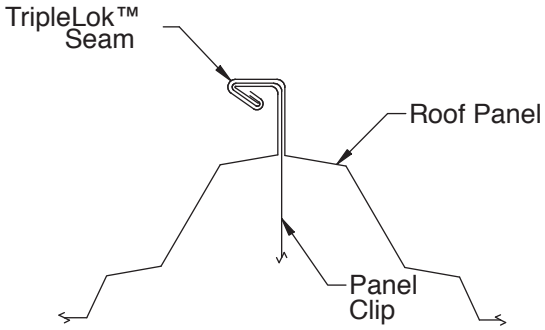
@ Panel Clips & Panel Ends



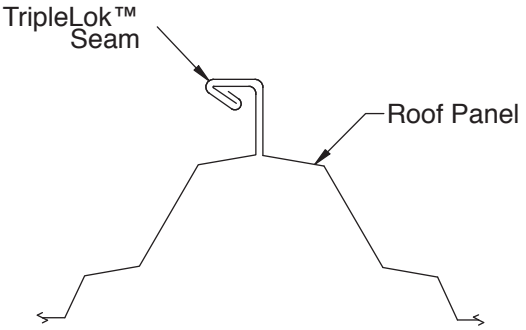
Between Panel Clips & Panel Ends

C. TRIPLELOK™ SEAM

The TripleLok™ Seam requires seaming the roof panel with the manual seaming tool at the starting eave or ridge end of the roof panel and at the endlaps, then seaming the full length of the roof panels with the motor seaming machine.



@ Panel Clips



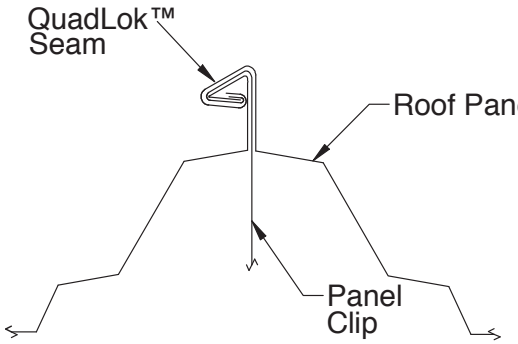
Between Panel Clips

9. SEAMING THE ROOF

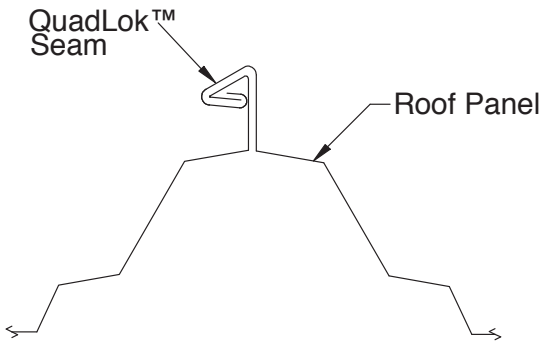
D. QUADLOK™ SEAM

The QuadLok™ Seam requires that the roof panels be previously TripleLok™ seamed. Then over-seaming specified areas of the roof panels with the motor seaming machine.

The motor seaming machine must be fitted with the QuadLok™ seaming rollers.



@ Panel Clips



Between Panel Clips

9.2. IMPORTANCE OF SEAMING

A. ROOF PERFORMANCE

The roof panels must be correctly seamed before the roof system can provide it's designed wind load and weather resistance capability. This means that an unseamed roof is subject to wind load failure and weather resistance failure.

B. WHEN TO SEAM

Whenever possible, the installed roof panels should be seamed at the finish of each days work. If high wind or rain/snow conditions are imminent, the installed roof panels must be seamed before such conditions occur.

C. TEMPORARY SEAMING

On roofs requiring machined seams, it may not always be practical or feasible to motor seam the roof panels until after the roof installation is completed. Motor seamed roof panels are difficult to reposition or replace. Motor seaming machines may not always be available during the entire roof installation period.

In such cases, it may be desirable to temporarily RollLok seam the roof panels with the manual seaming tool, then later complete the seaming with the motor seaming machine.

Important: Temporary RollLok seaming must be approved by the project's designer.

9.3. SEAMING EQUIPMENT

A. SPECIALIZED SEAMING TOOLS

The seaming of the Mueller Building Systems roof panels require special seaming tools which are available only from a third party supplier recommended by Mueller.

CAUTION: The use of other seaming equipment may result in faulty and/or damaged seams and may invalidate the roof system's material and performance warranties.

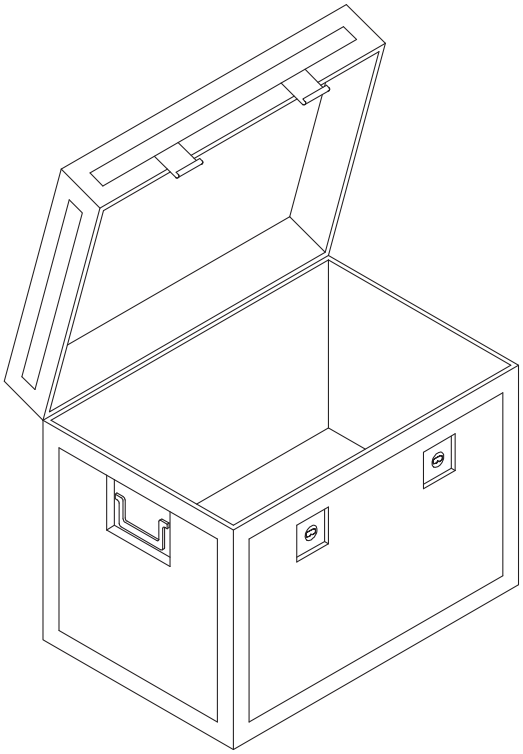
B. SEAMING TOOL SOURCE

Seaming tools are rented from a third party vendor recommended by Mueller. Please contact your Mueller sales person for seamer rental information.

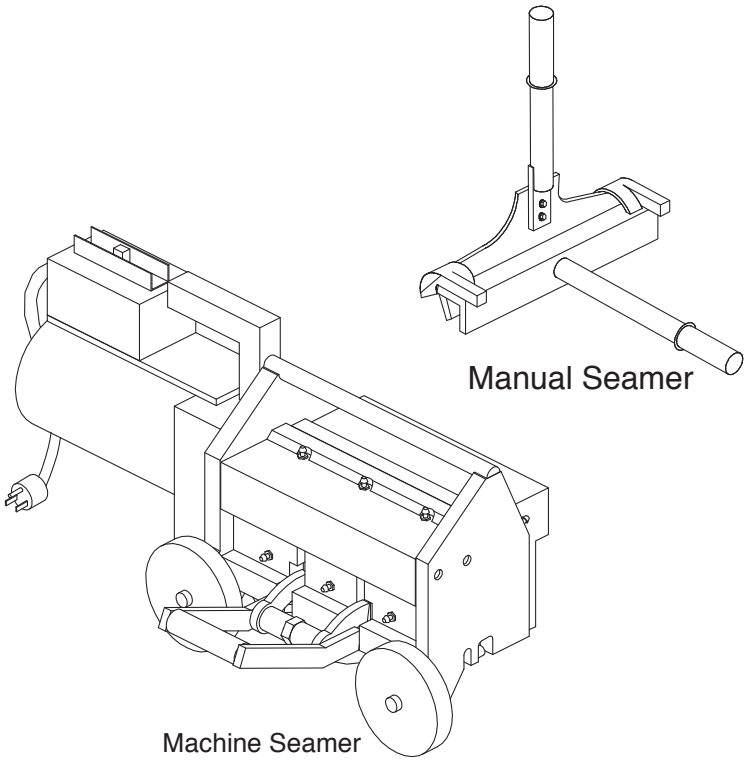
C. SEAMING KIT

The seaming equipment will normally be provided as a seaming kit. The seaming kit will consist of the following:

1. Seaming Kit Chest.
2. Manual Seaming Tool
3. Motor Seaming Machine
4. Seaming Instructions Manual
5. Return shipping documents and instructions Machine Seamer



Seaming Kit Chest



Manual Seamer

Machine Seamer

9. SEAMING THE ROOF

D. RECEIVING AND SHIPPING

Upon receipt of the seaming kit, and before signing the shipping receipt, check and verify that the seaming kit is received in good condition, without damage or loss of contents.

