

NUCOR BUILDING SYSTEMS

CFR

ERECTION MANUAL

FOR FIELD USE

PLEASE DISTRIBUTE TO THE ERECTION CREW

WATERLOO, IN
305 Industrial Parkway
Waterloo, IN 46793
Phone: 260-837-7891
Fax: 260-837-7384

SWANSEA, SC
200 Whetstone Road
Swansea, SC 29160
Phone: 803-568-2100
Fax: 803-568-2121

TERRELL, TX
600 Apache Trail
Terrell, TX 75160
Phone: 972-524-5407
Fax: 972-524-5417

LANCASTER, PA
255 Butler Avenue
Suite 200
Lancaster, PA 17601
Phone: 717-735-7766
Fax: 717-735-7769

BRIGHAM CITY, UT
1050 North Watery Lane
Brigham City, UT 84302
Phone: 435-919-3100
Fax: 435-919-3101

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TABLE OF CONTENTS	
-------------------	--

1.0	GENERAL	5
1.1	Purpose of this manual	5
1.2	Buyer's responsibility	5
1.3	MBMA	5
1.4	Disclaimer	5
1.5	Unloading and storing	6
1.6	Erection sequence	6
1.7	Coordination with other trades	6
1.8	Erection care	6
1.9	Field cutting of panels	7
1.10	Trim and Flashing	7
1.11	Engineering and Reinforcing Materials	7
2.0	DESIGN AND PERFORMANCE CRITERIA	8
2.1	Roof system	8
2.2	Panel clip spacing	8
2.3	Panel clip fastener reqmt's	8
2.4	Roof top units and curb supports	8
2.5	Insulation requirements	8
3.0	COMPOSITE NUCOR CFR™ ROOF SYSTEM	9
3.1	Product definition	9
3.2	Vapor barrier	9
3.3	Insulation	9
4.0	NUCOR CFR™ ROOF COMPONENTS WITH ENGINEERING	9
4.1	Components with engineering definition	9
4.2	Diaphragm	9
4.3	Clip fastening requirements	9
5.0	RECEIVING & HANDLING ROOF MATERIALS	10
5.1	Field storage of materials	10
5.2	Handling individual roof panels	11
5.3	Handling roof materials in strong winds	11
5.4	Material inventory	12
5.5	Equipment for unloading and lifting	12
5.6	Lifting roof panel bundles	13
5.7	Placing Panel Bundles on the Roof	14
6.0	SAFE ROOF INSTALLATION	15
6.1	Regulations	15
6.2	Erector's responsibility	15
6.3	Walking and working on roof panels	15
6.4	Safety equipment	16
6.5	Crew size	16
6.6	Panel overhang	16
6.7	Point loads	16
6.8	Slick surfaces	16
6.9	Electrical conductance	16
6.10	False security of insulation	16
6.11	Sharp edges	16
6.12	Safe Roof Installation Summary	17
7.0	CHECKING THE STRUCTURE	18
7.1	Completed and braced	18
7.2	Lateral stability	18
7.3	Alignment	18

	TABLE OF CONTENTS
--	--------------------------

	7.4 Tolerances	18
	7.5 Measuring	18
	7.6 Aesthetic acceptance	18
	7.7 Corrections	19
8.0	INSTALLATION BASICS	19
	8.1 Proper tools	19
	8.2 Mastic	19
	8.3 Fasteners	21
	8.4 Field cutting of panels and flashing	22
	8.5 Sheeting direction and modularity	23
	8.6 Layout and checking coverage	23
	8.7 Appearance considerations.....	23
	8.8 Inspection of the roof assembly during installation	24
	8.9 Inspection list	24
	8.10 Roof leak troubleshooting & potential causes of roof leaks	27
9.0	STANDARD HARDWARE PARTS	28
	9.1 General	28
	9.2 CFR Roof Accessory Tools	33
10.0	PREPARATION FOR ROOF PANEL INSTALLATION	34
	10.1 General	34
	10.2 Orientation and explanation	35
	10.3 Wall Rake Angle Attachment	35
	10.4 Eave plate	36
	10.5 Rake clip pre-drilling detail	37
	10.6 Insulation	38
	10.7 Proper mastic installation procedures	39
	10.8 Rake clip and rake angle installation.....	40
	10.9 Rake angle and eave plate mastic placement	41
	10.10 Thermal blocks.....	42
	10.11 EPS foam spacer	42
	10.12 Final pre-panel installation detail.....	42
11.0	EAVE START PANEL INSTALLATION.....	43
	11.1 Panel section, description, and nomenclature	43
	11.2 Installing the eave start panel	44
	11.3 Installing the low eave void closure.....	45
	11.4 Installing the leading edge panel clips	46
	11.5 Typical panel clip attachment details	47
	11.6 Installation of the back-up plate at the eave start panel.....	48
12.0	INTERMEDIATE START PANEL INSTALLATION	49
	12.1 Installation of intermediate start panel mastic	49
	12.2 Alignment of the intermediate start panel.....	50
	12.3 Fastening of the intermediate start panel	51
	12.4 End Lap rib butyl caulk.....	52
	12.5 Eave and ridge/high eave Butyl Tube Caulk installation	53
13.0	FULL PANEL RUN INSTALLATION	54
	13.1 Panel side lap assembly	54
	13.2 Alternate Method of Pre-drilling for Full Panel Modularity.....	55
	13.3 Panel modularity	56
	13.4 Adjusting panel modularity	56
	13.5 Installing the first full panel run, starting at the low eave.....	57
	13.6 Installing the leading edge clips at the full panel at eave	58

	TABLE OF CONTENTS
--	--------------------------

13.7	End Lap Preparation Detail at Full Panel	59
13.8	End Lap Assembly Detail at Full Panel	60
13.9	End dam installation	61
13.10	End dam mastic details	62
13.11	End dam installation	63
13.12	Installing end dams at the start and finish panels.	64
13.13	Installing the finish panel run.....	64
14.0	PREPARATION FOR ROOF LINE TRIM INSTALLATON	65
14.1	Preparation for trim installaton	65
14.2	General	65
15.0	STANDARD ROOF LINE TRIM PARTS	67
15.1	General	67
16.0	ROOF LINE TRIM INSTALLATION	71
16.1	Wall Panel/Trim Foam Closures	71
16.2	Low eave flash	72
16.3	Low eave Flash lap detail.....	73
16.4	Low eave standard gutter.....	74
16.5	Gutter lap detail	75
16.6	Gutter end caps.....	75
16.7	Preparation for standard rake trim installation	76
16.8	Standard rake trim installation at building with gutter.....	77
16.9	Rake trim lap detail	78
16.10	Standard rake trim termination at ridge	79
16.11	Rake retainer trim installation.....	80
16.12	Standard rake trim installation at building without gutter.....	81
16.13	Rake parapet trim installation.....	82
16.14	Standard rake parapet trim termination at high eave or ridge.....	83
16.15	Preparation for high eave or ridge trim installation.....	84
16.16	Rake parapet trim at high eave parapet trim installation.....	85
16.17	High eave parapet trim lap detail	86
16.18	Rake Trim Preparation for sculptured high eave trim installation.....	87
16.19	Sculptured high eave trim installation	88
16.20	High eave trim lap detail.....	89
16.21	Metal Peak Box and Peak Plate Preperation	90
16.22	Metal Peak Box & Peak Plate Installation at Standard Rake Trim.....	91
16.23	Ridge cap installation With Metal Peak Box.....	92
16.24	Ridge cap lap details	93
16.25	Peak Transition installation at rake parapet trim	94
17.0	CFR CHECKLIST	95

1.0 GENERAL

1.1 PURPOSE OF THIS MANUAL

This erection manual is provided to Nucor Builders and their erectors as the recommended procedure for the correct assembly of the Nucor Building Systems (NBS) CFR Roof System.

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

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

The NBS CFR Roof System can be erected on many different types of construction. However, for this manual we have assumed this roof system will be erected on a new pre-engineered metal building.

- **A CFR check list is provided at the end of this manual for punching out the roof system. Please review prior to erecting the roof.**

1.2 BUYER'S RESPONSIBILITY

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

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

NBS does not guarantee and is not liable for the quality of erection. NBS is not responsible for

building defects that may be attributed to improper erection or the negligence of other parties.

Clarification concerning the NBS CFR roof installation should be directed to the **QUALITY SERVICE REPRESENTATIVE** at the NBS plant. The following is a list of addresses and phone numbers for the quality service representative at each NBS division:

WATERLOO, IN
305 Industrial Parkway
Waterloo, IN 46793
Phone: 260-837-7891
Fax: 260-837-7384

SWANSEA, SC
200 Whetstone Road
Swansea, SC 29160
Phone: 803-568-2100
Fax: 803-568-2121

TERRELL, TX
600 Apache Trail
Terrell, TX 75160
Phone: 972-524-5407
Fax: 972-524-5417

LANCASTER, PA
255 Butler Avenue
Suite 200
Lancaster, PA 17601
Phone: 717-735-7766
Fax: 717-735-7769

BRIGHAM CITY, UT
1050 North Watery Lane
Brigham City, UT 84302
Phone: 435-919-3100
Fax: 435-919-3101

1.3 MBMA

This building is designed, manufactured, and delivered in accordance with most recent addition of the **M.B.M.A. METAL BUILDING SYSTEMS MANUAL. CONSULT THE INFORMATION IN THE "COMMON INDUSTRY PRACTICES" SECTION.**

1.4 DISCLAIMER

THE PRODUCTS AND PROCEDURES IN THIS MANUAL ARE SUBJECT TO CHANGE WITHOUT NOTICE

1.5 UNLOADING AND STORING

Check the quantities and condition of **all** CFR bundles and trim crates on arrival. Note on the delivery tickets any shortages, damage, or discrepancies. NBS shall **not be** liable for damage or shortages that are **not** noted on the delivery tickets. The customer assumes full responsibility for the condition of this material after deliver by the trucking company.

Extreme care should be exercised when unloading and handling the panel bundles and accessory crates to prevent damage. The weight of the panel bundle is printed on the bundle tag on the end of each bundle. If the tag is not on the bundle, you may calculate the weight of the bundle with the formula: (Qty. of panels x Bundle length x 2.5 lbs. per foot).

Bundles up to 25 feet long can be lifted with a forklift. Bundles over 25 feet long shall be lifted with a crane utilizing a spreader bar with 4-inch minimum width nylon straps. Straps should be 15 to 20 feet apart. To avoid damage to the panels, steel cables, chains, or chokers shall not be used.

