

Pro-VR Installation Guide

DEAN STEEL BUILDINGS, INC.

www.DeanSteelBuildings.com

500 Tenth Street ♦ Cedartown, GA 30125 ♦ (770) 748-7900

2929 Industrial Avenue ♦ Fort Myers, FL 33901 ♦ (239) 334-1051

71 Airport Road ♦ Thomasville, GA 31757 ♦ (229) 225-1112

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2 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 project.

Review the construction drawings for the differences with these details. If any differences exist, the construction drawings take precedence.

These details are arranged in a step-by-step sequence. Following this sequence ensures correct assembly and ensures that the part to be used will be readily accessible for the next step. Do not shortcut these assembly steps without careful consideration of the possibility of incorrect or omitted assembly and the resulting corrective rework. *Incorrect roof assembly will void any weather-tightness warranties.*

To minimize confusion, the details are oriented so that the view is from eave to ridge, with the starting rake at the left and ending rake at the right, unless otherwise noted. Refer to the construction drawings to determine a special sheeting direction or rake conditions.

To help ensure weather-tightness, the details emphasize proper fit-up, sealing and fastening, only use the specified sealants and fasteners in the locations shows in these installation details and on the construction drawings.

NOTICE

This manual is subject to change without notice.

2.1 Walking and Working on Roof Panels

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 structure support.

Do not use a roof panel as a working platform. An approved and safe walking platform should be used in high traffic areas to prevent the roof panel from being deformed, scratched, or scuffed.

An unsecured panel could collapse under the weight of a person standing between purlins or at the panel end. When installing clips or making end lap connections, etc., stand where the roof purlins will support your weight.

Light transmitting panels are not designed or intended to bear the weight of any person walking, stepping, standing or resting on them. THE MANUFACTURER DISCLAIMS ANY WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, that any person can safely walk, step, stand or rest on or near these light transmitting panels or that they comply with any OSHA regulation.

2.2 Substructure

Prior to installation, roof framing should be checked for overall dimensions and alignment of the surface area. To assure that the accumulation of structure length error and rake alignment 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 alignment (this usually occurs at an end rafter splice).

2.2.1 Out of Square

The roof system can accommodate 1/8" of saw tooth of the roof panel ends at the eave, ridge and panel splices. This means the allowable out of square of the rake line relative to the eave line and ridge line is 1/2" for each 10' of rake run.

2.2.2 Building 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.

2.2.3 Building 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.

2.2.4 Roof Plane

The roof substructure (eave to ridge) must be on plane - 1/4" in 20' or 3/8" in 40'.

2.3 Installation Recommendations

The manufacturer recommends the use of a screw gun with a speed range of 0-2000 RPM to properly install all fasteners referenced in this manual. Tools rated to 4000 RPM should never be used for self-drilling fasteners typically supplied with metal roof and wall systems.

Field cutting of the panels should be avoided where possible. If field cutting is required, the panels must be cut with nibblers, snips, or shears to prevent edge rusting. Do not cut the panels with saws, abrasive blades, grinders, or torches. All metal shavings must be removed from panel surfaces immediately.

3 Parts List

PART	PART NUMBER
Backup Plate	AN1139
Blind Rivet	HW5780
Clamps	Not by DSB
Clip	Floating 3/8" offset: HW9079 Fixed 0" offset: HW9080
Clip Screws	HW9053 (w/HW9079) #14-14 x 1-1/4" SD hex HW9204 (w/HW9080) #12-14 x 1" SD pancake
Clip Spacing	Match purlin spacing or See Construction Drawing Cover Sheet for alternate.
Closure Zee Angle	AN1138
Closure Zee Cover Flashing	FRZ4-100200, color to match roof
Counter Flashing	Not by DSB
Eave Panel Screws	HW5510 #12-14 x 1-1/4" SD ZAC
Eave Perimeter Angle	AN1135 G90

Eave Trim	FEK - See Construction Drawings
End Cap	FL4414
End Lap Panel Screws	HW9128 #17-14 x 1" ST ZAC
End Lap Tape Mastic	HW9129 1-1/4" x 5/32"x 30' roll
Flashing Tape Mastic	HW5721 7/8" x 3/16" x 25' roll Double Beaded
Hip Angle	AN - See Construction Drawings
Hip Flashing	FRK – See Construction Drawings
Insulation Strap (optional)	AN1265 (100' rolls)
Insulation Strap Screw (optional)	HW5518 #12 x 1" SD (w/HW9079)
Intermediate Panel	<i>See Roof Panel</i>
Rake Angle	AN1219 - See Construction Drawings
Rake End Cap	FL4217 (RH) & FL4218 (LH)
Rake Flashing	FRA – See Construction Drawings
Rake Flashing Screws	HW5510 #12-14 x 1-1/4" SD ZAC
Rake Peak Box	FNN – See Construction Drawings
Rake Perimeter Angle	AN1135 G90
Rake Slide Flashing	FRS – See Construction Drawings
Ridge Flashing	FRK – See Construction Drawings
Ridge Panel Framing Screws	HW5510 #12-14 x 1-1/4" SD ZAC
Roof Flashing Screw (sheeting lap screw)	HW5502 1/4"-14 x 3/4" ST
Roof Panel	PV - See Construction Drawings
Roof Purlins	ZE (ZT) - See Construction Drawings
Tape Mastic	HW5724 2-1/2" x 3/16 x 20' roll
Termination Panel	<i>See Roof Panel</i>
Termination Zee Angle	AN1138
Thermal Spacer (optional)	HW5778 16" x 3" x 3/8"
Tube Sealant	HW5720 CLR
Valley Angle	AN – See Construction Drawings
Valley Flashing	FL-x – See Construction Drawings
Wall Stitch Fastener	HW5502 1/4"-14 x 3/4" ST
Wall to Roof Flashing	FWR6-100200 – See Construction Drawings

4 Panel Offloading & Storage

Upon receiving material, check shipment against shipping list for shortages and damages. The manufacturer will not be responsible for shortages or damages unless they are noted on the shipping list.

4.1 Lifting Panels

Each bundle should be lifted at its center of gravity. Where possible, bundles should remain banded until final placement on roof. If bundles must be opened, they should be retied before lifting.

Under normal conditions, panel bundles less than 35' long can be lifted with two slings spaced at third points. Panel bundles 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. NEVER USE WIRE ROPE SLINGS, THEY WILL DAMAGE THE PANELS.

Slings should 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.

Panel bundles 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.

Improper unloading and handling of bundles may cause bodily injury or material damage. The manufacturer is not responsible for bodily injuries or material damages during unloading and storage.

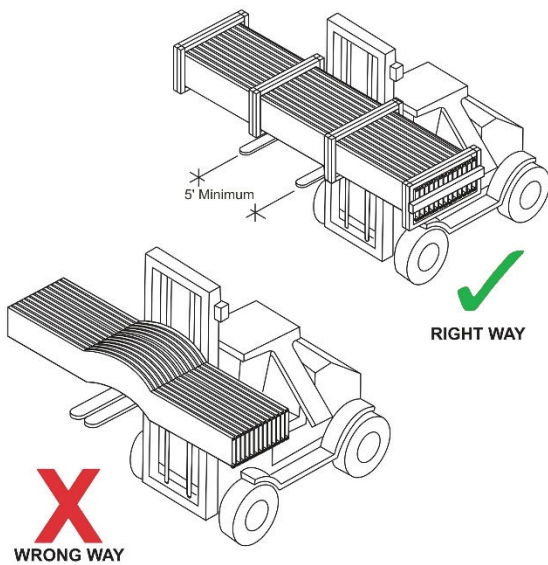


Figure 1 – Forklift

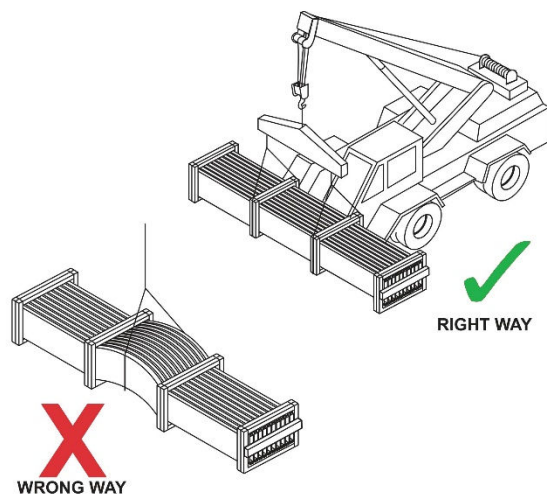


Figure 2 - Spreader Bar

4.2 Site Storage

Store bundled sheets off the ground sufficiently high to allow air circulation beneath bundle and to prevent rising water from entering bundle. Slightly elevate one end of bundle. Prevent rain from entering bundle by covering with tarpaulin, making provision for air circulation between draped edges of tarpaulin and the ground.

PROLONGED STORAGE OF SHEETS IN A BUNDLE IS NOT RECOMMENDED. If conditions do not permit immediate erection, extra care should be taken to protect sheets from white rust or water marks. Check to see that moisture has not formed inside the bundles during shipment. If moisture is present, panels should be unbundled and wiped dry, then restacked and loosely covered so that air can circulate between the panels.

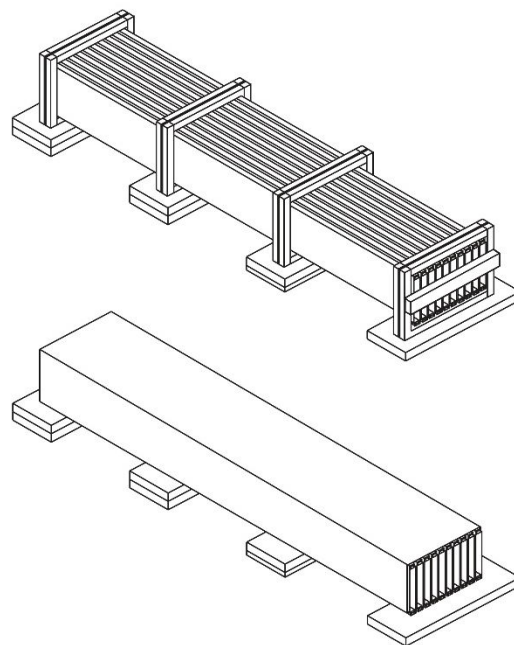


Figure 3 - Bundle Storage

4.3 Handling

Standing on one side of the panel, lift it by the seam. If the panel is over 10' long, lift it with two or more people on one side of the panel to prevent buckling.

Do not pick panels up by the ends.

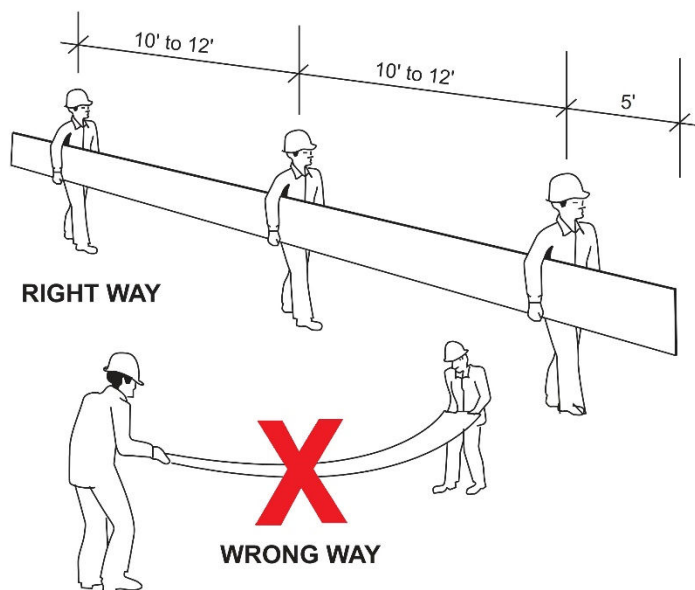


Figure 4 - Handling Panels

4.4 Installing Mastic

To assure proper adhesion and seal, the tape mastic 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 mastic's resistance to pressure becomes greater in cold weather. During cold weather, the fasteners must be tightened slowly to allow the mastic time to compress. If the fasteners are tightened too fast, the fastener may strip out before the mastic compresses adequately, or the panel or flashing may deform in the immediate area of the fastener, leaving the rest of the mastic insufficiently compressed.

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 mastic across the inside radius. When the lapping panel or flashing is pushed into place, the bridged mastic is stretched and thinned. The mastic may then be too thin to adequately seal this critical area. When tape mastic is applied at an inside radius, it is recommended that the mastic be folded back on itself, then pushed into the radius.

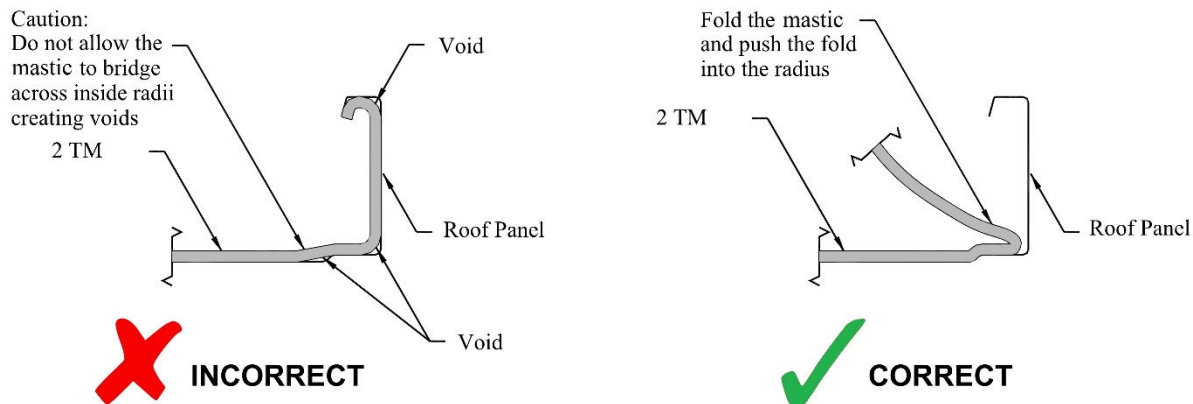


Figure 5 - Sealant

4.5 Orientation

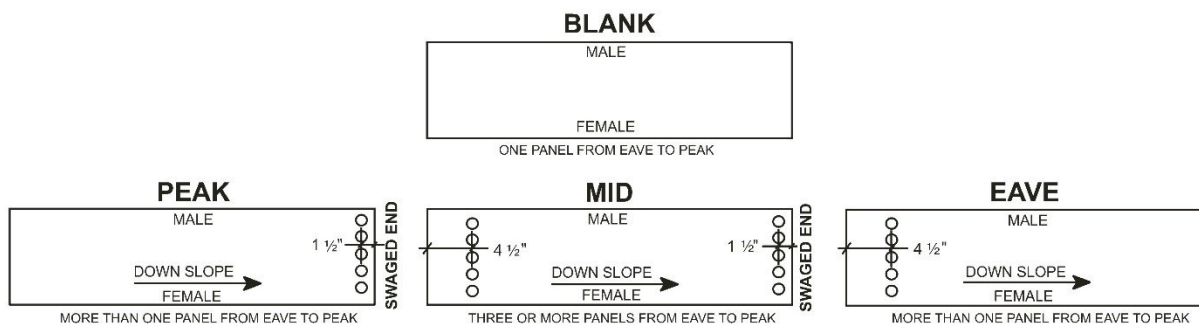


Figure 6 - Panel Orientation

Throughout these instructions, the references to the panel will be made using the terms shown in Figure 7.

Roof panels with the optional swage, are to be positioned so the swaged end is downslope. The sheeting direction for swaged panels is

NPD CODE FOR PANELS

LOCATION	STRIATED PAN	FLAT PAN
BLANK	PVA	PVE
PEAK	PVB	PVF
MID	PVC	PVG
EAVE	PVD	PVH

from left to right. Roof panels without the swage may be sheeted in either direction, (left-to-right) or (right-to-left).

Check the erection drawings and job conditions to determine if the roof must be sheeted in a specific direction. The male seam is the always the leading edge of the Pro-VR panel. Before loading the panels onto the roof structure, orient the panels so that the male seam is the leading edge.

The factory fabricated notches at the panel ends are only required at panel to panel laps

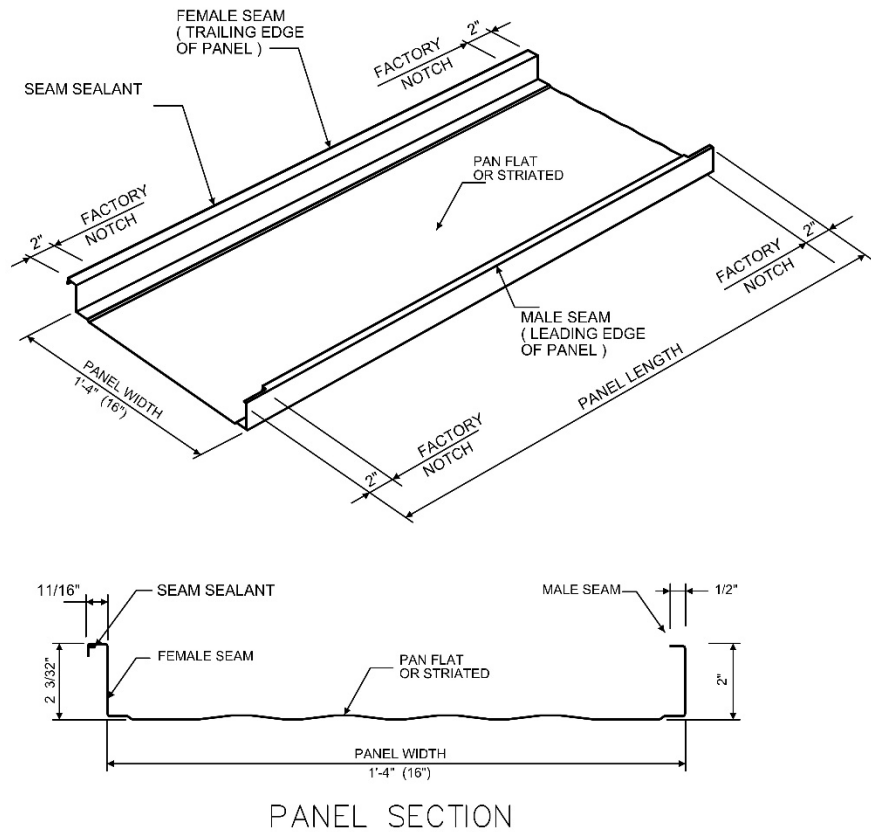


Figure 7: Panel Properties

5 Preparation for the First Panel

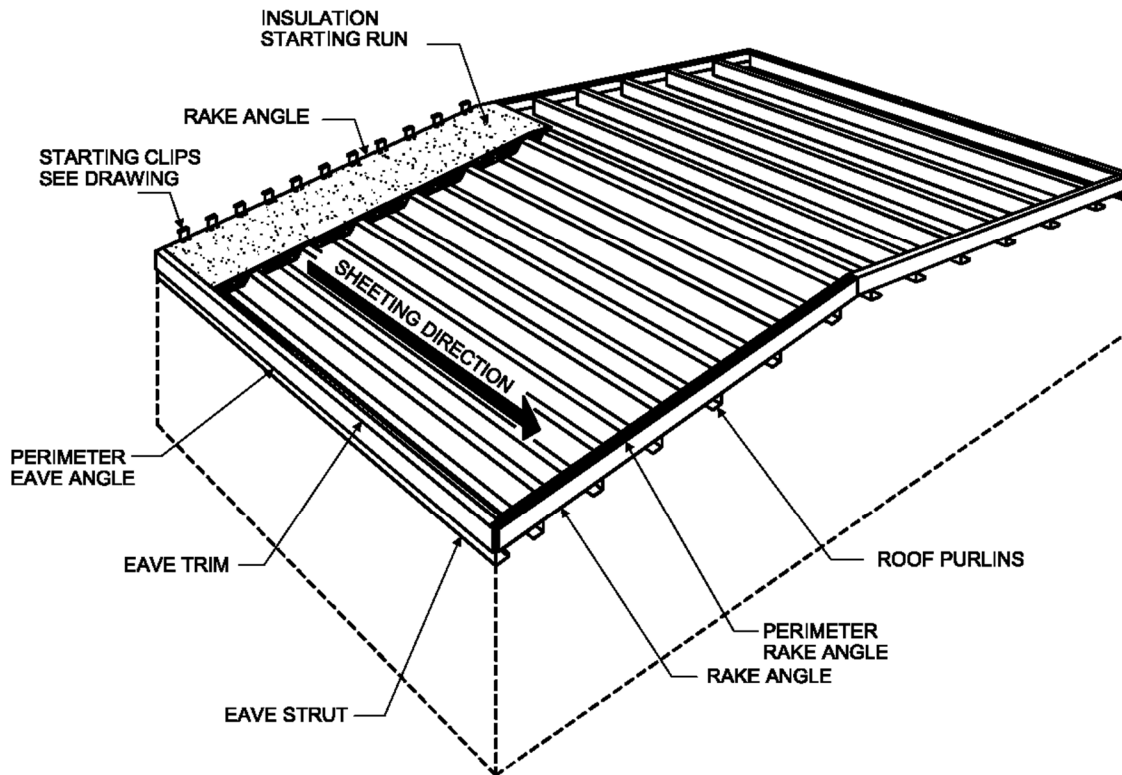


Figure 8: Preparation for First Panel

Before installing the first panel, install the eave perimeter angle, start clips, eave trim, eave sealants¹ and the first run of insulation.

In Figure 8, the starting rake is shown with clips installed for a starting panel and the finish rake is shown with a rake perimeter angle. Some buildings may require a rake perimeter angle at the start. Refer to the construction drawings for the required rake conditions.

¹ Do not expose sealant until panel installation to prevent unnecessary exposure and contamination of sealant for extended time periods.

5.1 Eave Perimeter Angles

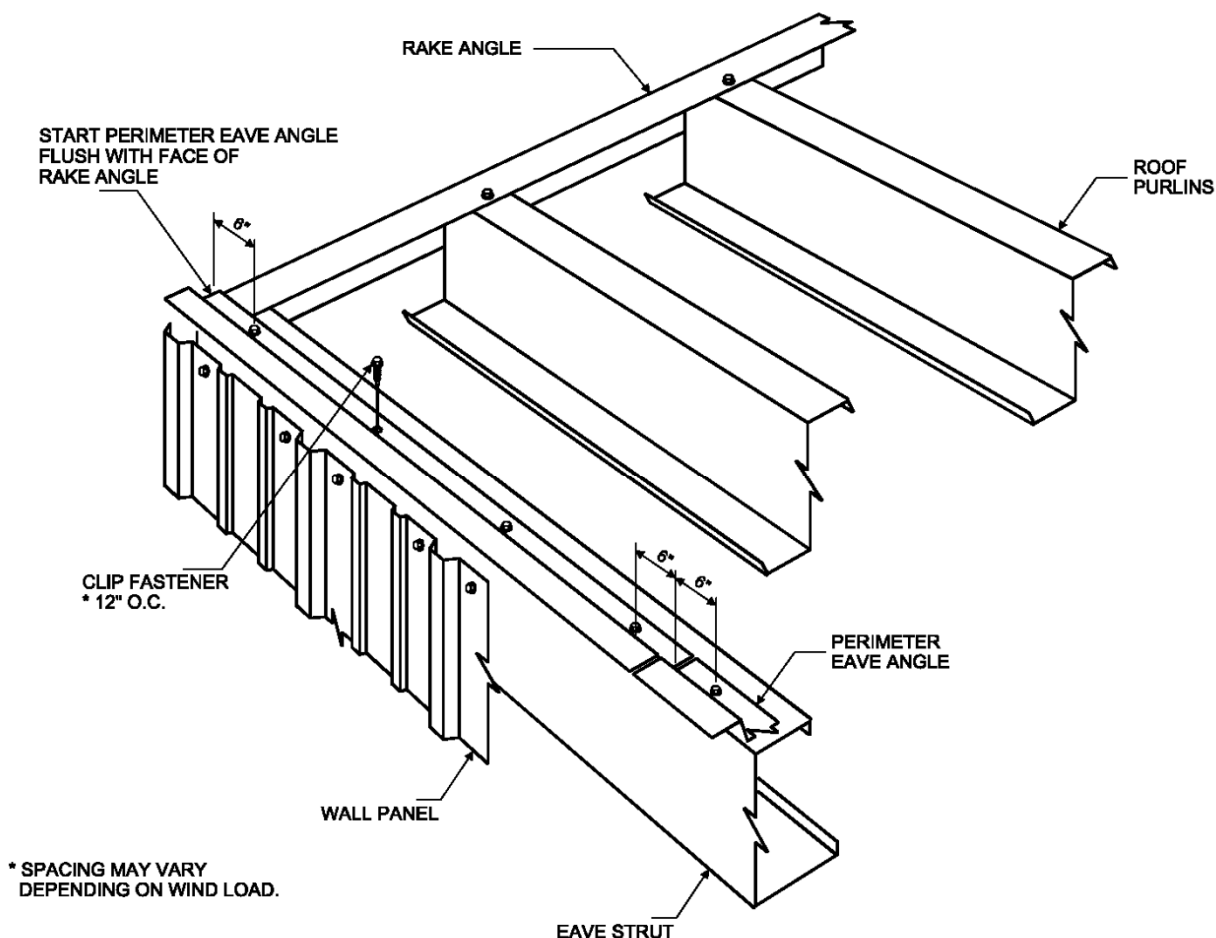


Figure 9: Perimeter Eave Angle

The eave perimeter angle is used with the floating 3/8" standoff clip only. Panels attached with the fixed or zero-offset clip screw directly into the eave strut.

