Standing Seam Mechanical Lock Panels Installation Guide

(1”, 1.5”, 2”)

VIRGINIA METAL SYSTEMS

7929 Midlothian Turnpike
Richmond, Virginia
804.622.2900
www.vametals.com

The application and detail drawings depicted herein are strictly for illustration purposes only and may not be applicable to all environmental conditions, building code. requirements, building designs or changes. It is the responsibility of the building owner, contractor, installer and design professional to determine and verify the suitability of this product(s) for the job, as well as applicable regulations, building codes, and accepted industry practices for installation. Consult with all authorities having jurisdiction and adapt recommendations enclosed herein to meet those requirements. When local or controlling codes, or insurance requirements conflict with these recommendations, the metal panel supplier should be consulted.

All instructions in this guide assume that a qualified firm or individual has been contracted to install the product(s) described herein. Failure to comply with these recommendations may limit or void any applicable warranties provided by your supplier. Always consult your specific product warranties to understand your responsibilities and contact your panel supplier if you have questions.

The details shown herein are proven methods of construction. However, a weathertight roof is the responsibility of the installer. Virginia Metal Systems shall be held harmless from any and all claims resulting from a lack of watertightness as a result of following these suggested typical detail drawings. Descriptions of products and specifications contained herein were in effect at the time this publication was approved for printing and subject to change at any time. Virginia Metal Systems reserves the right to make, and shall be held harmless from claims resulting from changes to product design and/or specifications, or the discontinuation of products at any time. To ensure you have the latest information available, contact your metal panel supplier. For complete performance specifications, product limitations, and disclaimers, please consult the metal and finish warranties for your specific product(s). For a description of warranties that may be available, contact a Virginia Metal Systems representative.

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VIRGINIA METAL SYSTEMS

ML100 — 1" Mechanical Lock Panel

PRODUCT DESCRIPTION

- Classic Low Profile Architectural Standing Seam Metal Roofing System
- Ideal for residential and light commercial applications
- Specially designed clip allows thermal movement
- Tested panel for rated assemblies achieves higher performance levels
- Mechanical locked seam for weather tight performance
- Excellent for roofing installation requiring exotic metals such as copper and terne

1" Mechanical Lock Panel; max width 17.25"; Double Lock 180 Degree Seam fastened with (2) #10-12 x 1" long No. 2 Phillips drive pancake head, wood screws; One Part Clip Assembly ML100R Clip fastening metal to panel to min. 15/32" plywood decking; maximum 24" clip spacing; Panel Rollformer: Schlebach Quadro-Plus Rollformer; Maximum Allowable Roof Uplift Pressure (steel): -71.0 psf Main Field @ 24" Clip Spacing; Perimeter and Corner Pressure -138.5 psf @ 6" Clip Spacing; Oil Canning is a characteristic of light gauge architectural metals and is not a flaw and therefore is not a cause for rejection.

On-site fabrication available

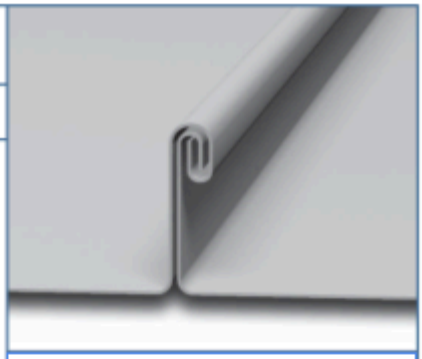
DESIGN INFORMATION

- Minimum Slope = 3":12"
- Actual Panel Width: 17.25" from 20" Coil
- Solid Substrate
- Structural, Hydrostatic Panel
- Mechanically Seamed in Field
- 24 and 26 Gauge Galvalume®
- .032" Aluminum
- 16oz Copper
- 30 Year Finish Warranty on Kynar 500 Finish
- Underlayment Required

TEST REPORT SUMMARY

- Miami Dade Building Code Compliance Approved
- Florida Building Code 2020
- Chapter 15: Roof Assemblies
- Section 1504.3.2; 1505.3; 1507.4
- Chapter 16: Structural Design
- Chapter 22: Steel; Section 2209 Cold Form Steel
- Chapter 23: Wood
- Testing per TAS 125-03 Std. Requirements for Metal Roof Systems
- Test Assembly #6 by Underwriters Laboratory for:
  a) UL 580-94, per FBC, Uplift Resistance of Roof Assemblies
  b) UL 1897-98, per FBC, Uplift Tests for Roof Covering Systems
- Testing per TAS 100 Wind Driven Rain Test
- FPA #9860.3 – HVHZ – .032" Aluminum
- FPA #9860.4 – HVHZ – 24ga

ML150 | 1 1/2" Mechanical Lock Panel



PRODUCT DESCRIPTION

- Classic Architectural Standing Seam Metal Roofing System
- Ideal for residential and light commercial applications
- Specially designed clip allows thermal movement
- Tested panel for rated assemblies achieves high performance levels
- Mechanical locked seam for long-term weather tight performance
- Excellent for roofing installation requiring exotic metals such as copper and terne

1-1/2" Mechanical Lock Panel; max width 16.3"; Double Lock 180 Degree Seam fastened with (2) #10-12 x 1" long No. 2 Phillips drive pancake head, wood screws; Floating Clip Assembly ML150R Clip fastening metal to panel to min. 15/32" plywood decking; maximum 24" clip spacing; Panel Rollformer: Schlebach Quadro-Plus Rollformer; Maximum Allowable Roof Uplift Pressure (steel): -59.75 psf Main Field @ 24" Clip Spacing; Perimeter and Corner Pressure -123.5 psf @ 6" Clip Spacing; Oil Canning is a characteristic of light gauge architectural metals and is not a flaw and therefore is not a cause for rejection.

On-site fabrication available.

DESIGN INFORMATION

- Minimum Slope = 1-1/2":12"
- Actual Panel Width: 16.3" from 20" Coil
- Solid Substrate Required
- Architectural, Hydrokinetic Panel
- Mechanically Seamed in the Field
- 24 and 26 Gauge Galvalume®
- .032" Aluminum
- 16oz Copper
- 30 Year Finish Warranty on Kynar 500 Finish
- Weather Tight Warranty Available
- Underlayment Required

TEST REPORT SUMMARY

- Florida Building Code 2020
- Chapter 15: Roof Assemblies
- Section 1504.3.2; 1505.3; 1507.4
- Chapter 16: Structural Design
- Chapter 22: Steel; Section 2209 Cold Form Steel
- Chapter 23: Wood
- Testing per TAS 125-03 Std. Requirements for Metal Roof Systems
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  a) UL 580-94, per FBC, Uplift Resistance of Roof Assemblies
  b) UL 1897-98, per FBC, Uplift Tests for Roof Covering Systems
- Testing per TAS 100 Wind Driven Rain Test
- FPA #9860.5 – HVHZ – 24ga
- FPA #15636.1 – HVHZ – .032" Aluminum

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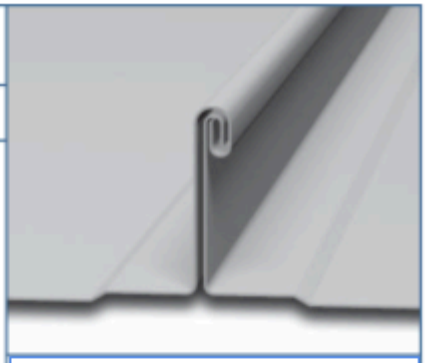
ML200 — 2" Mechanical Lock Panel



PRODUCT DESCRIPTION

- Structural Standing Seam Metal Roofing System
- Commercial profile for multiple deck and slope applications
- Combines optimum performance with excellent value
- Specially designed clip allows thermal movement
- Tested panel for rated assemblies achieves higher performance levels
- Mechanical locked seam for long-term weather tight performance

2" Mechanical Lock Panel; max width 18.75"; Double Lock 180 Degree Seam fastened with (2) #12/14 Quadrex drive pancake head, Self Tapping screws; Floating Clip Assembly ML150R Clip fastening metal to panel through Dens Deck Sheathing & Insulation to underlying Steel Decking or over open framing; maximum 24" clip spacing; Panel Rollformer: Schlebach Quadro-Plus Rollformer; Oil Canning is a characteristic of light gauge architectural metals and is not a flaw and therefore is not a cause for rejection.

On-site fabrication available

DESIGN INFORMATION

- Minimum Slope = 1/2":12"
- Actual Panel Width: 18.75" from 24" Coil
- Solid Substrate or Open Framing (max. 5' OC)
- Structural, Hydrostatic Panel
- Mechanically Seamed in the Field
- 24 and 26 Gauge Galvalume®
- .032" Aluminum
- 16oz Copper
- 30 Year Finish Warranty on Kynar 500 Finish
- Weather Tight Warranty Available
- Underlayment Required with Solid Substrate

TEST REPORT SUMMARY

- Miami Dade Building Code Compliance Approved
- Florida Building Code 2020
- Chapter 15: Roof Assemblies
- Section 1504.3.2; 1505.3; 1507.4
- Chapter 16: Structural Design
- Chapter 22: Steel; Section 2209 Cold Form Steel
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- Testing per TAS 125-03 Std. Requirements for Metal Roof Systems
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  b) UL 1897-98, per FBC, Uplift Tests for Roof Covering Systems
- Testing per TAS 100 Wind Driven Rain Test
- FPA #9864.1 – Non HVHZ – 24ga
- FPA #9860.1 – HVHZ – 24ga
- FPA #9860.2 – HVHZ – Aluminum

Safety

It is the installer's responsibility to study and ensure compliance with all applicable OSHA and other safety requirements before starting any project, including but not limited to, record keeping, fall protection, ladder safety, electrical and hand tools, and personal protective garments and equipment. It is recommended when working with metal panels to wear heavy gloves and long sleeves to avoid cuts from sharp edges. When power cutting or drilling metal panels, always wear safety glasses to prevent eye injury from flying debris. Use extreme caution when walking on a metal roof. Metal panels may become slippery, so always wear shoes with non-slip soles and avoid working on metal roofs during wet conditions. Do not walk on a metal roof which does not have a solid deck beneath it and avoid walking on seams. Safety railing, netting, harnesses, and safety lines should be provided and used by all crewmembers working on the roof.

Material Receiving and Delivery

Whether your metal panels will be roll-formed at the jobsite or prefabricated, bundled and delivered will depend on the terms of your order and agreement with your supplier. It is generally the contractor's responsibility to unload delivered material and inspect for shortages or damages at the time of delivery. Similarly, contractors that pick up their orders in lieu of delivery accept responsibility for verifying and securing material for transport before leaving. It is recommended that contractors have sufficient personnel present at time of delivery to facilitate receiving, inspecting, reporting shortages and/or damages, staging and storing of the roofing panels, trim and other delivered products. Notify your supplier of shortages, damages or discrepancies in accordance with the terms of your order. For additional information about material and delivery of metal panels, consult with your metal panel supplier

Storage

It is the contractor's responsibility to store panels properly. Materials should be installed soon after delivery, preferably beginning the following day. It is recommended that all material be stored in a dry area protected from the elements on the jobsite. If material must be stored outside, proper precautions must be taken to protect the material from damage and trapping moisture beneath, on top of, and between panels to avoid water stains or white rust. Panels must be stored at an angle to promote drainage of water off the bundle. Sufficient support must be provided to the raised and angled bundles to avoid excessive bowing, which may result in puddling of water. Bundles must be completely sheltered with a loose-fitting waterproof tarp to protect them during rain, while also allowing for air circulation and drying of condensed water. Plastic is not recommended since it may cause sweating and condensation.