The CFR panels and accessories shall be stored on high ground, sloped to drain and tarped to protect from moisture formation. The tarp should be open at each end to allow consistent airflow through the bundles. The recommended procedures are outlined in this manual. NBS will not be held responsible for damage or discoloration of panels caused by improper storage.

1.6 ERECTION SEQUENCE

The Nucor CFR™ Roof System is designed to be erected from either end of the building. In rare cases, due to the building layout, it may be required to start erection from a specific end. In those cases, this will be noted as such on the roof sheeting plan. Because the roof can be started from either end, the panel ribs may not be in alignment across the ridge. This is normal practice for the Nucor CFR™ Roof System and does not affect the performance of the roof system.

For buildings with roof translucent panels, in order to align the translucent panels across the ridge, it is suggested to erect the roof panels on both sides of the ridge from the same end of the building, utilizing the same start panel width.

Panel runs with translucent panels have been placed as specified in the order documents.

1.7 COORDINATION WITH OTHER TRADES

Supports for the Nucor CFR™ Roof System shall be provided and are required as shown in the sections and as noted in these specifications. All necessary clearance dimensions for proper elevations relative to the roof panels have been shown. The contractor shall be responsible for coordinating these dimensional requirements with other trades associated with the building roof system.

1.8 ERECTION CARE

The Erector must be skilled in the erection of Metal Building Systems, including roof panels, and is responsible for complying with all applicable local, federal and state construction and safety regulations including OSHA regulations as well as any applicable requirements of local, national, or international union rules or practices. The Erector remains solely responsible for the safety and appropriateness of all techniques and methods utilized by its crew in the erection of the Metal Building System and/or the Nucor CFR™ roof system. The Erector and/or Contractor is also responsible for supplying safety devices, such as scaffolds, runways, nets, etc. which may be required to safely erect the Metal Building System and/or CFR roof system.

The Erector of the Nucor CFR™ Roof System shall exercise great care and attention to the details as shown on the erection drawings and in the Nucor CFR™ erection manual to insure a secure and proper fit of all components. NBS shall not be responsible for supervising and/or coordinating the erection of the CFR Roof System with other trades.

Due consideration must be given by the erector to the effects of thermal expansion and contraction when erecting a roof tie-in to an existing structure to insure a safe, secure, weather-tight condition. **Flashing for tie-ins to existing buildings is typically not included as part of the material provided by NBS.** Refer to the sections and details for specific materials provided by NBS.

1.9 FIELD CUTTING OF PANELS

When field cutting or mitering CFR roof panels, non-abrasive cutting tools such as nibblers or tin-snips shall be used. Abrasive cutting tools such as mechanical grinders or power-saws, can damage the galvalume finish and create excess metal shavings that can corrode the panels. The use of non-approved cutting devices may void the factory warranty.

1.10 TRIM AND FLASHING

NOTE: Trim and/or flashing for transitions to existing buildings is not supplied by NBS.

1.11 ENGINEERING AND REINFORCING MATERIALS

NOTE: NBS does not supply engineering investigations or materials to reinforce existing non-Nucor buildings. These type investigations must be submitted to the project engineer of record.

2.0 DESIGN PERFORMANCE AND CRITERIA**2.0 DESIGN AND PERFORMANCE CRITERIA****2.1 ROOF SYSTEM**

The NBS CFR Roof System consists of 24 gage panels with a nominal coverage of 2'-0" and a panel seam that is 3" tall. The flat of the panel will be elevated above the top of the roof secondary member by either ½" (if short clips are used) or 1½" (if tall clips are used). Refer to the details and sections on the erection drawings for specific panel clip type.

The Nucor CFR™ Roof System has three seam type options. The project design and performance requirements govern which seam type is required.

Different seam types may be used on specific areas of a roof. In all cases, refer to the erection drawing roof sheeting plan and details for seam type and location. Also refer to the Seaming Manual for instructions on proper use of the seaming equipment.

2.2 PANEL CLIP SPACING

The Nucor CFR™ Roof System uses a clip to attach the panels to the roof secondary members. Panel clip spacing is as follows:

For CFR Roof on a Nucor Building:
Clips are required at every purlin and/or joist.

For CFR Roof on a non-Nucor Building:
Maximum clip spacing is to be 5'-0" for purlin roofs, and 5'-6" maximum for joist roof.

2.3 PANEL CLIP FASTENER REQMT'S

NBS standard clip fasteners are designed to fasten to a steel structural member of .060" minimum thickness (16 Ga.). A minimum of two fasteners are required to engage the structural member at every panel clip location. In certain instances, three fasteners may be required per

clip. See the final set of erection drawings for your specific clip fastener requirements.

Spread clip fasteners as far apart as possible. Avoid placing fasteners side by side.

Check fasteners to see if they are securely engaged into the roof secondary member.

Do not over-drive screws! Over-driving can strip the threads and/or damage the sealing washer. Use screw gun with torque control set to function properly for the combination of fastener size, hole size, and material thickness.

Required fastener pullout values are dependent upon project location, size, building code, and loading. Consult Nucor Engineering for project-dependent fastener specifications.

2.4 ROOF TOP UNITS AND CURB SUPPORTS

The Nucor CFR™ Roof System and the Roof Curbs are elevated above the top of the roof secondary structural members. Roof curb sub-framing is level with the secondary members. If your building has roof curbs, please refer to the respective roof curb erection manual for more information.

The Nucor CFR™ Roof System is designed as a floating system. Curb framing and flashing must be designed accordingly to allow the curb system to float with the CFR roof during thermal expansion and contraction. Roof curbs **shall not** span the ridge of a building.

2.5 INSULATION REQUIREMENTS

NBS recommends that insulation be used in all CFR Roof applications to avoid problems with condensation forming on the underside of the sheeting. This also provides a buffer between the purlins and the CFR roof to eliminate noise and possible damage due to metal to metal contact. NBS can supply a noise reducing foam tape for use in limited applications (canopies, etc.) when included as part of the roof order. Refer to the details for foam tape requirements.

3.0,4.0 COMPOSITE CFR & COMPONENTS WITH ENGINEERING**3.0 COMPOSITE NUCOR CFR™ ROOF SYSTEM**

(Applicable for Composite Nucor CFR™ Roof Systems)

3.1 PRODUCT DEFINITION

Refer to the sections and details on the erection drawings for specific clip fastening requirements, insulation thickness requirements, and liner deck type.

NBS recommends the roof secondary members be pre-drilled with 3/16" diameter holes to accept the panel clip fasteners to avoid potential fastener breakage.

Composite CFR Roof without the use of a liner deck **is not** a NBS standard product application. Due consideration must be given by the engineer of record or architect when this occurs to the effects of condensation. In addition, great care must be taken by the erector to insure that the roof system is erected in a safe, quality manner.

3.2 VAPOR BARRIER

Vapor barrier/ vapor retarder must be used between the liner decking and the rigid board insulation to prevent condensation. Refer to the erection drawing details.

3.3 INSULATION

Rigid board insulation is used in conjunction with a Composite Nucor CFR™ Roof System. The rigid board insulation must be cut to allow free movement of the back-up plates at panel splice, rake and ridge locations

4.0 NUCOR CFR™ ROOF COMPONENTS WITH ENGINEERING**4.1 COMPONENTS WITH ENGINEERING DEFINITION**

In a case where NBS is providing the CFR Roof System to be used in conjunction with a non-Nucor structure, NBS refers to that as a "Components with Engineering". This simply means that NBS shall calculate the quantities and lengths for the material required. NBS is performing no engineering study of the existing structure. The engineer of record on the project shall be responsible for coordinating the Nucor CFR™ Roof System with the other trades of the project to insure a safe, quality, and proper application of the roof system. NBS does not supply clip fasteners to attach to non-Nucor framing materials.

4.2 DIAPHRAGM

The Nucor CFR™ Roof is designed to accommodate thermal expansion and contraction and will NOT act as a diaphragm for resisting lateral load forces or providing lateral stability to the roof structural members. Due consideration for this must be addressed by the project engineer of record. In addition, the CFR Roof, because it is designed to float, will not support structural members laterally. When replacing an existing screwdown roof, additional bracing may be required to laterally support the members. Engineering and material for these uses shall not be provided by NBS.

4.3 CLIP FASTENING REQUIREMENTS

Refer to section 2.3 "Design and Performance Criteria" for CFR Roof panel clip fastening requirements.

5.0

RECEIVING & HANDLING ROOF MATERIALS

5.0 RECEIVING & HANDLING ROOF MATERIALS

5.1 FIELD STORAGE OF MATERIALS

Upon acceptance of the shipment, the buyer or his representative is responsible for proper handling, storage, and security of the roof materials. NBS is **not liable** for damage, injury, or loss as a result of improper storage and/or handling.

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

- Store panels in a protected area, out of standing water and drifting snow, etc. Panel bundles and trim crates should be blocked 12" above grade.
- Elevate panels with blocking to allow air circulation under the bundle.
- Slope panels for drainage of moisture from the panels.
- As necessary, cover panels with waterproof tarp, allowing for air circulation (**do not wrap tarp under panel bundle or restrict air movement**).
- Inspect panels daily for moisture accumulation.
- If panel bundles contain moisture, the panels should be dried and re-stacked. Use care in re-stacking to avoid damage to panels.
- Opened or re-stacked panel bundles should be secured to prevent wind damage.
- Bundles should be located over primary structural frame lines, not in the middle of the bay. Blocking should be used between the

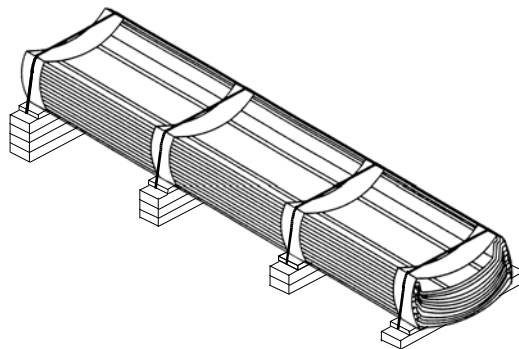
purlins/joists at the panel bundle locations. This blocking is not supplied by NBS.