The eave perimeter angle provides a structural attachment for the eave end of the roof panel. The eave perimeter angles must be installed before the roof insulation is installed. Before installing the eave perimeter angle, ensure the eave strut or eave purlin is straight and level from rake to rake. Shim the angle to provide a level roof line.

Refer to Figure 9 and install the perimeter eave angle ends flush with the outer face of the rake angle or perimeter rake angle. Install the outer edge of the eave perimeter angle flush with the outside face of the wall panel.

There should be NO gap between adjacent perimeter eave angles.

5.2 Starting Clips

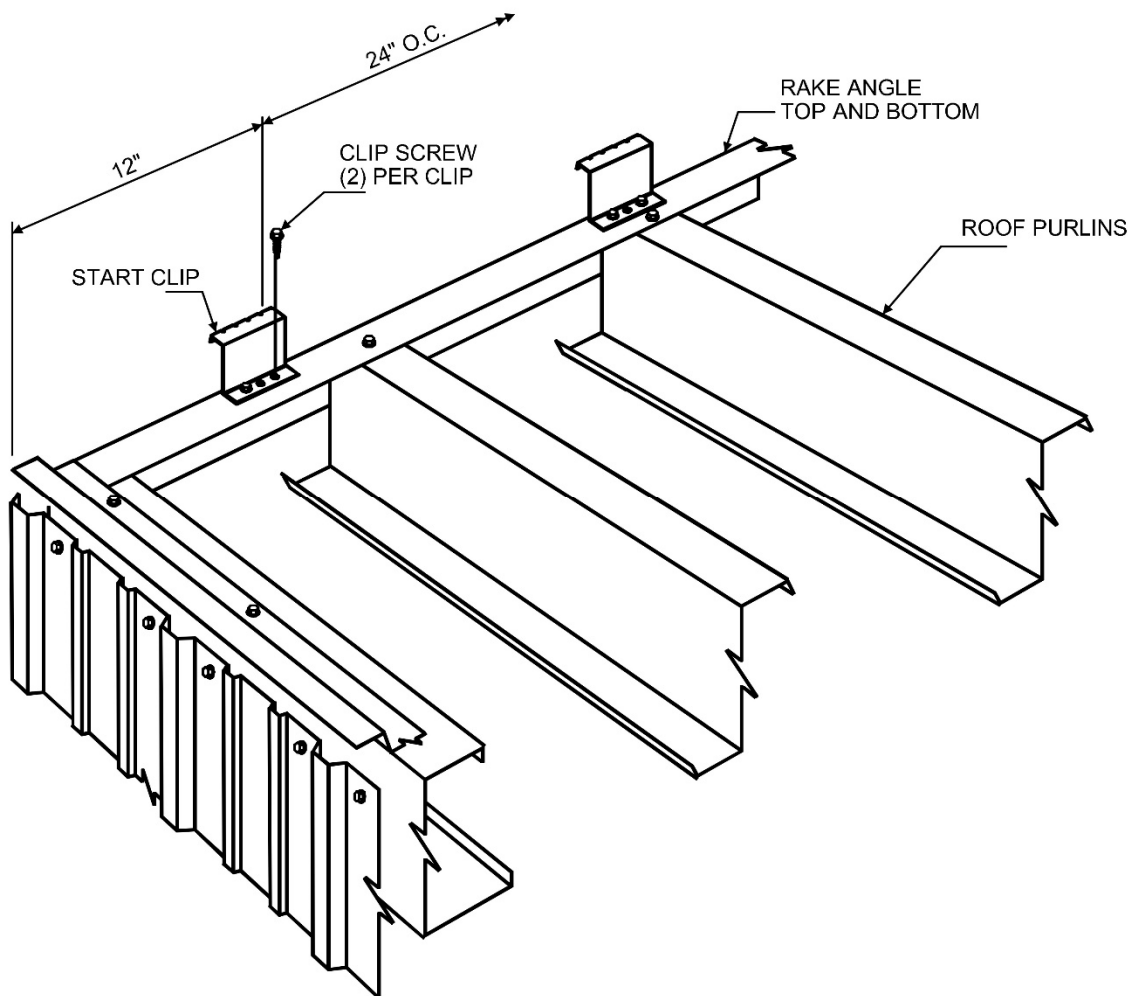


Figure 10: Install Starting Clips

The same clips used on the main field of the roof are used as the start clips. The default clip spacing is shown in Figure 10, unless otherwise noted on the construction drawings.

The position of the start clips establishes the starting roof panel alignment. It is important that the start clips are installed in a straight line, parallel to the building rake. If the rake angles have been installed true and square, the edge of the rake angle can be used to align the start clips.

Locate the start clips at the spacing shown and fasten them to the rake angle as shown in Figure 10.

5.3 Eave Trim

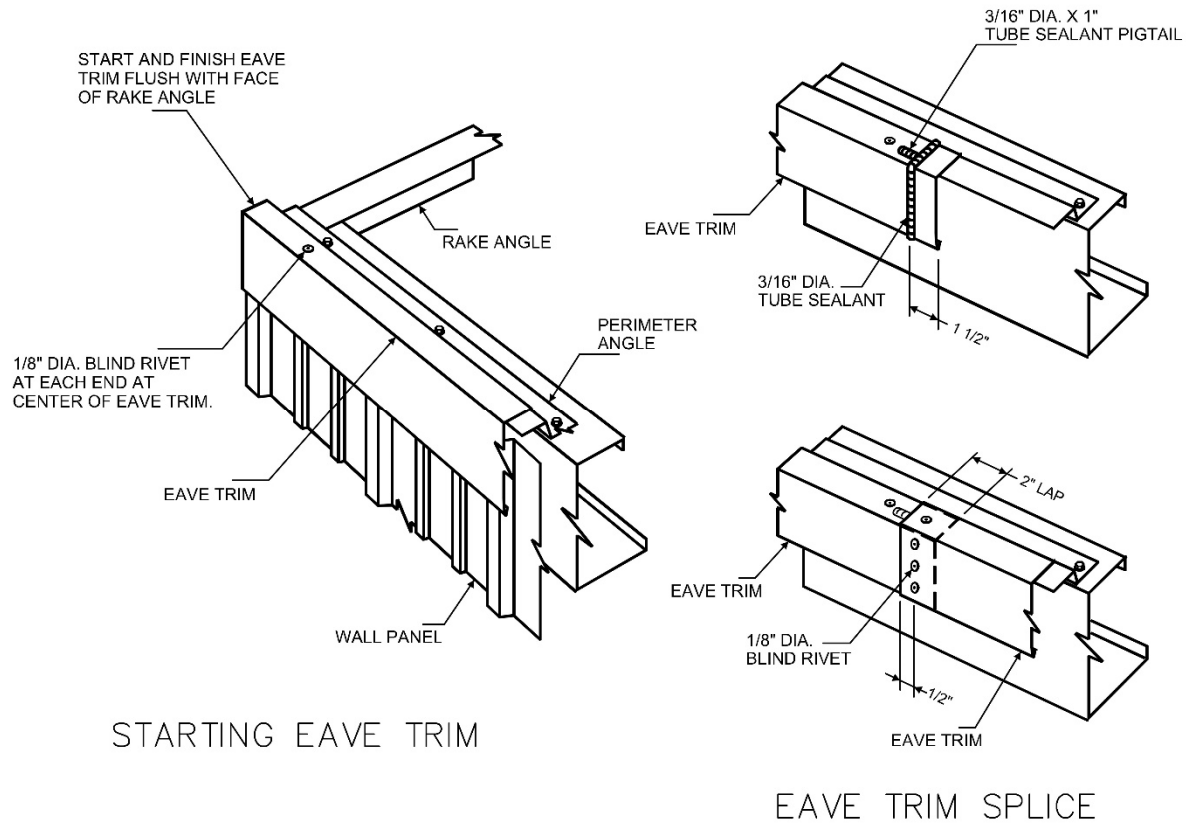


Figure 11 - Eave Trim

Skip this step if your building does not have eave trim. Buildings without wall sheets typically do not have eave trim. The eave trim provides a water seal between the roof panel and the wall panels. All laps of the eave trim must be sealed with tube sealant and rivets as shown, to minimize water entry.

Set the eave trim over the perimeter eave angle as shown in Figure 11 and align the face of the eave trim with the face of the wall panel.

Install the starting and ending ends of the eave trim flush with the ends of the eave angle.

Fasten each piece of eave trim to the eave support angle with three blind rivets. The rivets will hold the trim in position until the roof panels are installed and fastened.

5.4 Eave Sealant

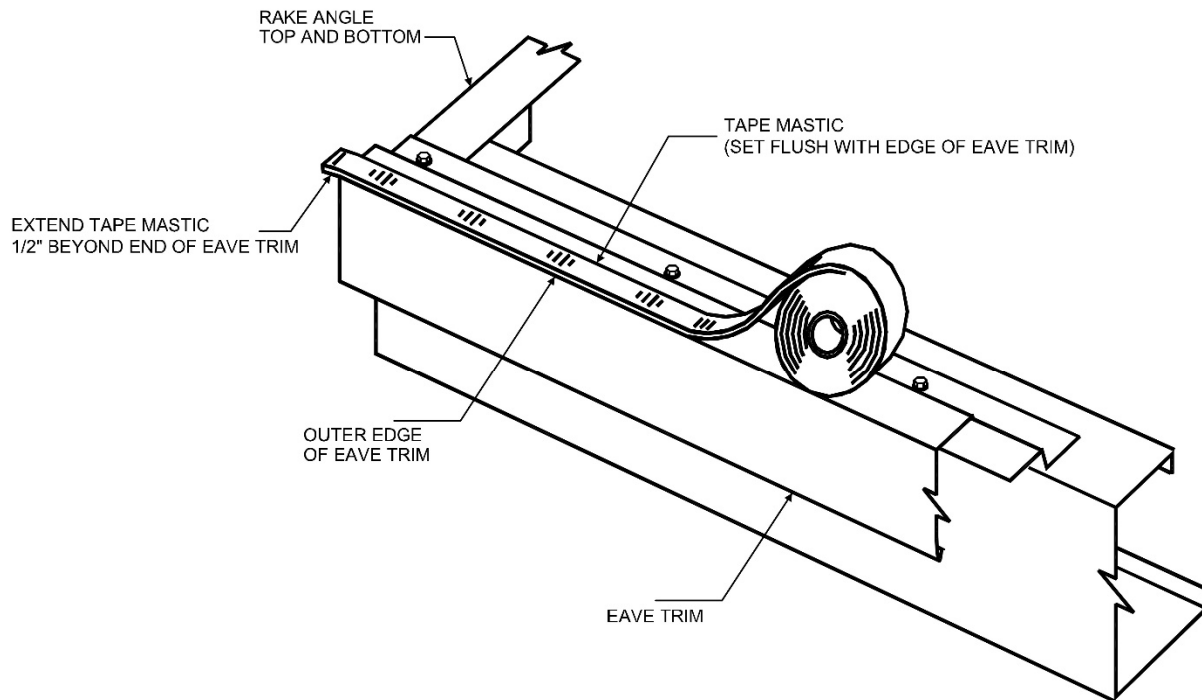


Figure 12: Eave Sealant

Apply a continuous strip of tape mastic along the top edge of the eave trim. Align the outer edge of the tape mastic flush with the outer edge of the eave trim.

Do not remove the tape mastic's paper backing from the sealant at this time. The tape mastic at the eave is vulnerable to damage from foot traffic or dragging material over the eave until the roof panels are installed.

5.5 First roll of Insulation

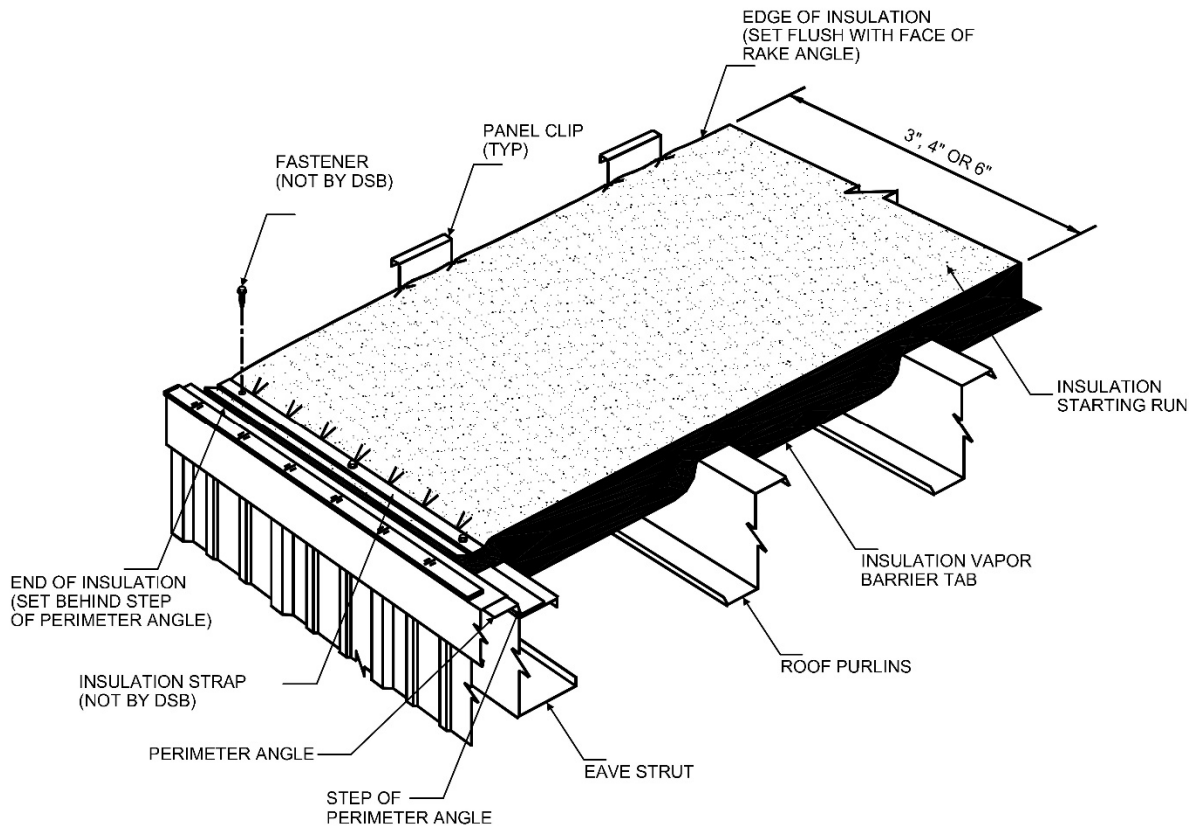


Figure 13: Insulation Starter Roll

Not all roof systems have insulation and not all insulation systems are installed as shown here. Refer to the insulation manufacturer's instructions for proper insulation installation and vapor seal assembly. These details show fiberglass blanket insulation, which is the most commonly used insulation for metal building systems.

The leading edge of each insulation run should extend approx. 12" beyond the leading edge of the roof panel. The overrun will allow for easy assembly of the vapor barrier seal between insulation runs. With 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 high stand-off clips, use insulation retainer straps to secure the insulation to the low flange of the eave perimeter angle. Never extend the end of the insulation over the high flange of the eave perimeter angle and the tape mastic at the eave. The insulation retainer strap is not provided as part of the roof system but can be purchased by component order.

6 First Panel Installation

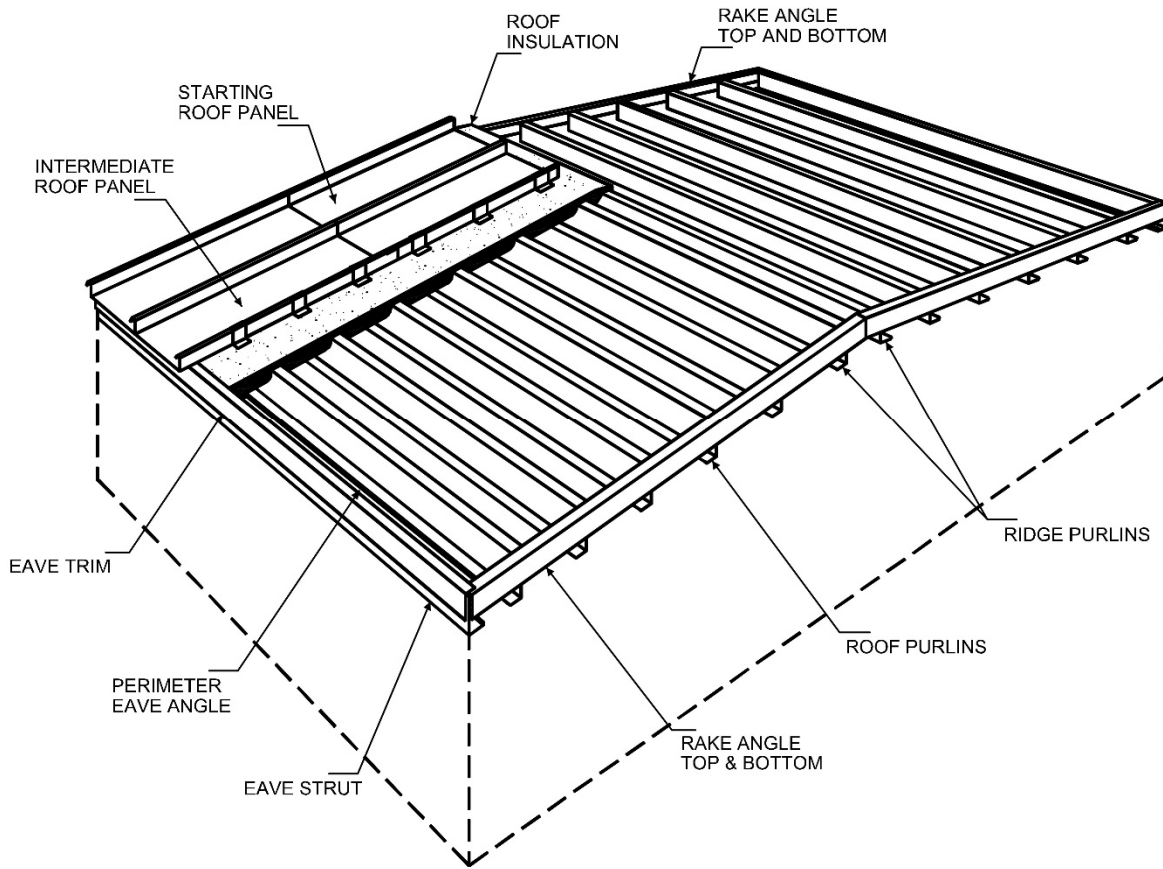


Figure 14: Orientation View

The roof panel end lap details are shown as an integral part of the roof panel installation. If the project does not require roof panel end laps, the *Section 6.5* through *Section 6.9* can be skipped.

The last run of roof panels are shown in *Section 8 - Termination Panel Installation*.

6.1 First Eave Panel

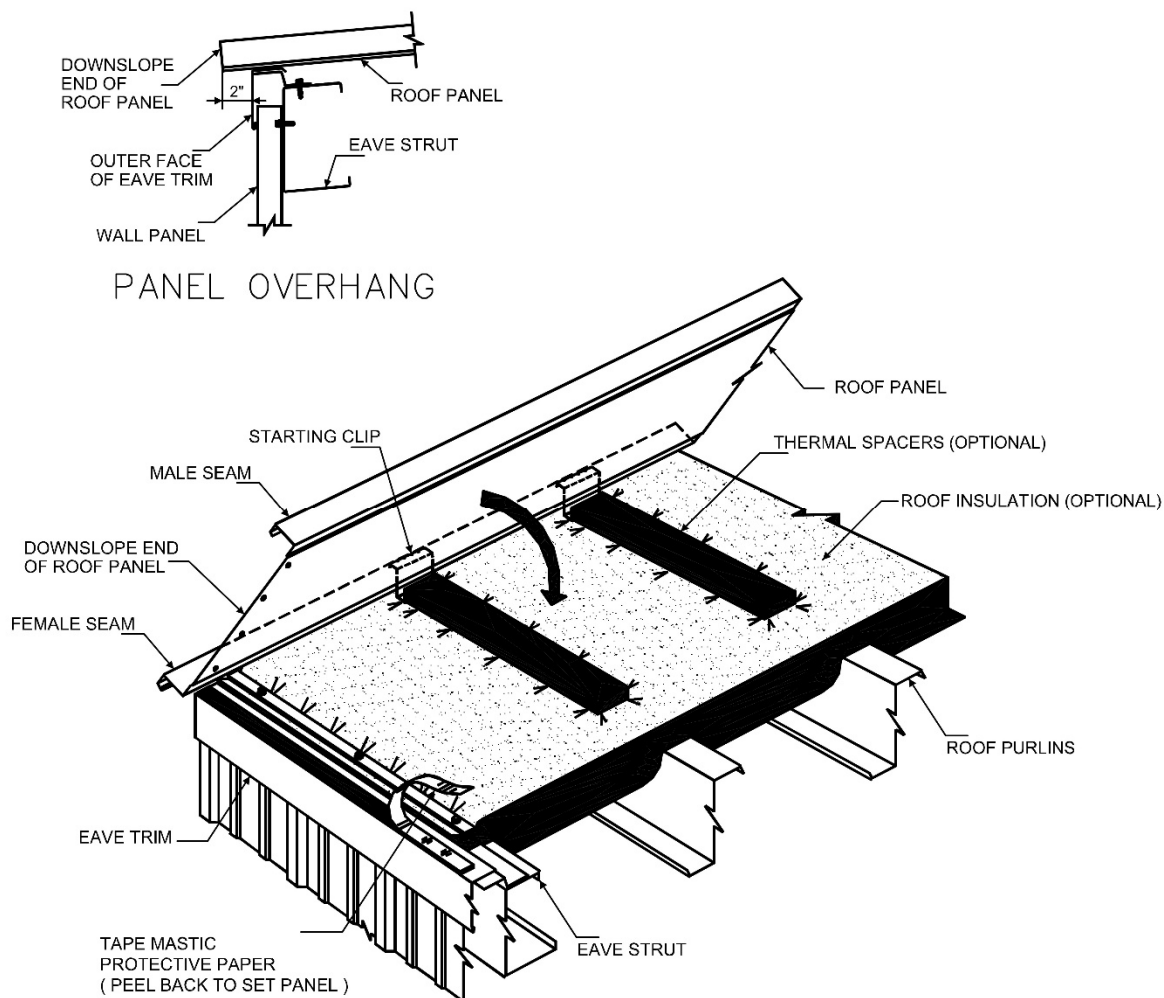


Figure 15: Starting Panel

The roof panel's eave overhang dimension is critical as it establishes the location of end laps and ridge cover attachment points. The edge of the roof panel extends 2" beyond the face of the eave trim, unless another dimension is specified on the construction drawings.

If thermal blocks are used, place the blocks on top of the insulation, directly over the roof purlins. Thermal blocks are not required at the eave strut.

Position the edge of the panel over the start clips and position the end of the panel 2" beyond the face of the eave trim. Install the first panel by setting the female seam over the start clips.

6.2 Crimp First Panel to Start Clips

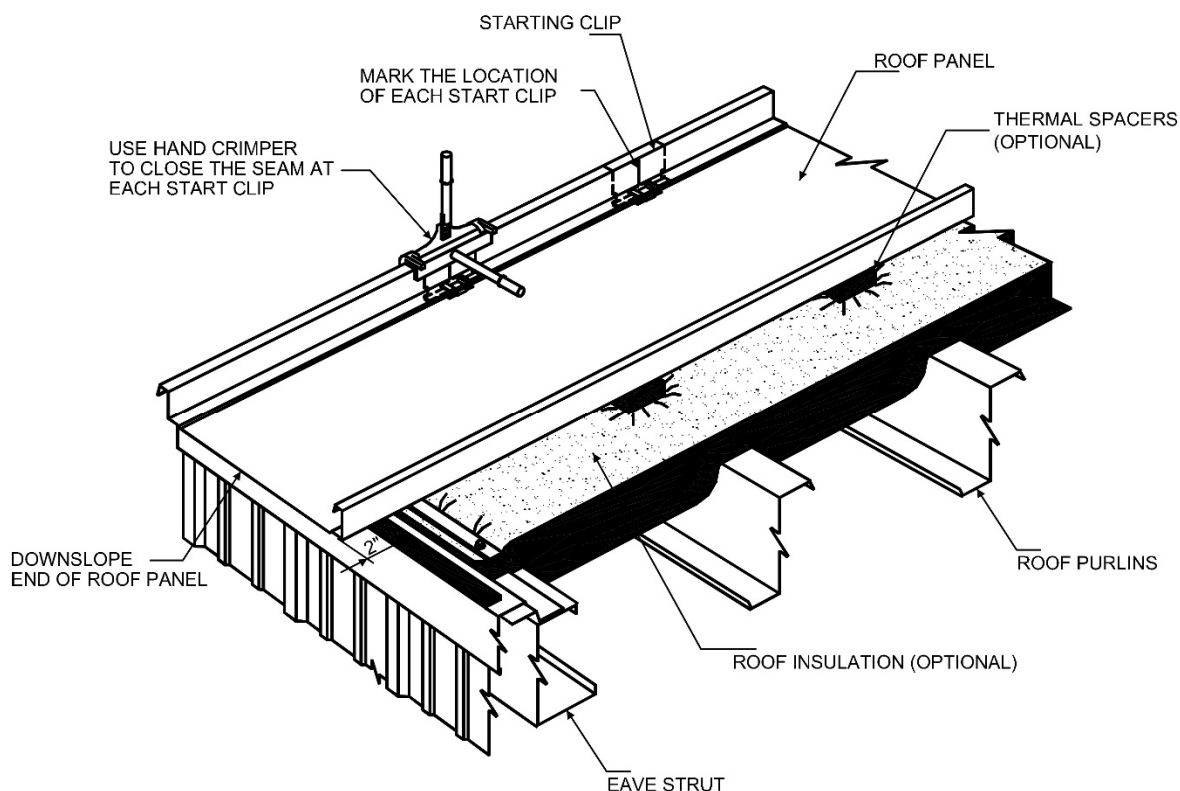


Figure 16: Crimp First Panel

Set the first panel down to rest on the spacer blocks or insulation. Verify that the roof panels overhang dimension is correct and verify that the roof panel is aligned parallel to the rake line.