If there is damage or loss of contents, immediately file the claim with the shipper and notify the third party supplier for replacement instructions. Upon completion of the roof seaming, promptly return the seaming kit to the third party supplier, in accordance with the instructions on the return shipping documents. The return shipping documents are provided in the seaming kit.

E. HANDLING AND STORAGE

Provide safe and secure handling of the seaming tools when in use.

The motor seaming machine weighs 65 lbs. and can cause severe damage and injury if it falls.

The machine may be too heavy to safely carry up a ladder. Always hoist the machine onto the roof with proper lifting equipment or with a proper sized rope, tied or hooked securely to the machine's front lifting handle.

When starting and finishing the seaming machine at the edges of the roof, the operator must be securely positioned so that he can safely lift the seaming machine on and off of the seam.

Caution: When running the machine in the downslope direction, the seaming machine will have greater downhill inertia and coasting distance.

When not locked to the seam, the motor seaming machine can freely roll on it's wheels. Always secure the machine to prevent it's rolling or sliding off of the roof.

When the seaming tools are not in use, they must be stored in the seaming kit chest and the chest secured in a safe and dry area. The seaming tools must be cleaned and dried before storing.

9.4. ELECTRICAL REQUIREMENTS

A. MOTOR SEAMING MACHINE

The seaming machine motor requires a minimum electrical power supply of: 20 amp @ 120 Volt @ 60 Hz AC.

B. ELECTRICAL SERVICE AND CORDS

The electrical service and the electrical cords to the seaming machine must be of sufficient capacity to provide the full 20 amp @ 120 Volts, **at the seaming machine**. If other tools or equipment are being used on the same service, the service and cord capacity must be increased accordingly.

Caution: Low voltage due to insufficient service capacity, insufficient cord size or excessive cord length will cause overheating and burnout of the seaming machine's motor.

C. ELECTRICAL SAFETY

Check that the power cords are fitted with the correct plug for safe and secure electrical connection to the seaming machine. Check that the power cords are properly grounded and that the service has a ground fault circuit breaker.

D. CORD CLEARANCE

Check that the electrical cord is of sufficient length to extend the full length of the area to be seamed, without stress on the cord or it's connections. Check that the path for the cord is clear and that the cord is clear of snagging on panel edges or entanglement into the seaming machine rolls.

9. SEAMING THE ROOF

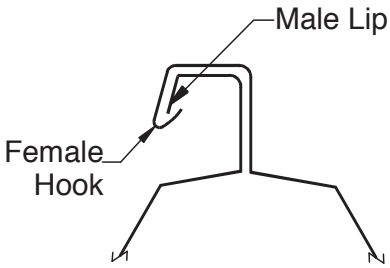
9.5. CHECK PANEL ASSEMBLY

A. SIDELAP FIT-UP

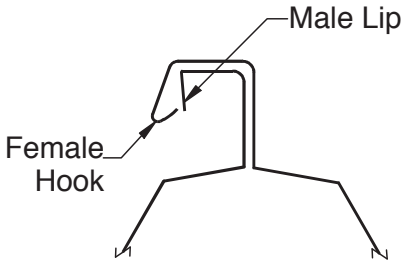
Before seaming, inspect the full length of each roof panel sidelap. Check that the lip at the panel's male edge is enclosed by the hook of the adjacent panel's female edge.

Any conditions where the male lip is not positioned inside of the female hook must be corrected before attempting to seam the roof panels.

Caution: False seaming may occur where the roof panel's male edge is not hooked by the female. False seamed roof panels cannot provide their designed load and weather resistance.



Correct



Wrong
(False Seam)

B. CLIP ALIGNMENT

Before seaming, check that each roof panel clip is properly seated in the roof panel sidelap assembly. Any displaced clips must be corrected before attempting to seam the roof panels.

Caution: Misaligned panel clips can cause faulty seaming and objectionable seam appearance.

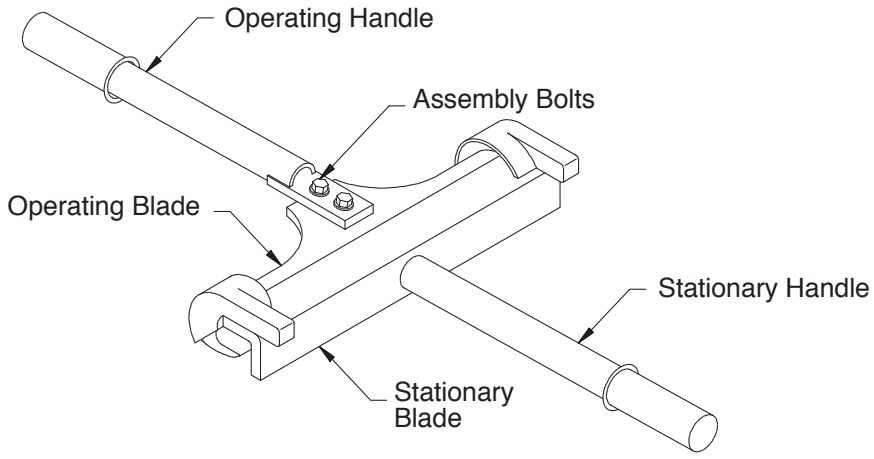
C. SEAM DAMAGE

Before seaming, check that the male and female edges are not kinked or otherwise distorted. Any such distortions must be corrected before attempting to seam the roof panels.

9.6. MANUAL SEAMING TOOL OPERATION

A. MANUAL SEAMING TOOL NOMENCLATURE

The following detail identifies the operational parts of the manual seaming tool.

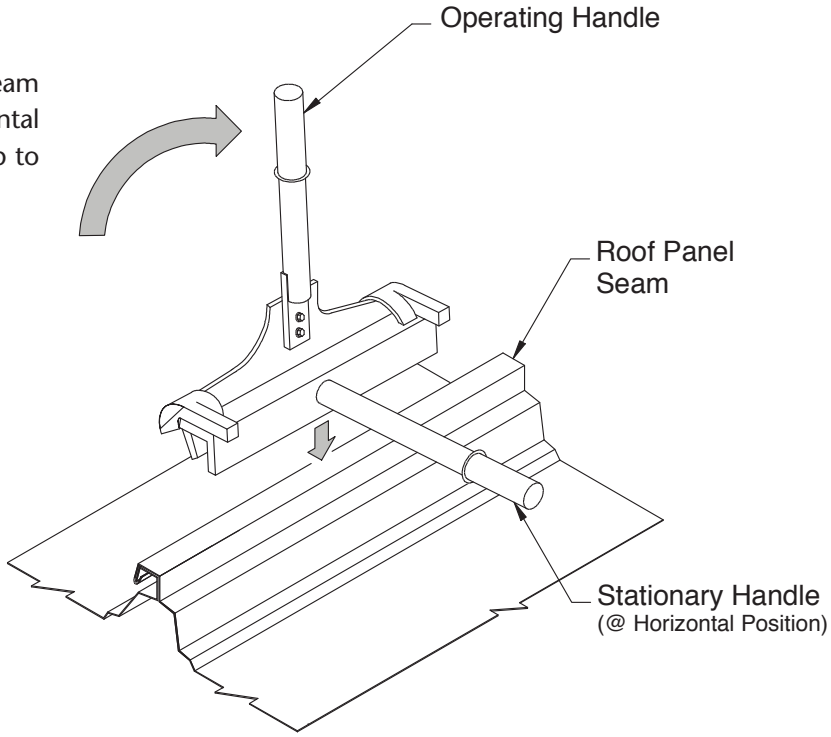


B. ASSEMBLE SEAMING TOOL

When received, the manual seaming tool may be disassembled. Assemble the handle to the tool body and secure with the provided bolts.