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

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

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

IMPORTANT NOTE: The finish on these panels may not perform as intended if not erected within **90 days** from receipt at the job site. The finish is also subject to severe damage if moisture, debris, or dust is allowed to get between the panels; therefore, panels **MUST BE STORED UNDER COVER** with one end elevated to allow for drainage and protection against moisture, dust, or debris until erected. The manufacturer will not accept claims for non-performing panels if not properly stored at the jobsite. The customer assumes full responsibility for the condition of this material after deliver by the trucking company.



5.0 RECEIVING & HANDLING ROOF MATERIALS**5.2 HANDLING INDIVIDUAL ROOF PANELS**

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

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

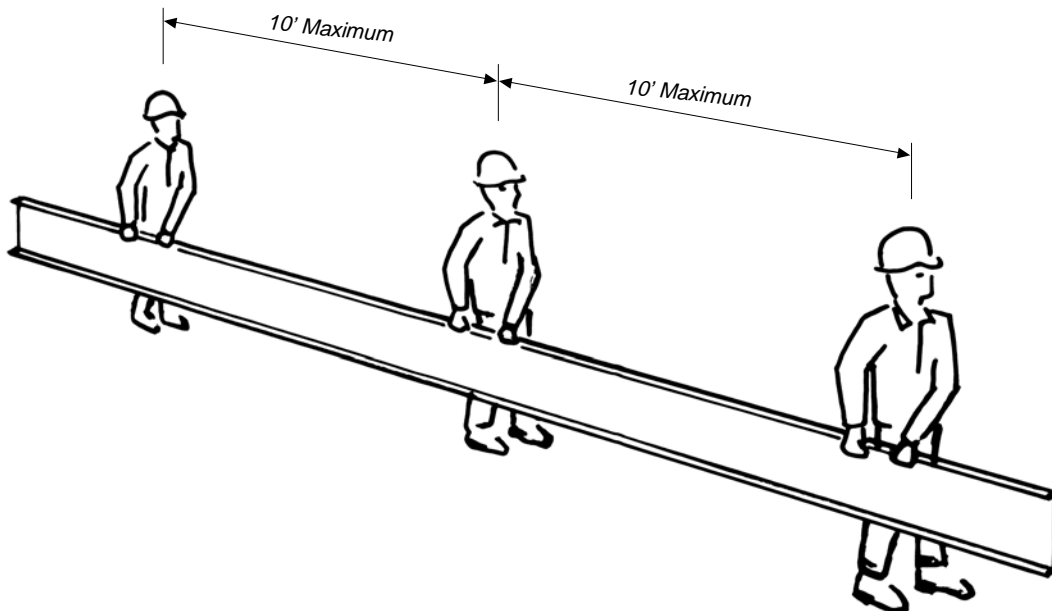
the panel, which can result in personal injury and property damage.

5.3 HANDLING ROOF MATERIALS IN STRONG WINDS

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

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

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



5.0 RECEIVING AND HANDLING ROOF MATERIALS**5.4 MATERIAL INVENTORY**

Your material is carefully inspected and packaged before leaving the plant and accepted by the transportation company as being complete and in satisfactory condition. It is the carrier's responsibility to deliver the shipment intact. Note any damage or discrepancies on the delivery tickets before signing as receiver.

Conducting a material inventory at the time of delivery is essential. By conducting the materials inventory, the erector is able to identify any material shortage or damage and avoid stopping installation later because of such shortage or damage. **All claims must be filed with NBS Quality Service Representatives prior to any field modifications or purchases that may result in a charge to NBS.**

It is imperative that any shortages or damages of the delivered materials be noted at once and clearly marked on the bill of lading before signature of acceptance. Notify NBS immediately of any conflicts. NBS will not be responsible for shortages or damages unless they are noted on the bill of lading. NBS is not responsible for items accepted in questionable condition.

In the case of packaged components (such as clips, fasteners, and mastics, etc.), the quantities are marked on their container and should be checked against the bill of materials.

5.5 EQUIPMENT FOR UNLOADING AND LIFTING

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

Nylon slings will be required to minimize panel damage. Nucor recommends a minimum 4" wide nylon sling be used. NBS panels are rolled and banded. No exterior covering is used, so care must be taken to prevent damage.

A spreader bar will be required for the longer panel bundles to assure correct sling spacing and uniform lifting. The spreader bar must be large enough to handle the maximum panel bundle weight and length.

Trim crates are to be handled in the same way as panel bundles.

Panel bundle weight can be found on the I.D. tag at the low end of each bundle. Maximum weight is 4000#. Steel chokers, cables or chains shall not be used.

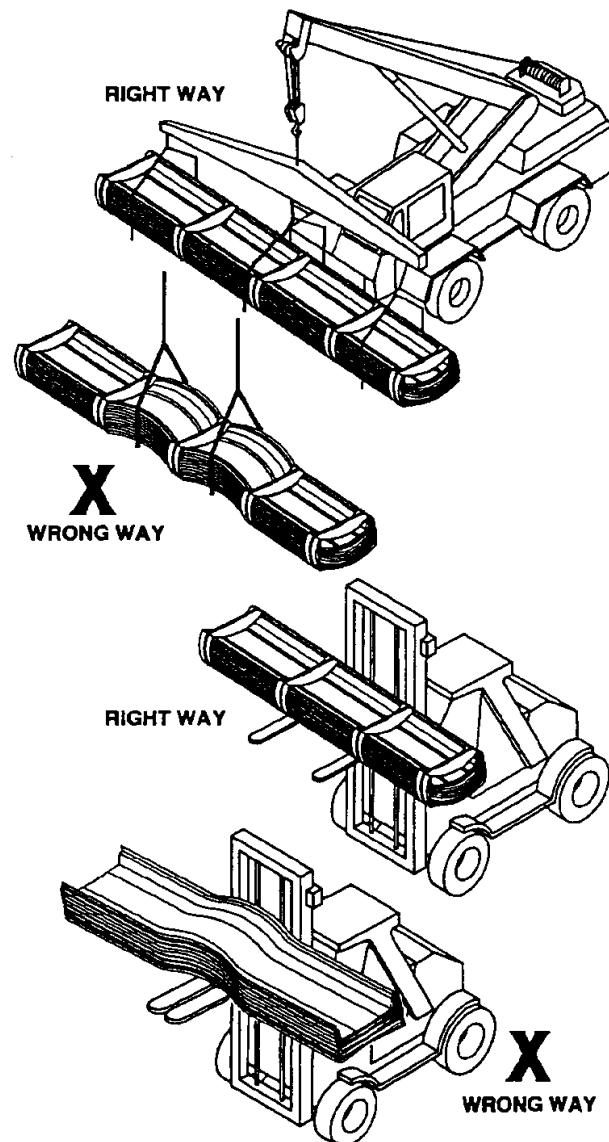
5.0 RECEIVING AND HANDLING ROOF MATERIALS**5.6 LIFTING ROOF PANEL BUNDLES**

Bundles over 25 feet long should be handled with a crane using a spreader bar and nylon slings. Lifting should occur at center of gravity. Locate slings at $\frac{1}{4}$ points of the length of the panel from each end of the bundle.

Loads should always be checked for secure hook-up, proper balance, and lift clearance. Tag

lines should be used if to control the load during lifting, especially if operating in the wind.

Panel crates less than 25' long may be lifted with a forklift only if the forks are spread at least 5' apart and blocking is used to prevent panel damage by the forks.



5.0

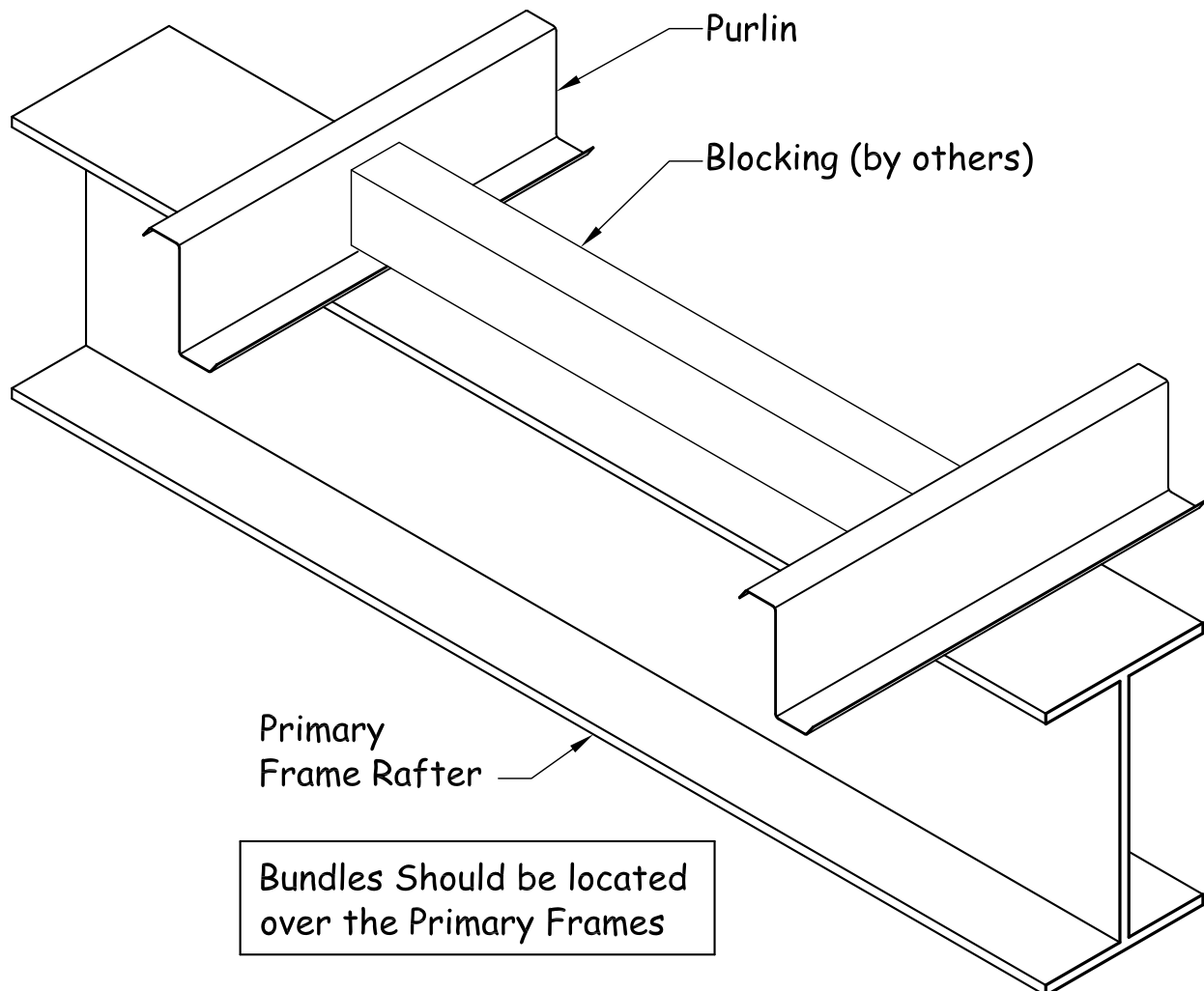
RECEIVING AND HANDLING ROOF MATERIALS

5.7 PLACING PANEL BUNDLES ON THE ROOF

Locate the bundles on the roof according to the erection sequence.