Using the manual seaming tool (crimper), close the panel’s seam over each start clip. For proper operation of the seaming tool, refer to the instructions provided by the seaming tool vendor².

Mark the roof panel’s vertical leg at each clip location. This will guide the installation of the rake trims screws in *Section 10 - Rake Trim Installation*.

² The seamer and seaming tools are provided by a third party vendor, not by Dean Steel Buildings, Inc.

6.3 Fasten First Panel

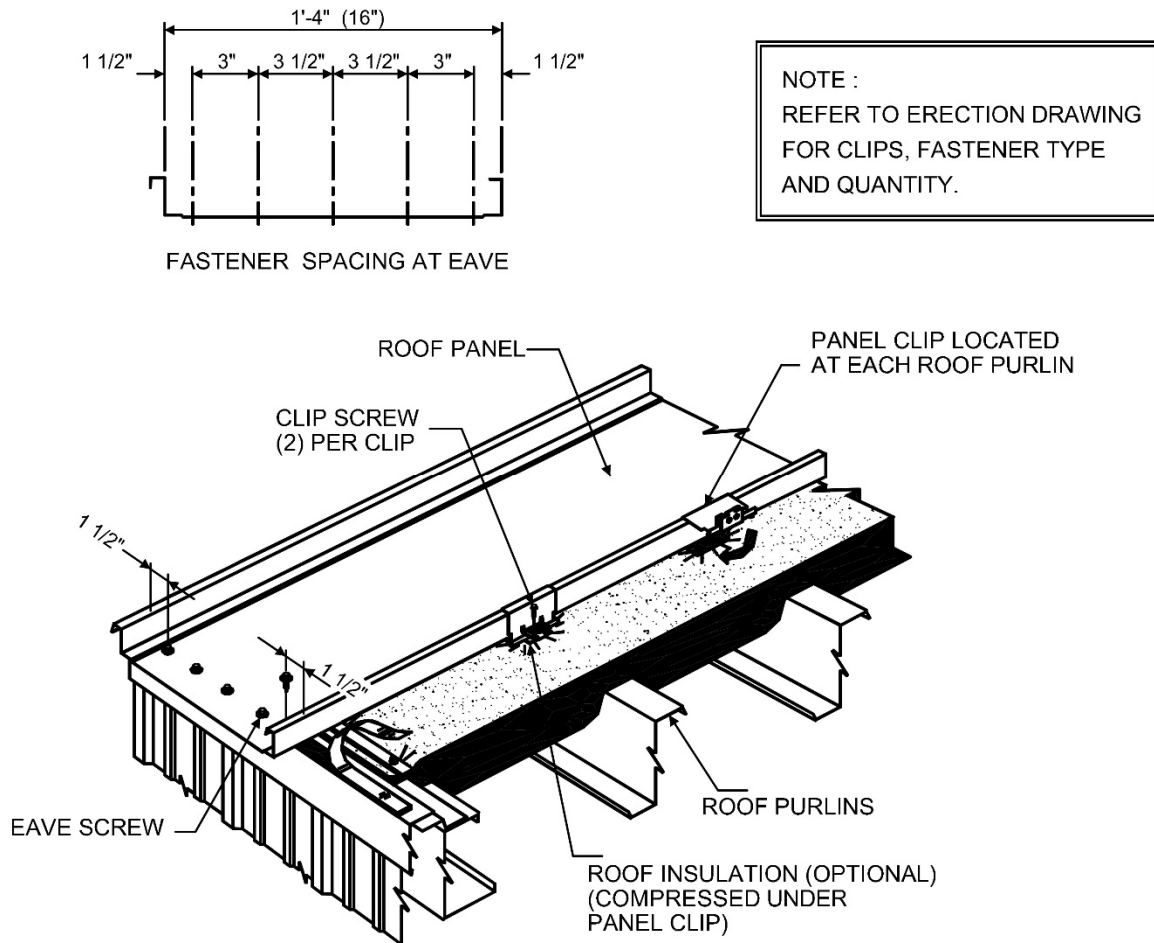


Figure 17: Fasten First Panel

Before fastening the roof panel, insure the panel coverage is correct and the leading edge of the panel is straight and parallel to the rake line. Fasten the eave end of the panel with roof fasteners, spaced as shown on the fastener spacing detail. Position the fasteners to penetrate through the center of the tape mastic, through the eave trim and into the eave support angle.

Install roof panel clips to the leading edge of the roof panel, at each roof purlin. Panel clips are not required at the eave strut. Position the clip's base so that the clip fasteners can be installed through the holes in the base and into the roof purlin.

When optional roof insulation is used, the panel clips normally set top of the insulation and the insulation is compressed between the clip's base and the top of the roof structural. Refer to the insulation installation instruction provided by the insulation vendor for any additional instructions.

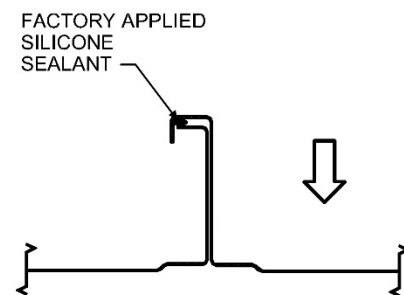
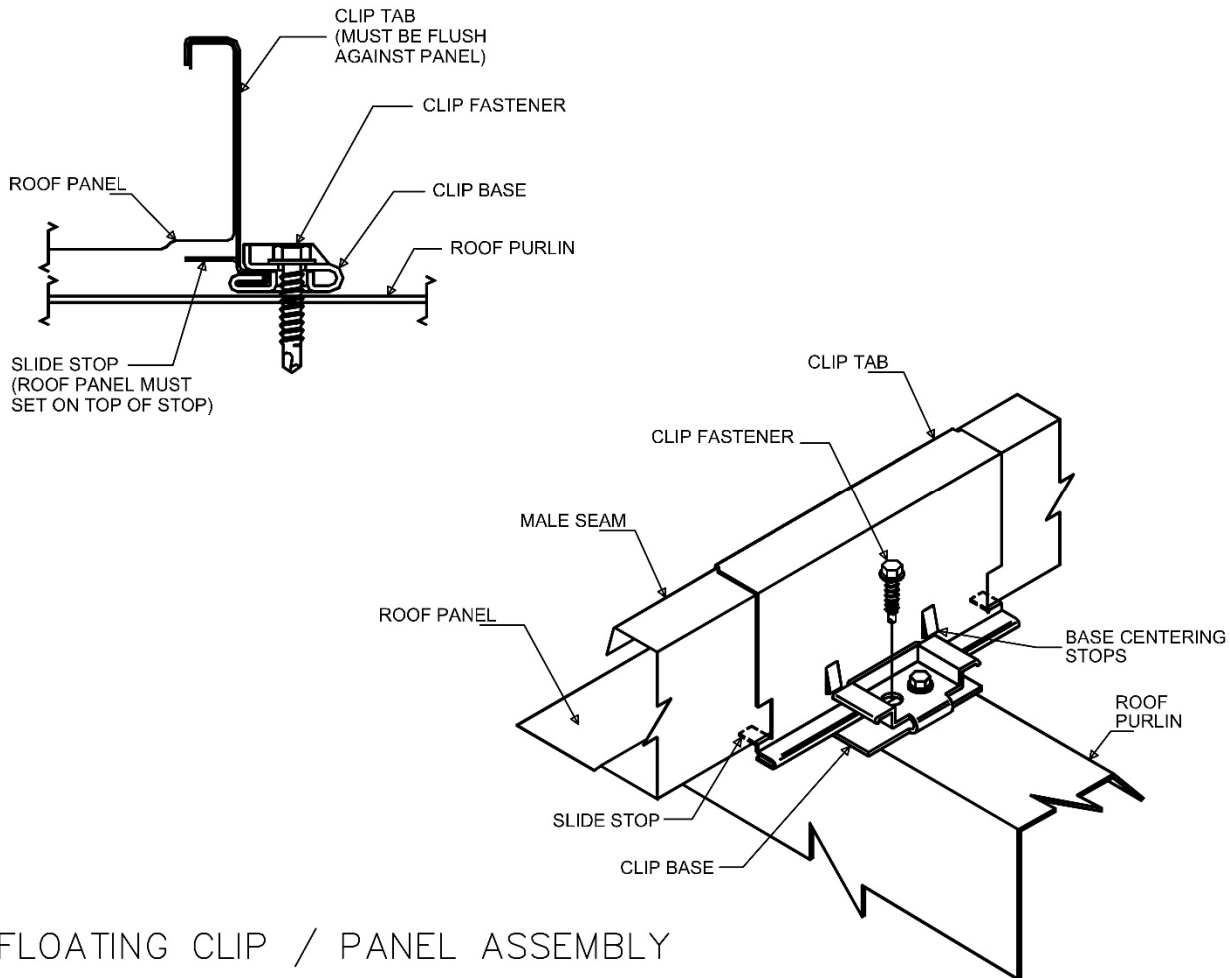


Figure 18: Side Lap Placement

6.4 Clip Details



FLOATING CLIP / PANEL ASSEMBLY

Figure 19: Floating Clip Details

Panel clips are available as floating clips or fixed clips. Floating clips have a 3/8" offset and fixed are at zero offset. Refer to the shipping list and contract documents to determine the type of clip required for each roof condition.

Ensure the panel clip's tab is seated tightly in the roof panel's seam. Ensure the clip's base is vertical and the base is set square and firmly over the roof purlins.

Panel clip fastener type varies according to clip type. Ensure the clip fasteners are equally spaced through the clip base holes and are securely engaged into the roof purlin.

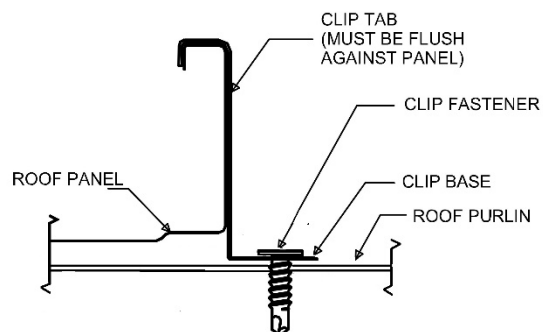


Figure 20 - Fixed Clip Detail

6.5 Prepare for Uphill Panel

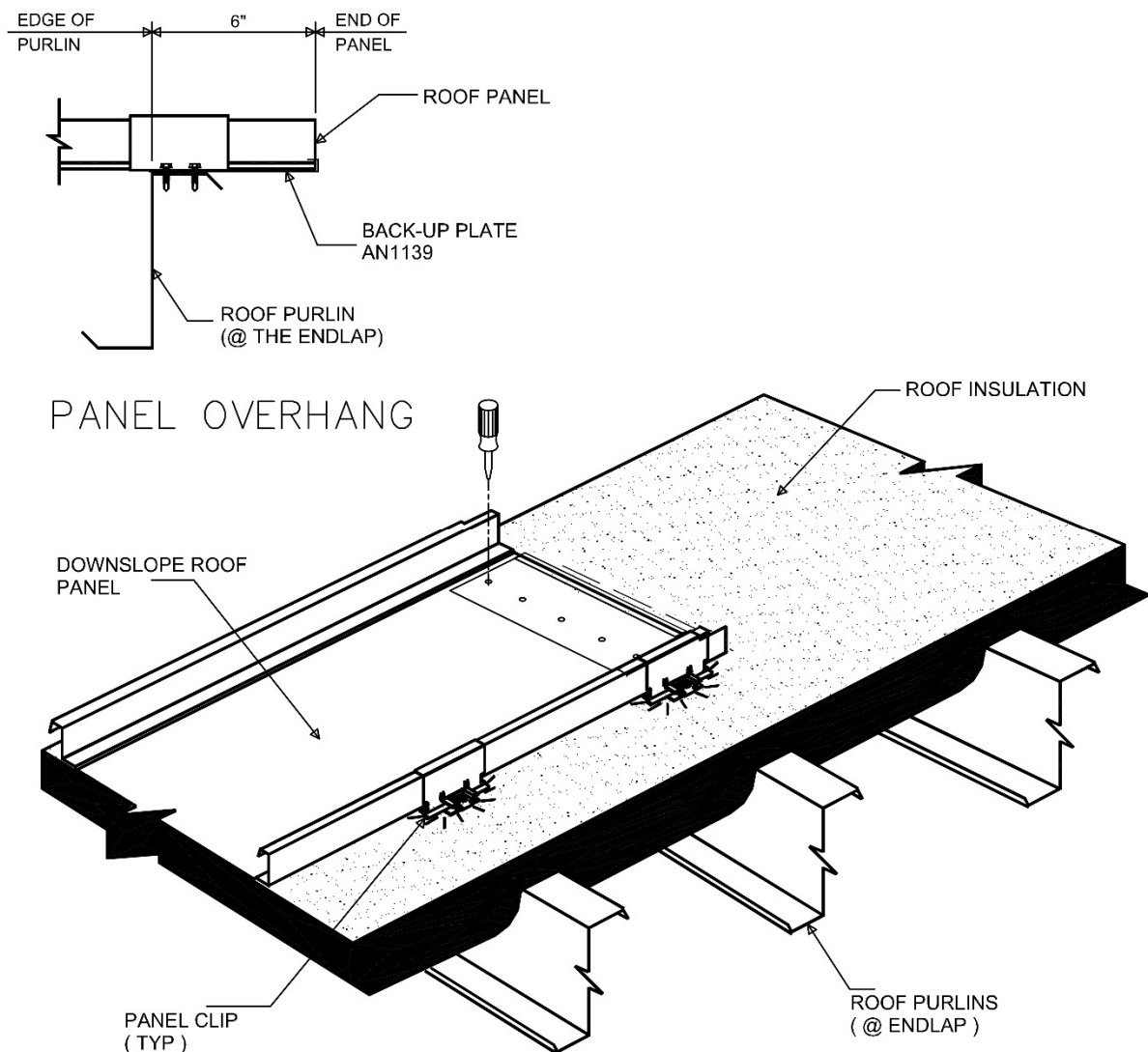


Figure 21: Verify Panel Overhang

If the roof has only one panel run from peak to eave, skip to *Section 7- Install Intermediate Panels*.

Lower the upslope roof panel to lap onto the downslope roof panel. While lowering the upslope roof panel, bow the end of the panel by pulling up on its center. This will allow the panel to readily nest into the downslope panel.

Do not displace or damage the tape mastic while nesting the upslope panel. If the roof panels have factory punched holes, use punches to align the holes of the lapping panels. The punch will have to penetrate through the tape mastic at the lap. Do not remove the punches from the roof panel holes until after the seam clamps have been installed.

CAUTION

While setting the roof panel, do not wipe the end lap sealant off the sides of the panel.

With the eave end of the roof panel attached, measure the panel overhang at the uphill roof purlin. The panel should extend 6" minimum beyond the web of the purlin. If the panel overhang is not between 5-1/2" and 6 1/2", call DSB customer service.

6.5.1 Install Back-up Plate

Slide the back-up plate under the roof panel, as shown. The back-up plate must be set over the top of the roof purlin. If insulation 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. Use punches to align the holes in the back-up plate with the factory punched holes in the roof panel.

6.5.2 Install End lap Sealant

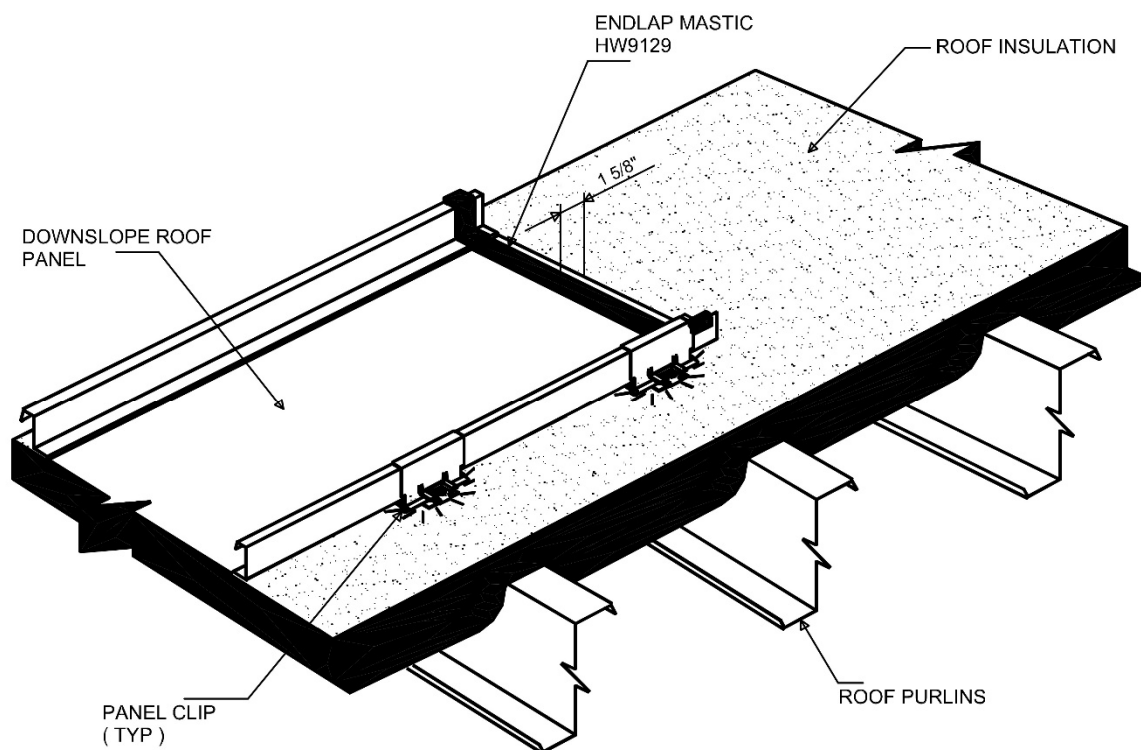


Figure 22 - Install End Lap Mastic

The proper placing of the end lap mastic is critical to the weather-tightness of the roof end laps. Before installing the end lap mastic, the roof panel's surface must be wiped clean and dry. Position the mastic so that its downslope edge is uniformly 1 5/8" from the end of the panel. The mastic must be centered over the roof panel's factory punched holes. Install a continuous strip of end lap mastic along the end of the roof panel, as shown.

Check that the mastic fully contacts the roof panel's surface and that it is completely fitted into the panel corners and around the seams. The mastic's protective paper helps to retain the mastic's shape during installation and protects the mastic's surface from damage and contamination. Do not remove the protective paper until immediately before the installation of the up-slope roof panel. Specific end lap mastic details are shown in *Figure 23 - Mastic Placement*.

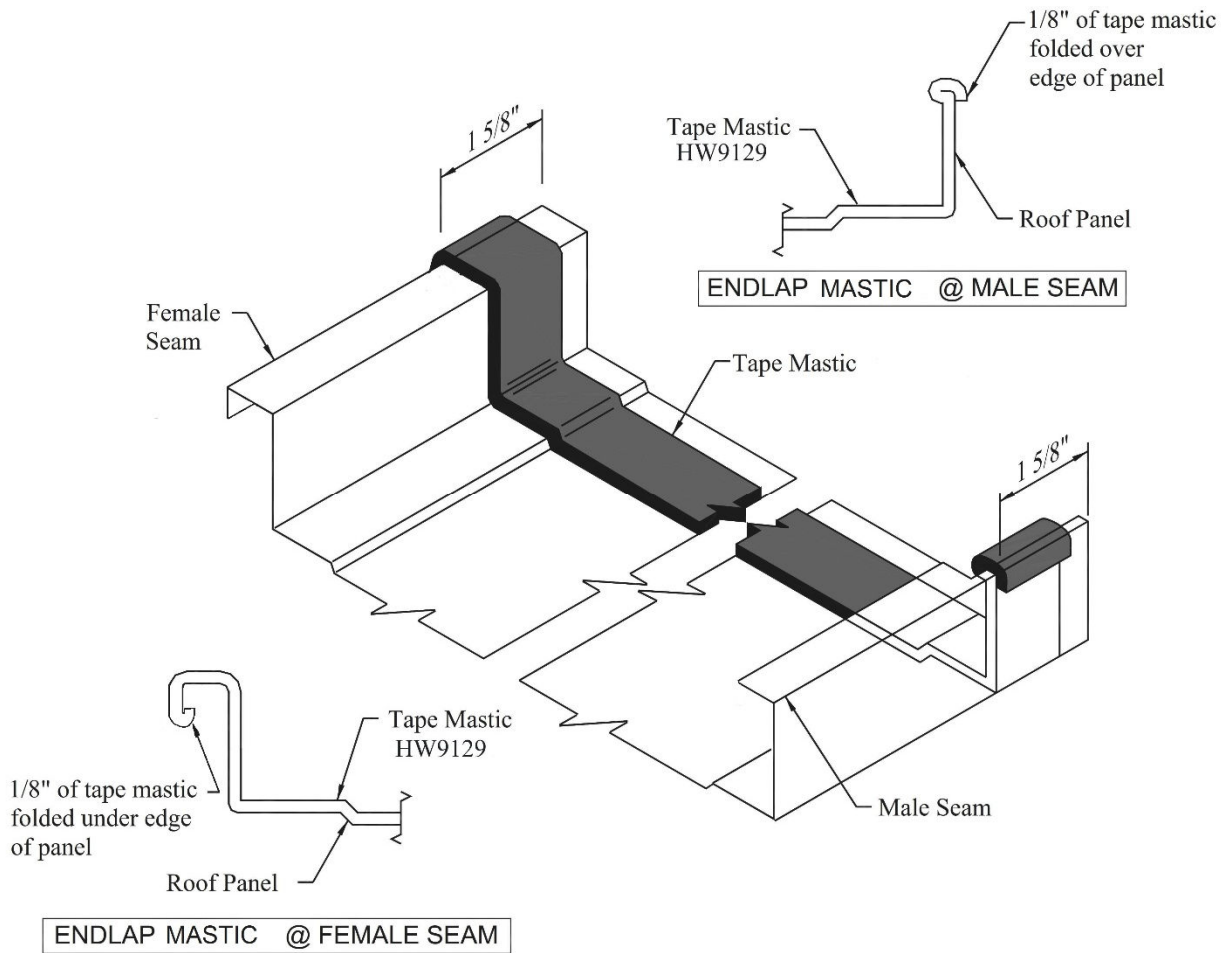


Figure 23 - Mastic Placement

Cut the end lap mastic to be fitted around the roof panel’s seams, as shown in Figure 23. Ensure the 1/8” ends of the mastic are correctly folded around the roof panel’s edges. Excess mastic in the roof panel seams will cause difficult panel assembly. Remove any excess mastic.

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

6.6 Uphill Panel Placement

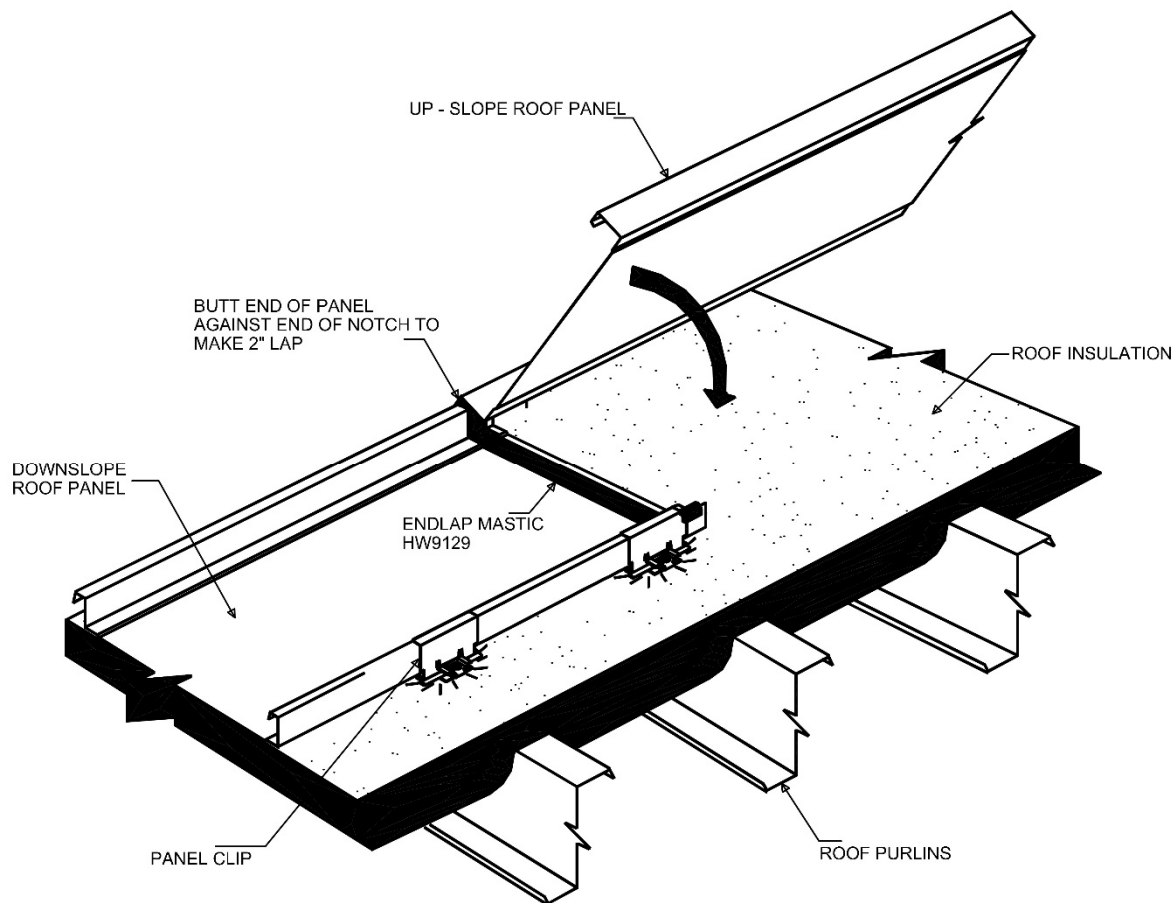


Figure 24 - Uphill Panel Placement

Wipe dry and clean the underside surface of the upslope roof panel.