C. TOOL ORIENTATION TO SEAM

Orient the tool to fit correctly onto the roof panel seam as shown. The stationary handle must be in the horizontal position and the operating handle must be rotated up to the open position.

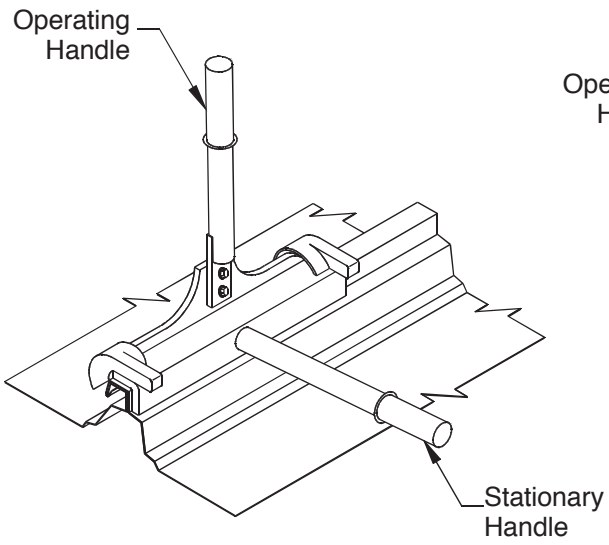


9. SEAMING THE ROOF

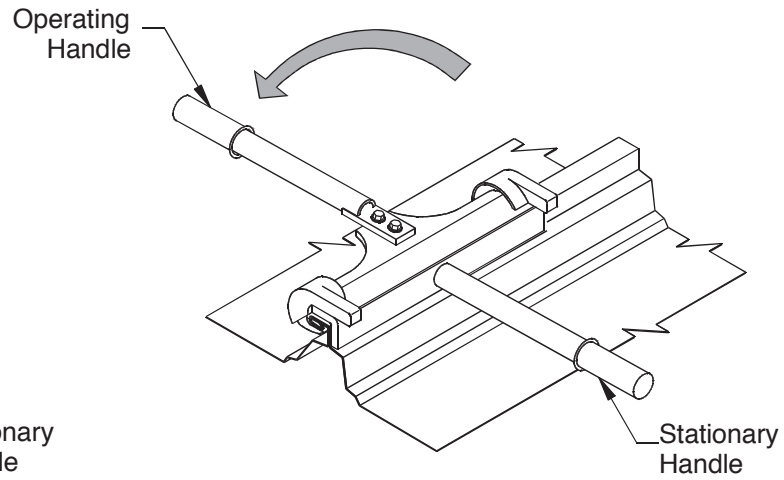
D. FORMING THE SEAM

When the tool is correctly positioned on the panel, push the stationary blade down solidly against the top of the seam.

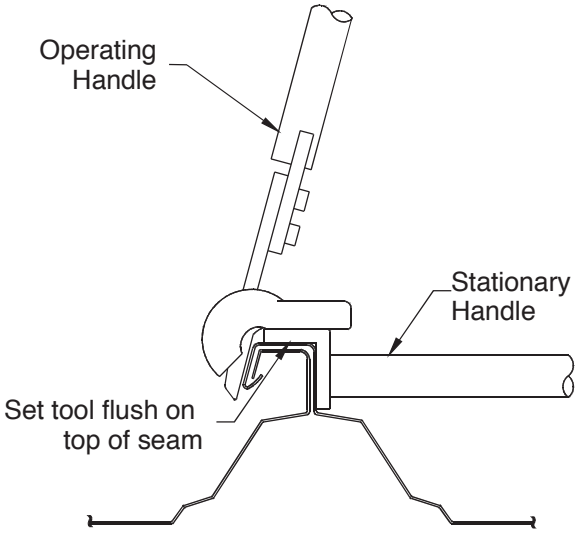
While holding the stationary handle in the horizontal position, rotate the operating handle down to the horizontal position. This will form the seam.



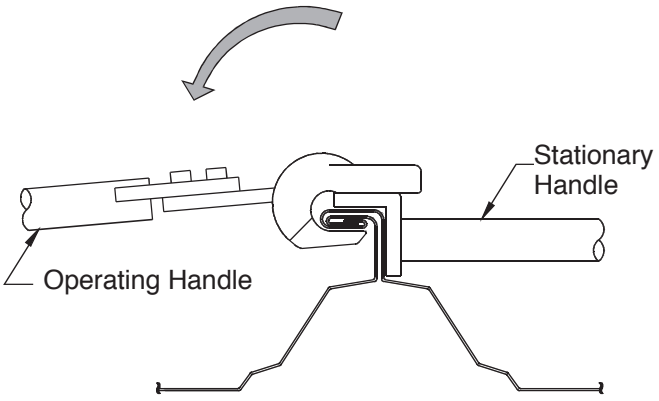
STEP 1



STEP 2



STEP 1

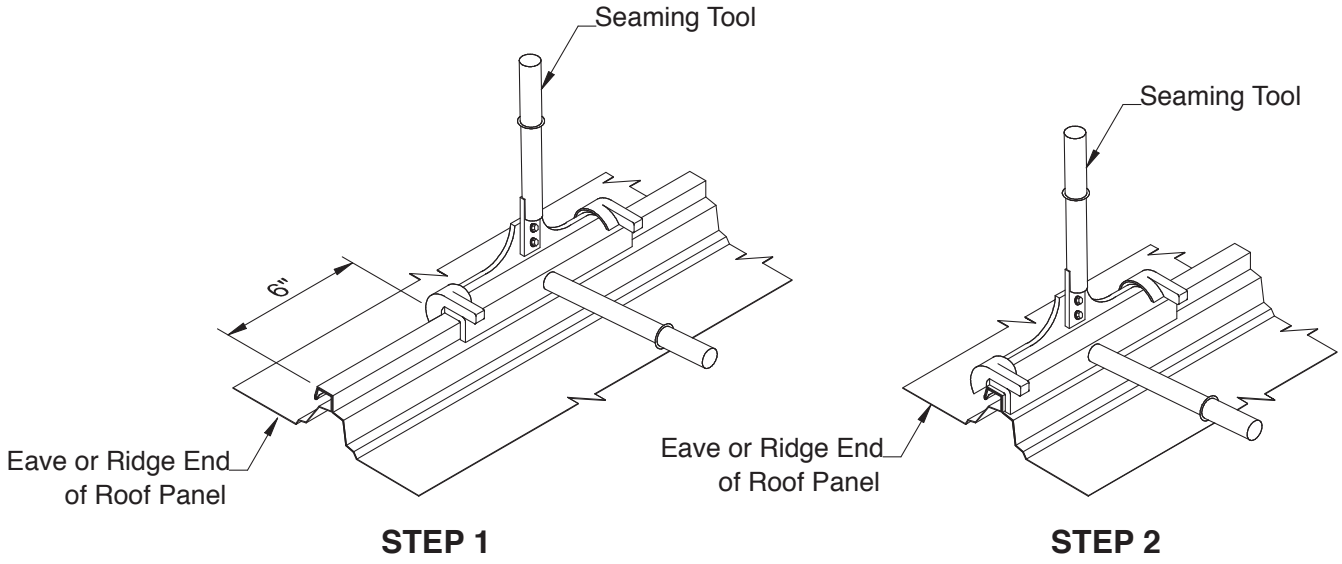


STEP 2

E. TOOL POSITION AT END OF ROOF PANEL

When seaming at the eave or ridge end of the roof panel, the seaming must be done in two steps. For the first step, position the end of the seaming tool at 6" from the end of the roof panel and seam that area.