In addition to water there are other important factors that contribute to the corrosion of stored panels including temperature and exposure time. Given enough time, panels will eventually become wet and storage corrosion may occur under most job site conditions. Even in a well-protected bundle the natural temperature and humidity variations will cause water to condense on and between panels. Shipping the bundle from a cold area to a warm area will cause water to condense not only on the bundle but also between the panels.

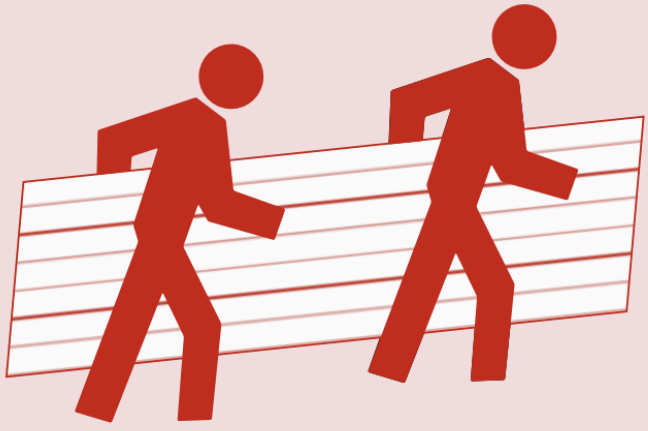
Handling of Metal Panels

General Handling: Each bundle should be handled with care to avoid product damage. Proper care should be used to prevent bending panels or scratching the finish. Clean protective gloves should be worn when handling metal panels to protect the finish and avoid injury from cuts.

To prevent panel damage, follow these steps for unloading and handling bundle:

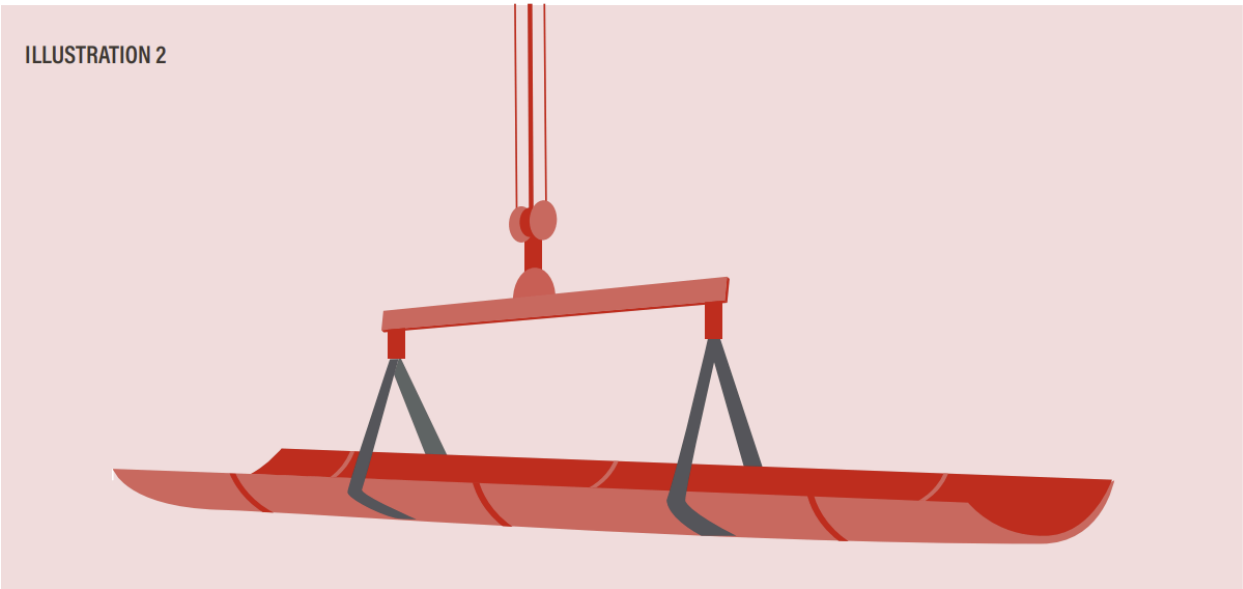
1. Bundle should remain banded and intact during any handling and remain banded until the panels are ready to be installed.
2. Never lift bundle by its banding. Do not lift with ropes or wires. Always lift bundle as close as possible to its center of gravity.
3. Never lift a panel by its ends. Carry a panel by its longitudinal edge and in a vertical (not flat) position. For panels over 10 ft., two or more people should lift and carry the panel from the same edge. (See illustration 1.)
4. Once a bundle is opened, individual panels must be handled with care to prevent panel buckling or finish damage. Never slide a panel over another panel when removing it from the bundle. A panel should be lifted up from the bundle in order to minimize the possibility of damaging the finish.

ILLUSTRATION 1



• **Mechanical Handling**

When lifting by crane, use a spreader bar of appropriate length with nylon band slings. (See illustration 2.) Do not use cable slings as they may damage panels. A panel bundle of manageable length may be lifted by forklift. Set forklift forks to their maximum spacing apart and center the load on the forks to prevent panel damage.



• **Protective Film**:

If your metal panels come with protective film, the film must be removed promptly before panels are exposed to direct sunlight and/or high temperatures. After exposure to heat or sunlight, this film cannot be removed. Never leave protective film on panels after installation. Metal supplier and metal fabricator cannot be held liable for damage to metal panels caused by improper storage or failure to remove protective film.

• **Touch-Up Paint**:

Painted panels, trim and flashings are made with a factory-applied heat-cured finish. During handling and installation, a panel may become slightly scratched or nicked. Your supplier may offer touch-up paint in matching colors. It is recommended that contractors order matching touch-up paint at the time of original metal panel order for best matching.

Limit application of touch-up paint to the exact area in need of repair with as little paint as necessary. Do not paint over panel finish with brushes that are too large for the affected area. Consider use of small artist's brush or cotton swab for improved application control. While aerosol touch-up paint may be available, its use can cause significant overspray and is not as durable. Note that touch-up paint does not have the superior chalk and fade

resistance of a factory-applied finish and will likely discolor at an accelerated rate. Due to the limitations and formulation of field-applied touch-up paint, no warranties apply to its use.

Important Information for Architect, Engineer, Contractor & Installer

It is the responsibility of the designer/engineer to ensure that the following details are adapted to meet the conditions encountered within any particular building design when using the products and specifications described herein, including governing product approvals and building codes. Contact your supplier if local, controlling codes or insurance requirements conflict with the recommendations in this guide. Please familiarize yourself with all instructions before starting the metal panel installation.

• **Ordering and Measuring for Metal Panels:** Material estimates can typically be created from satellite imagery, blueprints/drawings, or a sketch with dimensions. For specific information on estimating materials or other information needed to place an order for your specific project, contact your metal panel supplier.

Accurate Field Measurements= Quality Installation Measure > Verify Cut Sheets > Check Accuracy > Release to Production

It is always recommended that panel lengths, quantities, profiles and dimensions of flashings are verified through field measurements and checked for accuracy against cut sheets or other documents prior to approving your metal panel order for production.

Roof Deck: It is the responsibility of the contractor/installer to ensure that the roof deck is properly prepared and meets all applicable code requirements prior to panel installation. The deck should be examined to ensure that all supporting members are straight, level and plumb to prevent any panel distortion. Potential problems should be reported in writing to the general contractor, architect, or owner and work to install metal panels should not begin until all unsatisfactory conditions have been corrected. In general, the appearance of installed metal panels will follow the form of the roof deck. The surface should be smooth, straight, and free of humps and depressions. Any surface imperfections will be transferred through the roof panel and likely visible after the roof is installed. Check for and correct uneven decking, ridges in underlayment and other protruding areas. A solid deck should also be swept clean and be free of any fasteners, litter, or debris. Panel distortions caused by improper handling, ridges in underlayment, uneven decking, construction debris, etc. are not cause for rejection of metal panels.

• **Delivery and Receiving:** Refer to the Product Safety and Handling section on pages 5-7 of this guide for important information about delivery, receiving and handling of metal panels.

• **Before Start of Installation:** When starting metal panel installation, ensure panels are held true, plumb and straight. Panel widths are typically nominal, and it is recommended that periodic measurements be taken to ensure horizontal spacing is not gaining or losing width.

• **Field Cutting:** Some field cutting and fitting of metal panels and trims, as well as minor field corrections are a part of normal installation work and should be planned for. Virginia Metal Systems recommends the use of tin snips or a “nibbler” type electric tool for field cutting panels. Circular saws, torches, and plasma cutters should not be used. All metal shavings and/or filings must be removed from panels and flashing each day to avoid rusting metal surfaces which could shorten metal roof life and void any applicable warranties. Always do a final check for any filings at the end of the project to ensure removal.

• **Dissimilar Metals:** When using dissimilar metals and/or pressure-treated wood, a separation barrier must be used to prevent contact between them to avoid corrosion. Fasteners installed into pressure treated lumber should be tested and approved for use. Approved fasteners are Series 300 stainless steel, hot-dipped galvanized, or fasteners coated with an approved coating capable of resisting the corrosive effects of pressure-treated lumber.

• **Clips/Fasteners**: Proper fastener installation is critical to ensure the performance of a metal roof. Fasteners, clips and spacing patterns should follow recommendations in this guide, applicable product approvals and building codes governed by the jurisdiction of the project. Over or under-tightening of fasteners can reduce performance or result in a wavy panel. Metal shavings or fragments resulting from fastener installation should be completely removed from panels daily to avoid rusting.

• **Sealants:** Sealant used in joints, flashings and seams shall be the sealant used in testing, details of which can be found in the applicable product approval. Sealant should be field applied on clean, dry surfaces without any skips or voids in the bead.

• **Trims,** Closures and Accessories:For trims, closures and accessories shown on installation detail drawings herein, contact your metal panel supplier.

Important Information About Oil Canning

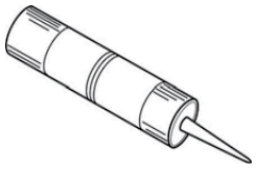
Oil canning can be described as the amount of waviness found in the flat area of metal panels. Oil canning ***is an inherent characteristic*** *of light-gauge, cold-formed metal products, does not affect the integrity of the panel, and is not a cause for rejection. Designers may consider narrower panel widths, heavier gauge metal, and the use of stiffening ribs or striations as potential means to minimize oil canning. Installers should take care to use proper torque when installing fasteners to reduce waviness as well.*

Ways to compensate for excessive oil canning.