Remove the tape mastic's paper backing, revealing the mastic. Position the end of the up-slope roof panel to make a 2" lap over the downslope roof panel. At the seams, the end of the up-slope roof panel should butt against the notch on the downslope roof panel. Ensure the up-slope roof panel will correctly lap over the tape mastic.

Lower the upslope roof panel to lap onto the downslope roof panel. While lowering the upslope roof panel, bow the end of the panel by pulling up on its center. This will allow the panel to readily nest into the downslope panel.

Do not displace or damage the tape mastic while nesting the upslope panel. If the roof panels have factory-punched holes, use punches to align the holes of the lapping panels. The punch will have to penetrate through the tape mastic at the lap. Do not remove the punches from the roof panel holes until after the seam clamps have been installed.

CAUTION

While setting the roof panel, do not wipe the end lap mastic off the sides of the panel.

6.7 Clamp the End lap Seam

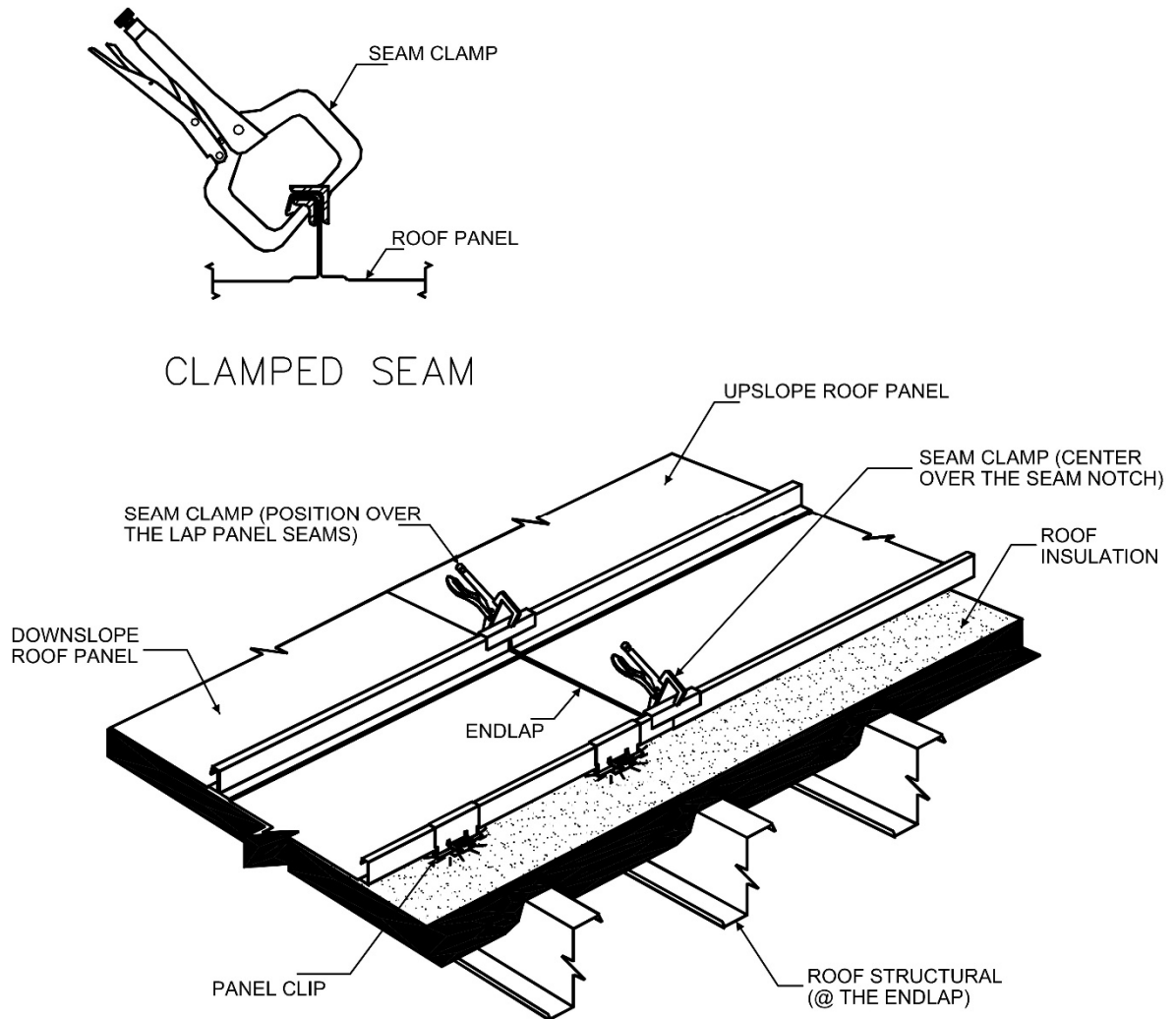


Figure 25 - Clamp End Seam Lap

Use the seam clamps to draw the lapping panel seams together, as shown. Ensure 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 tape mastic to flow between the lapped seams. With the seam clamps installed, uniformly press down on the upslope panel to close the panel lap and to assure adhesion to the tape mastic at the lap.

Do not remove the seam clamps until after the screws have been installed.

6.8 Fasten End Laps

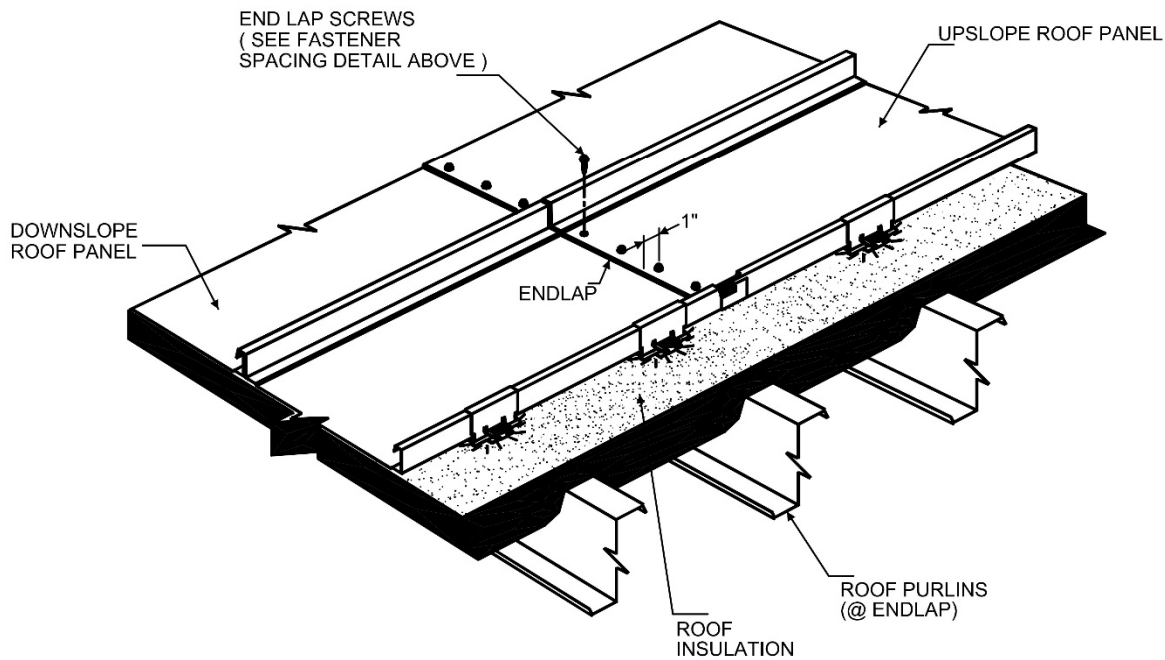
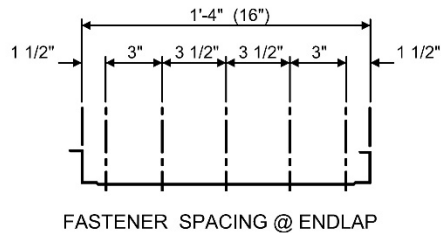


Figure 26 - Fasten End Laps

Install the roof fasteners at 1" from the panel end. Refer to the detail above for the fastener spacing. Install roof fasteners in the holes at each side of the roof panel. Next install fasteners in the remaining holes.

Ensure the roof fasteners penetrate through the center of the tape mastic at the end lap and are securely engaged into the back-up plate.

Ensure the end lap is correctly assembled, as shown in Figure 27. **Error! reference source not found.** Confirm there are no unsealed voids between the lapped panels, especially at the critical corner areas.

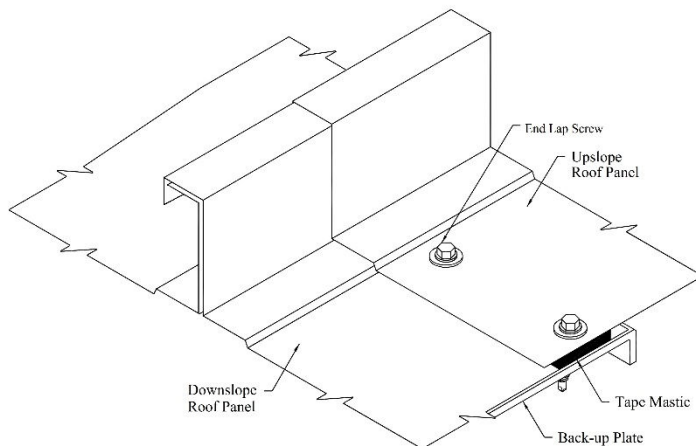


Figure 27 - End Lap Detail

6.9 Install Tape Mastic at Notches

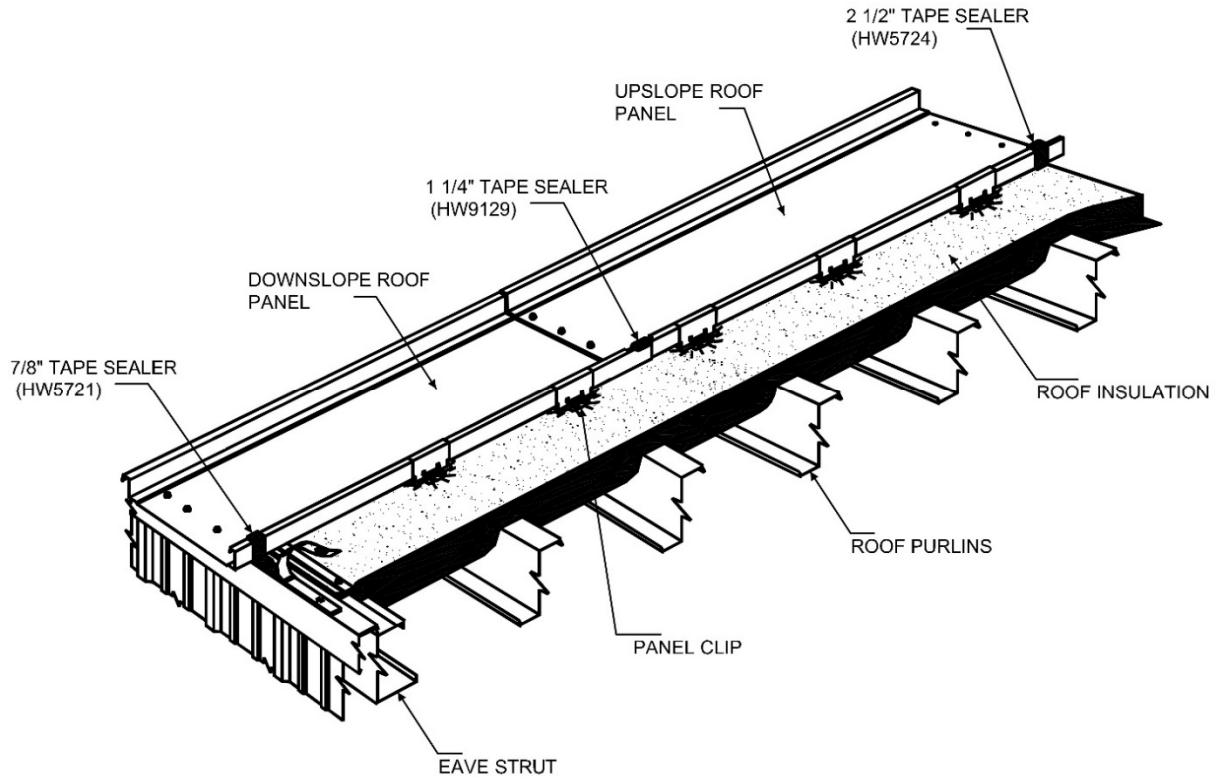


Figure 28 - Tape Mastic at Notches

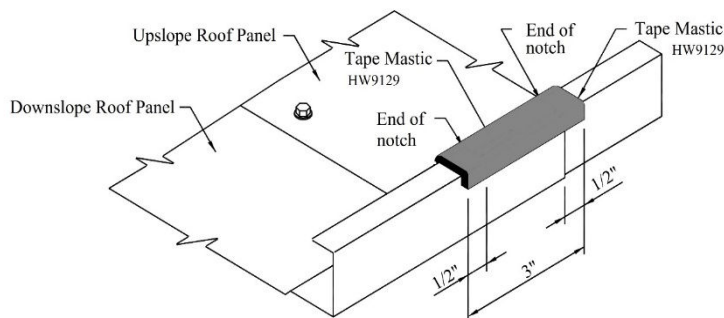
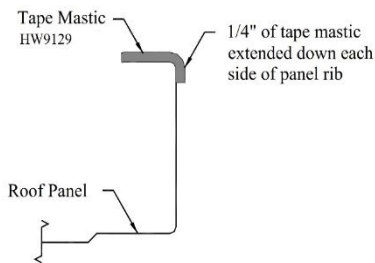


Figure 29 - Tape Mastic at Notch Detail

The tape mastic at notch must be correctly installed before the next roof panel run can be installed. Install the eave, end lap and ridge tape mastic at notch on the leading edge of the roof panel, as shown. The tape mastic at notch are pieces of tape mastic at the end lap, cut to the required length.

Cut the tape mastic at the notch to a 3" length and fit around the roof panel's seam as shown in Figure 29. Position the tape mastic at the notch to lap 1/2" beyond the downslope end of the roof panel's notch. Center the tape mastic over the roof panel's seam. Fold the edges of the tape mastic down, over the sides of the seam.

Excess tape mastic in the seams will cause difficult roof panel assembly. Remove any excess tape mastic. After the tape mastic at the notch is correctly placed, uniformly press the tape mastic against the panel's surface to assure adhesion.

7 Install Intermediate Panels

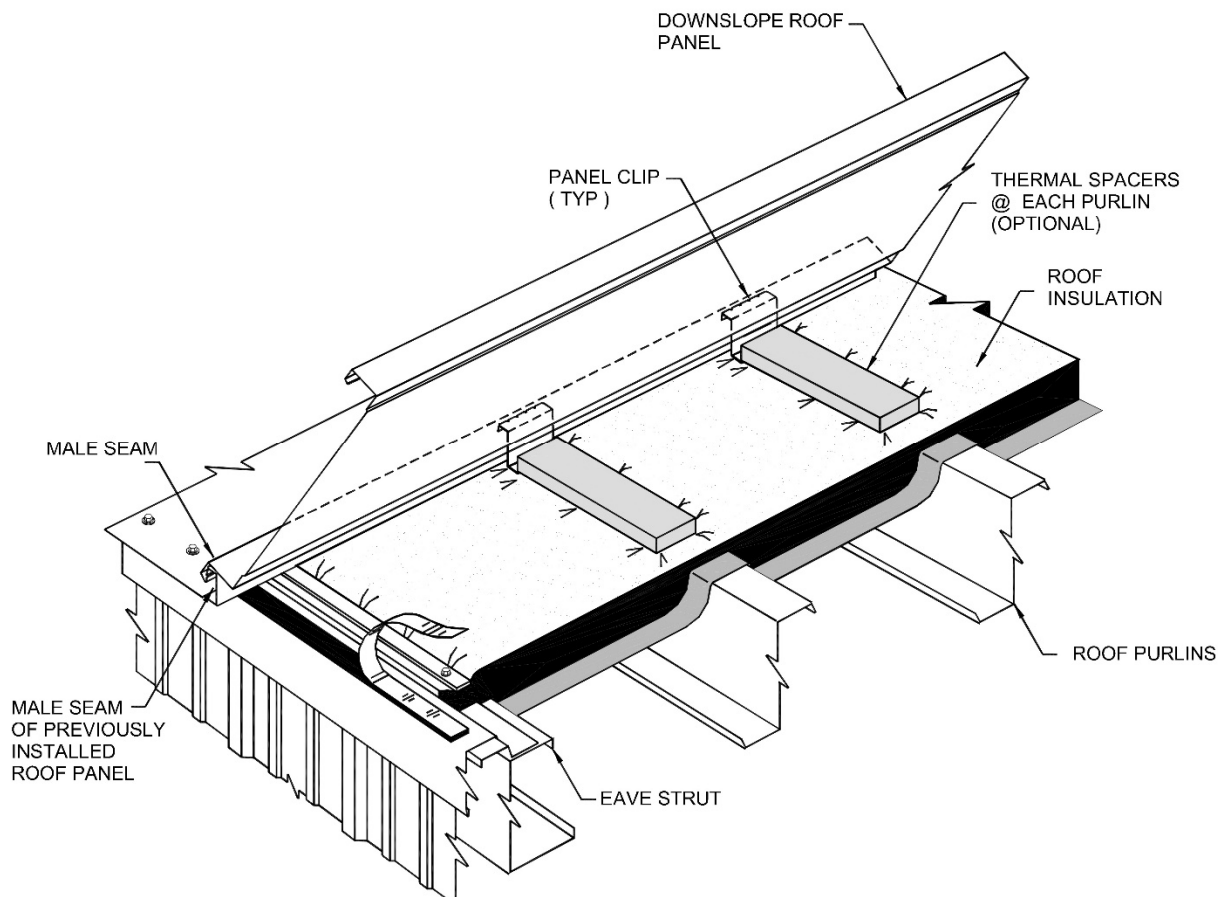


Figure 30: Intermediate Panel

Remove the protective paper from the tape mastic at eave. Remove only enough of the paper backing to allow installation of the next roof panel.

Install the intermediate panels in the same manner as the first panel shown in *Section 6.1 First Eave Panel*.

7.1 Panel Coverage

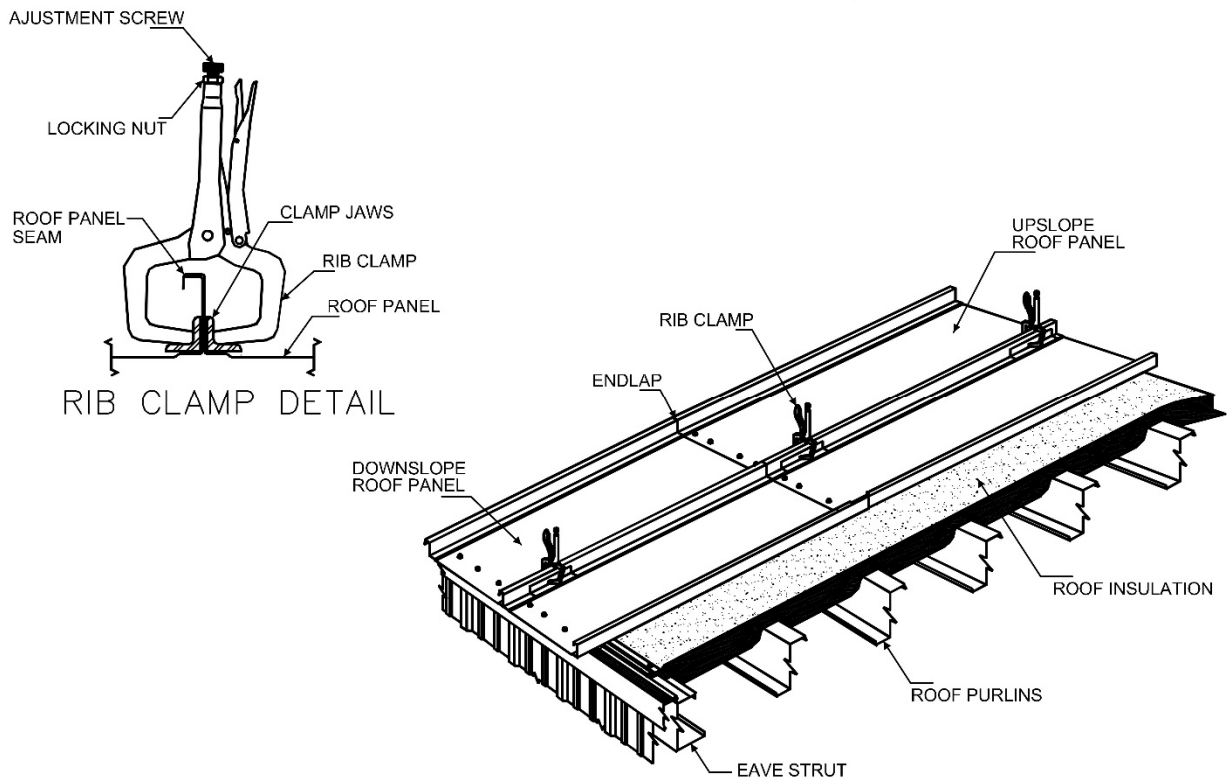


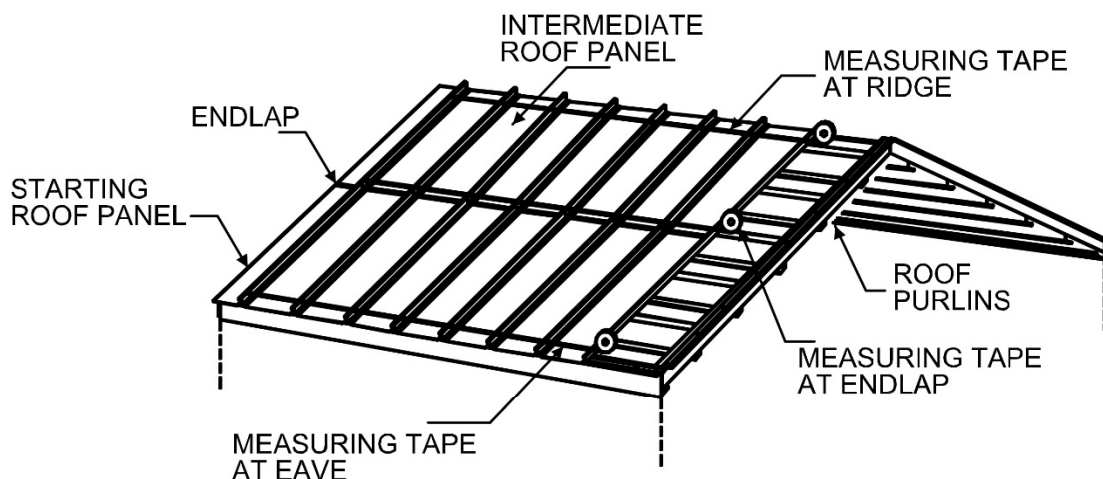
Figure 31: Panel Coverage A

The most common coverage error is the spreading of the roof panel side laps, especially at the panel ends. Excessive spreading can cause excess panel coverage along the eave, end laps and ridge.

Before installing the next run of panel clips, use rib clamps³ to squeeze together the previous side lap, 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 1/16" per panel. Correct accumulated coverage error by making the correction over several panel runs.

³ Rib Clamps are not provided by Dean Steel Buildings, Inc.