The bundles should be located over the primary structural frame lines, not in the middle of a bay.

Blocking should be used between purlins at the bundle locations as shown in the detail below. This blocking is not provided by NBS.



6.0 SAFE ROOF INSTALLATION

6.0 SAFE ROOF INSTALLATION

6.1 REGULATIONS

Regulations set forth by the Occupational Safety and Health Act, local, state, and/or federal agencies should be adhered to at all times. NBS is not responsible for injury, damage, or failure, which may be the result from failing to meet any of these regulations.

In compliance with the Hazard Communication Rule 1910:1200, Material Safety Data Sheets (MSDS) have been provided for your use and safety. These data sheets should be made available to all personnel that come in contact with these products. These data sheets will give you the necessary information to properly handle such materials and what to do in case of an emergency. (The MSDS sheets are located in one of the warehouse boxes for non-Nucor builders, and in the office of Nucor Builders).

6.2 ERECTOR'S RESPONSIBILITY

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

manual are believed to be reliable. However, NBS shall not be responsible for injury, damage, or failure due to the misapplication of these procedures, improper erection techniques, or negligence

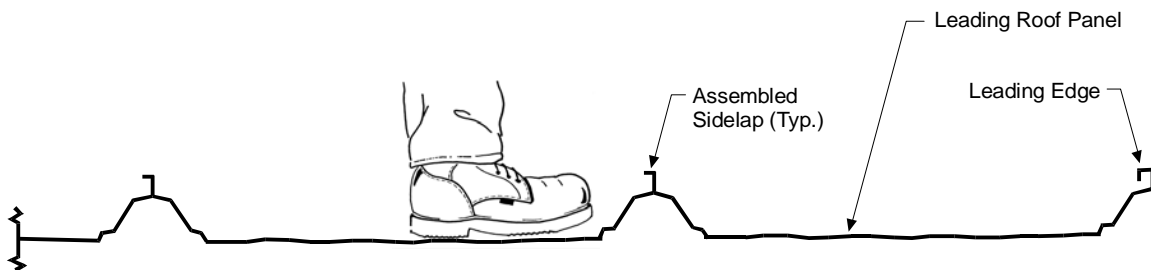
6.3 WALKING AND WORKING ON ROOF PANELS

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 unsecured panel could collapse under the weight of a person standing between purlins or at the panel end.

DO NOT walk on the last installed panel run, as the unsecured edge could collapse under a person's weight. When installing clips or making end lap connections, etc., stand where the roof structural will support your weight.

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



CORRECT
Step **ONLY** on secured roof panels.

6.0 SAFE ROOF INSTALLATION**6.4 SAFETY EQUIPMENT**

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

6.5 CREW SIZE

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

6.6 PANEL OVERHANG

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

6.7 POINT LOADS

When properly supported by the structural steel, panels are designed to support uniform loads, which are evenly distributed over the panel surfaces. Point loads that occur in small or concentrated areas, such as heavy equipment, ladder, or platform feet, etc., may cause panel deformation or even panel collapse.

6.8 SLICK SURFACES

Panel surfaces and structural steel surfaces are hard, smooth, and nonabsorbent, which causes these surfaces to be very slick when wet or covered with snow or ice. Even blowing sand or heavy dust can make these surfaces difficult to walk on without slipping.

Unpainted panel surfaces are often coated with oil to accommodate the panel-fabrication process. Although designed to wash away or evaporate during normal weather, the oil on new panels can be extremely slick, especially during periods of light rain and dew.

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

6.9 ELECTRICAL CONDUCTANCE

Metal panels are excellent electrical conductors. A common cause of injury is the contact of metal panels with power lines during handling and installation. The location of all power lines must be noted and, if possible, flagged. The installation process must be routed to avoid accidental contact with all power lines and high voltage services and equipment. All tools and power cords must be properly insulated and grounded and the use of approved ground fault circuit breakers is recommended.

6.10 FALSE SECURITY OF INSULATION

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

6.11 SHARP EDGES

Some edges on panels and flashing are razor sharp and can cause severe cuts if proper protective hand gear is not worn. Be careful not to injure others while moving panels and flashing.

6.0 SAFE ROOF INSTALLATION**6.12 SAFE ROOF INSTALLATION SUMMARY**

- **EXTREME CAUTION SHOULD BE EXERCISED WHEN WALKING ON ROOF PANELS.**
- **OILS USED DURING THE ROLL FORMING PROCESS AND/OR NATURAL MOISTURE MAY CAUSE THE PANELS TO BECOME SLIPPERY.**
- **DO NOT STEP ON PANELS WITH CREASED EDGES.**
- **DO NOT STEP ON OR NEAR THE EDGE OF A PANEL.**
- **DO NOT STEP WITHIN 5 FEET OF THE END OF A PANEL.**
- **DO NOT USE LOOSE PANELS AS WORK PLATFORMS.**
- **DO NOT WALK ON UNSECURED PANELS.**
- **DO NOT WALK ON TRANSLUCENT PANELS.**
- **SECURE ALL LOOSE PANELS AT THE END OF THE WORK DAY.**
- **USE EXTRA CARE WHEN WORKING ON STEEP SLOPES.**
- **WHEN INSTALLING CLIPS, WALK ONLY OVER THE PURLIN / JOIST LINES.**
- **AT THE END OF EACH WORKDAY, ALL FULL PANEL RUNS SHOULD BE HAND CRIMPED INTO A ROLL LOCK SEAM AT THE LOW EAVE, END LAP, HIGH EAVE, AND EVERY CLIP LOCATION.**

IN COMPLIANCE WITH THE HAZARD COMMUNICATION RULE 1910:1200, MATERIAL SAFETY DATA SHEETS HAVE BEEN PROVIDED FOR YOUR USE AND SAFETY. THESE DATA SHEETS SHOULD BE MADE AVAILABLE TO ALL PERSONNEL THAT COME IN CONTACT WITH THESE PRODUCTS. THESE DATA SHEETS WILL GIVE YOU THE NECESSARY INFORMATION TO PROPERLY HANDLE SUCH MATERIALS AND WHAT TO DO IN CASE OF AN EMERGENCY.

7.0 CHECKING THE STRUCTURE**7.0 CHECKING THE STRUCTURE****7.1 COMPLETED AND BRACED**

Before placing materials and workers on the roof structure to start roof installation, it must be confirmed that the structure is designed to accommodate the material and erection loads as well as the appropriate live loads and wind uplift loads.

It also must be determined that the structure is complete and structurally sound with all structural connections and bracing in place and secure.

7.2 LATERAL STABILITY

The sliding clip method of attaching roof panels to the roof secondary members provides only limited lateral stability and diaphragm bracing to the roof secondary members.

Before placing materials on the roof and starting the roof installation, confirm that the necessary roof bracing and sag angles or bridging is in place and secured.

7.3 ALIGNMENT

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

7.4 TOLERANCES

To assure the roof system's correct fit-up and designed weather tightness, the structure must be aligned within the following tolerances; also refer to the MBMA manual for common industry standards.

OUT OF SQUARE – The roof system can only accommodate 1/8" of "sawtooth" of the roof panel ends and 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 1/8" for each 40' of rake run.

STRUCTURE WIDTH AND EAVE STRAIGHTNESS – The roof system is designed to accommodate +/- 1" of overall structure width error, or +/- 3/4" of eave straightness error at each eave.

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

STRUCTURE LENGTH AND RAKE STRAIGHTNESS – The roof system is designed to accommodate +/- 2" of overall structure length error, or +/- 1" of rake straightness error at each rake line.

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

7.5 MEASURING

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

7.6 AESTHETIC ACCEPTANCE

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

8.0 ROOF INSTALLATION BASICS**7.7 CORRECTIONS**

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

8.0 INSTALLATION BASICS**8.1 PROPER TOOLS**

Before starting the roof installation, be sure that the proper equipment and tools are on hand. The tools must be in good operating condition and operators should adhere to safety precautions at all times.

The following tools and equipment should be considered for efficient installation of the NBS CFR Roof System. Actual tools and equipment required may vary due to variations in building type and construction:

- Nucor CFR™ End Lap Clamp (if required)
- Nucor CFR™ Modularity Clamp
- Nucor CFR™ Panel Modularity Tool
- Nucor CFR™ Manual Seaming Tool
- Panel Hand Crimping Tool
- Motorized Seaming Machine
- Screw Guns-designed for use with self-drilling screws
- Socket Extensions-6" for screw guns
- Hex Socket Heads-5/16" and 3/8", magnetic
- Electric Drill
- Drill Bits-assortment
- Sheet Metal Cutter-or power shears or nibblers
- "C" Clamps-vise grip type
- Pop Rivet Tool-1/8" capacity

- Sheet Metal Shears-left and right cut
- Hack Saw-with metal cutting blade
- Steel Measuring Tapes-12', 50', 100, and 120'
- Nylon String Lines
- Blue Chalk Line (Not Red)
- Brooms
- Marking Pens (do not use pencils)
- Caulk Guns-for 1/10 gallon mastic tubes
- Power Source and Extension Cords-capable of handling the total equipment requirement, including 20-amp seaming machine, without power drop due to extension cord length.

8.2 MASTIC**TEMPERATURE EFFECTS**

Temperature extremes must be considered during installation of the roof due to the sensitivity of mastics. The recommended installation temperature range is 20-120 degrees Fahrenheit. At colder temperatures, the mastic stiffens resulting in loss of adhesion and compressibility. At hotter temperatures, the mastic becomes too soft for practical handling. On cold but sunny days, the panel surface may become warm enough to accept the application of heated mastic even though the air temperature is below 20 degrees Fahrenheit.