- *Deck- it is paramount to make sure that the roof deck is as flat and straight as possible. Problems in the deck will show through to the panels. Alert the General Contractor or site supervisor before installing any panels.*
- *Backer Rod- Installing backer rod under the panels will give them a slight bow to allow for expansion and contraction*
- *Stiffening Ribs- Pencil ribs, Planks, or Straitions may be added to the panel AS THEY ARE BEING RUN. This helps stiffen the panel.*
- *Clip Tension- take care to make sure that the clips are not tight on the panel and not pinching them down.*

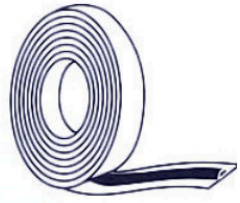
Common Accessories for Standing Seam

TUBE SEALANT



- Bostik ChemCalk 915 ❑
- Geocell 2320 ❑
- TiteBond WeatherMaster Polymer ❑

TAPE SEALANT



- Butyl Tape ❑
- Peel & Seal Tape ❑

INSULATION

- Single Bubble ❑
- Double Bubble ❑
- MaxTight Air Barrier System ❑
- Opti-Liner High R Banded Liner ❑

RIDGE VENT

- ProfileVent ❑
- Razorback Universal ❑

HEMMING TOOL

- Drip Edge Hemming ❑
- Single Handle Hemming ❑
- 7" Turn-Up ❑
- Wide Handle Hemming ❑

HAND CRIMPER

- 90 Degree ❑
- 180 Degree ❑
- Modulation Clamp ❑
- Offset ❑

METAL SNIPS

- Straight L/R ❑
- Offset L/R ❑
- Aluminum Tinner's Snips ❑
- TurboShear HD Drill Attachment ❑

PENETRATIONS

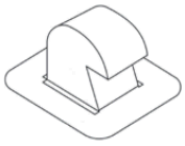
- Pipe Boot ❑

- Retro-fit Boot ❑

VENTS

Attic Breeze

- 20w ❑
- 30w ❑
- 40w ❑



Gooseneck Vent

	Alum	Steel
4"	❑	❑
6"	❑	❑
10"	❑	❑

FASTENERS

- #10 Pancake Wood Screw ❑

- #10 Pancake Self-Driller ❑

- #14 Pancake Self-Driller ❑

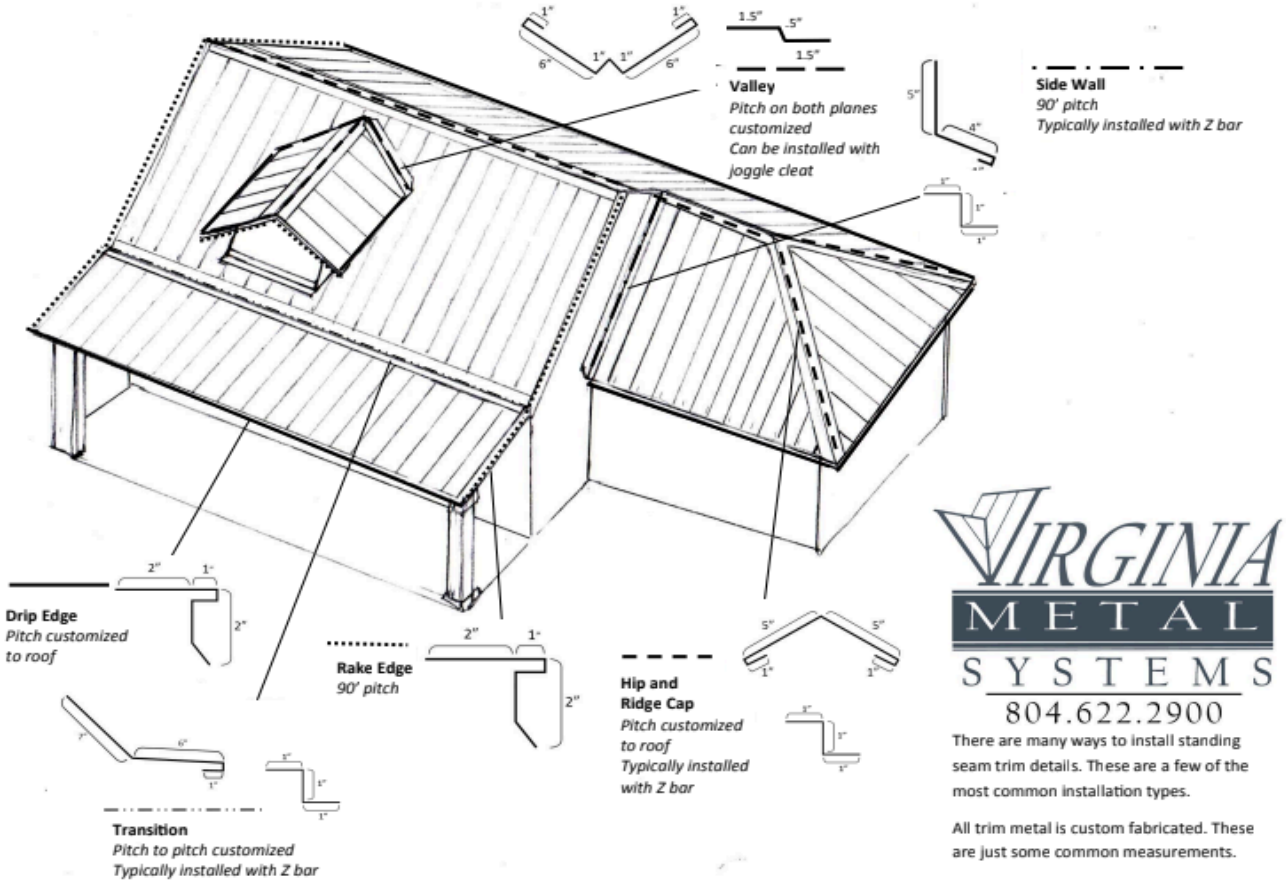
- #14 HWH Self-Driller ❑

- 1/4x3/4" HWH Self-Driller Stitch ❑

- SS Pop Rivet ❑

Accessories

Item	Size	Use	Spacing
Screws	250 per bag, 1.25” pancake head	Attaching trim metals and clips	2 per clip.1.5’ for trim metal.
Clips	Based on panel size	Attaching panels to deck	Clips should be installed every 1.5’
Butyl Tape	50’	With Z bar or joggle cleat to prevent water from entering	Full length of Z bar or joggle
Caulk	16 oz tube	As trim fits together	@ 1 tube per 2 squares on average
Poprivets	250 per bag	Connecting corners	
Rubber Pipe Boots		Venting	



Cleaning, Maintenance, and Repairs

Metal panel roofing is designed to provide trouble-free performance for years, with little service required. However, damage can occur from the build-up of debris as well as storm-related damage like hail stones and falling branches. The following maintenance guidelines consist primarily of preventing and correcting these issues. Contractors and installers should familiarize themselves with this information and ensure that building owners understand the minimum maintenance recommended to prolong the beauty and protective properties of their metal roof.

Routine Maintenance

Routine visual inspection helps to identify potential problems. This can easily be done by simply walking around the building to look for accumulated debris or possible damage. It is recommended that the building owner do this at least twice a year. After a major weather event is another good time to inspect the roof to identify potential problem areas. **Caution: The use of binoculars is recommended so inspection can be done from the ground. If assessing damage from the ground is not possible, building owners should strongly consider hiring a professional trained in the safety precautions and proper maintenance of metal roofing.**

Additional steps building owners can take to prolong the life of their metal roof include:

- Eliminate any conditions that are causing water to pond and accumulate on roof panels.
- Keep an eye out for leaves, branches and other debris piled up on the roof, especially around valleys and protrusions such as vent pipes, skylights, etc.
- Keep gutters and downspouts maintained and clear of debris.
- Remove vegetation that may contact metal panels, including trees, branches or leaves, weeds, ivy, etc.
- Clean off dirt, mildew, stains, and other elements.• Promptly address scratches that appear to have penetrated the protective finish to the metal substrate.
- When in doubt, building owners should contact a professional trained in the inspection, maintenance, repair and safety of metal roofing for their maintenance and cleaning needs.

A metal roof should be professionally inspected every four to five years. In coastal or humid areas like Florida that are more prone to corrosion and rust, professional inspections should be done more frequently to prevent any rust that might have started from spreading and causing structural damage to the metal panels. Refer to all finish and material

warranties issued by your supplier for important maintenance and cleaning requirements for your specific metal panel project.

Cleaning Metal Panels

The coating systems on metal roofing are designed to be resistant to many elements found in the environment such as air pollution, acid rain and general airborne dirt. Although these finishes are extremely durable, a periodic cleaning to remove build-up of resins and other residue is a good idea to extend life of the coating and performance of a metal roof. A variety of methods for removal of surface deposits from metal roofing panels are available. IMPORTANT: Refer to care and maintenance guidance included in all applicable material and finish warranties prior to using any cleaning method on metal panels.

Building owners should use extreme caution if attempting to follow the cleaning instructions listed in this guide. The hiring of an experienced professional trained in the safety precautions and cleaning methods for metal roofing is highly recommended.

Routine Cleaning

• **Painted Finishes, Tedlar® PVF Film and Acrylic-Coated Galvalume®**: Simple washing with clean fresh water twice a year using a hose or low-pressure spray equipment (no more than 2500 psi) is usually adequate for routine maintenance of metal panels. To remove leaves and debris, using a leaf blower is a common choice, but a long-handled push-broom or a telescoping pole with a window cleaning brush will also do the job. Use caution not to scratch metal panels.

• **Copper**: Copper metal panels should be cleaned with clean, fresh water only. Do not chemically or abrasively clean copper metal panels. Do not use soaps, detergents or other cleaning agents.

Tougher Stains

When heavy deposits of dirt or other contaminants dull metal roof surfaces, stronger cleaning methods may be necessary. In these situations, there are specific steps and methods that should always be followed so panels are not damaged as a result of cleaning. Contractors and installers should familiarize themselves with this information and ensure that property owners are provided with the information they need to properly maintain their metal roof.

Note: The following applies to painted finishes, Tedlar® PVF Film and Acrylic-Coated Galvalume® only. These instructions do not apply to copper.

• **Detergent Solutions:** A 5% solution of commonly used commercial (non-industrial) detergents, such as Dawn®, will not have an adverse effect on painted metal panels. Use a cloth or soft brush for application. These solutions should be followed by liberal rinse of water.
• **Solvents:** For removal of non-soluble deposits like tar, grease, oil, paint, graffiti, etc., the solvents listed below can be used. These products should only be used to spot clean affected areas and should not be used to clean the entirety of the metal roof. Follow with liberal rinse of clean water. Caution: Most organic solvents are flammable and/or toxic and must be handled accordingly. Keep away from open flames, sparks, and electrical motors. Always use adequate ventilation and wear protective clothing and goggles.

- Watts Removal Products, approved by Sherwin Williams.

Call Virginia Metal Systems for cleaning kits 804.622.2900

Mildew: In areas subject to high levels of humidity (like Florida), dirt and spore deposits can permit mildew growth to occur. The following solution is recommended to remove mildew: - 1/3 cup Dry Powdered Laundry Detergent (such as Tide®) - 1-quart Sodium Hypochlorite 5% solution (such as Clorox®) - 3 quarts water

Rust Stains: Depending on where a metal roof is located, rust stains can develop on the painted surface over time. Usually, this occurs when uncoated metal pieces and particles (typically steel) come into contact with the painted metal panels. The solution listed below, used with caution, may assist in removing rust stains. - 1-part Hydrochloric, Citric Acid or Muriatic Acid or Oxalic Acid or Vinegar - Diluted with Ten Volumes of Water - Limit Contact to Five Minutes All chemical solutions used to remove mildew or rust stains should be flushed thoroughly with large amounts of clean water. (Not approved by Sherwin Williams, may void paint finish warranty)

All chemical solutions used to remove mildew or rust stains should be flushed thoroughly with large amounts of clean water.