For the second step, position the end of the seaming tool flush with the end of the roof panel and seam that area.

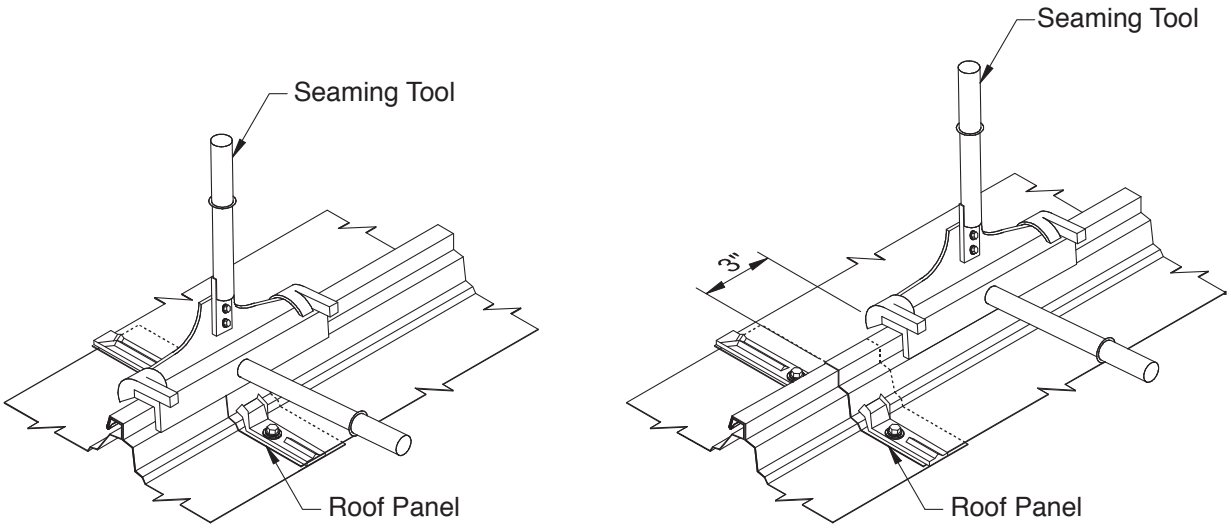


F. TOOL POSITION AT ROOF PANEL ENDLAP

When seaming at a roof panel endlap, the seaming must be done in two steps.

For the first step, center the tool over the endlap and seam that area.

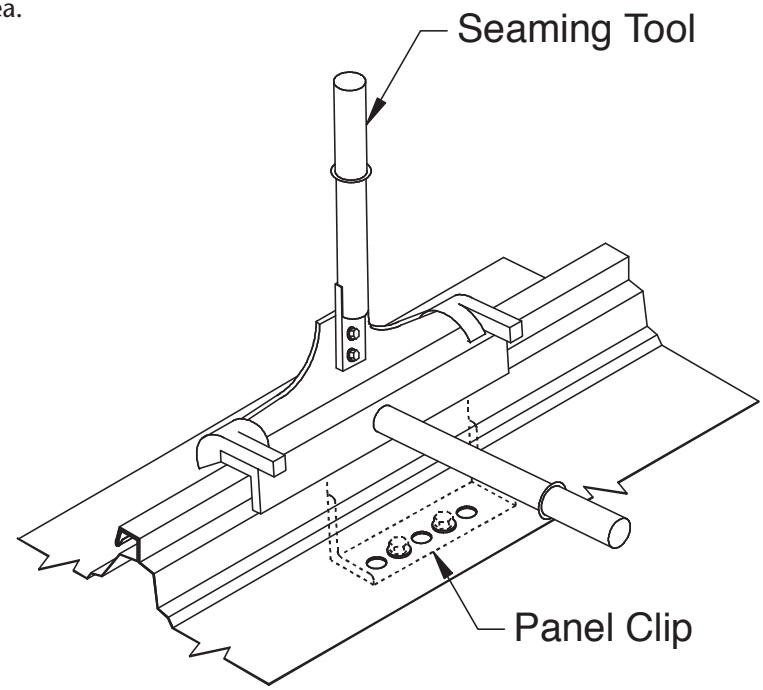
For the second step, position the end of the tool 3" from the edge of the endlap and seam that area.



9. SEAMING THE ROOF

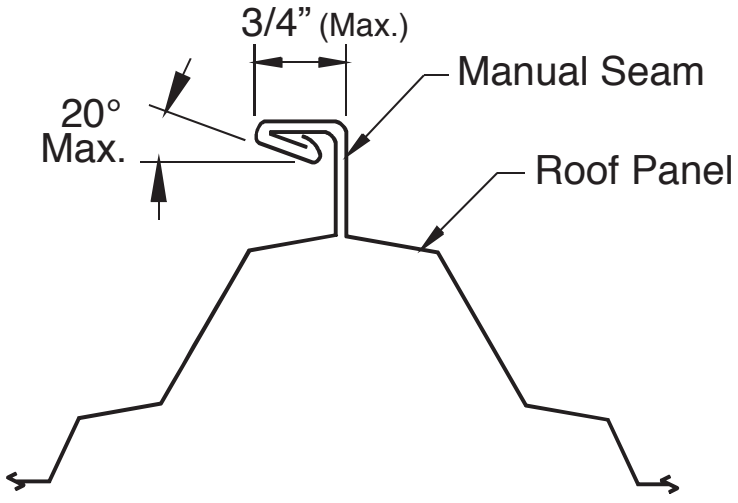
G. TOOL POSITION AT PANEL CLIPS

When seaming at a panel clip location, center the tool over the panel clip and seam that area.