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

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

8.0 ROOF INSTALLATION BASICS

CONTAMINATION

To assure proper adhesion and sealing, the mastic must have complete contact with adjoining surfaces. Contaminants such as water, oil, dirt and dust prevent such contact. The panel and flashing surfaces **must be dry and thoroughly cleaned of all contaminants.** Before applying tape mastic, the mastic should be checked for contaminants. If the mastic surfaces are contaminated, it must not be used.

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

Tape mastic is provided with a protective paper to reduce contamination. Incomplete removal of the protective paper will prevent the mastic adhesion to the panel or flashing surfaces. Always check that the protective paper is completely removed. **DO NOT** remove the protective paper until immediately before the panel or flashing is installed over the mastic.

COMPRESSION

To assure proper compression and seal, the tape mastic must be compressed between the

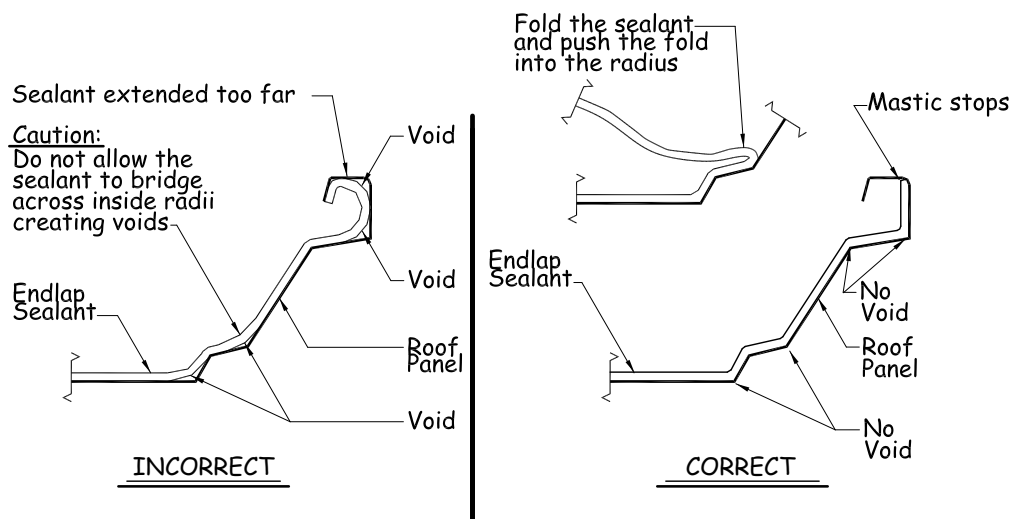
panel and flashing surfaces with firm and uniform pressure. In most cases, the required pressure is applied by the clamping action of screws pulling the adjoining surfaces together. However, the tape sealant's resistance to pressure becomes greater in cold weather.

During cold weather, the fasteners must be tightened slowly to allow the mastic time to compress. If the fasteners are tightened too fast, the fasteners 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.

INSIDE CORNERS

An inside radius, such as where the panel flat meets a rib, is usually the most critical area to seal. A common mistake for the installer is to bridge the 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, then push the mastic fold into the radius.



8.0 ROOF INSTALLATION BASICS**8.3 FASTENERS****SCREW GUNS**

Use torque control screw guns for driving self-drilling screws. 2000-2500 RPM screw guns with torque adjustable clutch are necessary to attain efficient drilling speeds. High tool amperage (6-7 AMP) is required to achieve the proper torque for secure fastening. **Do not use impacting tools. Also note that cordless screw guns will not work.**

To assure proper voltage to the tool, extension cords should be checked for proper wire size and cord length:

- 16 ga. wire, max cord length = 100'
- 14 ga. wire, max cord length = 200'
- 12 ga. wire, max cord length = 300'

SOCKETS

Use good quality magnetic sockets. Good fitting sockets reduce wobble and stripping of the screw heads. They also minimize objectionable paint chipping and scuffing on colored screws and minimize damage to the protective coating on unpainted screws.

Magnetic sockets collect drill shavings, which will build up and eventually prevent the socket from seating properly on the screw heads. One method of removing the drill shavings is to roll up a ball of tape mastic and push the socket into the mastic.

When the socket is removed from the mastic, most of the drill shavings will be embedded in the mastic thereby cleaning the socket. This process should be repeated as often as needed to keep the socket clear of drill shavings.

SOCKET EXTENSIONS

A 4" or 6" socket extension is recommended for installing the panel clip screws. With the extension, the screw can be driven straight down without tilting the screw gun to clear the panel or clip.

INSTALLATION

Before starting the screw, the materials to be joined must be pressed together with foot or

hand pressure. The pressure must be maintained until the screw has drilled through all the materials and the threads have engaged.

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

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

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

The fastener should be driven tight enough to uniformly compress the washer but not so tight that the washer splits or rolls out from under its metal dome. The recommended procedure is to tighten the fastener until the sealing washer just starts to visually bulge from under the metal dome. **Refer to the chart on the following page for a proper fastener-seating diagram.**

As a standard practice, NBS provides oversized (goof) screws. Upon stripping or breaking a screw, the screw must be immediately removed and replaced with the goof screw. Do not defer the screw replacement to be remembered and fixed later, or to be found by the clean-up crew. The majority of such screws are easily overlooked until they cause leak problems later.

8.0 ROOF INSTALLATION BASICS**THIS CHART SHOWS PROPER FASTENER SEATING PRACTICE**

<u>CORRECT</u>	<u>TOO LOOSE</u>	<u>TOO TIGHT</u>
		
Sealing Material slightly visible around Metal Washer	Sealing Material not visible around Metal Washer	Sealing Material deformed beyond the edge of the Metal Washer

8.4 FIELD CUTTING OF PANELS AND FLASHING**ABRASIVE SAW PROBLEMS**

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

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

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

SHEARING METHODS

It is recommended that panels and flashing be cut with shears or nibblers to provide a clean, undamaged cut. On shear cut edges, the protective cladding extends to the edge of the cut and is often wiped over the edge to further protect the base metal. Whenever possible, fit the material so that the factory cut edge is exposed and the field cut edge is covered.

When field cutting complex shapes, it is usually easier to cut out a 1" wide strip using both left and right hand shears. The 1" cutout provides clearance to smoothly cut the flats and the clearance to work the shears around tight corners.

When making repetitive cuts (such as cutting panels at a hip condition) it is recommended that a template be made from a piece of drop-off panel or flash to provide fast and accurate marking of the field cut. When using panel material for the template, cut off the top portion of the panel ribs so that the template is easily laid onto the panel being marked.

MARKING PANELS

Avoid marking the panels for cutting, etc., in a manner that will leave visible markings, stains, etc., on the finished roof surface. Use chalk or felt tip ink markers. Consider using clothes pins attached to the panel seam to mark problem/ unfinished areas. **DO NOT USE GRAPHITE (LEAD) PENCILS ON UNPAINTED PANEL SURFACES; THE GRAPHITE WILL CAUSE RUSTING OF THE SURFACE.**

8.0 ROOF INSTALLATION BASICS**8.5 SHEETING DIRECTION AND MODULARITY**

Although the Nucor CFR™ Roof System is designed so it can be installed either direction (left to right or right to left), there may be roof conditions that require a specific sheeting direction. Check the erection drawings to determine if a specific sheeting direction is required. The required installation sequence is to complete each panel run from eave to ridge before starting the next panel run. This sequence will help ensure straight runs and allow the insulation to be installed immediately ahead of each panel run.

During installation of the roof, considerations must be made for maintaining panel modularity. By maintaining panel modularity, proper roof coverage can be obtained and the standard perimeter parts will fit properly without necessity of field modifications or reordering of parts, etc.

For proper fit-up between the panel, mastic and closures or end lap parts, the panels must be held to the 24" coverage dimension (within a 1/8" tolerance per panel). The accumulated coverage (start panel to finish panel) tolerance is determined by the ability to keep the panels parallel and to correctly fit and assemble the finish rake condition.

If the roof panel has conditions such as fixed location penetrations, parapets, firewalls, etc., the accumulated panel coverage may require tighter tolerances for proper fit-up and weather-tightness of the roof system.

IN ORDER TO MAINTAIN ROOF PANEL MODULARITY IT IS REQUIRED TO INSTALL THE END DAMS IN THE PREVIOUS PANEL RUN. IF THE END DAMS ARE NOT INSTALLED IN THE PREVIOUS PANEL RUN, IT WILL BE DIFFICULT TO HOLD MODULARITY AND TO ACHIEVE PROPER WEATHER-TIGHTNESS. ALSO: IMPROPER INSTALLATION CAN VOID YOUR

WARRANTY. NOT INSTALLING THE END DAMS USING THIS METHOD WILL ALSO ADD A SIGNIFICANT AMOUNT OF FIELDWORK LATER ON.

It is also recommended to use **panel modularity tools and panel clamps** to help hold the proper coverage.

8.6 LAYOUT AND CHECKING COVERAGE

Recommended for all roofs, but a must for large or complex roofs, is to make a layout of the actual structure (field measured as described in sections 7.4-7.5) so that the roof panel start and stop dimensions can be laid out to accommodate any structural misalignments.

Panel coverage is always checked at the eave, ridge, and end laps so that non-parallel seam (or dogleg) conditions can be detected and corrected before they become objectionable. The coverage check should be one with a measuring tape held taut and measured to the same side of the seam and always parallel to the eave to prevent any measuring error.

Every four to six panel runs should be checked for panel modularity. This will assure that the panels are maintaining a straight line and proper coverage is being maintained. If the panels are off module, they should be corrected by equal adjustments of the next four to six panel runs.

8.7 APPEARANCE CONSIDERATIONS

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

8.0 ROOF INSTALLATION BASICS**8.8 INSPECTION OF THE ROOF ASSEMBLY DURING INSTALLATION****IMPORTANCE OF INSPECTION**

During the roof installation, all areas of the roof system assembly must be frequently inspected to ensure the correct assembly in accordance with the erection drawings and this manual.

Failure to assemble the roof system correctly will result in roof performance problems that may require costly corrective work, roof replacement and performance and damage claims, etc. Also, incorrect installation may void the material and weather-tightness warranties.

8.9 INSPECTION LIST**ERECTION DRAWINGS**

Check that the erection drawings are available at the job site and have been reviewed for differences with the actual job conditions and differences with the erection manual. Also confirm that the drawings are the latest issue with the latest revisions and additions.