- **Proper Equipment**: Do not use wire brushes, abrasives or similar cleaning tools which will mechanically erode the coating surface.
- **Test:** Always test the cleaning agents listed in an inconspicuous area before use on a large scale.
- **Disposal:** Please make sure you dispose of cleaning solutions in an environmentally friendly manner.

Repairs

• **Touch-Up Paint for Minor Scratches**: Metal panels can become scratched due to branches or other lightweight debris coming into contact with the roof. Tradespeople doing work unrelated to the metal roof can also inadvertently scratch it. Use the manufacturer's recommended touch-up paint to correct scratches as they can quickly degrade the surface protection and jeopardize the longevity of metal panels. It is recommended that touch-up paint is ordered at the same time as original metal panel order for best matching.

Limit application of touch-up paint to the exact area in need of repair with as little paint as necessary. Do not paint over panel finish with brushes that are too large for the affected area. Consider use of small artist's brush or cotton swab for improved application control. While aerosol touch-up paint may be available, its use can cause significant overspray and is not as durable. Note that touch-up paint does not have the superior chalk and fade resistance of a factory-applied finish and will likely discolor at an accelerated rate. Due to the limitations and formulation of field-applied touch-up paint, no warranties apply to its use.

• **Other Repairs:** Should metal panels become damaged due to storm or other impact, improper maintenance, or if panels have separating seams, holes, loose or missing fasteners, it is recommended that the building owner engage a metal panel repair specialist to make the necessary repairs.

INSTALLING METAL PANELS

Prior to installation of a metal panel roofing system, the installer should familiarize themselves with the information in this guide. The installer should examine the roof deck to ensure that all supporting members are straight, level and plumb before work begins. Applicable product approvals, building codes, and accepted industry practices governing the project's jurisdiction should be verified. Contact your metal panel supplier when local controlling codes or insurance requirements conflict with the recommendations in this guide.

Order of Installation

The direction and sequence of metal panel installation may vary from installation to installation based on a variety of conditions, including geographic factors, panel design, structural characteristics and aesthetic requirements. Proper planning of panel layout can save material, time, and labor and is always recommended. The steps below represent a typical installation. Contact your metal supplier for assistance with your specific installation if needed. Typical order sequence for installing metal panels:

- Underlayment
- Eave or drip edge, and valley flashing
- Metal panels
- Transition (pitch break) flashing (if required by roof design)
- Z-closure, valley or transition cleat, ridge caps, gable rake trim, headwall and sidewall flashing.

Panel Installation

Once underlying metal trim/flashing is in place, panel installation can begin. Mechanical standing seam metal roofing systems employ special clips for proper installation. A panel clip, crimped (rolled) with opposite ends of two metal panels, becomes part of a seam. A rolled or formed seam bonds and forms the individual panels into a single roof layer.

Installation starts with the overlap side of metal panel along the gable. It is critical to set the first panel square to the eave and ridge since it will be used as a baseline for remaining panels. If the first panel is not set square, subsequently installed panels will also not be square impacting appearance and long-term performance of the metal roof.

IMPORTANT INFORMATION ABOUT THERMAL MOVEMENT

A standing seam roof panel experiences changes in panel length with changes in temperature. This is known as thermal movement. To ensure that installed panels are allowed to expand and contract during this process as needed, installers should make certain that panels that are fixed on one end are not fixed on the opposite end.

The female end of the first panel is typically attached to the roof deck on the gable end using approved fasteners. For greater thermal movement, the use of a floating rake is an acceptable alternative to fastening the first panel directly to the substrate. Next, a panel clip will be installed over the opposite (male) end of the panel. The female leg of the second panel is then rolled into place over the clip and male leg of the first panel so their ends are flush. This process repeats across the roof section until the gables/ends are reached on both sides. Installers should make sure that all clips are properly installed and that panel side laps are positioned correctly for seaming. Installers are reminded that even small errors grow over distance. **IMPORTANT: As panel widths can nominally vary, it is also recommended that periodic measurements be taken to ensure horizontal spacing is not gaining or losing width.**

Field Cutting

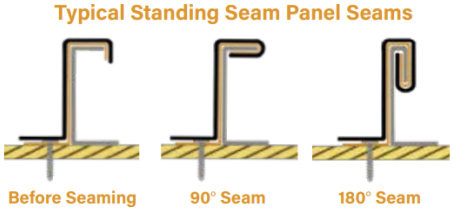
Field cutting and fitting of metal panels and trims is usually required. When field cutting panels, use tin snips or a “nibbler” type electric tool. Properly using these tools will deliver the cleanest cuts, cause the least damage, and leave minimal rough edges. **Circular saws, torches, and plasma cutters should not be used. Always wear protective gloves and stay clear of cutting blades.**

When possible, locate field cuts away from weather. If a roof panel has to be trimmed to length, trim the top of the panel where the cut will be hidden from the weather with a ridge flashing. When it is necessary to cut an eave flashing to length, put the field cut end beneath the factory cut end of the adjacent section.

Remember to remove all metal shavings and/or filings created during field cutting or fastener installation from panels and flashings each day to avoid the development of rust.

Seaming Metal Panels Creating a standing seam requires special seaming tools including hand crimpers, tongs or electrical (mechanical) seaming devices. Installed clips are bent and formed along with the panels when seams are formed. Typically, a hand crimper is used to begin a seam, followed by seaming the full length of roof panels with an electric seaming machine.

Seam Types:
Mechanical seam panels can be seamed at 90° or 180°. The design and specifications of your project will govern which seam type is required. Both seam types may be indicated on different areas of the same



project. Always refer to your project's drawings to determine all required seam types and locations.

Seaming Instructions: A 90° seam requires seaming the roof panel with a 90° hand crimper at the eave, ridge end of the roof panel, and at the end laps. This is followed by seaming the full length of roof panels with an electric seaming machine. A 180° seam requires a roof panel to have already been seamed or hand crimped with a 90° hand crimper. Installers are responsible for the proper seaming of metal roofing panels in accordance with the erection drawings and good engineering and construction practices. Consult the manufacturer's instructions for your specific seaming equipment for proper use and all seaming instructions.

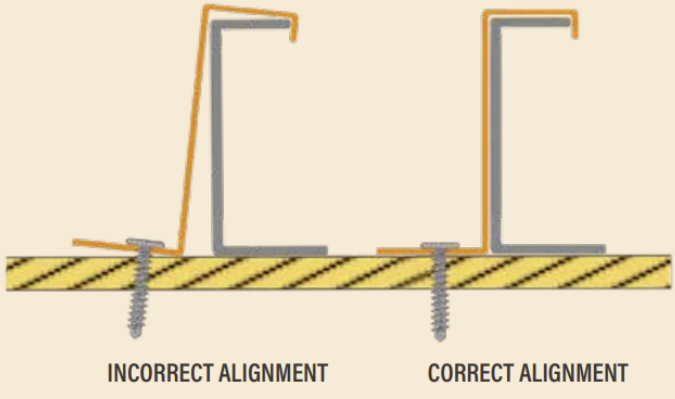
WHEN INSTALLING/SEAMING PANELS, REMEMBER THE FOLLOWING:

- Before fastening clip to substrate, always check to ensure vertical leg of the clip is tight and aligned to vertical leg of the panel. Failure to keep this leg tight to the panel leg will lead to improper installation and compromise the panel system. See Exhibit 1 below.
- Clamp panel seam together at both ends to hold the panel in place. Long panels may require one or more clamps in the middle.
- Panels should be hand-crimped at each clip location as they are installed to provide temporary wind resistance.
- Fully seam panels with electric seamer as quickly as possible after a section of the roof is completed.
- Seamer operation should be closely supervised at all times and follow all manufacturer instructions and safety procedures for your specific seaming equipment.

EXHIBIT 1

Clip Installation

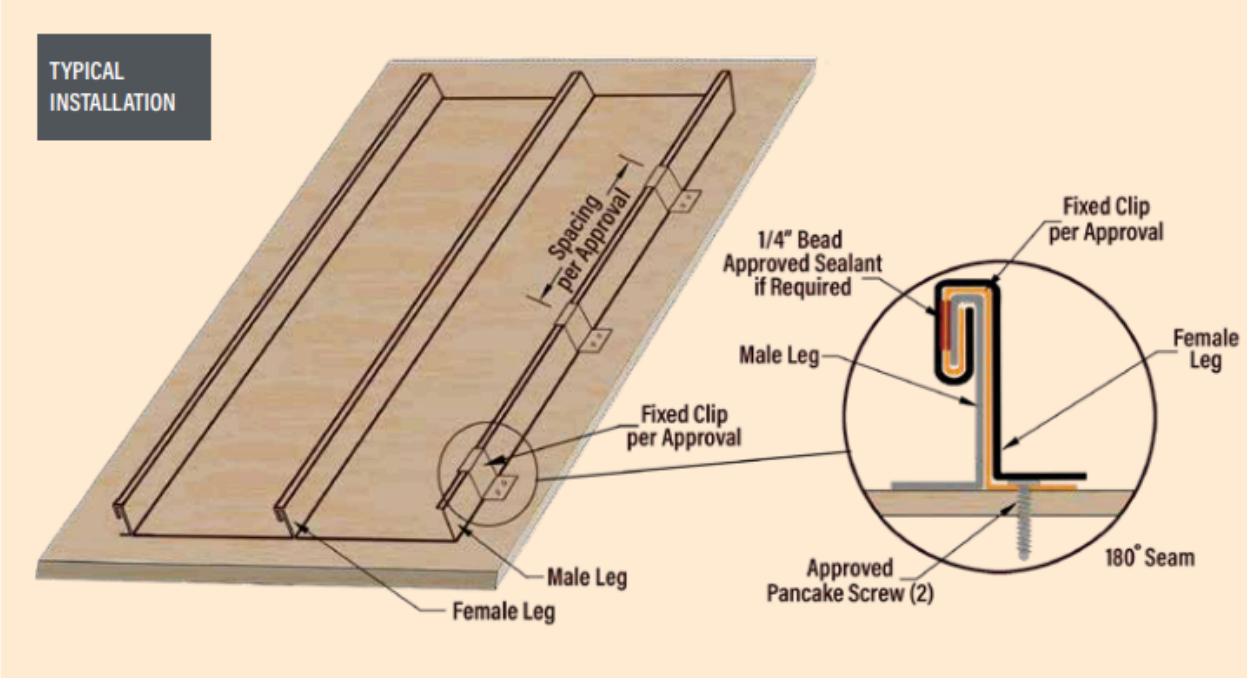
Before fastening each clip to substrate, always check to ensure clip's vertical leg is tight and aligned to the vertical leg of the panel.



CLIP AND FASTENER PATTERNS

Mechanical SEAM panel installation relies primarily on special clips, hidden (pancake) fasteners and cleats. Clips work to fasten metal panels together by creating seams, while hidden fasteners help to create a clean uninterrupted look to panels. Refer to Seaming Metal Panels on page 19-20 for important information about seaming. Cleats are typically used along the roof edge and where trim, flashing and gutters are installed. Some installations also require the use of approved sealant in seams and other locations. Clip, fastener, and cleat types, quantity and spacing, as well as any required sealants should be installed per product approvals and building codes governing the project's jurisdiction.