H. CHECKING THE FINISHED SEAM

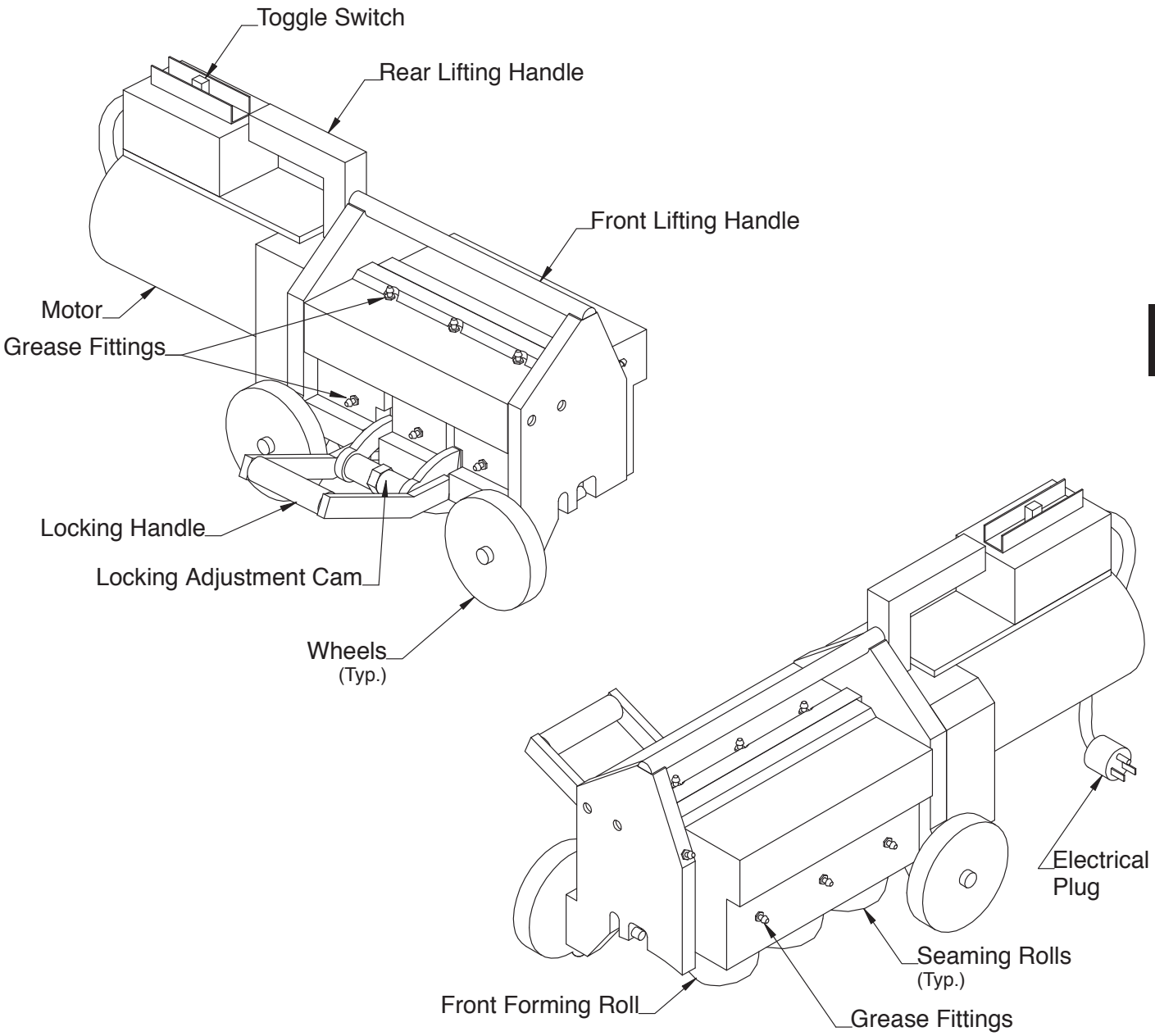
Rotate the operating handle to the open position, remove the tool and check that the seam is correctly formed, as shown on the detail below.



9.7. BEFORE OPERATING THE MOTOR SEAMING MACHINE

A. SEAMING MACHINE NOMENCLATURE

The following details identify the operational parts of the motor seaming machine.

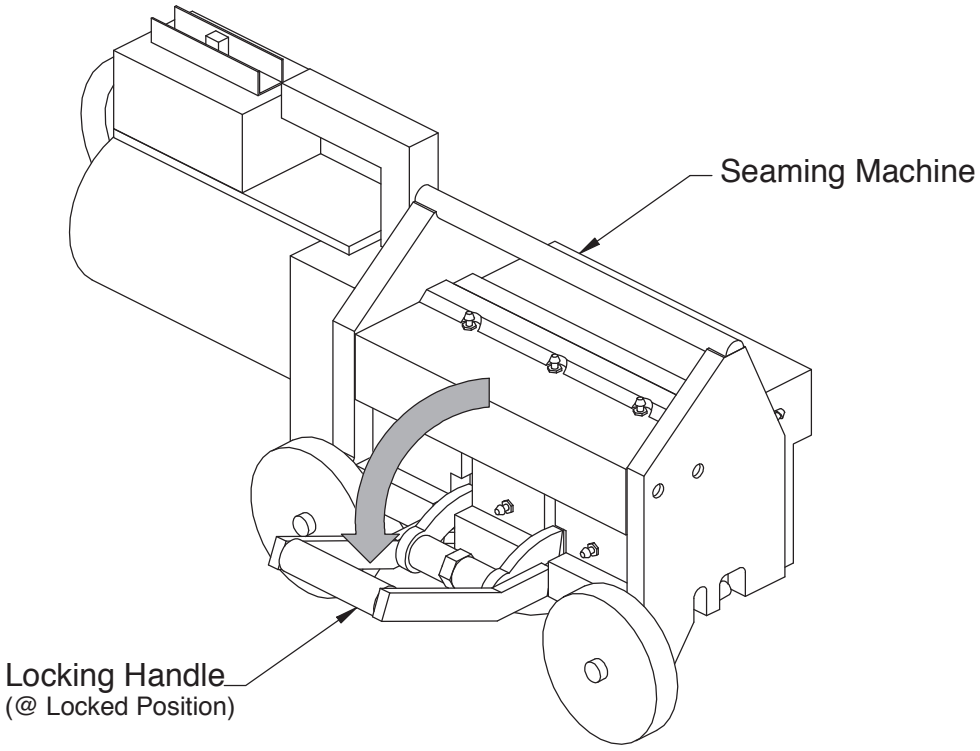


9. SEAMING THE ROOF

B. CHECK LOCKING PRESSURE

Before operating the seaming machine, check the locking pressure, per the following instructions. With the machine not setting on a roof panel seam, pull up the locking handle to the fully open position, then push the locking handle down as far as it will go. A force of 10 to 15 lbs. should be required to push the locking handle into the locked position. The locking handle should "snap" (over center) into it's locked position.

Important: If the locking pressure is less than 10 lbs., or the locking handle does not "snap" into a locked position, contact the third party supplier for instructions.



C. CLEAN THE SEAMS

The roof panel seams must be thoroughly cleaned of abrasive dirt or dust that can cause scuffing or scratching of the seam surface. The roof panel seams must be cleaned of grease or other contaminants which can cause seaming machine slippage and marking of the seam surface.

D. STARTING SEAMS

For machine seaming, the seaming machine must start on a portion of seam which has already been seamed with the manual seaming tool. Depending on which direction the seaming machine will be run, form the starting seam at the eave or ridge end of the roof panels with the manual seaming tool as described in section 7.4.