ROOF LAYOUTS

Check that the roof start and finish dimensions have been correctly determined based on the erection drawings and the actual structural conditions.

STRUCTURAL ALIGNMENT

Check that the structural misalignments were corrected in accordance with section 7.3 of this manual.

PANEL LENGTH

Check that the installed roof panels have the correct overhang at the eave and end laps and have the correct hold back dimension at the ridge or high eave, in accordance with the erection drawings.

EAVE SEAL

Check that the eave mastic is in the correct position on top of the eave plate and that the void closure and eave tube caulk are correctly placed. Check that the eave fasteners penetrate the center of the eave mastic and into the eave plate. Check that the fasteners are not loose or stripped.

Check that the eave mastic is in complete contact with the roof panel and eave plate without any voids or gaps. Confirm that the roof panel and eave plate are clean and dry during installation and that the mastic is not wet or otherwise contaminated.

END LAP SEAL

Check that the roof panel end laps are correctly assembled and that the lapping panels are tightly nested without visible gaps.

Check that the mastic is in the correct position and is in complete contact with the lapped panels without any voids or gaps, especially at the radius between the panel flat and the vertical legs of the panel. Confirm that the panels are clean and dry during installation and that the mastic is not wet or otherwise contaminated.

Check that the butyl tube caulk is in the correct position and seals the end lap seam notches.

Check that the end lap fasteners penetrate through the center of the mastic and into the back-up plate. Check that the fasteners are not loose or stripped.

Check that the end lap assembly is not bowed down causing water ponding and debris accumulations.

RIDGE SEAL

Check that the end dam assembly is correctly installed.

Check that the mastic is in the correct position and is in complete contact with the end dam and the roof panel without any voids or gaps. Confirm that the end dam and roof panels are clean and dry during installation and the mastic is not wet or contaminated.

Check that the end dam fasteners penetrate through the center of the mastic and into the back-up plate. Check that the fasteners are not loose or stripped.

Check that the tube caulk is installed along the back of the end dam as necessary to seal any voids around the panel seam area.

8.0 ROOF INSTALLATION BASICS**RAKE SEAL**

Check that the mastic between the rake trim and the roof panel is properly installed.

Check that the end caps are installed properly.

Check that the flashing splices are correctly lapped, sealed, and fastened.

Check that all fasteners are seated properly.

PANEL CLIP ATTACHMENT

Check that the panel clips are correctly fitted to the panel without any distortion or damage of the clip tab. On sliding clips, check that the clip tab is centered on the clip base between the centering tabs.

Check that the clips are located along each panel side lap at each roof secondary member or at the locations specified on the erection drawings.

Check that the panel clip fasteners are of the type, size, length, finish and quantity per clip as specified on the erection drawings.

Check that the panel clip fasteners are not loose or stripped. In the case of composite Nucor CFR™ construction, verify that the fasteners penetrated and engaged the specified roof secondary member.

SIDE LAP

Check that the factory installed side lap mastic is in the correct position without voids or interruptions and is not damaged, wet or otherwise contaminated. Replace missing side lap mastic with butyl tube caulk supplied with job.

Check that the full length of each side lap seam is correctly seamed.

Check that the panel coverage tolerance does not exceed 1/8" per panel and that the accumulated coverage will allow proper fit and assembly of the end dams and finish rake condition and any other critical fit conditions such as penetrations, parapets, etc.

FLASHING AND PENETRATIONS

Check that all flashing (including penetrations) are correctly assembled and tightly fitted. Check that the required mastics are correctly positioned and in complete contact with the adjoining surfaces without voids or interruptions. Confirm that the mastics and adjoining surfaces are clean and dry during installation.

Check that the flashing splices are correctly lapped, sealed and fastened.

Check that the flashing is sufficiently pitched to shed water and eliminate ponding areas, especially at the critical splices, end laps and corners.

Check that the fasteners are of the specified type, size, length, finish and spacing. Check that the fasteners are not loose or stripped. Check that the sealing washers are in full contact with the flashing surface and not distorted, split or otherwise damaged.

Along the rakes, high eave transitions, fixed penetration, etc., check that the flashing is not constrained and will allow for the roof's expansion/contraction movement.

UNSPECIFIED MATERIALS

Use of the wrong materials may cause installation and performance problems and may void the performance and material warranties.

Check that all installed roof system materials, especially mastics and fasteners, are only those which are provided or specified by NBS for your specific project and are used only as a specified on the erection drawings and this installation guide.

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

8.0 ROOF INSTALLATION BASICS

SURFACE CONDITIONS

Damaged roof system surfaces are subject to corrosion and performance problems and may void the material and performance warranties.

Check that the panel and flashing surfaces are not being subjected to abusive conditions such as: careless handling of panels and flashing, excessive roof traffic, abrasive or contaminated footwear, rough handling of materials, tools and equipment, or contact with abrasive materials or residue, etc.

Check that the panel and flashing surfaces are not being subjected to exposed metal objects and material left on the roof such as: tools, material drop-off, fasteners, wire, staples, drill and nibbler chips, saw and file particles, etc. In the process of rusting, these materials will absorb the panel's protective coating, thus leaving the panels exposed to rusting.

Check that the panels and flashing are not being subjected to long term wet conditions such as: standing water, consistent sources of steam, mist, spray, dripping or runoff, wet debris, wet insulation or other moisture holding material.

Check that the panels and flashing are not subjected to direct contact or runoff from corrosive materials such as: copper pipes and flashing, uncured cement, treated lumber, anti-

icing chemicals, galvanized materials, strong solvents or other corrosive materials.

Check that graphite (lead) pencils were not used to mark on unpainted surfaces. The graphite marks will cause rusting.

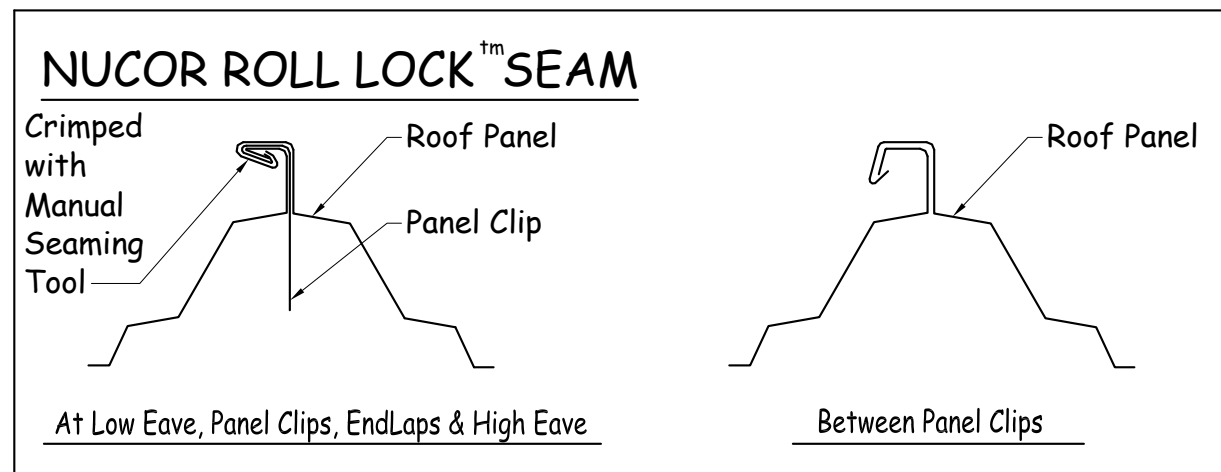
Check that the roof materials are not subjected to damaging heat such as: cutting torches, abrasive saws, etc.

HAND CRIMPING & MOTORIZED PANEL SEAMING

As the roof installation progresses, it is **required** to hand crimp and/ or mechanically seam the previous full panel run. Seaming options differ per project. Refer to the erection drawings for specific seam requirements. Then review the details in sections **10.2**, **12.3**, and **17.4** of the Seaming Manual (the seaming manual is included with the seaming kit).

IMPORTANT NOTE:

As a minimum, the roof should be hand crimped into a Nucor Roll Lock™ Seam at the low eave, end lap, high eave, and every clip location at the end of each workday. Failure to do so may result in panels coming off of the roof due to high winds.



8.0 ROOF INSTALLATION BASICS**8.10 ROOF LEAK TROUBLESHOOTING & POTENTIAL CAUSES OF ROOF LEAKS**

The erector does not locate and read the Nucor CFR™ erection manual and erection drawing instructions

The erection manual defines the standard details required for installing the Nucor CFR™ Roof System. **The manual and erection drawings are shipped in a warehouse crate clearly stamped, "OPEN ME FIRST"**. Reading the erection manual and drawings will actually improve the productivity and quality of your work. We have included the benefit of years of testing and feedback from many installers who have installed millions of square feet of Nucor CFR™ Roof. Be cautious with anyone who tells you that their experience allows them to deviate from the tried and true instructions found in our erection manual and erection drawings.

The building insulation is not properly tied off to form a vapor barrier, allowing the roof to condensate.

Condensation occurs when warm moist air comes in contact with colder surfaces such as panels, framing members, etc. The insulation system must be designed to act as a vapor barrier in addition to providing thermal values. It is the erector's responsibility to install the insulation properly, according to normal and customary industry practices.

The back-up plate at the end lap is not properly installed or aligned.

If the tabs on the back up plate are not properly attached over the end of the roof panels, the back-up plate will push away and not allow the end lap fastener to engage properly. NBS recommends the panel to be fully seated into the alignment tabs on the back up plate to align the end lap parts. Be sure not to penetrate the vinyl insulation backing.

The 27" pre-cut mastic at the end lap is not properly located.

The end lap mastic is placed 2" down from the top of the lower panel. This allows the fasteners that are installed in the dimples on the upper panel to properly penetrate the tape mastic.

Stripped fasteners at end laps, joints, rake, eave, ridge, etc.

NBS provides oversize fasteners (goof screws) to be used when end lap fasteners are stripped. It is important that if a fastener is stripped, it is replaced with one of a larger size to ensure the proper tightening and clamping force is achieved.

The end dams are not installed as the roof is put down and/or they are not properly caulked.

If the proper installation procedure is not followed the coped area of the panel will not be sealed and moisture build up from ice and snow or a driving rain may infiltrate the building. Refer to the NBS erection manual section **(13.8-13.11)** for instructions. The end dams must be installed in the prior full panel run. The end dams are aligned and fastened together, sealed with butyl tube caulking.

Mastic is not applied properly at the low eave void closure.