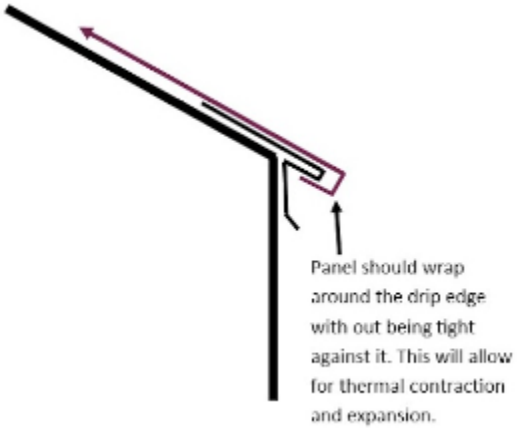
Installers are reminded that proper fastener installation is critical to long-term performance of a metal roof. Avoid over-tightening fasteners which can strip out the substrate and draw panels down, increasing tension on panels that creates a wavy look. **NOTE: Impact drivers are not recommended as they may overdrive or damage the fastener.**



Actual clip and fastener pattern may vary from the pattern shown based on the specific roof plan, metal type and strength, local building codes and product approvals.

HEM LENGTHS AND THERMAL MOVEMENT

A standing seam roof panel experiences changes in panel length with changes in panel temperature. A panel must be fixed at one end and allowed to expand and contract on the other end. If the panel end that is not fixed incorporates a hemmed detail, allowance must be made for the panel to move. The length of the hem will vary according to the anticipated temperature range, the length of the panel, and the type of metal. The example and table shown in Exhibit 2 can be used as a guideline. If more stringent analysis is required, a design professional should be consulted.



When Installing Panels, the following are required:

- Leave the correct gap between the end of the panel that is not fixed and the cleat.
- The hem should not be tight against the cleat.
- The lower edge of hem should not contact any flashings when the panels contract.
- All hems should be cut clean and crisp in a straight line, as these are visible from the underside, and should not be crimped tightly to the cleat.

Thermal Movement Table

PANEL/SUBSTRATE	10 FEET	50 FEET	100 FEET
Aluminum Over Rigid Insulation	3/16"	7/8"	1-9/16"
Aluminum Over Wood Deck	3/16"	11/16"	1-3/8"
Aluminum Over Steel Deck	1/8"	5/8"	1-3/16"
Aluminum Over Concrete Deck	1/8"	5/8"	1-1/4"
Steel Over Rigid Insulation	1/8"	1/2"	7/8"
Steel Over Wood Deck	1/16"	3/8"	5/8"
Steel Over Steel Deck	1/16"	3/8"	5/8"
Steel Over Concrete Deck	1/16"	3/8"	1/2"

MINIMUM GAP SPACE (X)

[1]Assumption: Panel Temperature change of 100°F and substrate temperature change of 50°F.

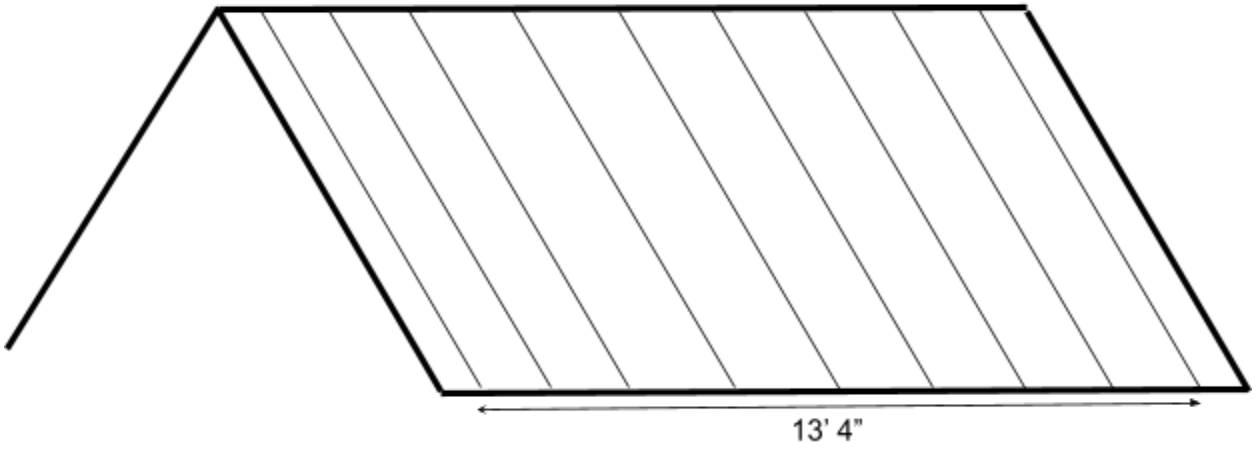
Panel Layout Calculations

Find the number of inches along the eave
Divide by the width of the panel- panels may vary by rib height and machine set up
This will give you the total number of panels needed for the roof

If the remaining panel is less than 10” an additional full panel can be split to create the larger end panels.

Layout the end cut panels should be the same width.

13’ 4”= 160”
160/17=9.41, 10 panels minimum
(Remaining 6.97”/2 *TOO SMALL)*
17” panel + 6.97” / by 2 = 11.98”
End panels 11.98” each
8 Full panels, 2 end panels at 11.98”

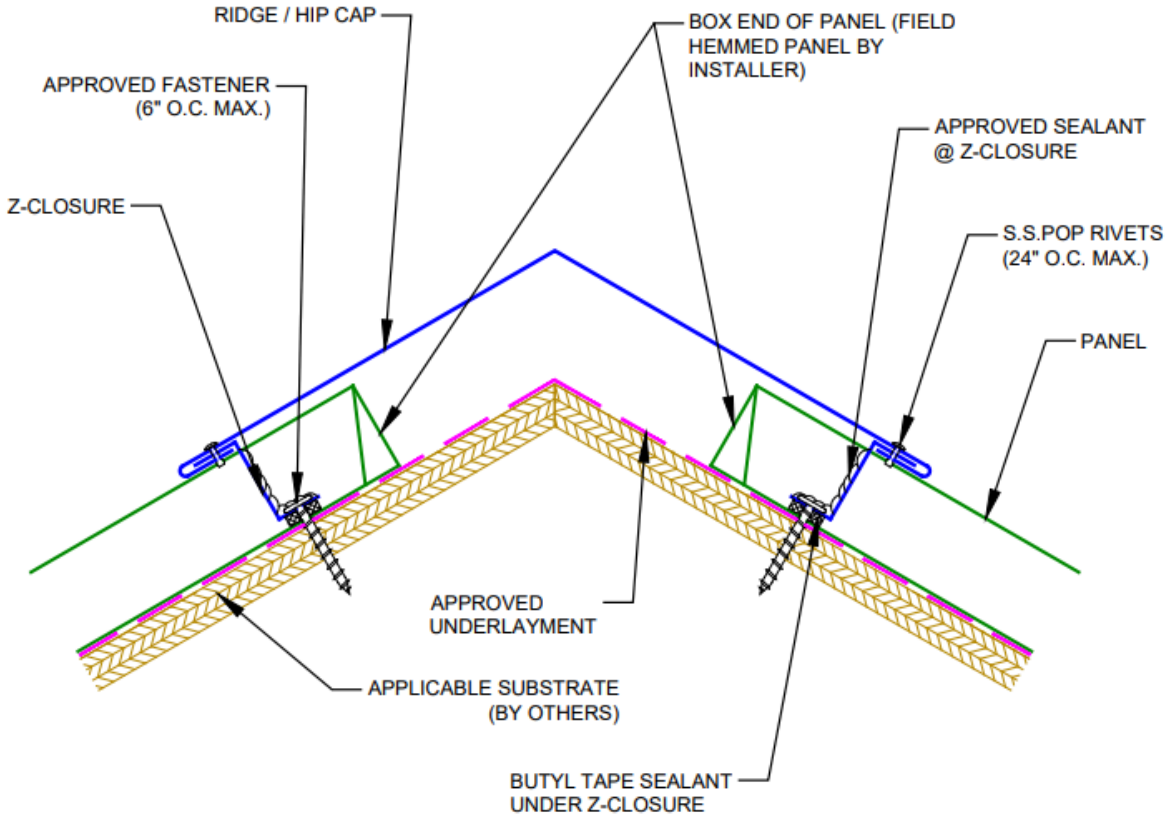


INSTALLATION DETAILS

The detail drawings in this guide are for a typical installation. It is the installer's responsibility to determine and select the details and specifications that are appropriate for each project. As the requirements of each project will vary, Virginia Metal Systems does not warrant the fitness or suitability of the details contained herein for any specific project. For specific advice on design, installation details, code compliance, or feasibility of use for a particular project, consult your metal panel supplier or a design professional.

Fixed Hip and Ridge Detail

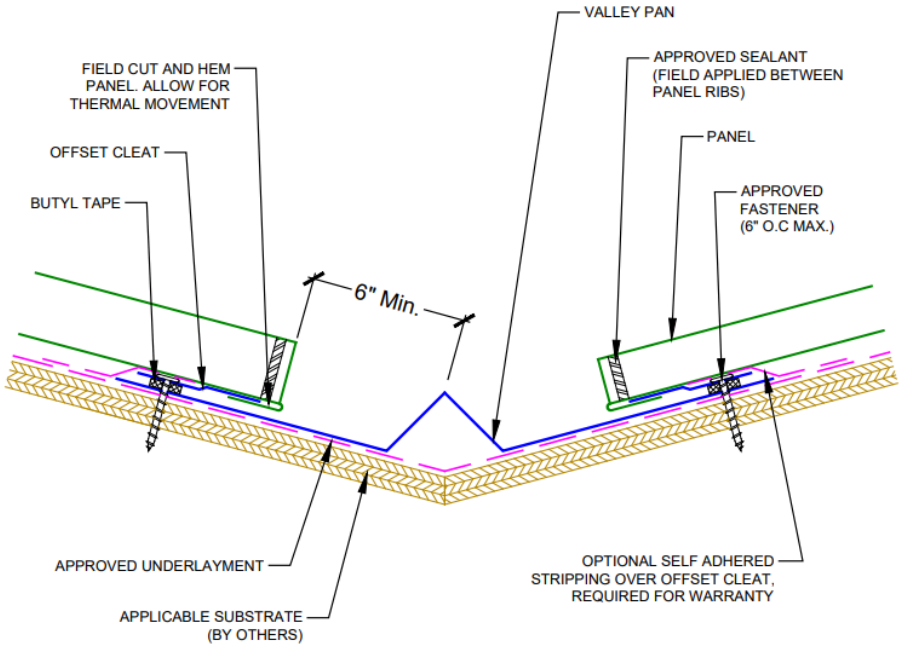
Not to scale



Z Bar may be perforated for roof ventilation. This must be requested at the time of order.