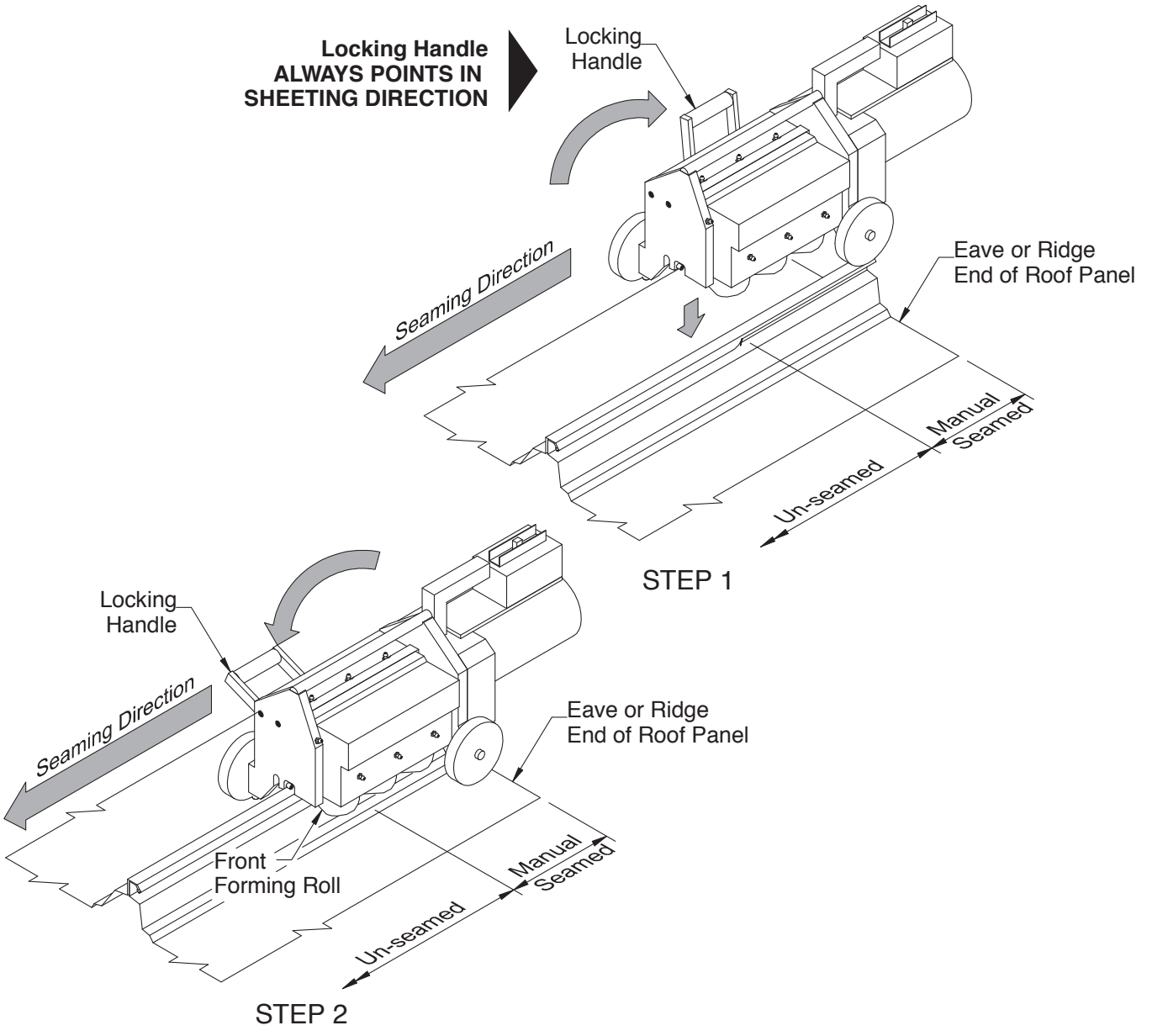
9.8. MOTOR SEAMING MACHINE OPERATION

A. MACHINE ORIENTATION TO SEAM

On roofs sheeted from left to right, the seaming machine will run from the eave to the ridge. On roofs sheeted from right to left, the seaming machine will run from the ridge to the eave. As the seaming machine travels along the roof panel seam, the seaming machine's motor is always at the rear.

B. MACHINE POSITION ON ROOF PANEL

With the locking handle held up in the open position, set the seaming machine onto the starting end of the roof panel's seam, over the manually seamed portion of the seam. Roll the seaming machine forward to align the front seaming rolls over the unseamed portion of the seam, as shown in the detail below.



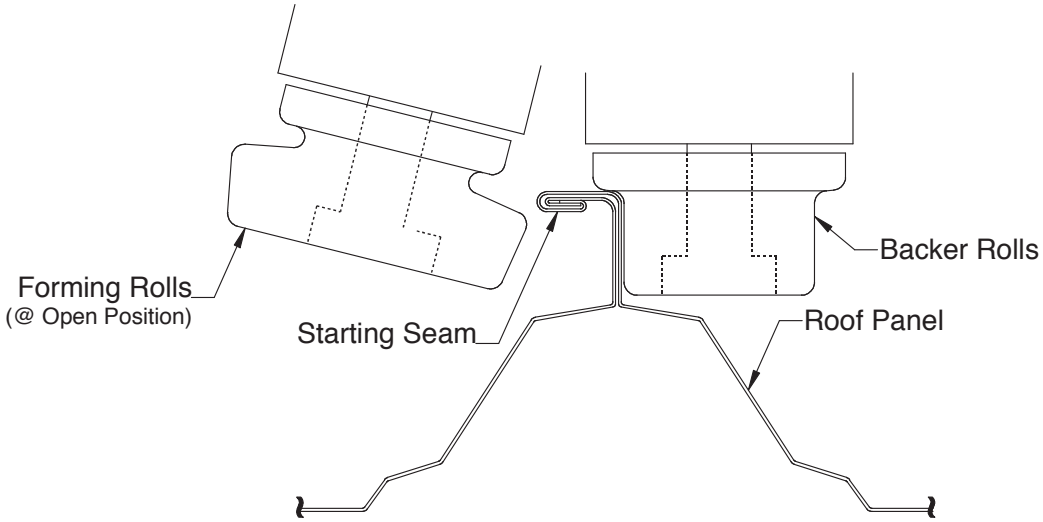
9. SEAMING THE ROOF

C. LOCKING THE MACHINE TO THE SEAM

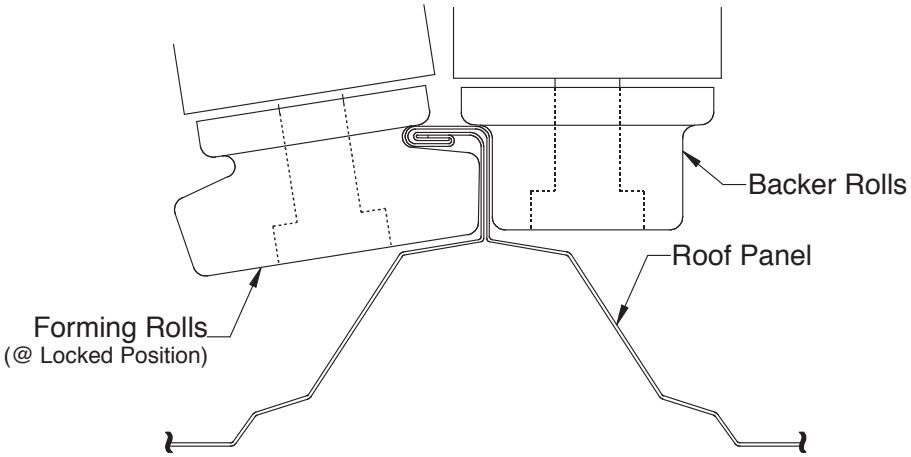
When the machine is in the correct position on the seam, push the locking handle down to the locked position. The locking handle should lock when 25 to 30 lbs. of downward force is applied.

If the locking handle will not readily lock, roll the machine forward or backward slightly, until the position is found where the locking handle will readily lock.

Check that the seaming rolls are properly engaged on the seam, as shown on the details below.



Open Position
(Locking Handle Up)



Locked Position
(Locking Handle Down)

D. RUNNING THE MACHINE

Check that the machine's path is clear of power cords, tools, debris etc. Start the machine by turning on the machine's toggle switch. Watch the machine and finished seam carefully for any indications of machine malfunction or faulty seaming.

Caution: The seaming machine must always be in the vertical position while seaming. Do not allow the machine to tilt sideways when locking the machine onto the seam or while the machine is running. On roofs with high stand-off clips, walking or standing on the panel next to the machine can deflect the panel and cause the machine to tilt. Do not walk or stand on the panel next to the machine while it is running.

E. STOPPING THE MACHINE

Stop the machine by turning off the machine's toggle switch. Always allow sufficient space for the machine to coast after turning the machine off.

Caution: Stop the machine immediately, and investigate any indications of machine malfunction or faulty seaming. Do not run the machine into previously installed end dams or other obstructions.

F. UNLOCKING THE MACHINE

After the machine is turned off and has fully stopped, lift up the locking handle to the open position to unlock the machine from the seam. While holding up the locking handle, the machine can be lifted from the seam. If the machine must be stopped and removed, before completing the seam, use a felt marker to mark the position of the machine's front wheel on the panel. The machine can later be repositioned on the mark to complete the seaming.

G. CHECKING THE FINISHED SEAM

At the completion of each seam, check the full length of the seam for any false seaming or distortions. Refer to section 9.10.A and 9.12.B for details of the correctly formed finished seam.

9. SEAMING THE ROOF

9.9. MOTOR SEAMING MACHINE MAINTENANCE

A. GENERAL

The motor seaming machine is a precision fabricated, high performance, portable roll forming machine. This relatively lightweight machine does the tough job of forming the extra strong TripleLok seams under often rugged field conditions.