Mastic is to be placed above the void closure at the eave of the building. Refer to section **(11.3)** of the NBS erection manual. Additionally, care must be taken to ensure the void closure is centered under the corrugation of the roof panel.

Incorrect caulking type used at roof locations.

NBS provides two types of tube caulking. A non-skinning butyl caulk is supplied for all roof applications, and a skinning polyurethane caulk is supplied for trim applications. The polyurethane caulk is not to be used in roof applications.

Holes in the roof panels

Most of the time, holes in roof panels are from objects being dropped or thrown onto the panels. These include screw guns, end dams, back-up plates, clips, etc. Small holes can be patched with a piece of galvalume material sealed with tape mastic and screwed in place. Larger holes should be repaired by replacing the roof panel.

9.0 STANDARD HARDWARE PARTS**9.0 STANDARD HARDWARE PARTS****9.1 GENERAL**

The following details provide a basic description and graphic illustrations of the standard roof assembly parts. The purpose of these details is to assist the erector in the correct selection and identification of parts.

Because of the many variations in conditions, it is important that you review the job conditions to identify the specific parts required for your job.

Review the erection drawings for any special parts or parts which are different from the standard parts shown in these details. If differences exist, the erection drawings will take precedence.

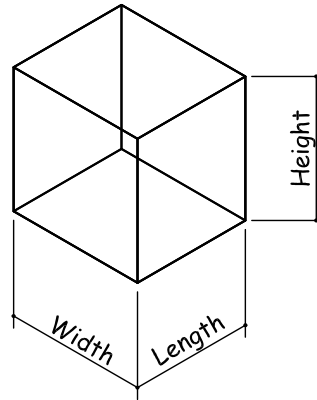
For proper fit-up, sealing and fastening, and to help ensure the roof assembly's weather-tightness, structural capability, durability and appearance, the correct parts must be used. Do not use parts other than those specified on the erection drawings.

9.0

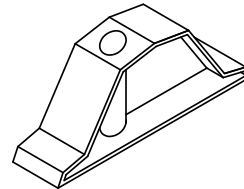
STANDARD HARDWARE PARTS

DIMENSION INFORMATION

The detail at right shows how the standard parts are dimensioned. Note that the dimensions given are nominal. Some parts do not have all 3 (length, width, height) dimensions given, as they may not be relevant.

VOID CLOSURE

Polypropylene Plastic - Black
Factory Hole

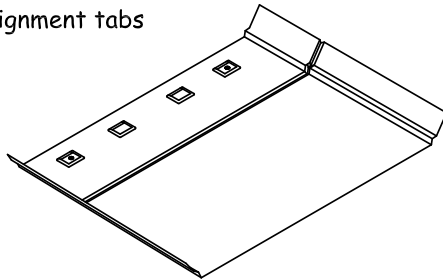


Length = $4 \frac{9}{16}$ "
Width = 1"
Height = 2"

Part No. H2630

BACK-UP PLATE

16 Gauge Steel
Galvanized
Factory alignment tabs

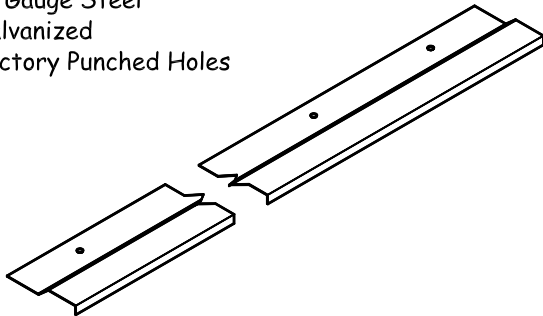


Length = 24"
Width = $12 \frac{1}{2}$ "

Part No. H2650

EAVE PLATE

18 Gauge Steel
Galvanized
Factory Punched Holes

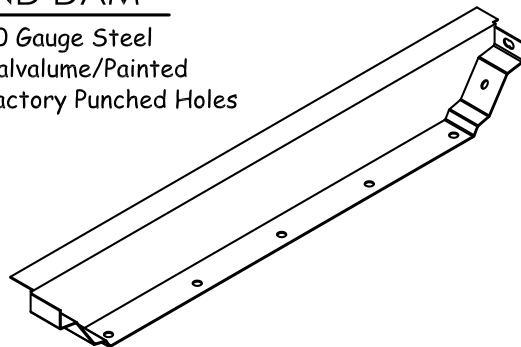


Length = 9'-0"
Width = $3 \frac{1}{2}$ "
Height = Short $1 \frac{1}{2}$ ", Tall $1 \frac{1}{2}$ "

(See the
Erection Dwgs
for Part No's)

END DAM

20 Gauge Steel
Galvalume/Painted
Factory Punched Holes



Length = $23 \frac{7}{8}$ "
Width = 2"
Height = 3"

Part No. H2600

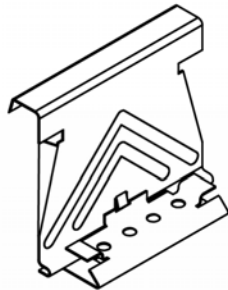
9.0

STANDARD HARDWARE PARTS

CFR CLIP

20 Gauge Steel
Galvanized

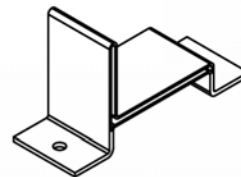
(See Erection Dwgs for Part No's)
(Fixed and Floating Clips Available)



Length = 4 1/4"
Height = 3 5/8" Short, 4 5/8" Tall

RAKE ANGLE CLIP

16 Gauge Steel
Galvanized
Factory Punched Holes

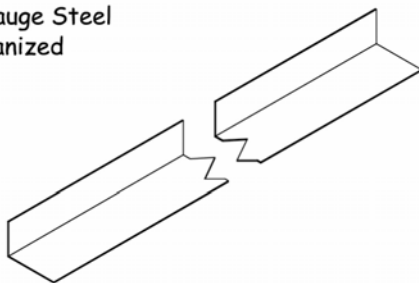


Length = 5 11/16"
Width = 1 1/2"
Height = 2 3/4" Short, 3 3/4" Tall

Part Number
Short-H2041
Tall-H2051

RAKE ANGLE

16 Gauge Steel
Galvanized

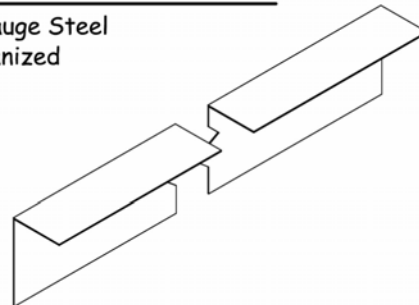


Length = 20'-0"
Width = 3"
Height = 2"

Part No. MAR02

WALL RAKE ANGLE

16 Gauge Steel
Galvanized

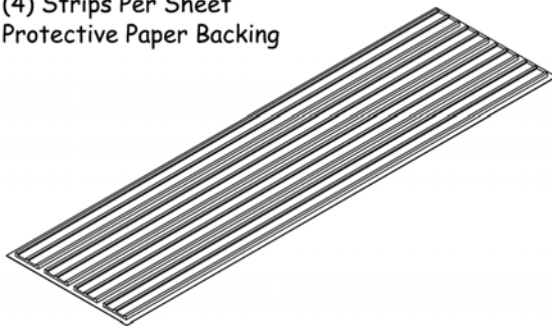


Length = 20'-0"
Width = 3"
Height = 5"

Part No. MAR01

27" PRE-CUT MASTIC

(4) Strips Per Sheet
Protective Paper Backing

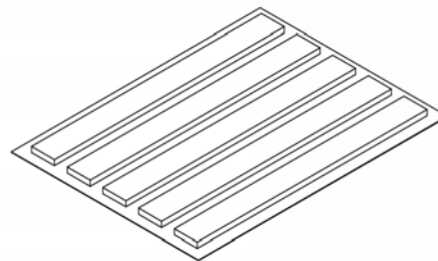


Width = 1 1/2"
Thickness = 3/16"

Part No. H3650

8" PRE-CUT MASTIC

(5) Strips Per Sheet
Protective Paper Backing



Width = 1"
Thickness = 1/4"

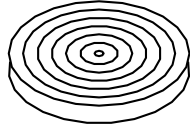
Part No. H3640

9.0

STANDARD HARDWARE PARTS

TAPE MASTIC

Isobutylene Tripolymer
50'-0" Roll

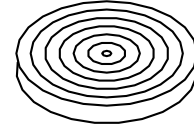


Width = 3/4"
Thickness = 1/8"

Part No. H3000

TAPE MASTIC

Isobutylene Tripolymer
30'-0" Roll

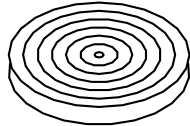


Width = 1 1/2"
Thickness = 1/8"

Part No. H3001

TAPE MASTIC

Isobutylene Tripolymer
50'-0" Roll

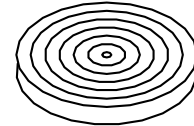


Width = 1/2"
Thickness = 3/32"

Part No. H3010

TAPE MASTIC

Isobutylene Tripolymer
20'-0" Roll

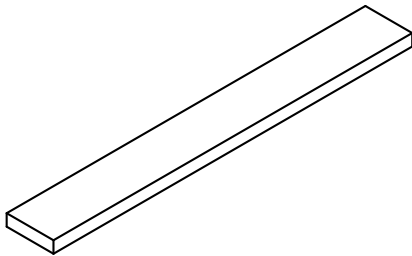


Width = 2 1/4"
Thickness = 3/16"

Part No. H3020

THERMAL BLOCK

Expanded Polystyrene

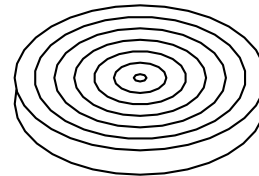


Length = 23"
Width = 3"
Height = 13/16"

Part No. H3300

EPS FOAM SPACER

Expanded Polystyrene
50'-0" Roll



Width = 2 1/2"
Thickness = 1/2"