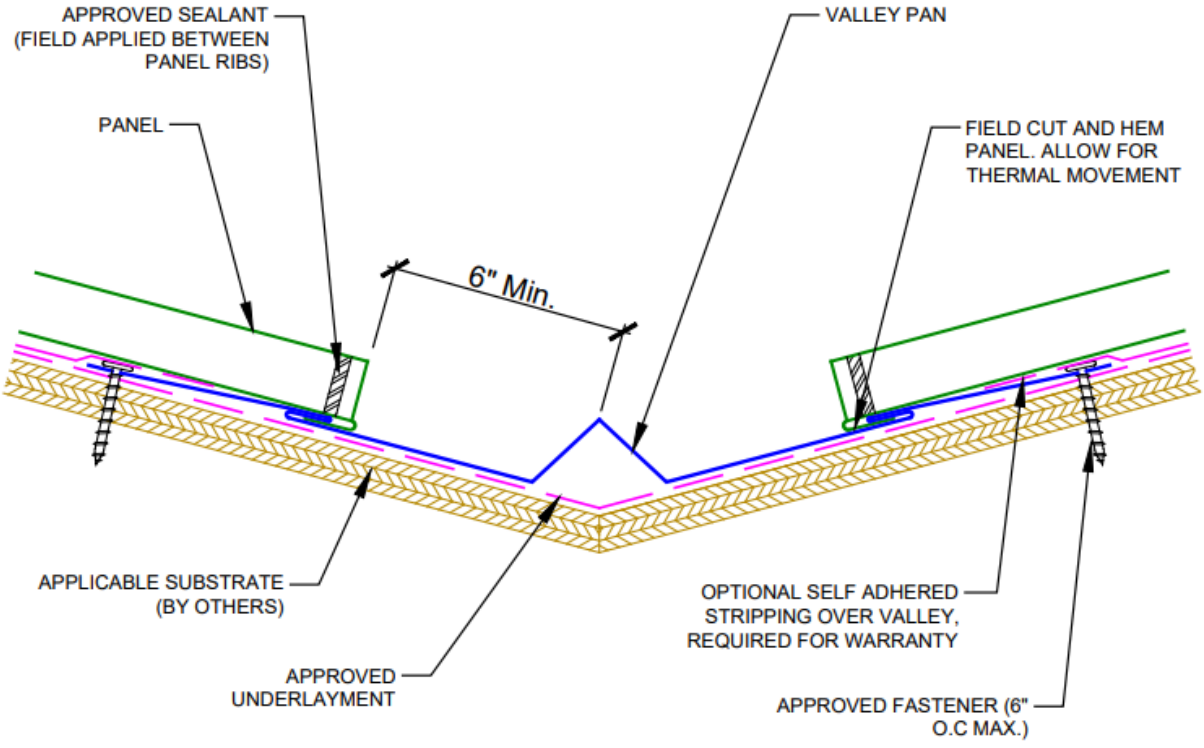
Valley Joggle Cleat Detail

Not to scale



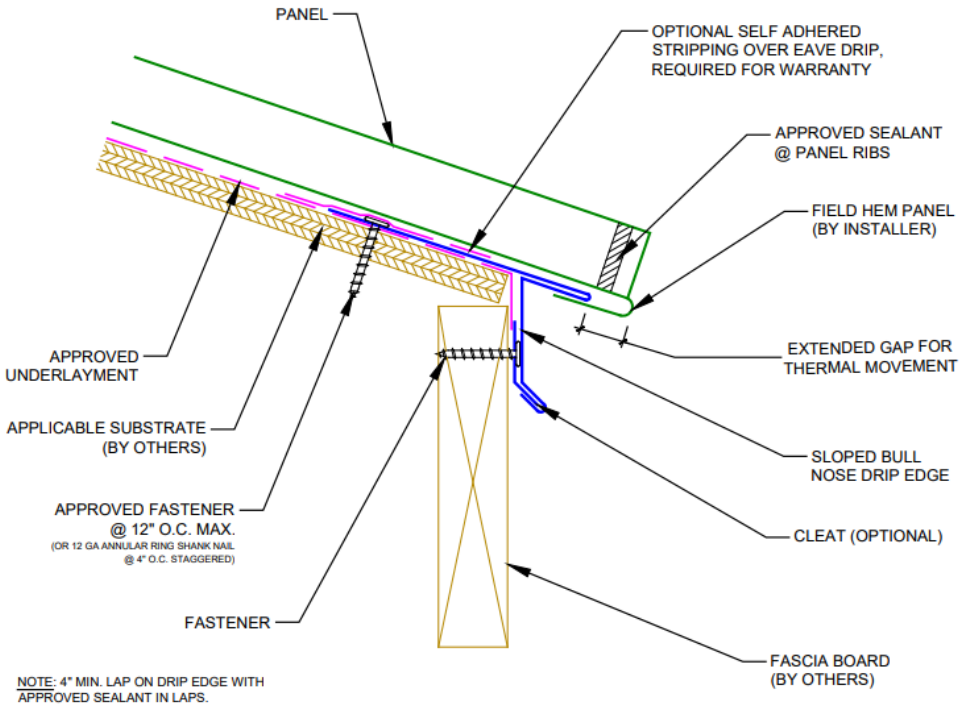
1 Piece- Valley Detail

Not to scale



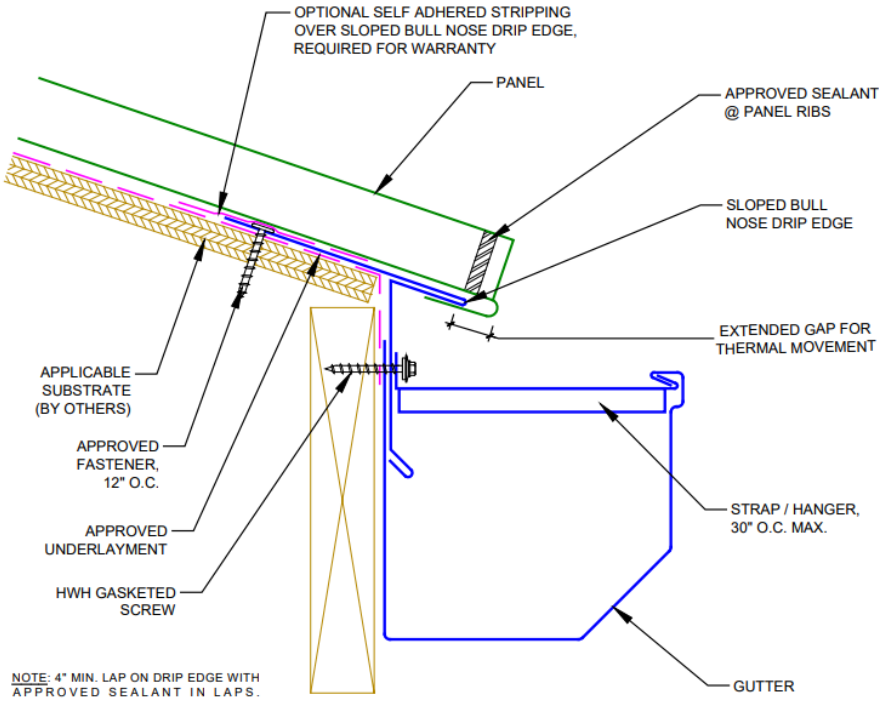
Eave Detail

Not to Scale



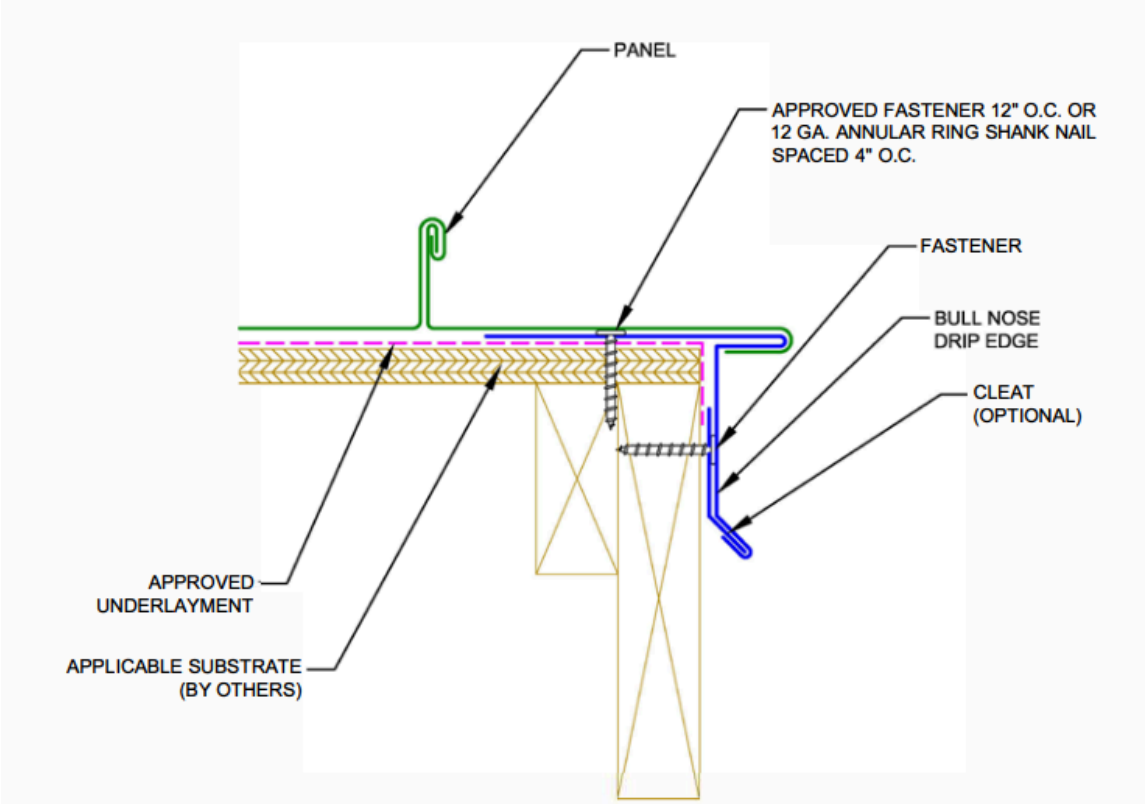
Eave Gutter Detail

Not to scale



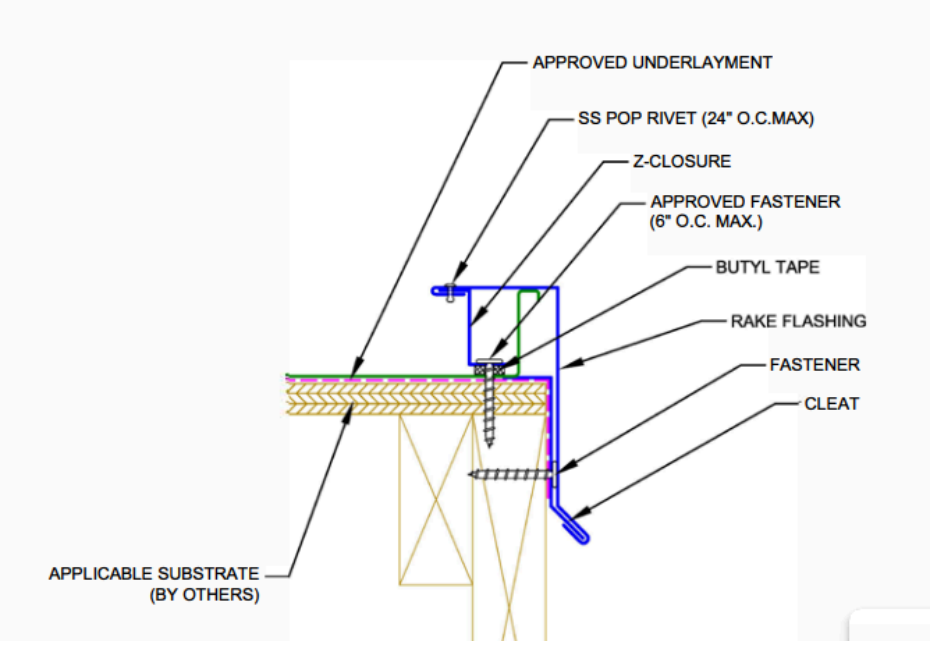
Hemmed Rake/ Gable Detail

Not to scale



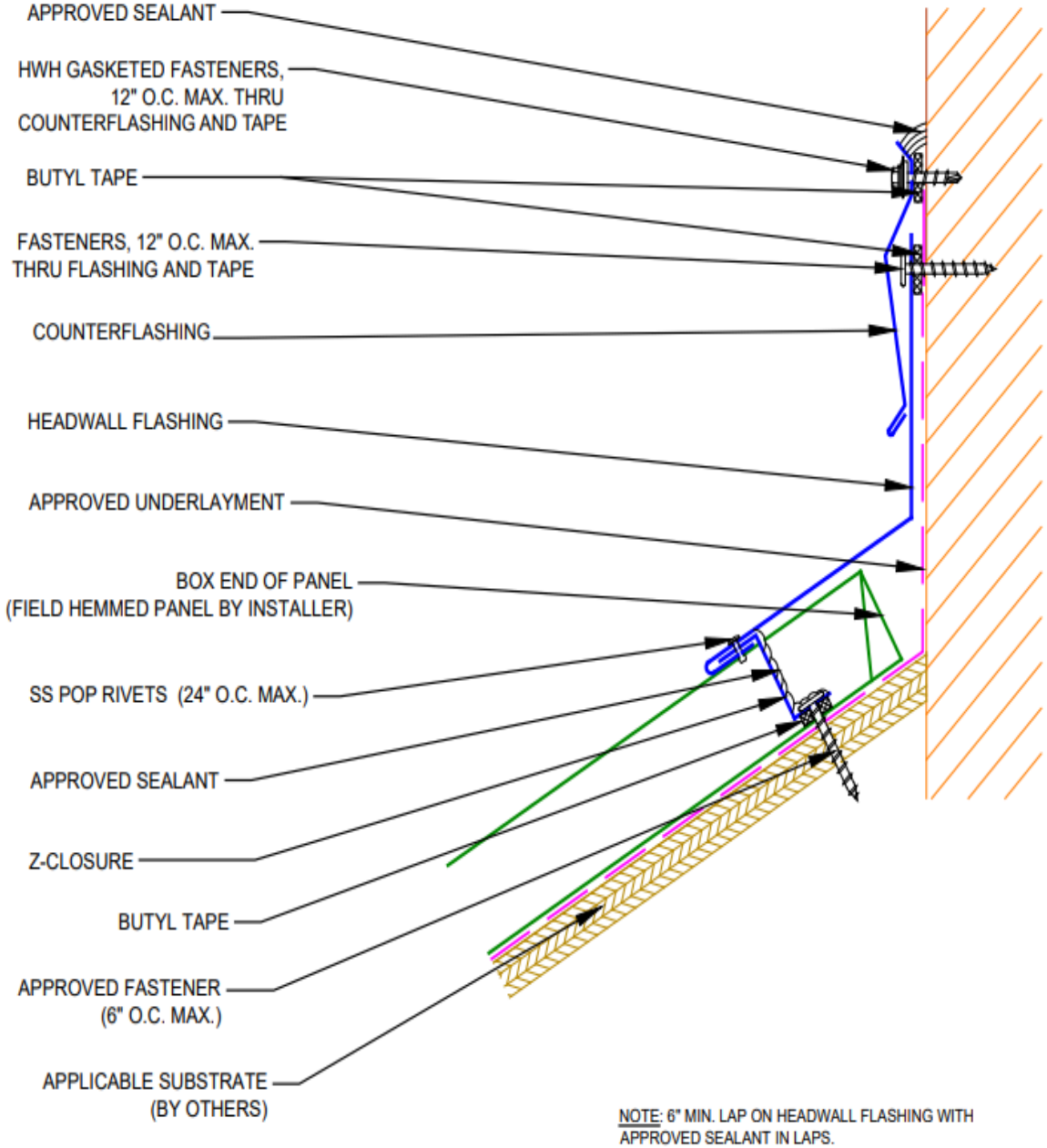