CHECKING PANEL COVERAGE

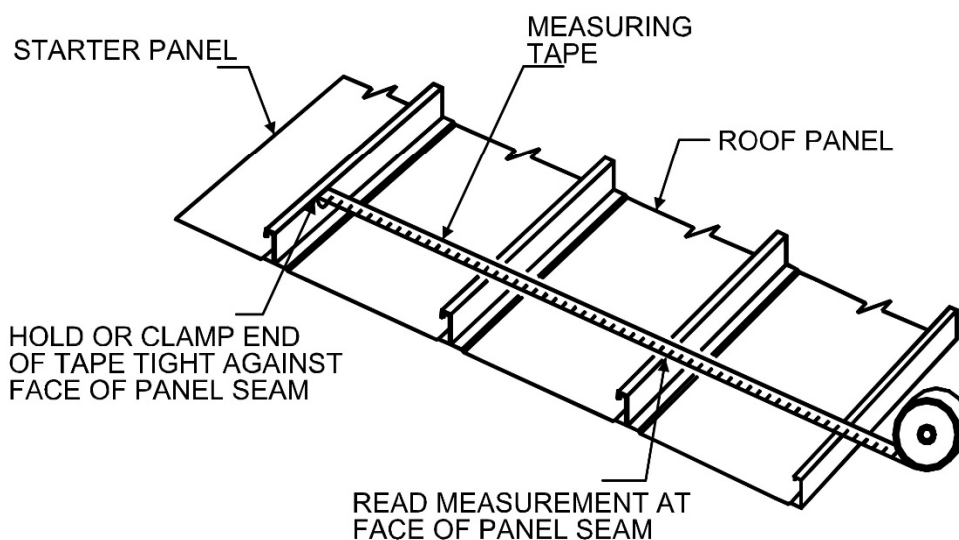


Figure 32: Panel Coverage B

For proper fit-up of the roof panel side lap assembly and the fit-up to the closures, flashing and 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 and ridge and at every end lap.

To avoid accumulation error, the coverage measurement should always be from the rake line or the starting roof panel's seam. To avoid measurement error, the measuring tape must be free and taut and must be parallel to the eave line or ridge line.

8 Termination Panel Installation

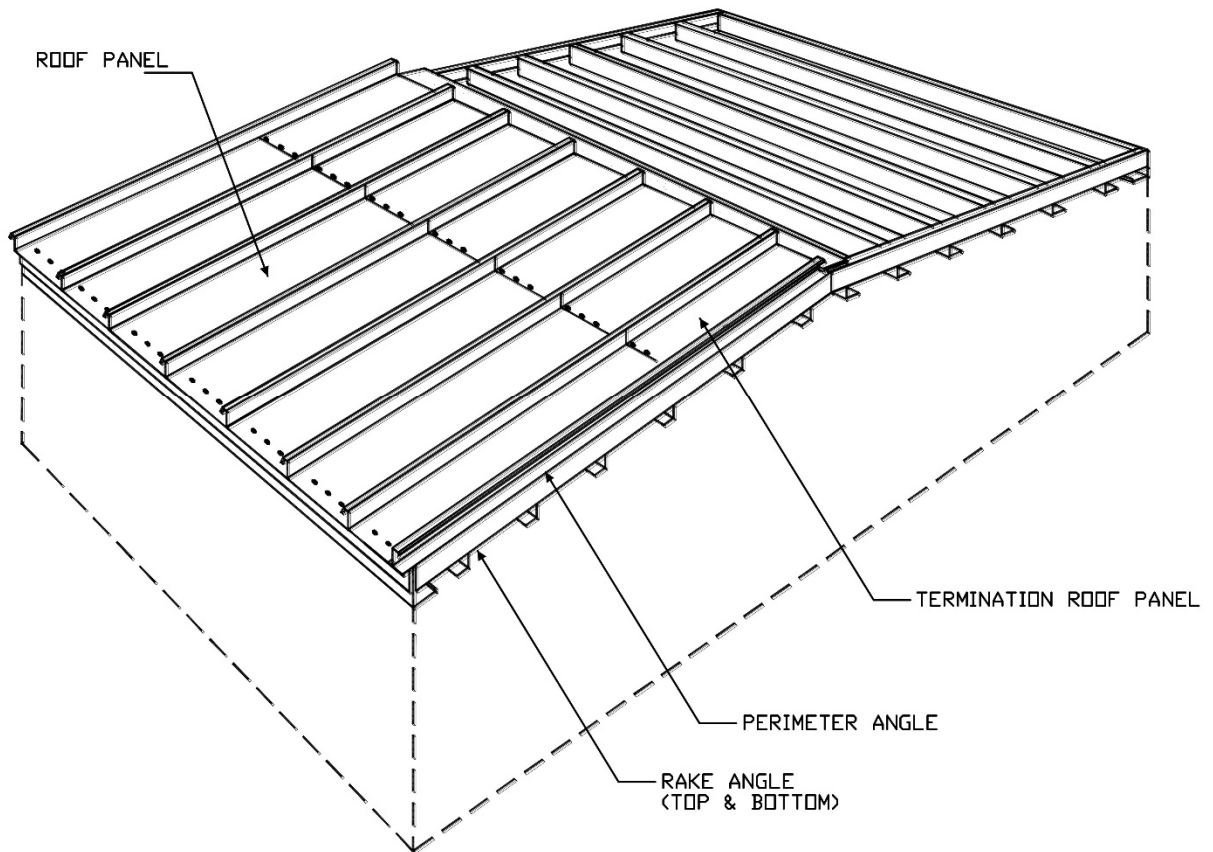


Figure 33: Termination Panel

The details in this section show the installation of the termination roof panel and the rake flashing. The details show the termination roof panel installed at the ending rake.

8.1 Rake Perimeter Angle Orientation

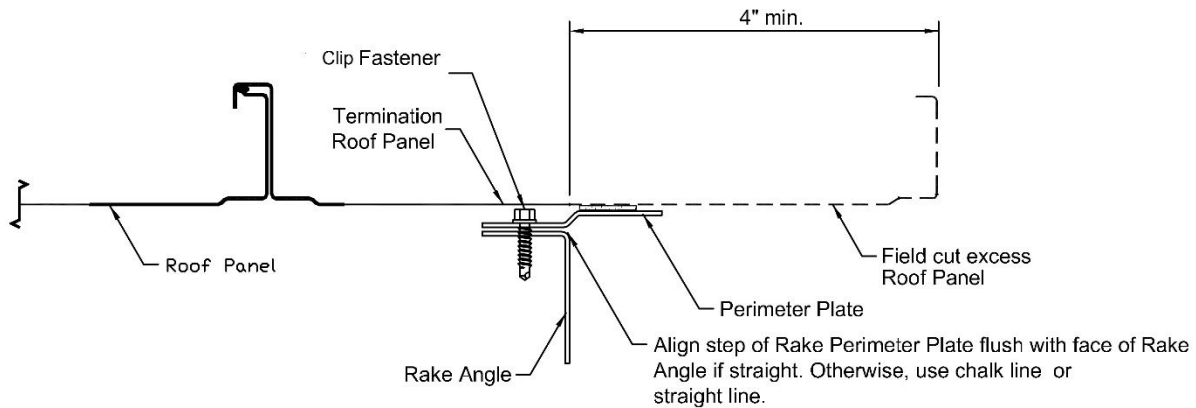


Figure 34: Standard Angle Position

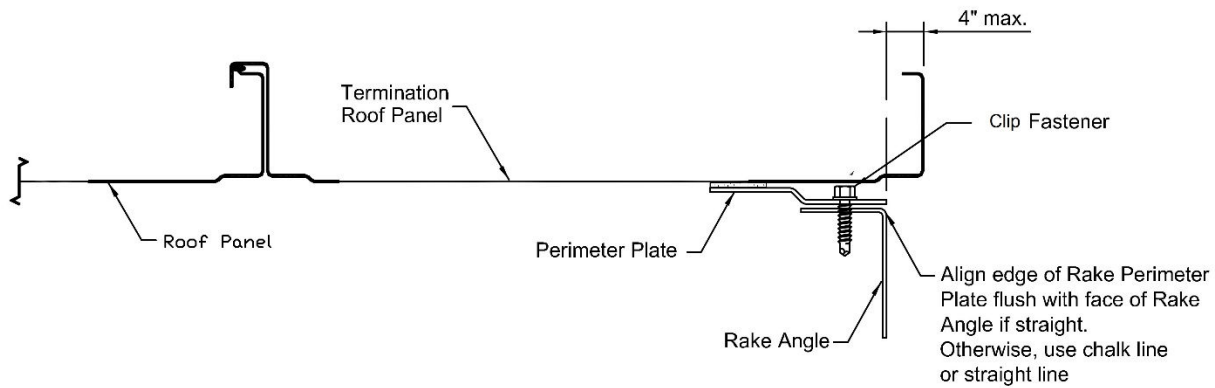


Figure 35: Alternate Angle Position

The position of the rake perimeter angle will depend on the location of the termination roof panel. If the leading edge of the panel extends 4" or more beyond the face of the rake angle, install the rake perimeter angle in the standard position. If the leading edge of the panel extends less than 4" beyond the face of the rake angle, install the rake in the alternate position.

A rake perimeter angle is not required with the fixed clip (zero offset). Attach the termination panel directly into the rake angle.

8.2 Install Rake Perimeter Angle

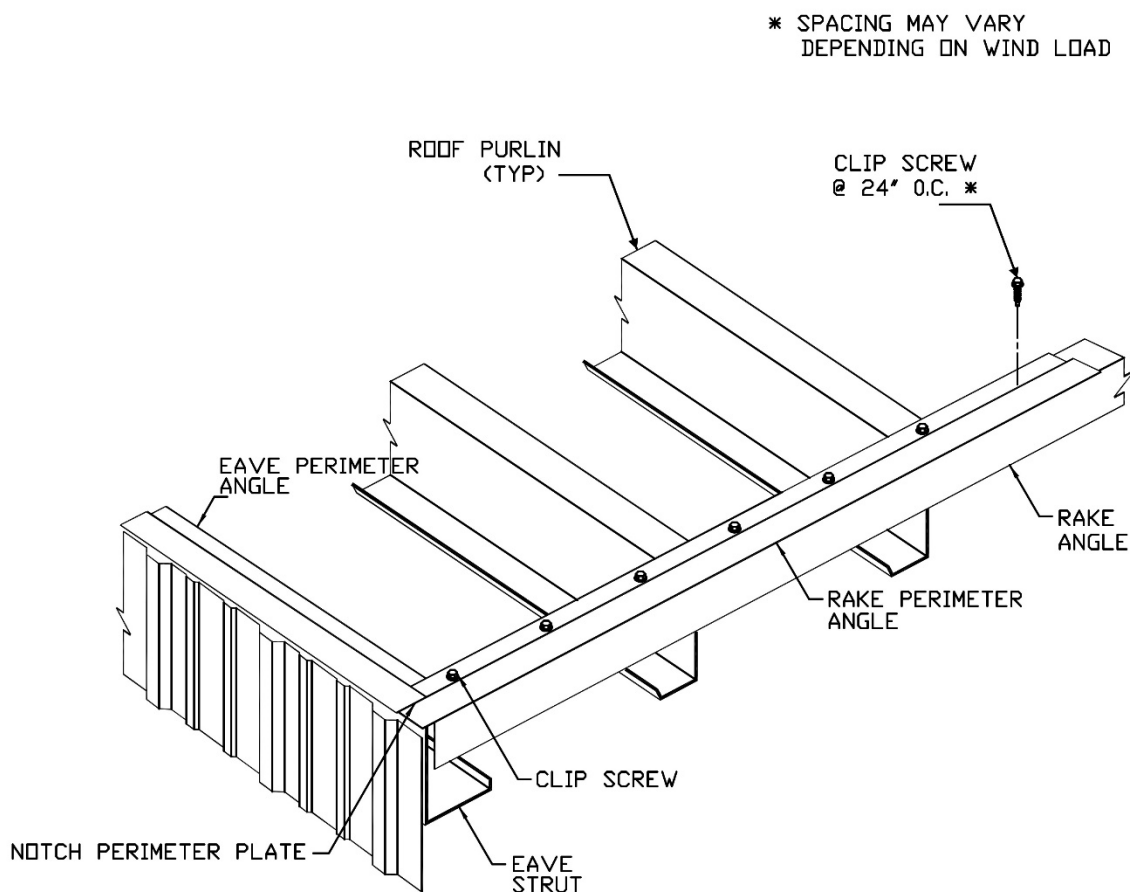


Figure 36: Install Rake Perimeter Angle

The rake perimeter angle provides a 3/8" elevated surface to terminate the panels for a floating system. The zero-offset or fixed clip system does not use a rake perimeter angle.

It is important that the rake perimeter angle is installed in a straight line, square with the eave. If the rake angles have been installed straight and true, the edge of the rake angle can be used to align the rake perimeter angle. If the rake angle is not true and square, a chalk line should be used to guide the installation of the rake perimeter angle.

Start the end of the rake perimeter angle flush with the outer edge of the eave perimeter angle. Notch the bottom flange of the rake perimeter angle to clear the eave perimeter angle. Secure the starting end of the rake perimeter angle to the rake angle with a panel clip fastener.

8.3 Rake Perimeter Angle Attachment

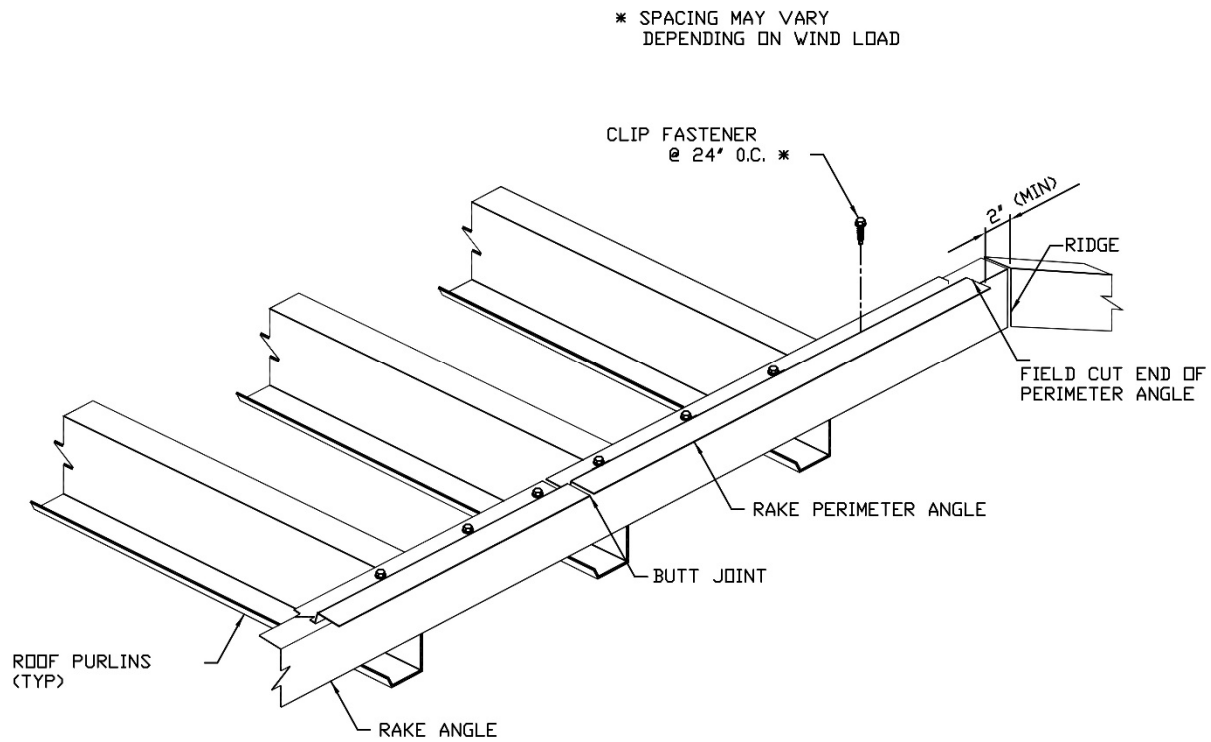


Figure 37: Rake Perimeter Angle Attachment

Butt the rake perimeter angles together and install a clip fastener on either side. Field cut the last rake perimeter angle two inches from the ridge line.

8.4 Install Rake Perimeter Angle Mastic

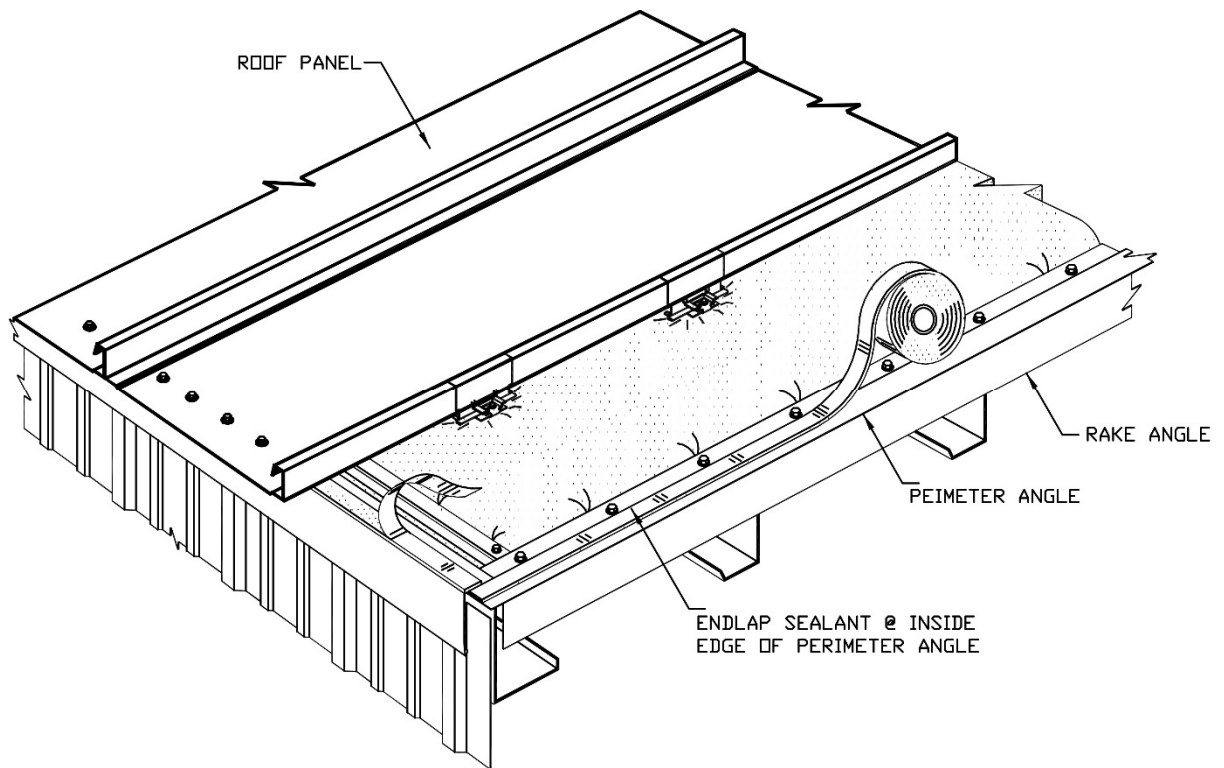


Figure 38: Rake Perimeter Plate Mastic

Install end lap sealant along the top flange of the rake perimeter plate as shown in Figure 38 and either Figure 34 or Figure 35. Do not remove the protective paper until immediately before installing the termination roof panel.

8.5 Install Termination Panel

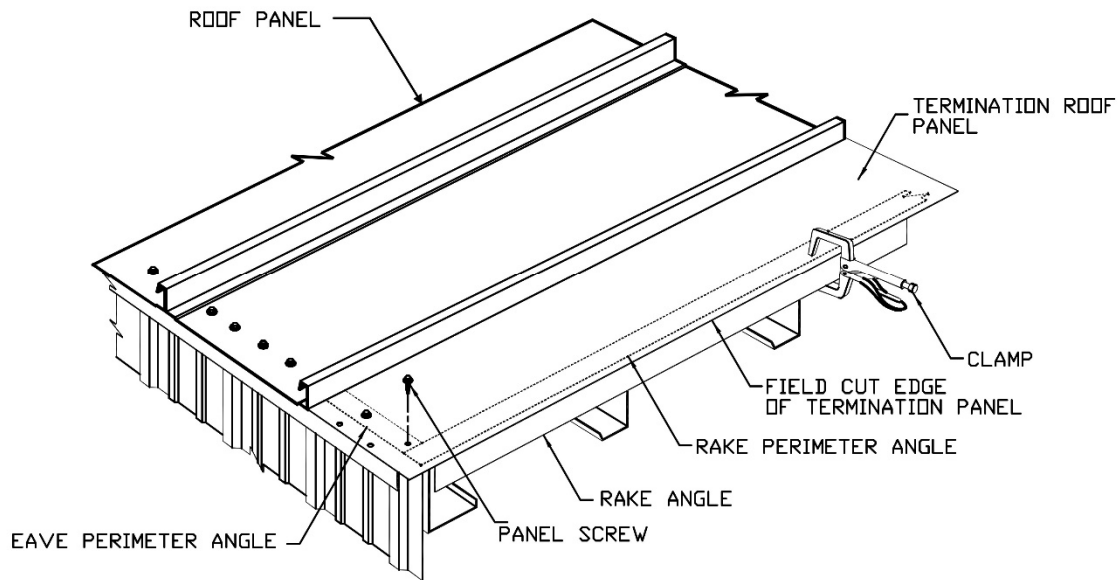


Figure 39: Install Termination Panel

Field cut the termination roof panel to the required width. The cut edge of the panel should extend 1” beyond the outer edge of the rake perimeter angles top flange.

Along the cut edge of the termination roof panel, wipe the underside clean and dry. Remove the protective paper from the eave and rake sealant.

Install the termination panel into the position as shown in Figure 39. Install the eave fasteners as described in *Section 6.3 - Fasten First Panel* and temporarily clamp the edge of the panel to the rake perimeter angle.

8.6 Termination Zee Angle Sealant

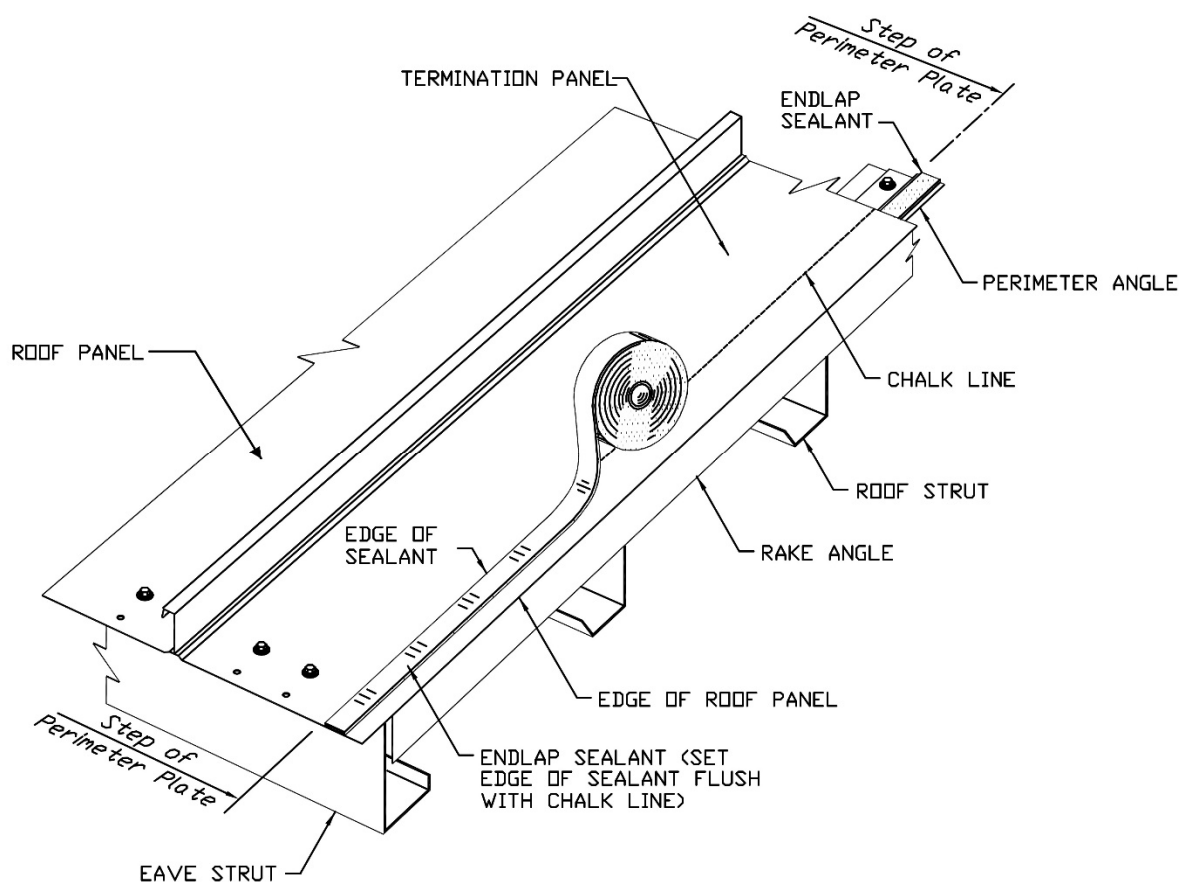


Figure 40: Termination Zee Angle Sealant

Along the bend of the termination roof panel, wipe the top surface clean and dry. Install the tape mastic on the panel's top surface with a chalk line as shown. Align the chalk line slightly away from the panel bend as shown in Figure 40.

Position the edge of the tape mastic on the chalk line. Starting and ending ends of the tape mastic should be flush with the ends of the roof panel. Check the entire length of the tape mastic to assure that it is correctly positioned and there are no voids or thinned areas.

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

8.7 Start Zee Angle at Ridge

IMPORTANT
INSTALL TERMINATION ZEE ANGLE
FROM PEAK TO EAVE TO PROVIDE
WATERSHED AT ZEE SPLICES.