Although designed for tough industrial use, the seaming machine requires proper maintenance to assure proper seaming and efficient, trouble free operation.

Caution: Failure to properly maintain the seaming machine, as instructed below, can result in faulty or damaged seams and costly breakdown of the seaming machine.

B. SEAMING ROLLS

The seaming rolls require the following regular maintenance:

A. Assure that the seaming machine's seaming rolls are clean of dirt, grease and sealant etc.

B. When seaming unpainted Galvalume® roof panels, spray the seaming rolls with WD-40 (or equal) to prevent Galvalume® build-up on the rolls.

C. Assure that the seaming machine's seaming rolls are tight on their shafts. Check and tighten the rolls' retainer screws as necessary.

C. DAILY MAINTENANCE

For lubricating the seaming machine, use EP2 grease or equivalent. Lubricate the seaming machine every morning prior to beginning seaming operations, after every 10,000 sq. ft. of roof area is seamed (or every 5,000 sq. ft. if temperatures exceed 100° F.) Apply the grease at the (9) grease fittings on the top and sides of the seaming machine.

Metallic particles and other debris can accumulate on the rollers of the machine during normal operation. Use a scraper to gently scrape any such accumulations from the rollers every morning, and at any time such accumulations begin to interfere with seamer operation or pane aesthetics during the day.

DO NOT attempt to clean the rollers while the machine is running.

DO NOT use a hammer and chisel for removing any debris, as the rollers may be irreparably damaged.

D. COOLING VENTS

To prevent motor overheating, the motor has vents and an internal fan to provide a cooling air flow over the internal motor parts.

The cooling vents are located at the front and rear of the motor. At the front of the motor, the vents are the slots between the motor housing and the gear box. The rear vents are on the end of the motor housing. Check frequently to assure that these vents are kept clean and clear of debris and stringing sealant, etc.

While the machine is running, never cover the machine or place it in a position where the cooling air flow to the vents will be restricted.

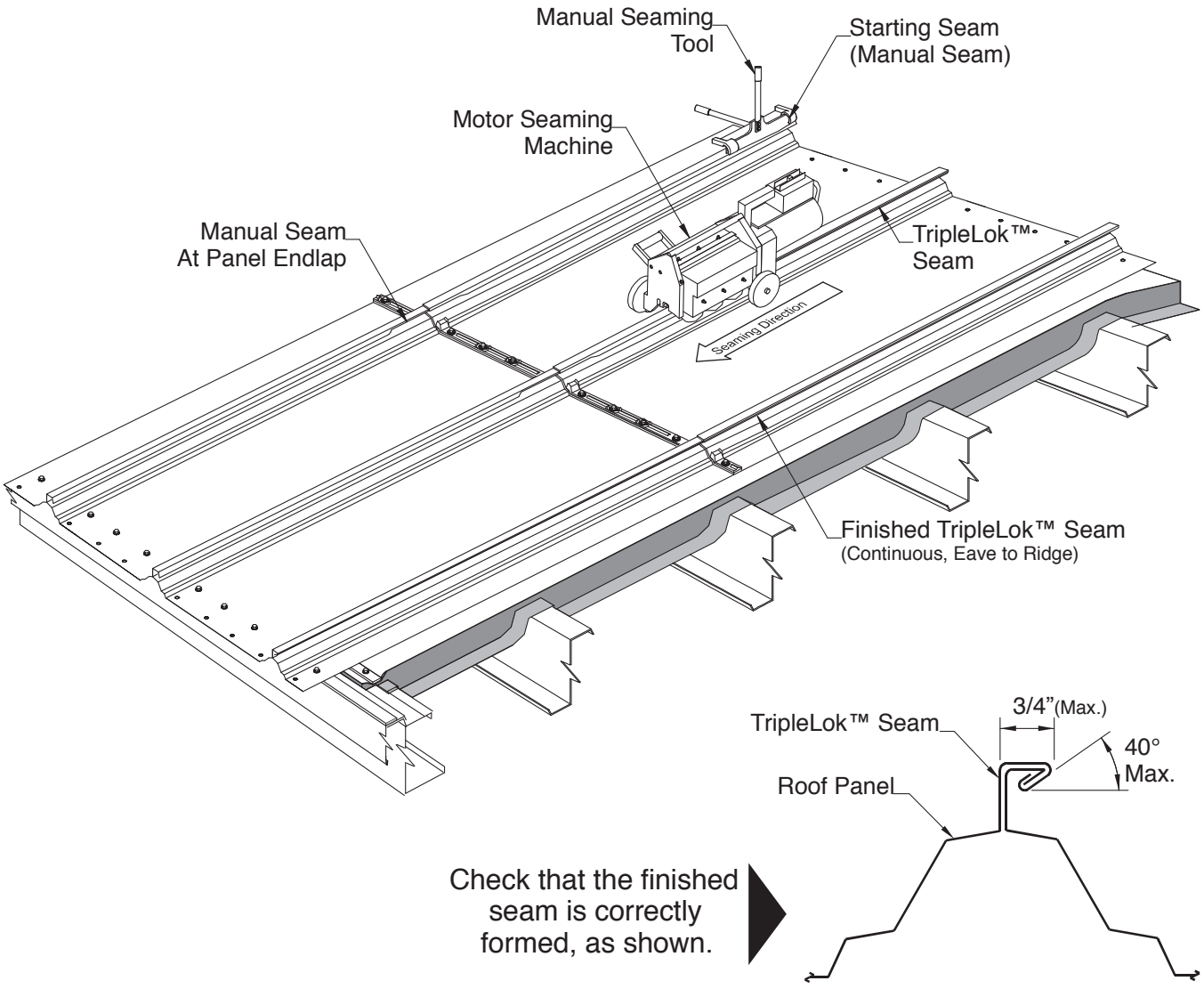
9.10. RollLok™ SEAMING

A. MANUAL SEAMING

Along each roof panel seam, use the manual seaming tool to close the seam at the eave and ridge ends of the panels, at the panel endlaps and at each clip.

NOTE

RollLok™ Seaming is intended for temporary panel attachment only! It is not intended as a permanent installation method.



Check that the finished seam is correctly formed, as shown.

9. SEAMING THE ROOF

9.11. TripleLok™ SEAMING

A. MANUAL SEAMING

Prior to motor seaming, use the manual seaming tool to seam the roof panels at the starting end of the seam (eave or ridge end, depending on seaming direction) and at the endlaps.