Floating Rake/ Gable Detail

Not to scale



Headwall-Surface Mount Detail

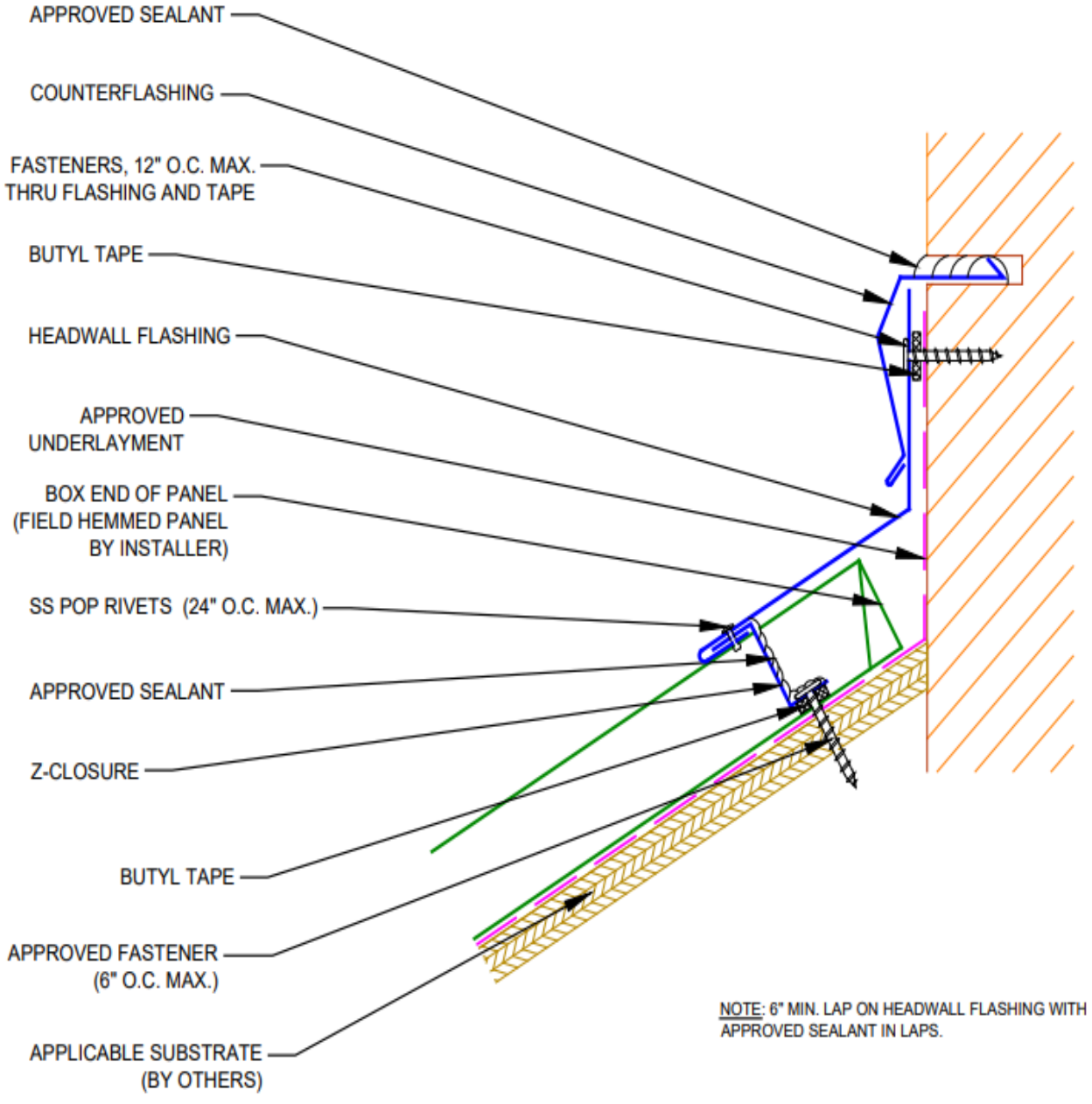
Not to scale



NOTE: 6" MIN. LAP ON HEADWALL FLASHING WITH APPROVED SEALANT IN LAPS.

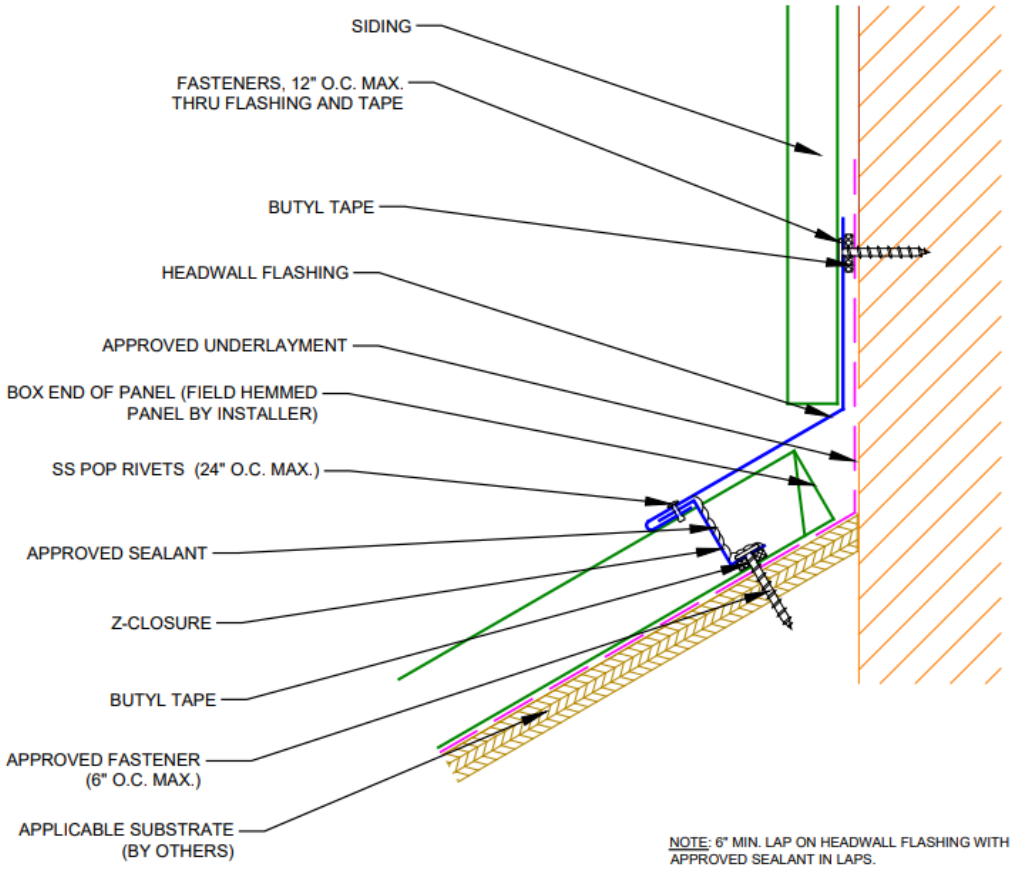
Headwall- Reglet Detail

Not to scale



Headwall Siding Detail

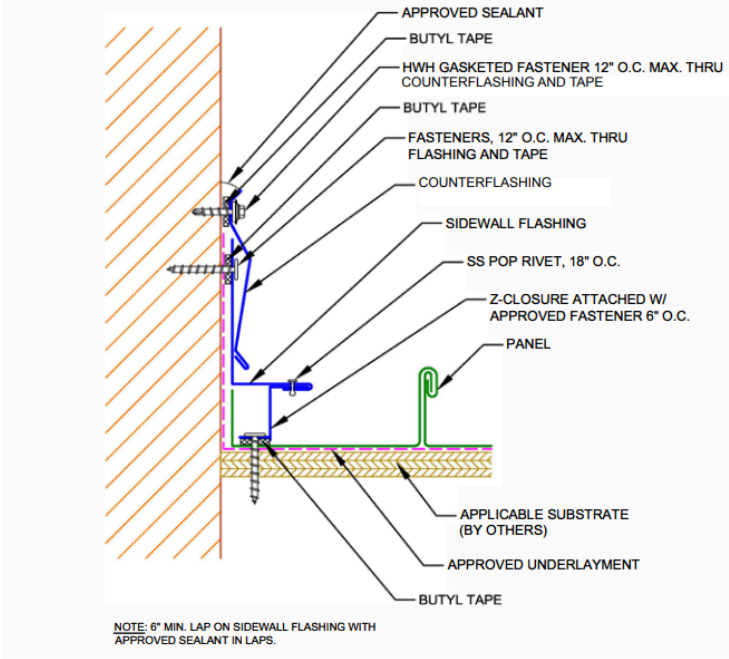
Not to scale



NOTE: 6" MIN. LAP ON HEADWALL FLASHING WITH APPROVED SEALANT IN LAPS.