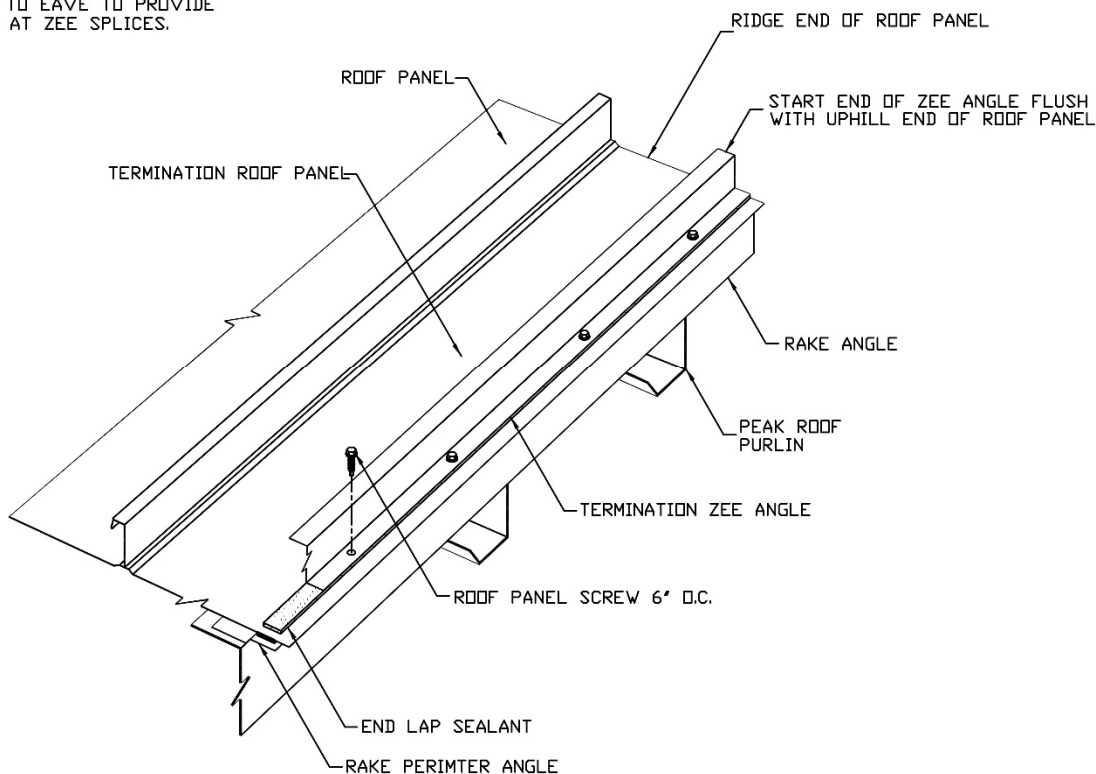


Figure 41: Zee Angle Start

The termination zee angle must be installed from ridge-to-eave to provide for watershed at the zee angle splices. Install the termination zee angle on top of the tape mastic, as shown.

Uniformly press the termination zee angle against the tape mastic sealant to assure adhesion.

Attach the termination zee angle with the roof panel screws at 6" on center. Ensure the fasteners penetrate the center of the tape mastic sealant, and securely engage the rake perimeter angle.

8.8 Termination Zee Angle Splices

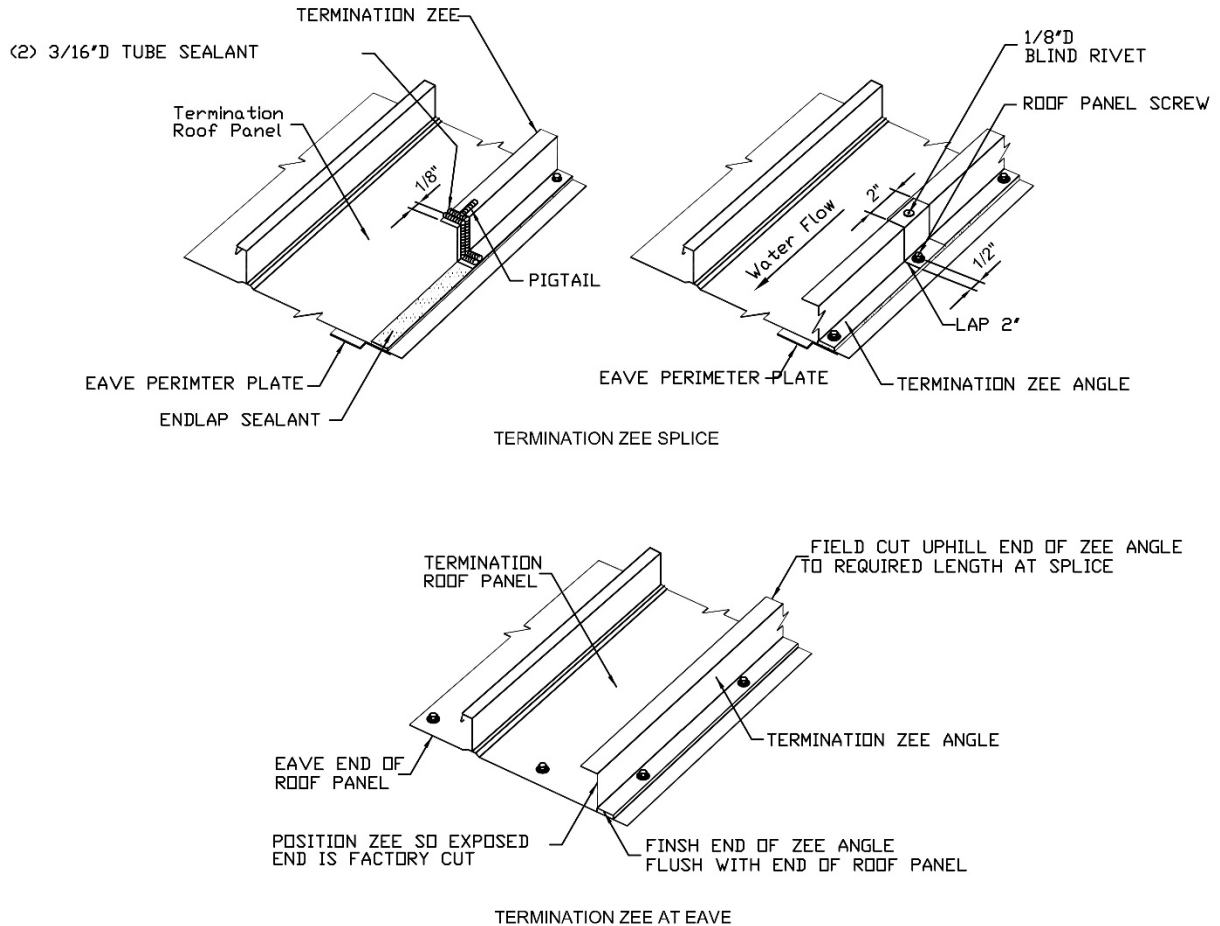


Figure 42: Zee Angle Splices

Apply two - 3/16" beads of tube sealant along the up slope end of the down slope termination zee angle as shown in Figure 42. Position the up slope termination zee angle so it is overlapping the previously installed down slope termination zee angle by 2".

Clamp the lapped termination zee angle while installing the fasteners.

Install the first panel screw through the lapped bottom flanges. Install a 1/8" blind rivet through the lapped upper flanges.

Field cut the up slope termination zee angle to the required length to splice at the ridge.

9 Ridge Closure

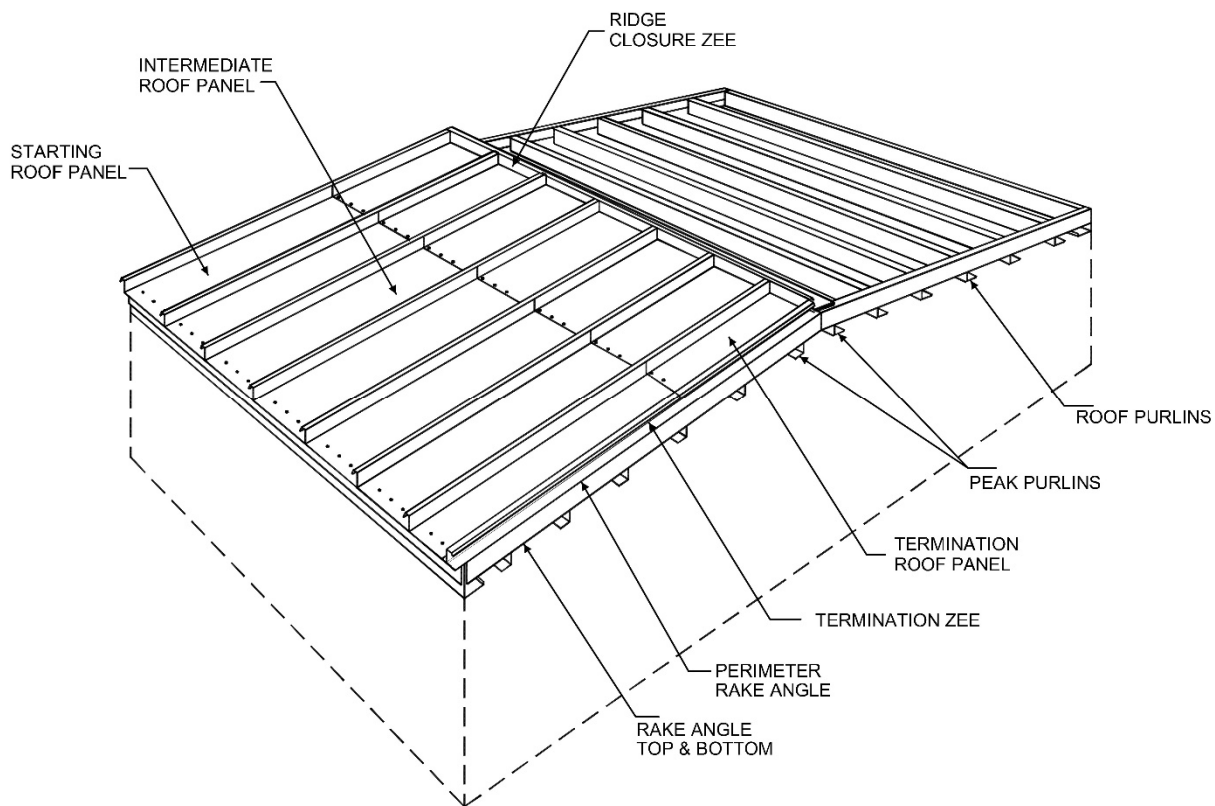


Figure 43: Orientation View

Ridge closure zeos are used to close the ends of the roof panels at the ridge. The details in this section will show the installation of the ridge closure zee and the preparation of the roof panels for installation of the ridge closure zee.

9.1 Install Closure Zee

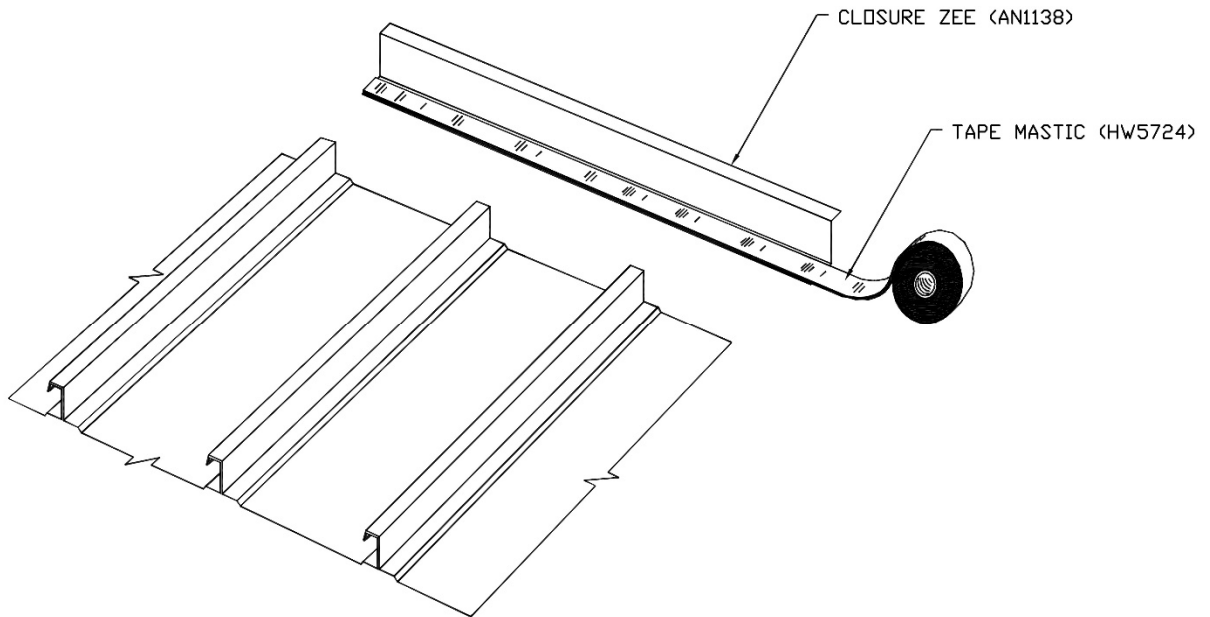


Figure 44 - Ridge Closure Zee

Install tape mastic along the top of the bottom flange of the ridge closure zee as shown in Figure 44. Do not remove the paper backing of the tape mastic until immediately before attaching it to the roof panel.

9.2 Closure Zee Laps

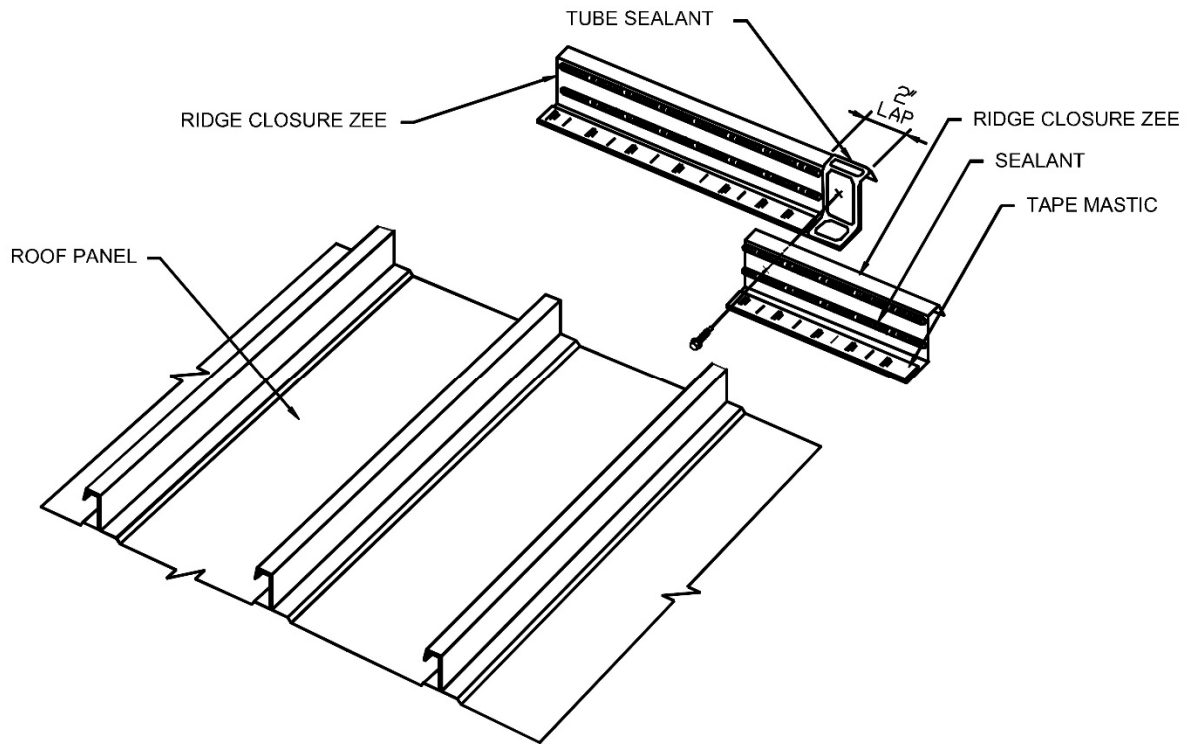


Figure 45 - Ridge Closure Zee Laps

Figure 45 shows how to lap two ridge closure zees at a splice.

Apply tape mastic along the bottom flange of the ridge closure zee for later roof panel attachment. Do not remove protective paper of the tape mastic until immediately before attaching it to the roof panel.

Designate a 2" lap at the end of the ridge closure zee. Apply caulking along the 2" lap. Lap the ridge closure zee's together and secure with fastener.

Apply tube sealant continuously along the face of the ridge closure zee.

9.3 Installation of Closure Zee Cover Flashing

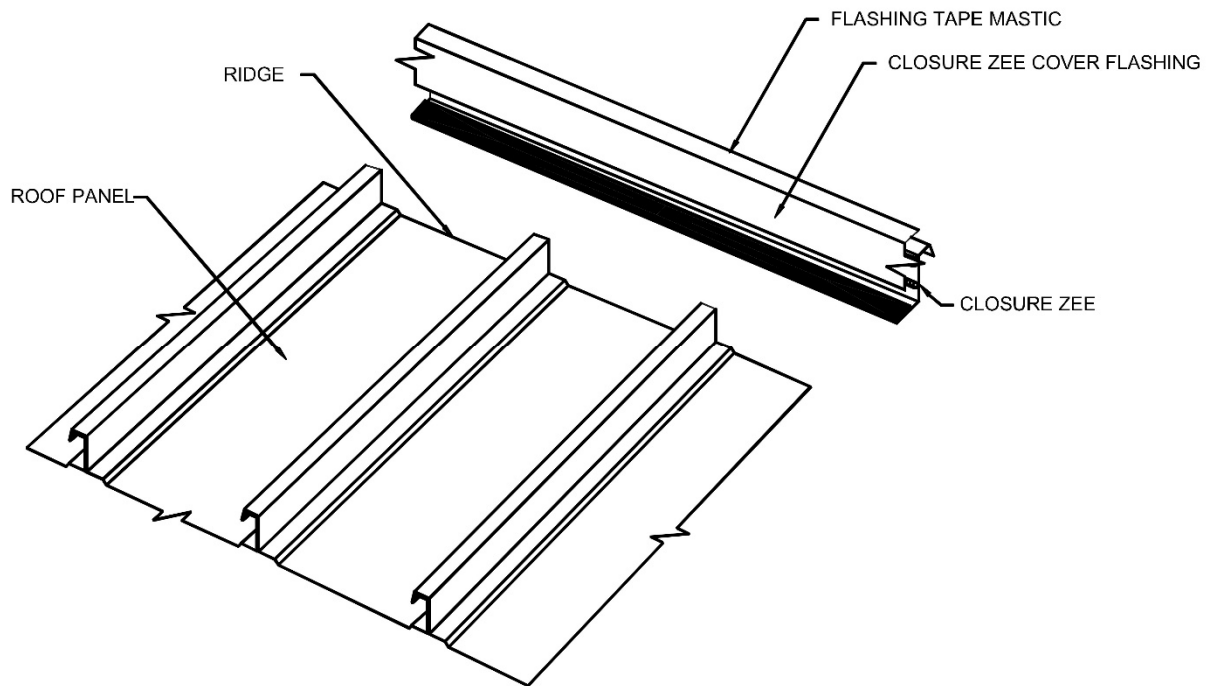


Figure 46 - Closure Zee Cover Flashing

Install the cover flashing onto the ridge closure zee as shown in Figure 46.

Secure by pressing the cover flashing against the caulking applied to the ridge closure zee. Wipe clean the underside of the panel near the ridge and remove the tape mastic from the lower flange of the ridge closure flashing.

9.4 Fasten Closure Zee

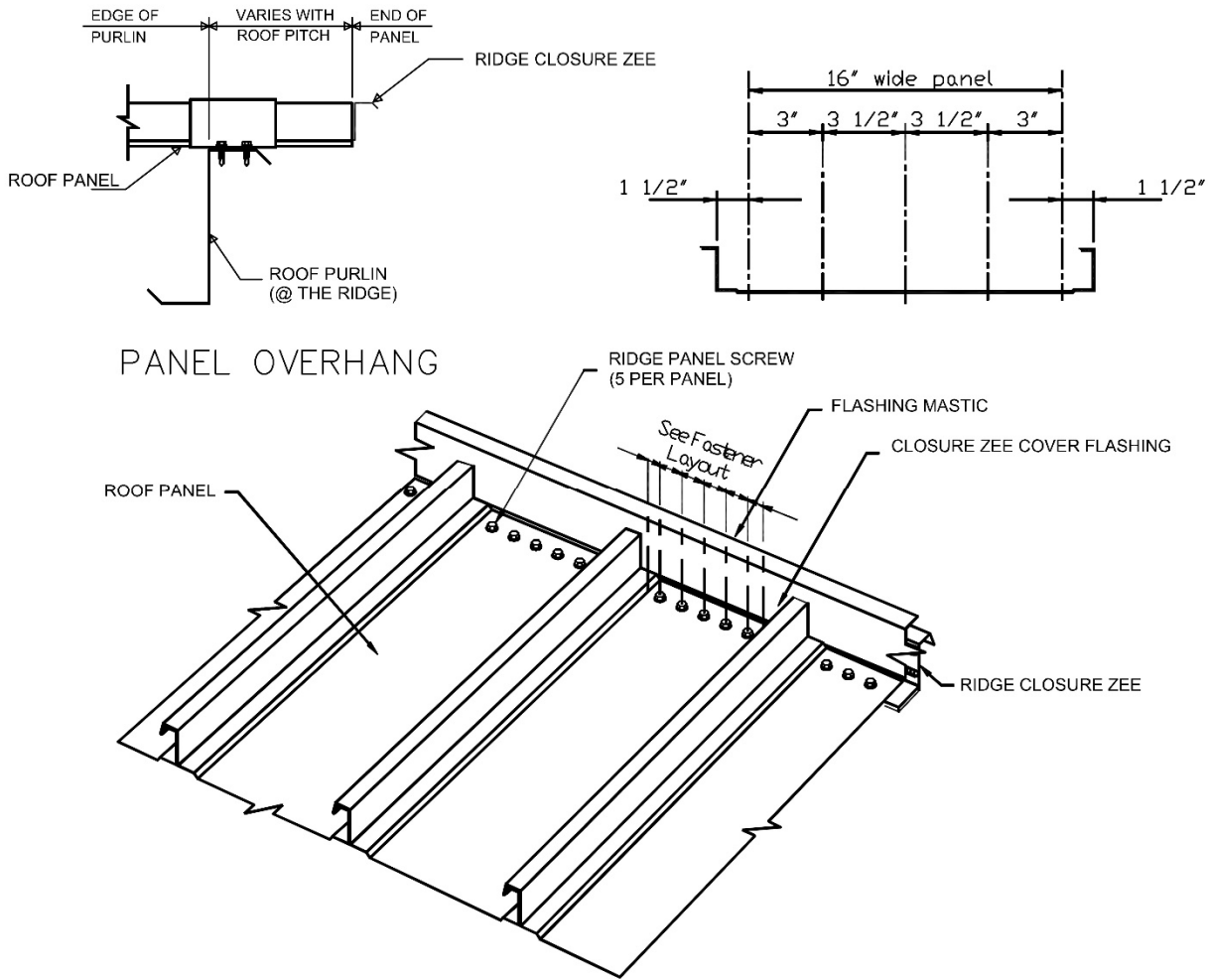


Figure 47 - Fasten Closure Zee

Install the ridge closure zee to the roof panels at the ridge by pressing the tape mastic sealant of the lower flange of the ridge closure zee against the underside of the panel at the ridge.

Do not use excessive pressure, which will thin the tape mastic sealant.

Secure the ridge closure zee to the panels by installing fasteners insuring that they penetrate the center of the tape mastic and through the lower flange of the ridge closure zee.

The construction drawings will show the panel overhang at the ridge.

10 Rake Trim Installation

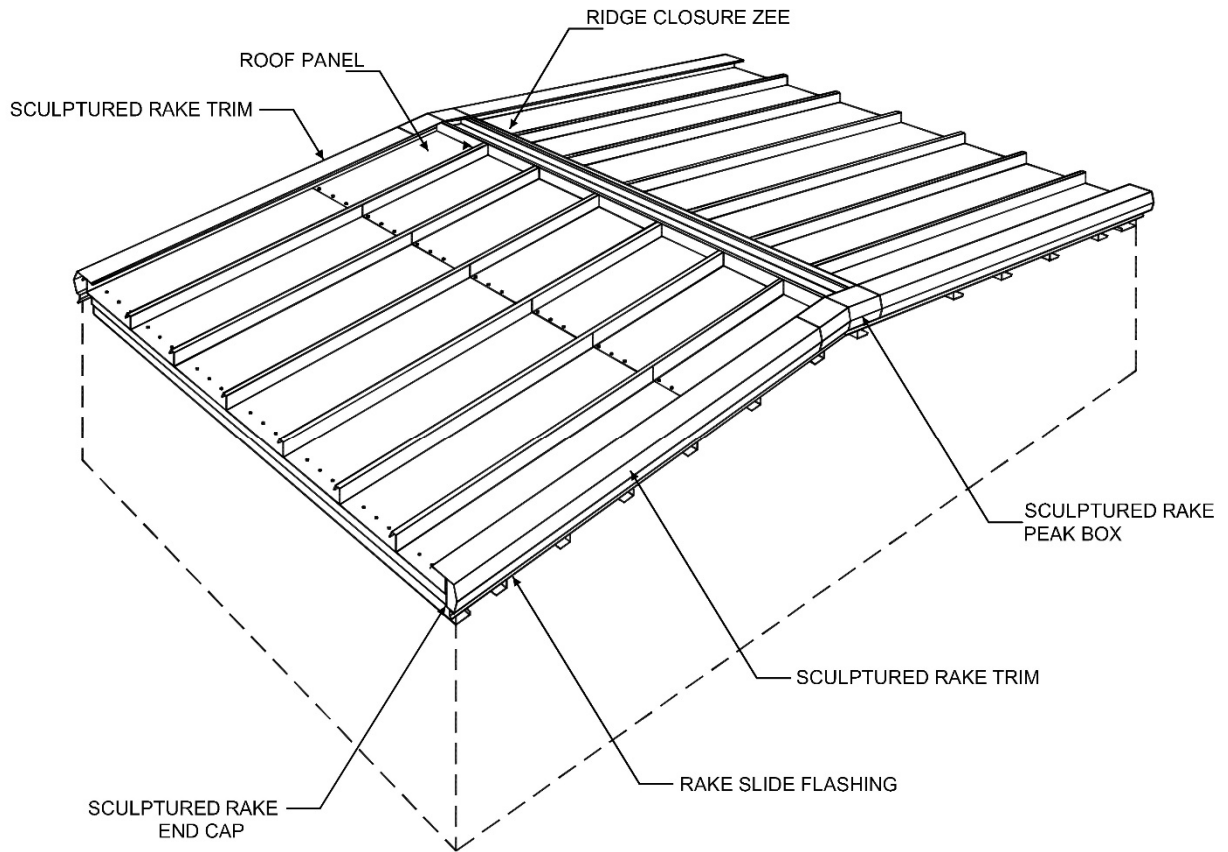


Figure 48 - Rake Flashing

The details in this section show the installation at the rake trim, rake peak box and rake end caps. These details show the rake trim at a termination roof panel condition. The details at a starting roof panel condition are similar.