B. MOTOR SEAMING

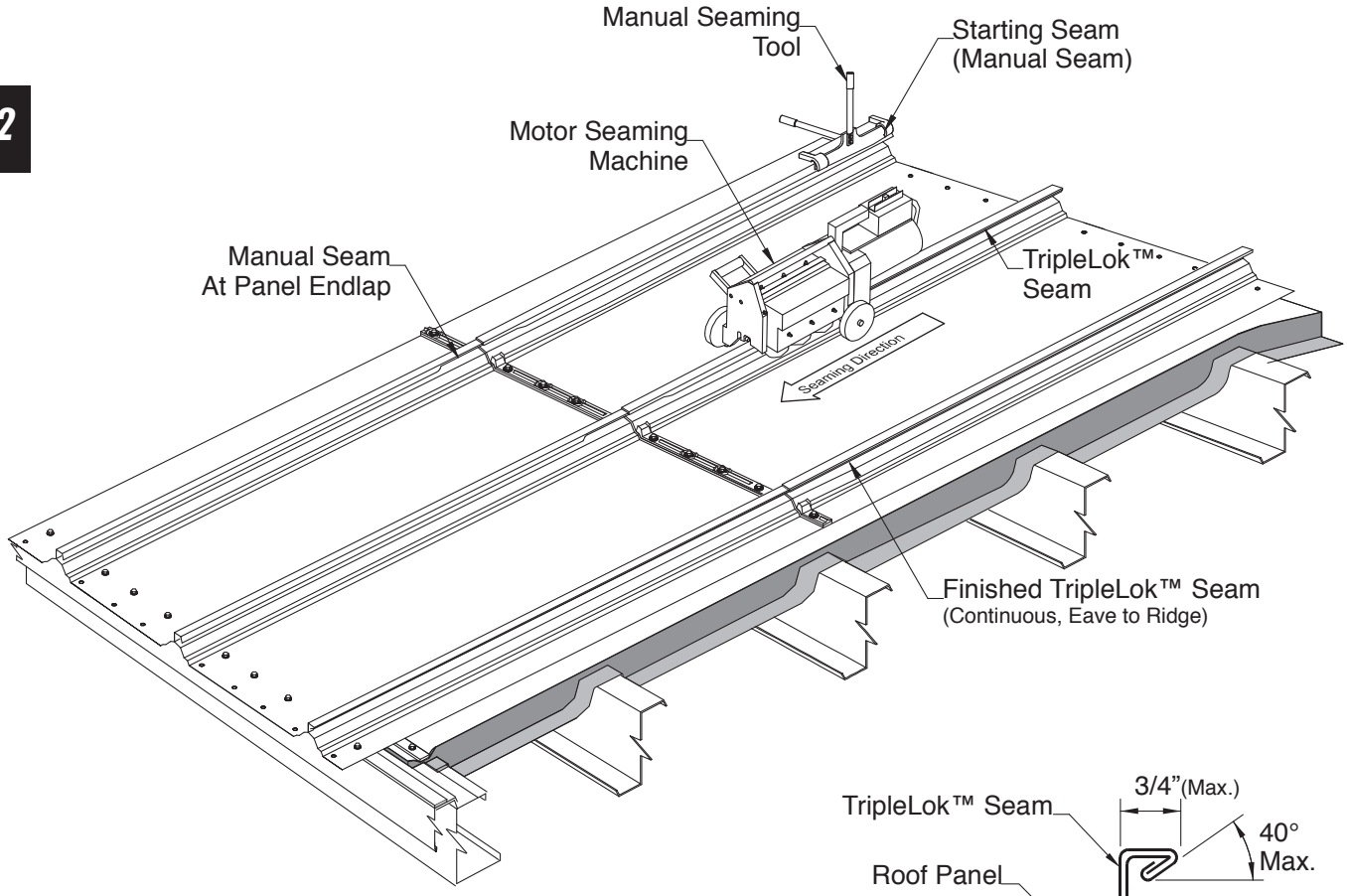
Seam the full length of each roof panel seam, using the motor seaming machine which is fitted with the TripleLok forming rolls.

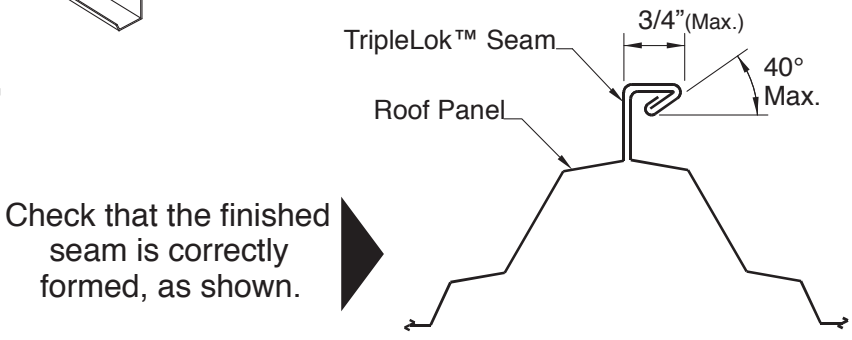
Start the seaming machine at the starting end of the seam, on the area previously seamed with the manual seaming tool.

If the roof panels have endlaps, stop the seaming machine just before running onto the endlap. Remove the seaming machine and restart it on the other side of the endlap, on the area previously seamed with manual seaming tool.

Run the seaming machine to the finish end of the seams.

At any uncompleted seam areas, such as where the seaming machine had to be stopped prior to the endlap or ridge end dam, complete the seam with the manual seaming tool. Check that the finished seam is correctly formed, as shown.





Check that the finished seam is correctly formed, as shown.

9.12. QuadLok™ SEAMING

A. DETERMINING AREAS TO BE SEAMED

Among the packet of erection details and drawings related to your job, you will find and engineering report which lists the areas of your roof that are to be QuadLok™ seamed. This document will identify zones of the roof which require the additional seaming.

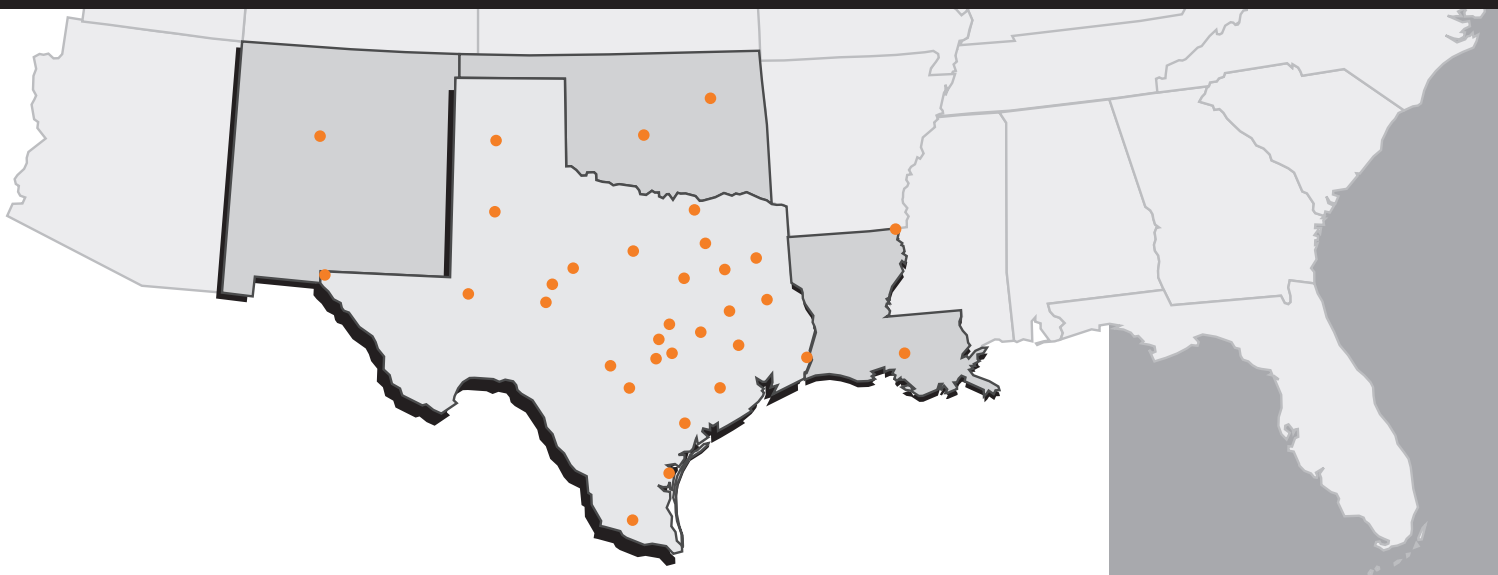
It IS NOT necessary to QuadLok™, unless specifically specified by the engineering summary. The roof MUST be TripleLok™ seamed prior to the QuadLok™ machine seamer.

B. MOTOR SEAMING

Operation of the QuadLok™ machine seamer is identical to that for the TripleLok™ machine. The QuadLok™ process will differ only in that seaming a full run from eave to peak will generally not be required.

MUELLER, INC.
METAL BUILDINGS, ROOFING & COMPONENTS

IronClad Guarantee



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