Sidewall- Surface Mount Detail

Not to scale



Sidewall - Reglet Detail

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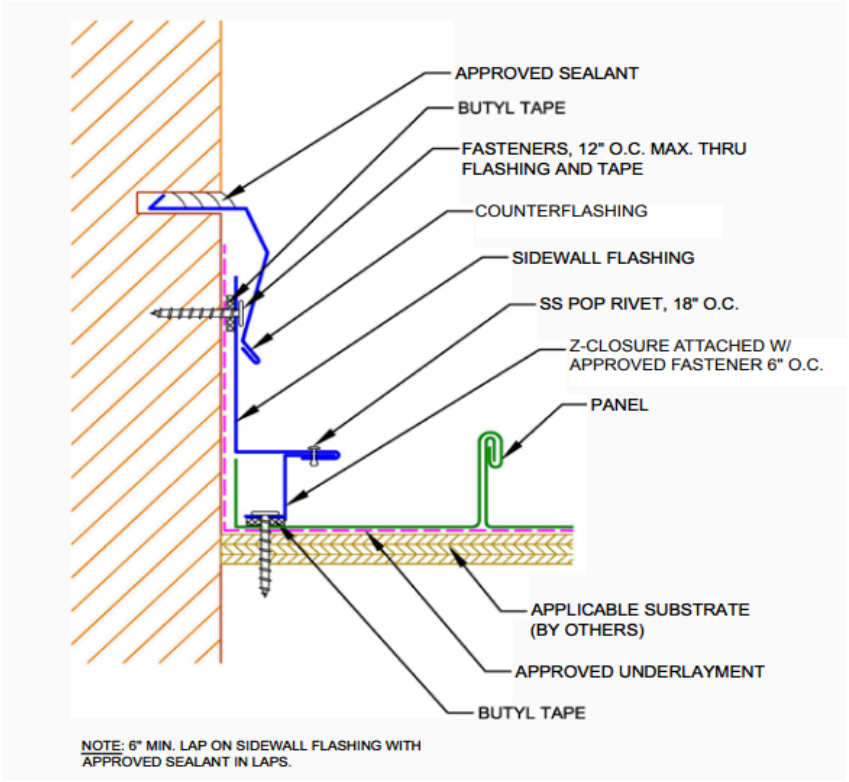
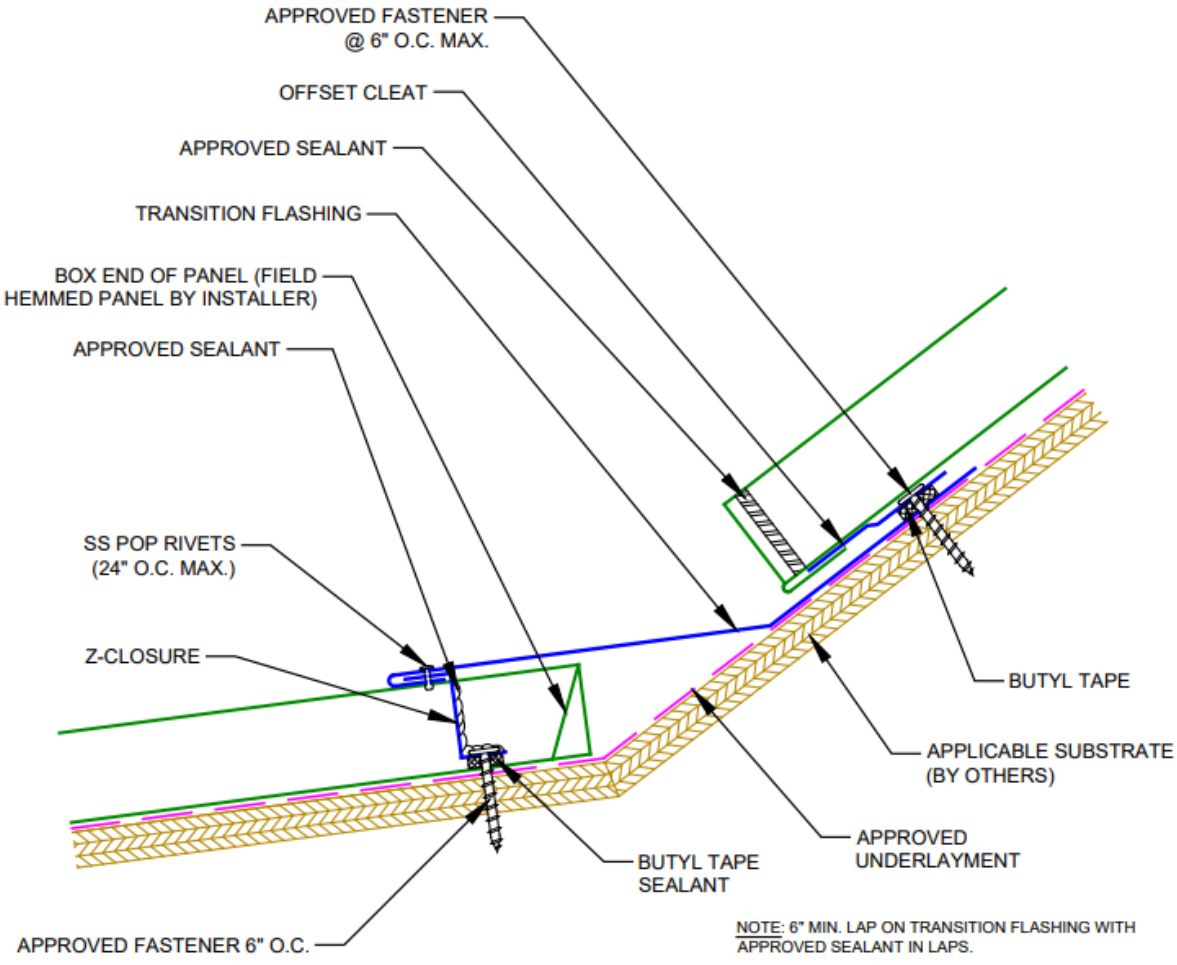


Slope Transition Detail

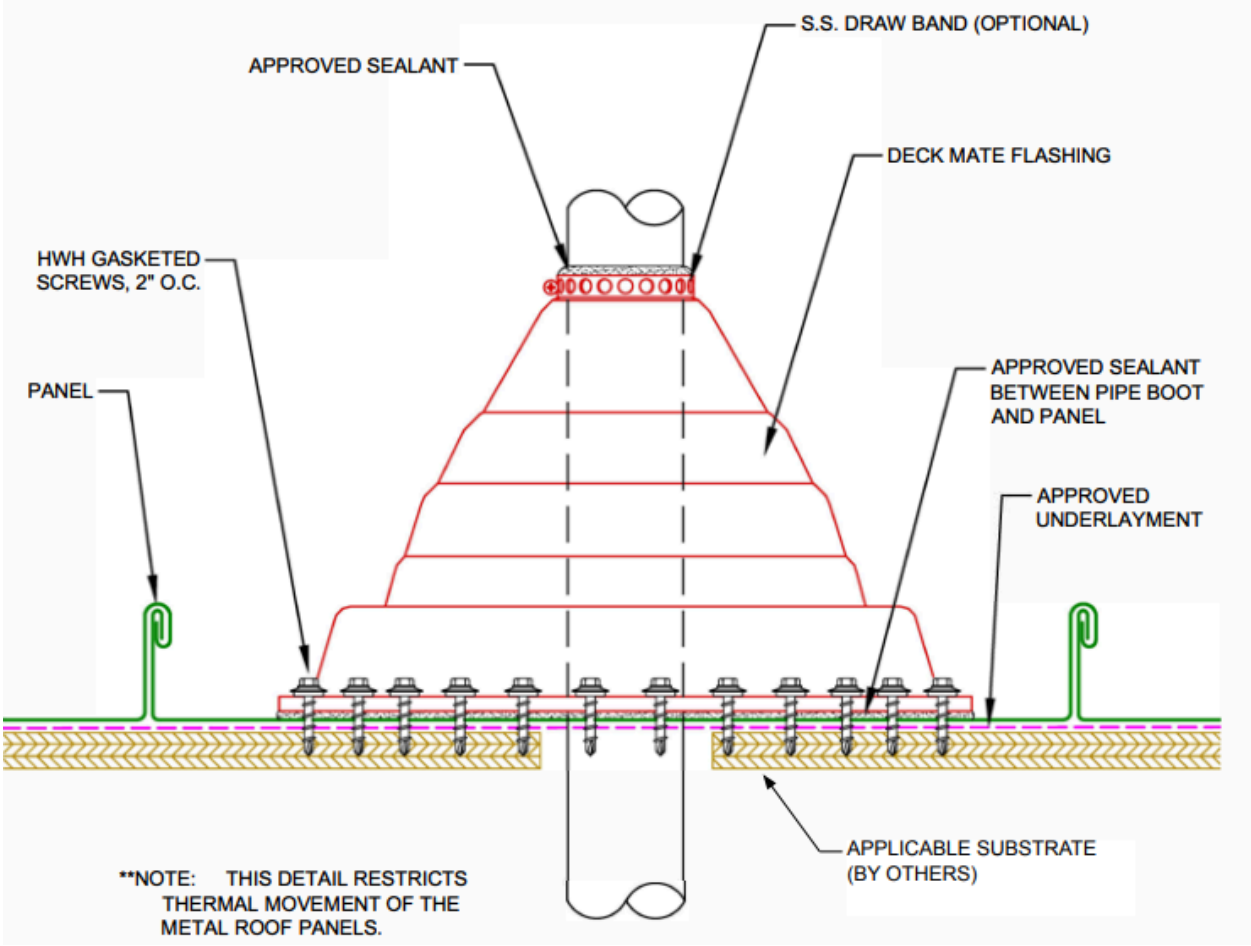
Not to scale



Slope transition from or to asphalt shingles will require a minimum 12" on shingle's side.

Penetration Detail, Pipe Boot Detail

Not to scale



Please feel free to contact the office for specific testing criteria, design details, or other technical questions.

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