10.1 Install Rake Flashing

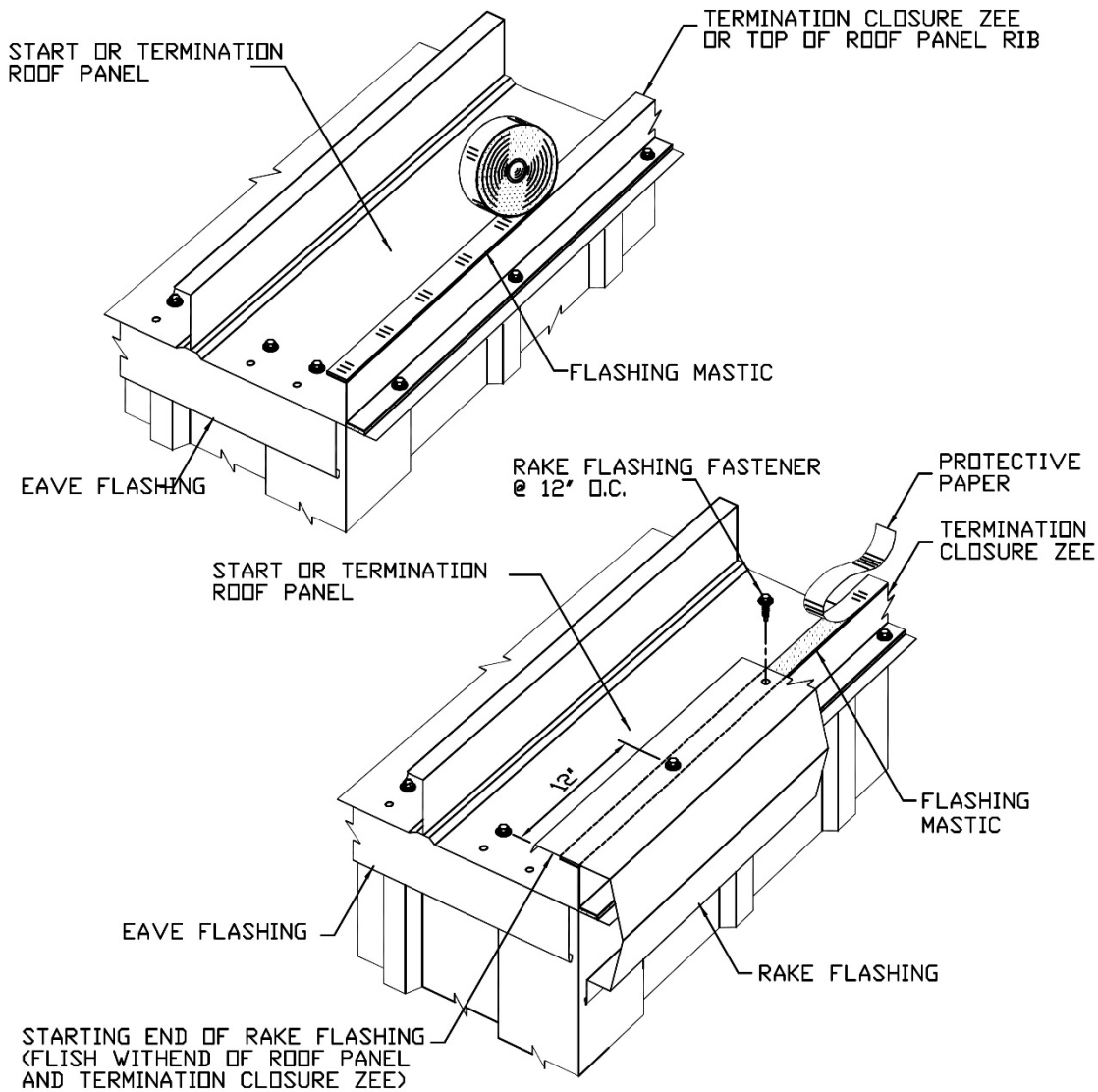


Figure 49 - Rake Trim Detail

Install the rake trim from eave to ridge, to provide for watershed at the splices. Install tape mastic continuous along the top flange of the termination closure zee or panel seam.

Start the down-slope end of the rake trim flush with the end of the roof panel. Ensure the rake trim is properly aligned with the face of the wall panel.

Fasten the rake trim to the termination closure zee with fasteners at 12" on center, as shown. Ensure the fasteners penetrate the center of the tape mastic sealant and securely engage the termination closure zee or panel seam. At the start panel end, be sure the fasteners do not penetrate the start clip tabs and are 2" from clip ends.

10.2 Rake Flashing Laps

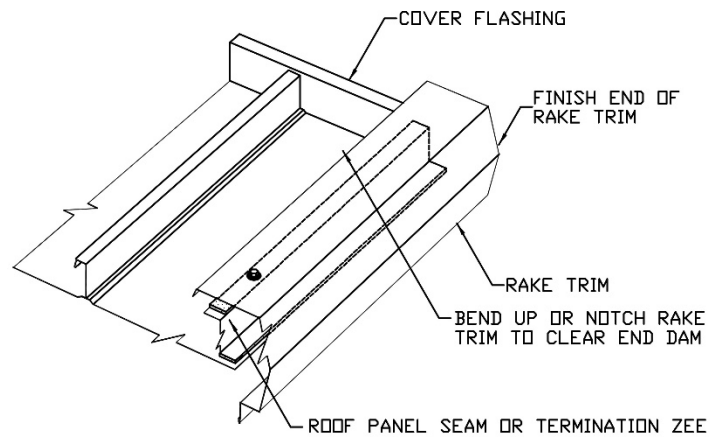
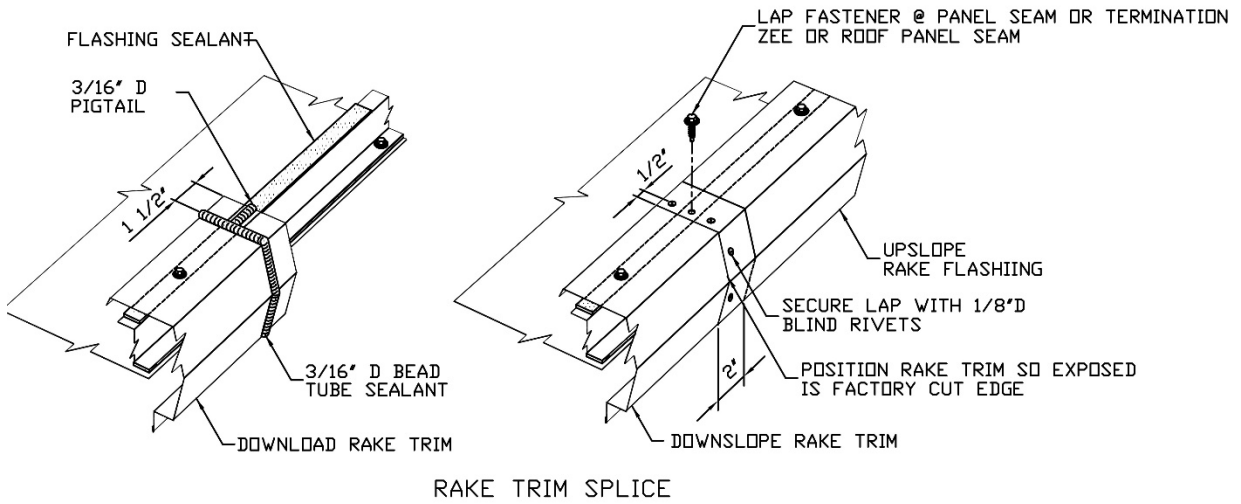


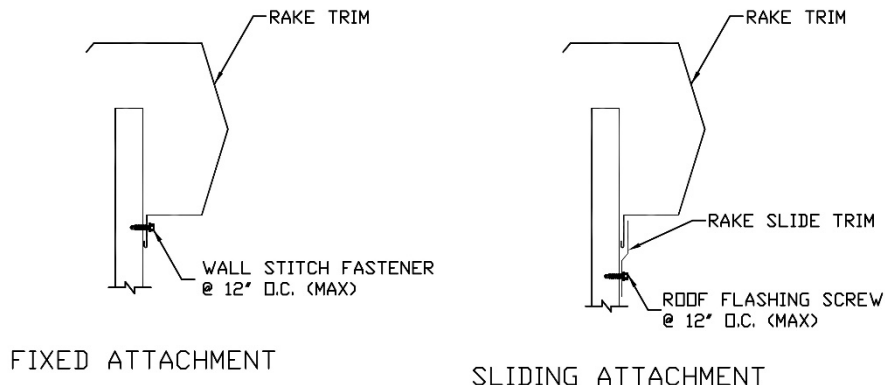
Figure 50 - Rake Flashing Laps

Assemble rake trim splices with tube sealant and rivets as shown.

Bend or notch the rake trim's lip to clear the top flange of the closure zee. At the ridge, field cut the end of the rake trim 2" away from the center line of the ridge.

At a high eave transition, field cut the end of the rake trim as required for a weather tight joint with the adjacent construction.

10.3 Rake Flashing to Wall



IMPORTANT
 FOR RAKE LENGTHS (EAVE TO RIDGE) EXCEEDING 50', A SLIDING TYPE ATTACHMENT OF THE RAKE TRIM TO WALL IS REQUIRED.

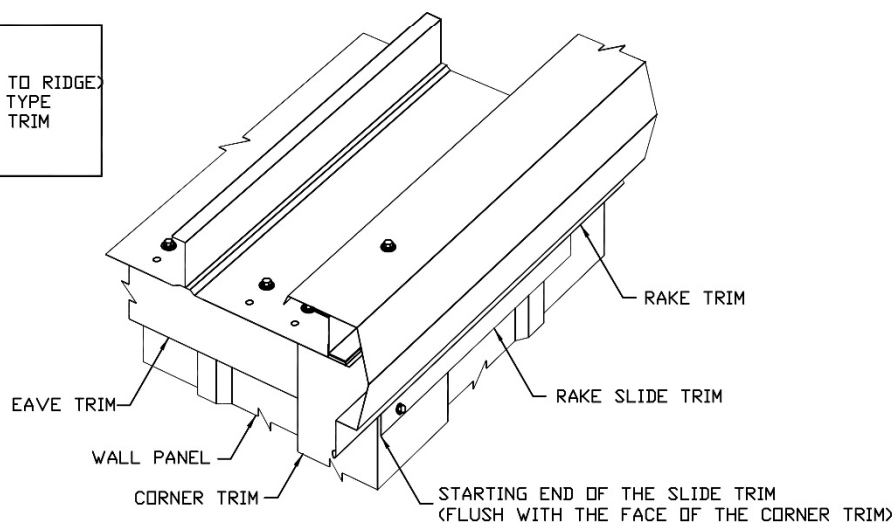


Figure 51 - Rake Flashing to Wall

If the rake trim run is 50' or less, the bottom edge of the rake trim can be attached directly to the wall with wall fasteners as shown. If the rake trim run exceeds 50', the bottom edge of the rake trim must be secured with rake slide flashing to allow for expansion/contraction.

Install the rake slide flashing continuous along the bottom edge of the rake trim as shown. In all cases, the bottom edge of the rake trim must be installed straight and parallel to the roof line. Use a chalk line to guide the alignment of the rake trim's bottom edge.

10.4 Peak Box

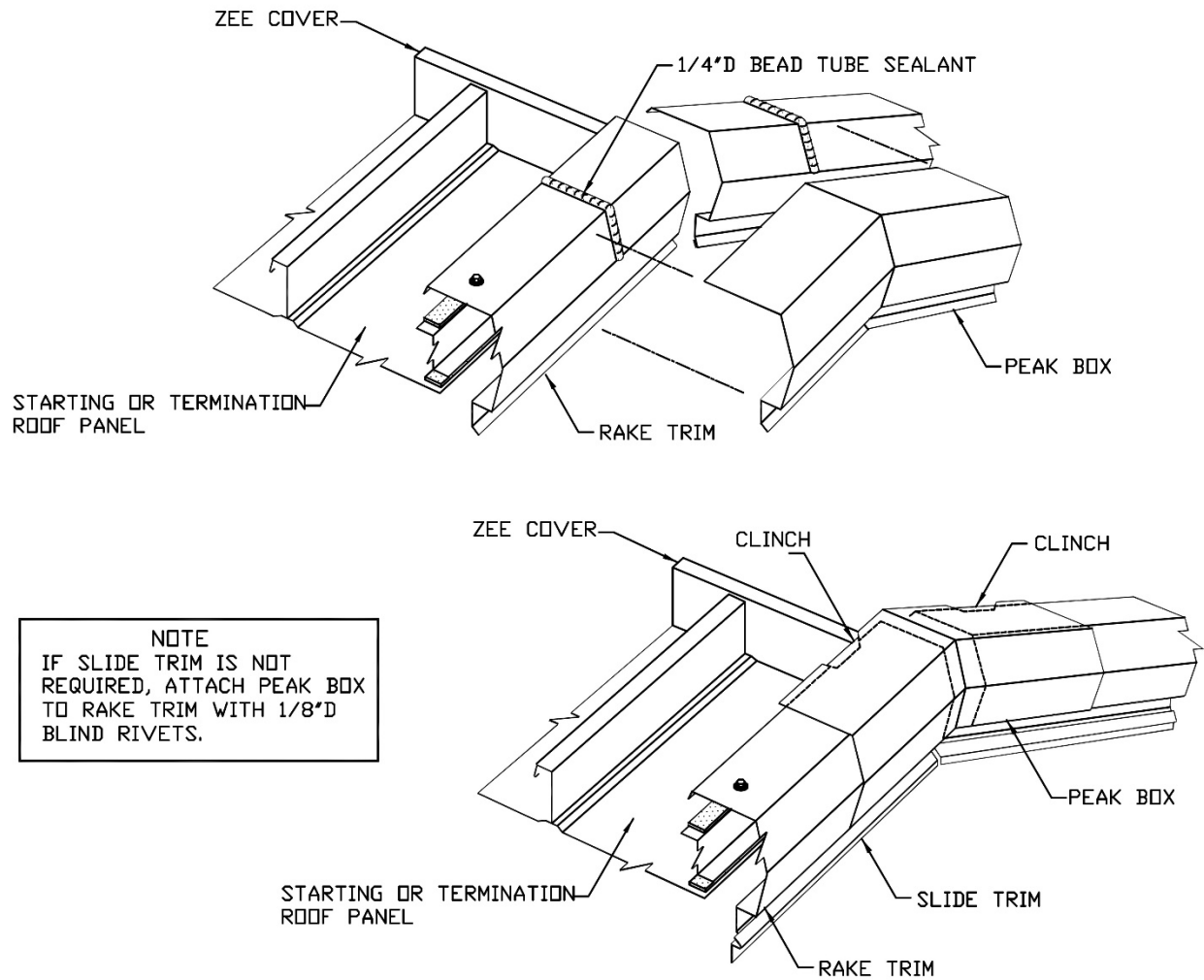


Figure 52 - Peak Box

If the rake trim does not require the slide trim for expansion/contraction, the peak box can be installed with tube sealant and rivets in the same manner as a splice.

Install peak box with tube sealant and rivets in the same manner as a splice on rake trim. Rivets should be installed at the peak box ends as shown.

Secure the bottom edge of the peak box with the rake slide flashing.

10.5 Rake Flashing Finishing

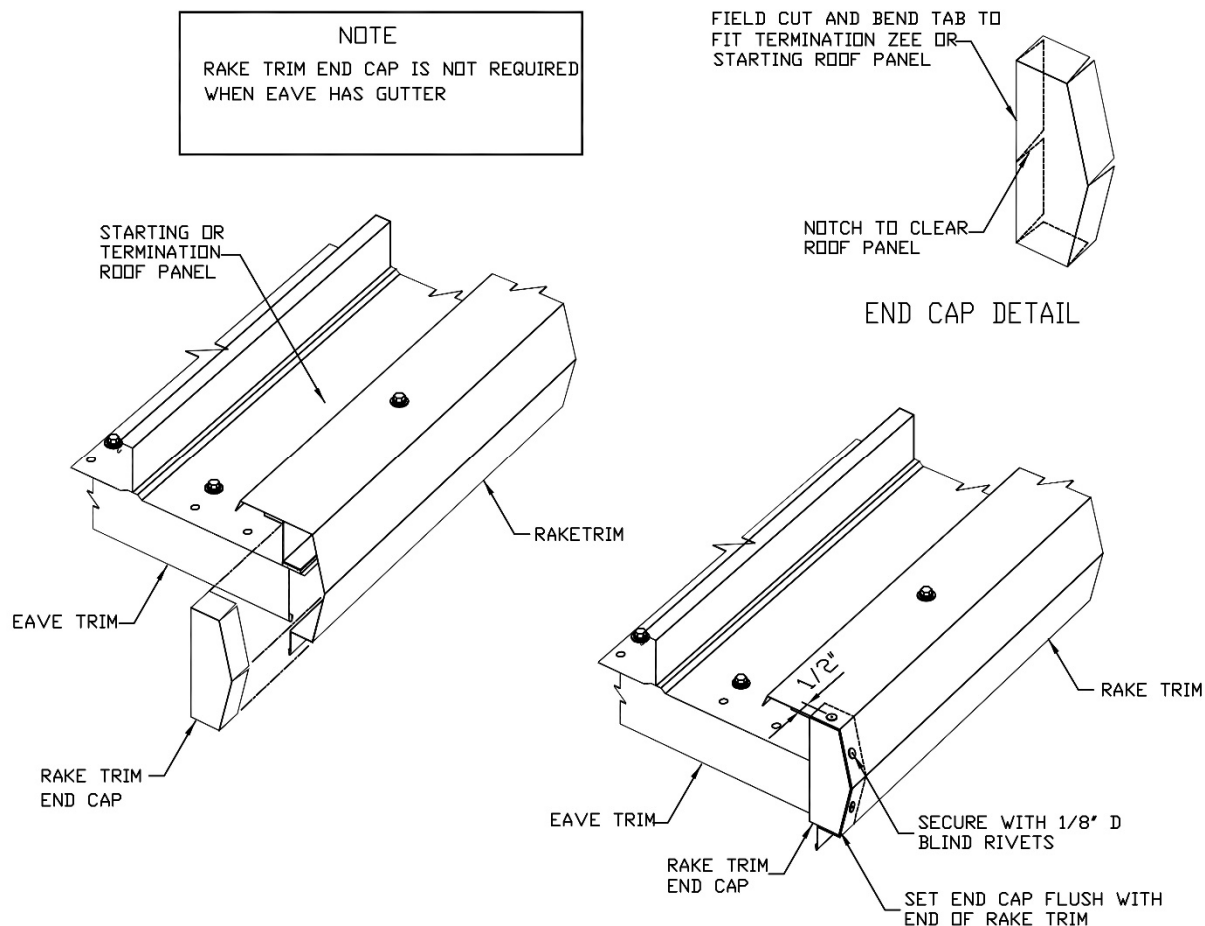


Figure 53 - Rake Flashing End Caps

The rake trim end cap is only required for roof applications without eave gutter. The end cap must be field cut and a tab bent to fit the auxiliary rake flashing as shown. Install the end cap with tube sealant and rivets in the same manner as a splice.

11 Ridge Flashing Installation

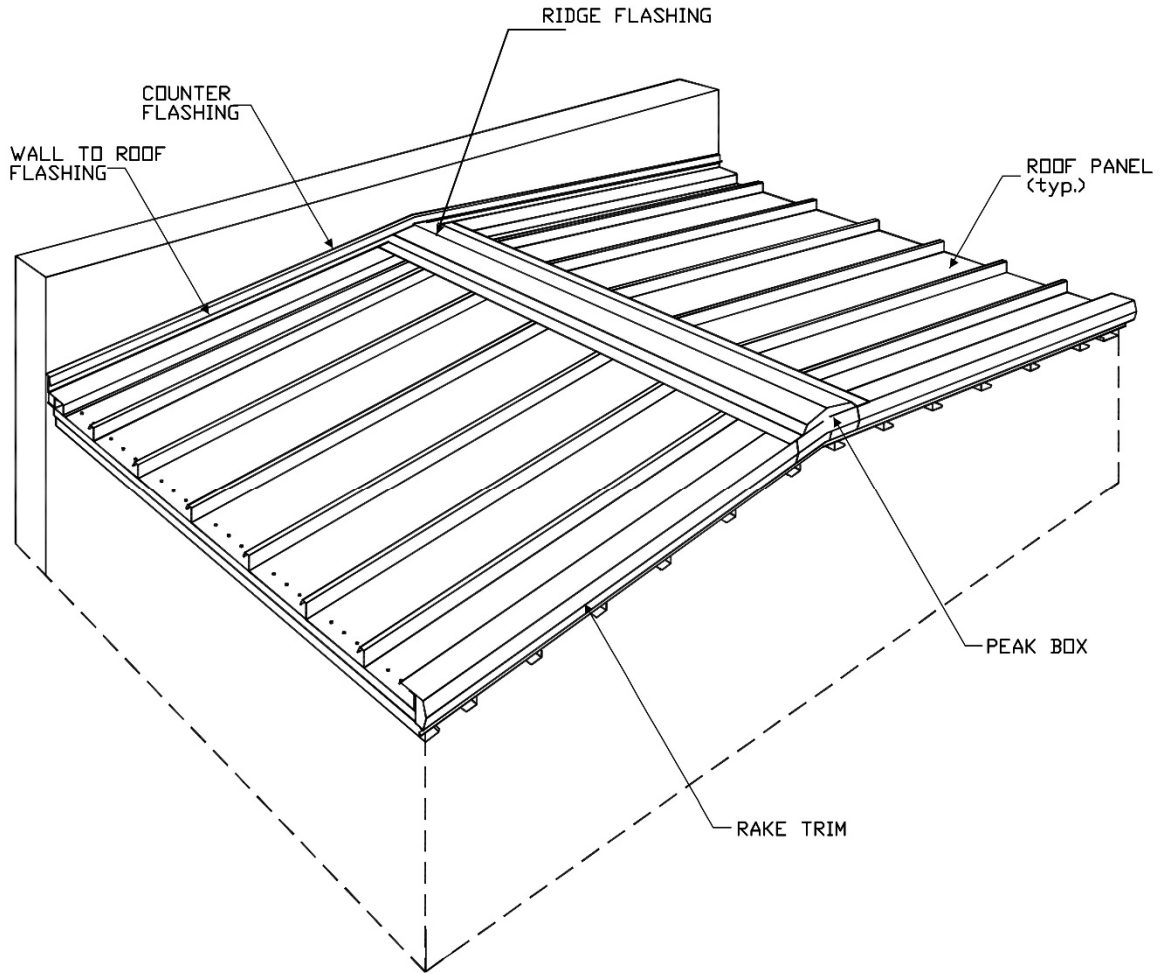


Figure 54 - Ridge Flashing Overview

The details in this section show the installation of the ridge flashing. The ridge flashing can start or finish at either a rake trim condition or a roof to wall condition.

11.1 End Cap Installation

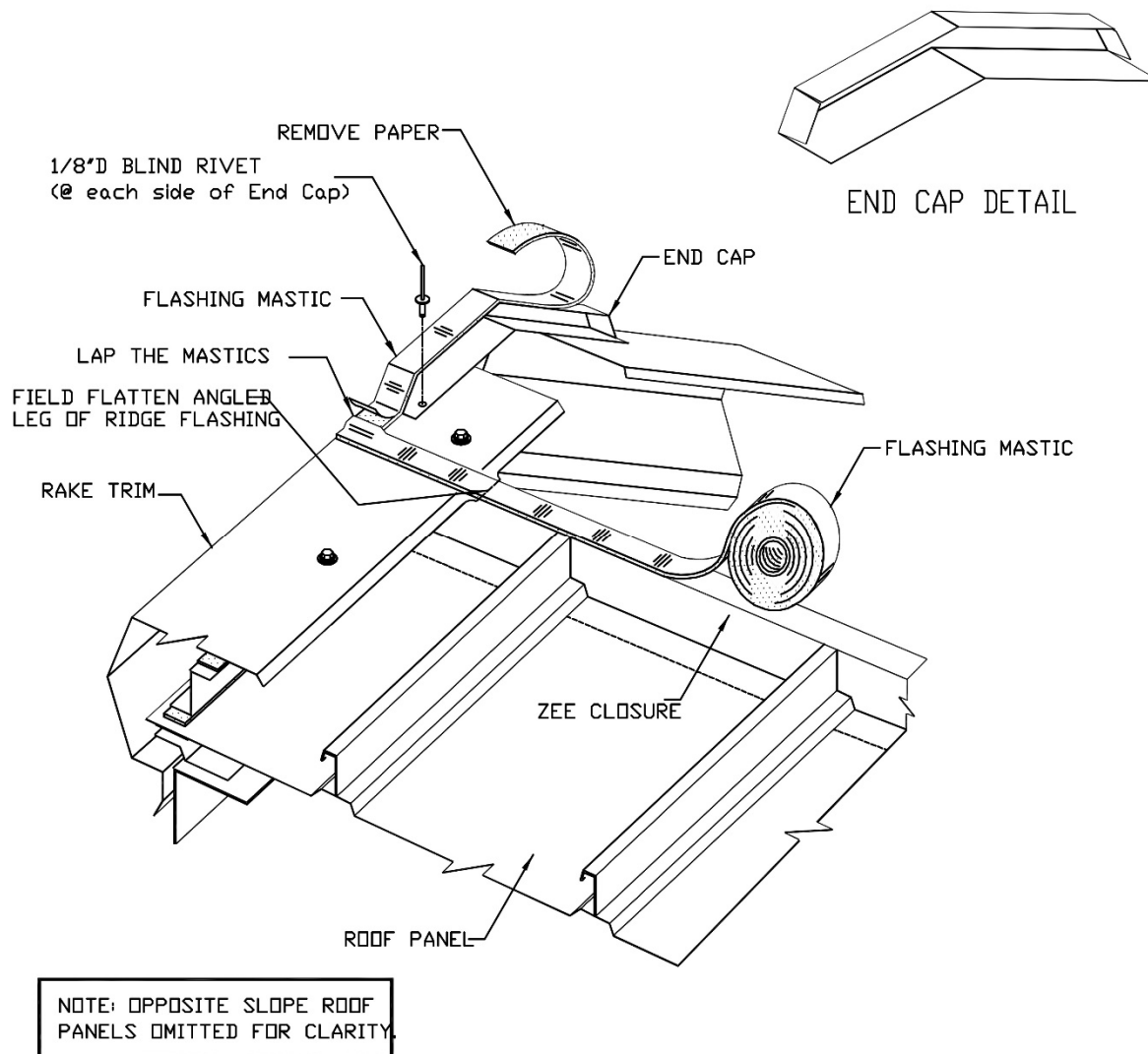


Figure 55 - End Cap Installation

Position the end cap so its face is flush with the face of the rake trim. Fasten the end cap to the rake trim with (2) blind rivets as shown in Figure 55. Install the flashing mastic on top of the end cap as shown. Align the edge of the mastic flush with the face of the end cap and extend the mastic to align with end dams.

Install flashing mastic continuous along the top flange of the end dams. Lap the end of the mastic over the end cap mastic.

Do not remove the tape mastics paper backing until immediately prior to ridge flashing installation.

11.2 Install Ridge Flashing

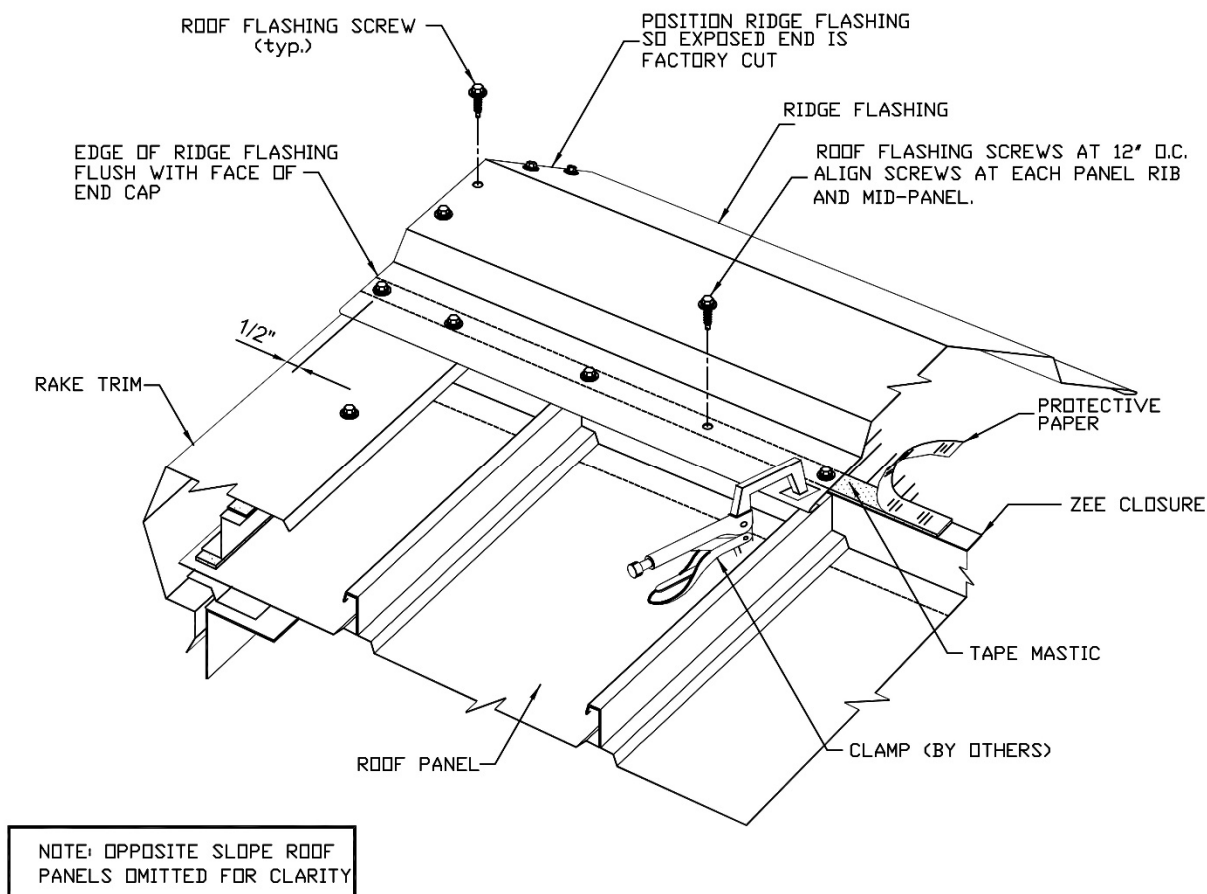


Figure 56 - Ridge Flashing Installation

Install the ridge flashing to span across the zee closures as shown in Figure 56. Position the end of the ridge flashing flush with the face of the end cap. Align the center of the ridge flashing over the ridge centerline. Use a string line to assure a straight ridge cover installation.

Fasten the ridge cover to the ridge zee closure with flashing screws spaced as shown in Figure 56. Check that the fasteners penetrate the center of the mastic and securely engage the termination zee closure.

Important

To provide watershed, the ridge flashing must have a positive pitch, even during roof panel contraction.

To increase the ridge cover's pitch, first fasten only one edge of the ridge flashing, then push on the opposite edge of the ridge flashing to deflect its center upward. Hold it in this position with clamps while fastening the other edge.

11.3 End Plate at End Wall Parapet

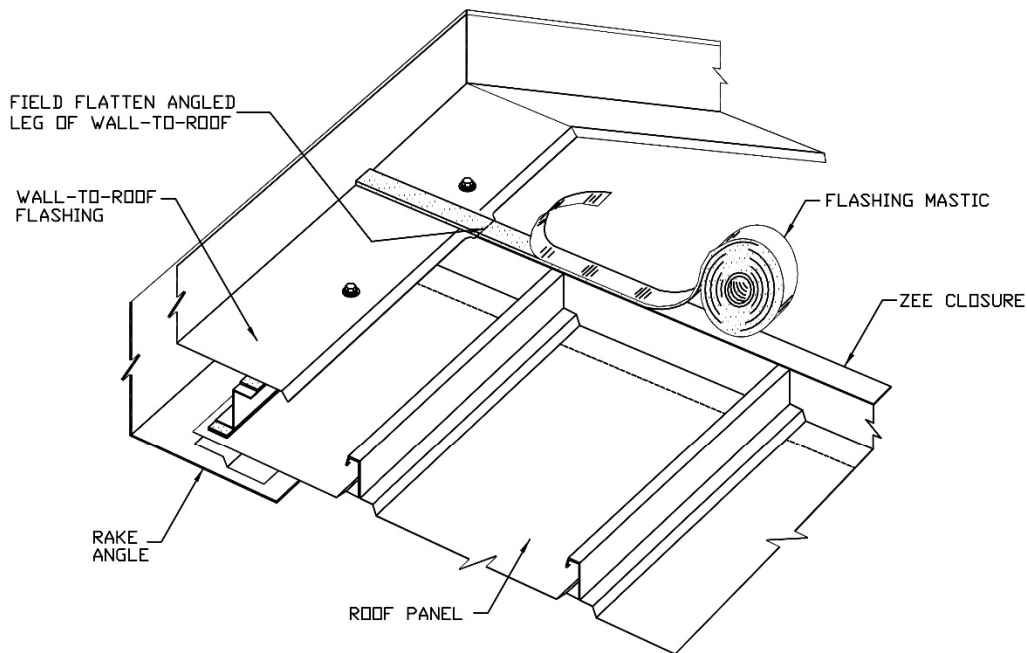


Figure 57 - End Plate at End Wall Parapet

Position the end plate so its face is flush with the face of the wall-to-roof flashing. Fasten the end plate to the wall-to-roof flashing with rivets as shown in Figure 57. Install flashing mastic on top of the end plate as shown.

Position the edge of the mastic flush against the face of the wall-to-roof flashing and extend the ends of the mastic to align with the ridge zee closure.

Install tube sealant continuously along the top flange of the end dam. Lap the end of the sealant over the end cap.

11.4 Ridge Flashing at End Wall Parapet

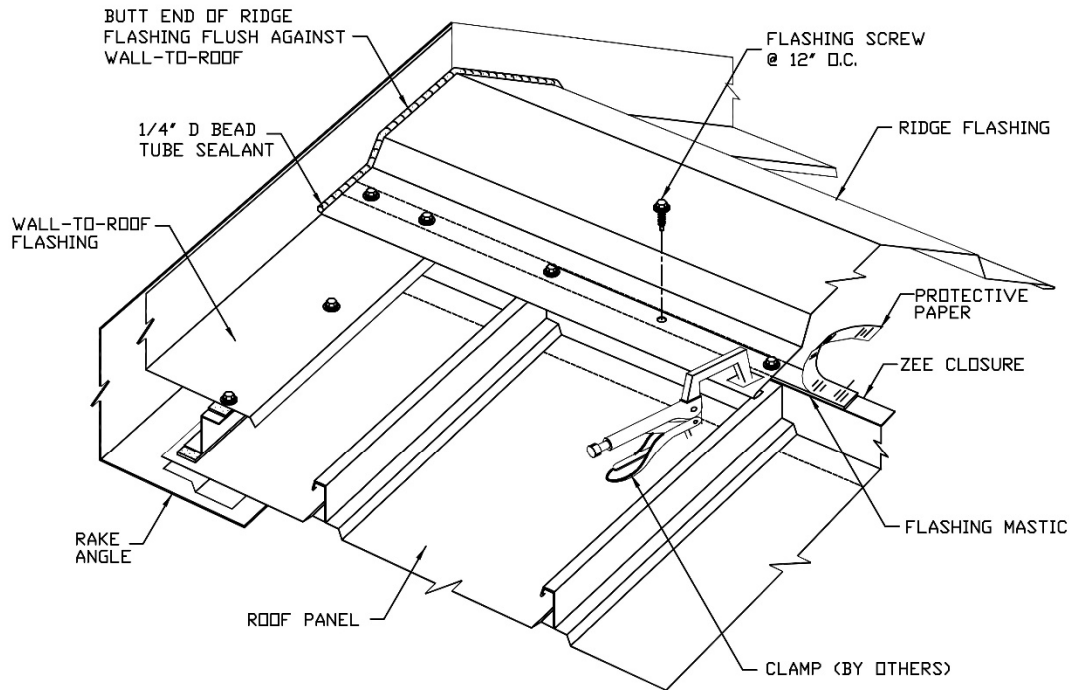


Figure 58 - Ridge Flashing at End Wall Parapet

Install the ridge flashing to span across the opposing zee cover flashing runs, as shown in Figure 58. Position the end of the ridge flashing flush against the face of the wall-to-roof flashing. Align the center of the ridge flashing over the ridge centerline. Use a string line to assure a straight ridge flashing installation.

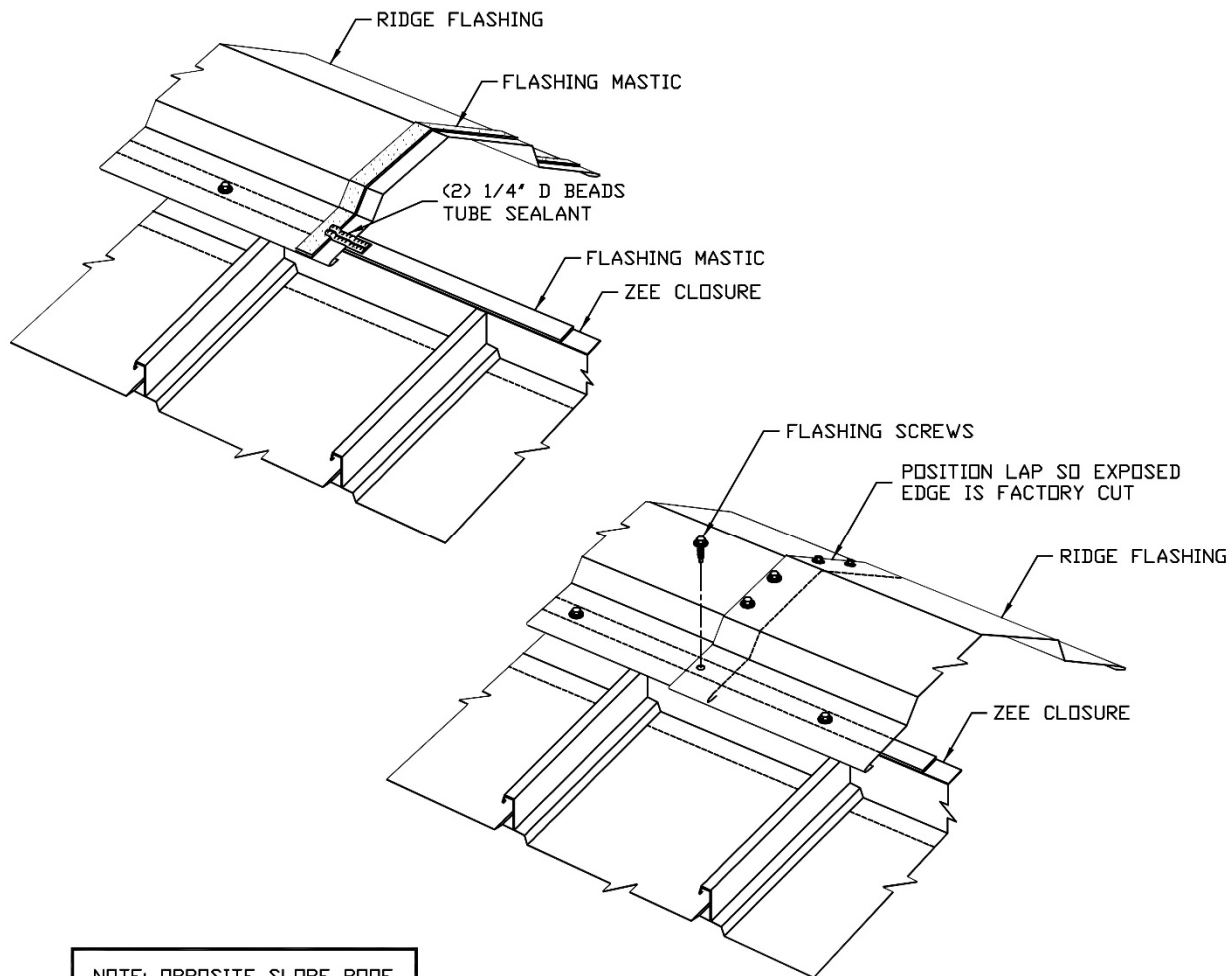
Fasten the ridge flashing to the zee closure. Ensure the fasteners penetrate the center of the tape mastic and securely engage the ridge closure zee.

Important

To provide watershed, the ridge flashing has to have a positive pitch, even during roof panel contraction.

To increase the ridge flashings pitch, first fasten only one edge of the ridge flashing, then push on the opposite edge of the ridge flashing to deflect its center upward, then hold it in this position with clamps while fastening the other edge.

11.5 Ridge Flashing Laps



NOTE: OPPOSITE SLOPE ROOF
PANELS OMITTED FOR CLARITY

Figure 59 - Ridge Flashing Laps

Assemble the ridge flashing splices with tape mastic and lap fasteners, as shown in Figure 59.

Important

The splice fasteners must be installed carefully to avoid downward deflection and buckling of the ridge flashing ends.

12 Hip and Valley Details

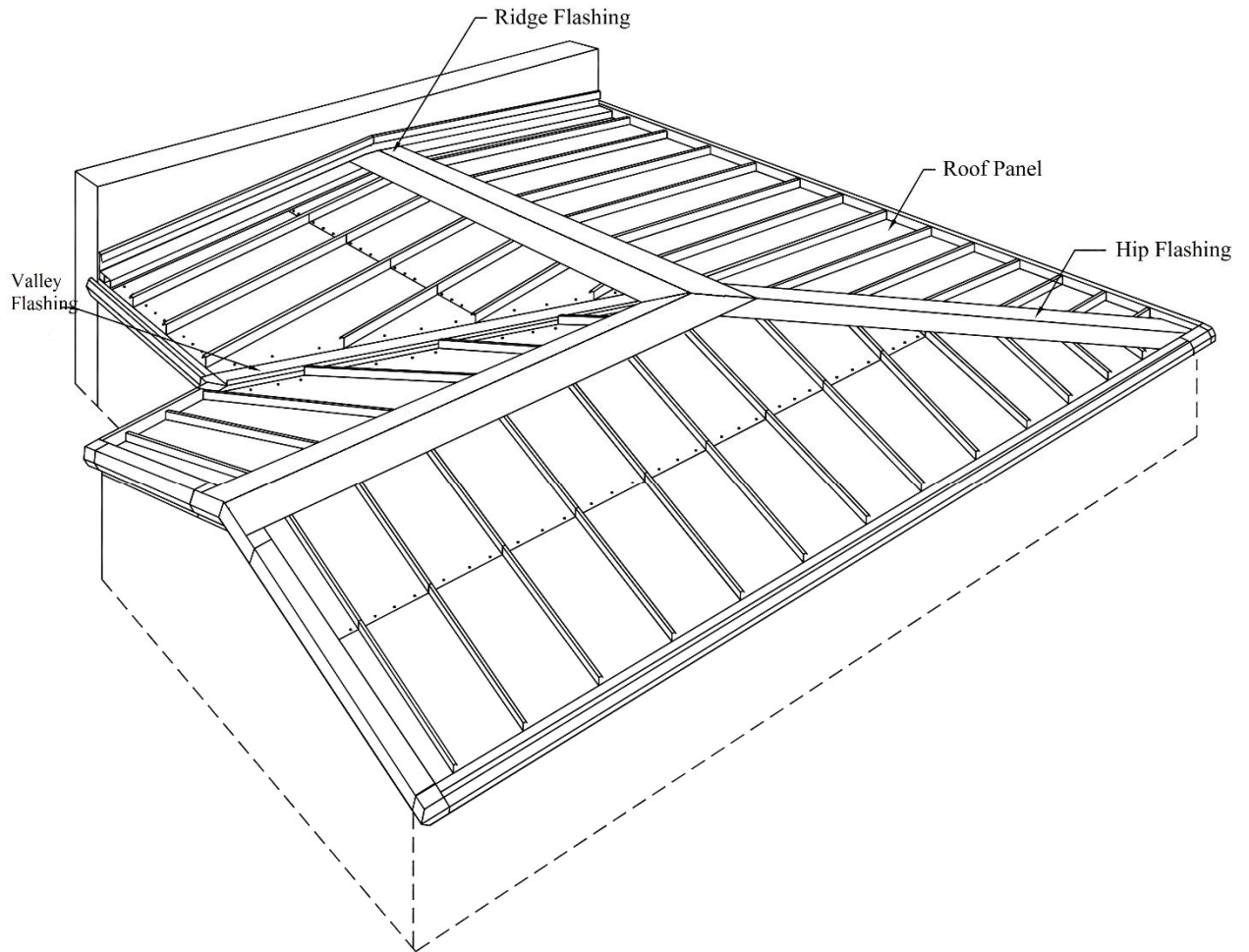


Figure 60 - Hip/Valley Overview

The details in this section show the installation of the hip and valley flashing.

12.1 Hip Detail

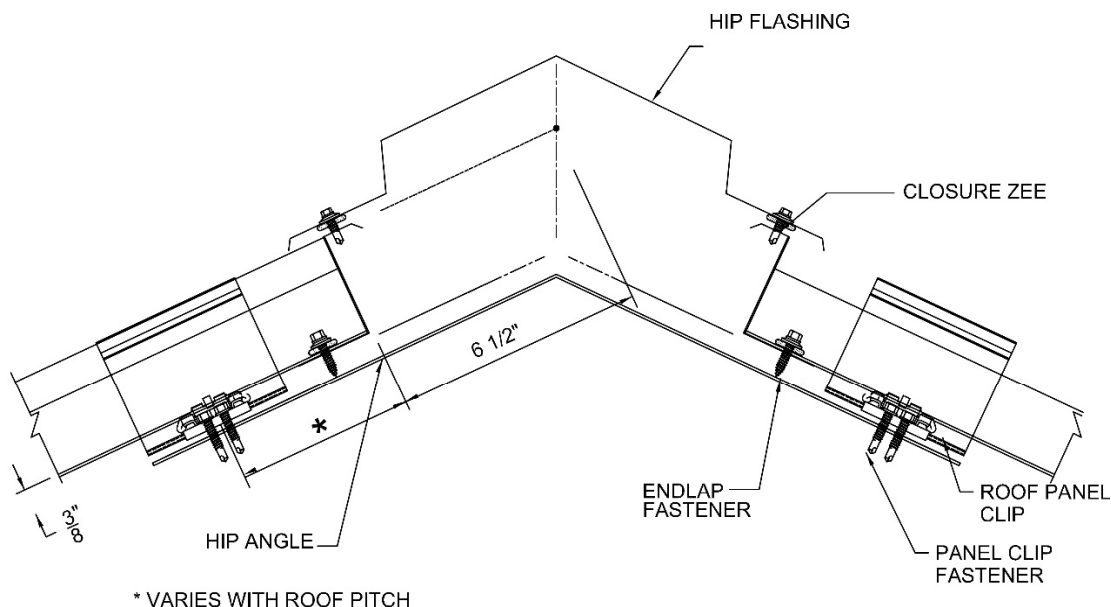


Figure 61 - Hip Detail

Install the hip angle to the hip purlins with the panel clip screws at each purlin. The installation of the hip flashing is similar to the ridge flashing details in *Section 11 - Ridge Flashing Installation*.

12.2 Valley Detail

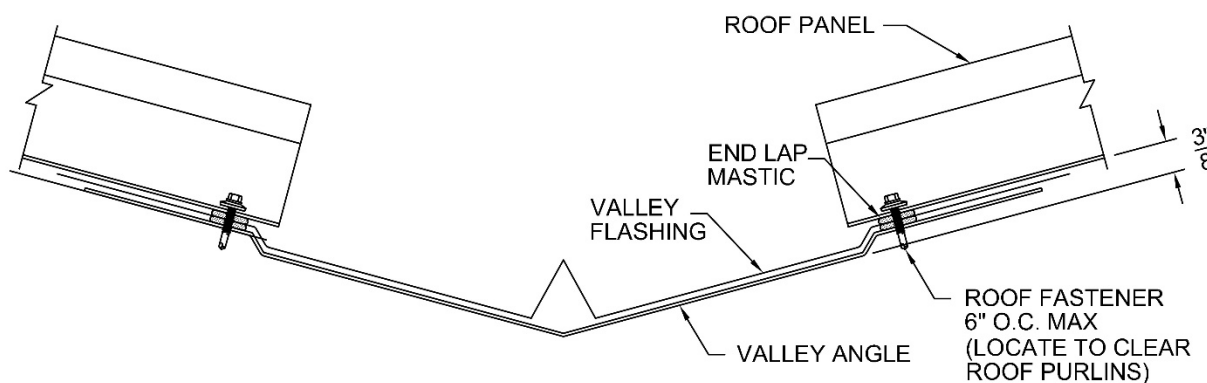


Figure 62 - Valley Flashing Detail

Before installing insulation, install the valley plate with clip fasteners at every valley purlin location. Field cut and install roof panel to valley angle. Wipe clean and apply tape mastic continuous along the top flange of the valley flashing. Secure roof panel to valley angle with fasteners as shown in Figure 62. Do not remove paper backing until immediately prior to installing ridge flashing.