Part No. H3310

BUTYL TUBE CAULK

Roof Applications

Provides 23'-0" lineal feet with
a 1/4" to 3/8" bead size

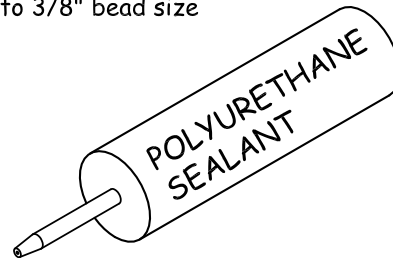


Part No. H3151

POLYURETHANE TUBE CAULK

For Use At Trim Laps


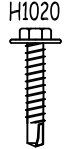




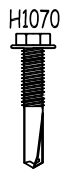


Provides 23'-0" lineal feet with
a 1/4" to 3/8" bead size



Part No. H3152

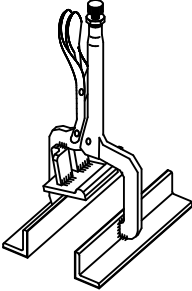
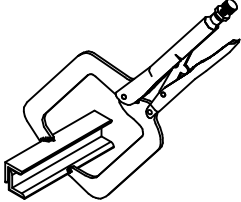

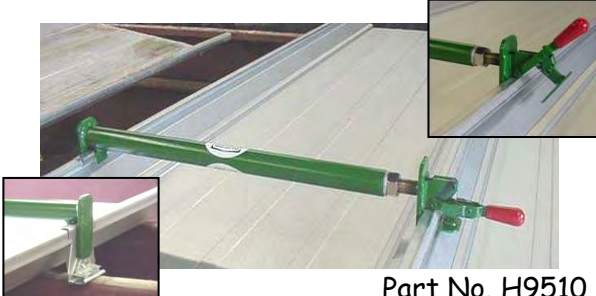
9.0

STANDARD HARDWARE PARTS

FASTENER	SPECIFICATIONS	USAGE
	SELF-TAPPING SCREW No. 17-14x1 1/4" W/ Sealing Washer "GOOF-SCREW" LONG LIFE FASTENER - 3/8" HEAD Recommended Tool Types: (High Torque, Low RPM) Torque Adjustable Clutch -DO NOT use Impacting Tools	Used at locations where fastener has stripped out.
	SELF-DRILLING SCREW No. 1/4-14x1 1/4" TCP3 W/O Washer 5/16" HEAD Recommended Tool Types: -2000 RPM; Torque Adjustable Clutch -4 Amp or Higher Rated Tools -DO NOT use Impacting Tools	Used to attach panel clips, end dams, rake angle clips, and rake angle to purlins.
	SELF-DRILLING SCREW No. 12-14x1 1/4" TCP2 W/ Sealing Washer LONG LIFE FASTENER - 5/16" HEAD Recommended Tool Types: -2000-2500 RPM; Torque Adjustable Clutch -DO NOT use Impacting Tools	Used to attach roof panel, roof flashing and light gauge parts. Maximum insulation thickness is < 6".
	SELF-DRILLING SCREW No. 1/4-14x 7/8" TCP1 W/ Sealing Washer LONG LIFE FASTENER - 5/16" HEAD Recommended Tool Types: -2000 RPM; Torque Adjustable Clutch -DO NOT use Impacting Tools	Used to attach light gauge roof trim end laps and trim to roof panels.
	SELF-DRILLING SCREW No. 1/4-14x 7/8" TCP1 W/O Washer 5/16" HEAD Recommended Tool Types: -2000 RPM; Torque Adjustable Clutch -DO NOT use Impacting Tools	Used to attach light gauge wall trim end laps and trim to wall panels.
	SELF-DRILLING SCREW No. 1/4-14x 7/8" TCP1 W/ Washer 5/16" HEAD Recommended Tool Types: -2000 RPM; Torque Adjustable Clutch -DO NOT use Impacting Tools	Used to attach light gauge wall trim end laps and trim to wall panels.
	SELF-DRILLING SCREW No. 12-24x 1 1/2" TCP5 W/O Washer 5/16" HEAD Recommended Tool Types: -2000 RPM; Torque Adjustable Clutch -4 Amp or Higher Rated Tools -DO NOT use Impacting Tools	Used to attach panel clips, rake angle clips, and rake angle to joist.
	POP RIVET 1/8" x 3/16" Stainless Steel Blind Pop Rivet Recommended Tool Types: -Manual or Electric Rivet Tool -DO NOT use Impacting Tools	Used at trim laps, corner caps and attaching light gauge material to siding where screws can't be used.
	INSULATION RETAINER WASHER 1 1/4" Steel Flat Washer with 5/16" diameter hole	Used with self-drilling screws to attach insulation at the building eave.

9.0 STANDARD HARDWARE PARTS

9.2 CFR ROOF ACCESSORY TOOLS

CFR ROOF ACCESSORY TOOLS	USAGE
<p><u>CFR MODULARITY CLAMP</u></p>  <p>Part No. H7100</p>	<p>Used to hold or adjust panel modularity as needed (BUY OUT ITEM)</p>
<p><u>CFR ENDLAP CLAMP</u></p>  <p>Part No. H7200</p>	<p>Used as an aid when installing the panel end lap. Also, used on the finished end lap seam (BUY OUT ITEM)</p>
<p><u>CFR MODULARITY TOOL</u></p>  <p>Part No. MTB01</p>	<p>Used to hold panel modularity as needed (SUPPLIED WITH EACH JOB)</p>
<p><u>CFR ADJUSTABLE MODULARITY TOOL</u></p>  <p>Part No. H9510</p>	<p>Used to hold or adjust panel modularity as needed (BUY OUT ITEM)</p>

10.0 PREPARATION FOR ROOF PANEL INSTALLATION

10.1 GENERAL

The following details provide graphic illustration of the roof assembly steps. The purpose is to instruct the erector in correct and efficient assembly of the roof system.

Because of the many variations in conditions, it is important that you review the job to identify and isolate the specific installation details required for your job.

Review the erection drawings for differences with these details. If differences exist, the erection drawings will take precedence.

These details are arranged in a step-by-step sequence. Following this sequence ensures that correct assembly and ensures that the part to be worked on will be readily accessible for the next assembly step.

Do not shortcut these assembly steps without careful consideration of the possibility of incorrect or omitted assembly and the resulting corrective rework.

To minimize confusion, the details are usually oriented so that the view is from eave to ridge, with the starting rake at the left and finish rake at the right. Refer to the erection drawings to determine the required sheeting direction and rake conditions.

To help ensure weather-tightness, the details emphasize proper fit-up, sealing and fastening. It is most important that only the specified mastics and fasteners be used for each condition and that they be installed correctly as shown on these details and the erection drawings.

Be sure that these critical instructions are reviewed often and the roof assembly is checked at each assembly step

10.0 PREPARATION FOR ROOF PANEL INSTALLATION

10.2 ORIENTATION AND EXPLANATION

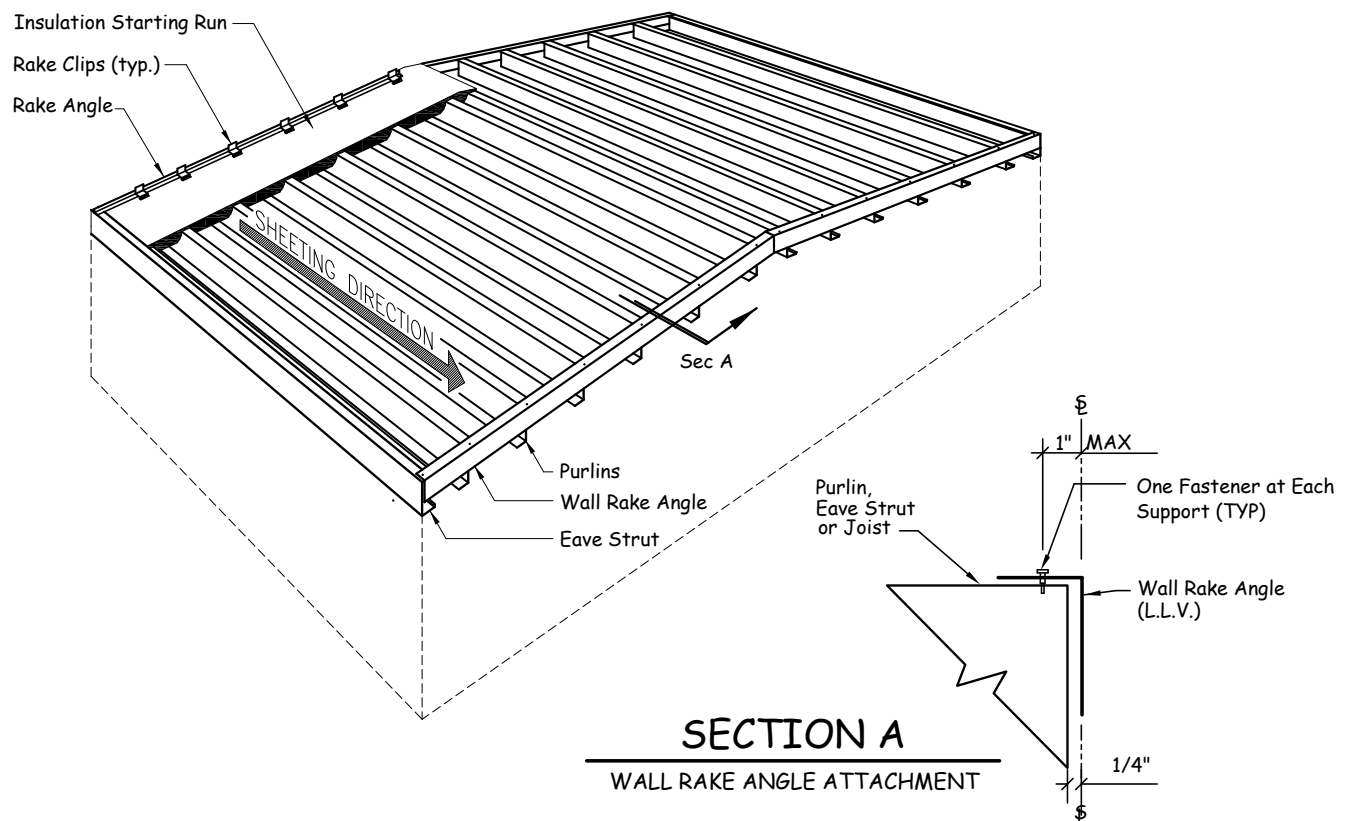
The details in this section will show the installation of the eave plate, eave mastic, rake clips, rake angle, and the first run of insulation. **These are the parts that must be installed before the roof panel installation can begin.**

The view below shows the roof system oriented for a left-to-right sheeting direction. For right-to-left sheeting direction, reverse the parts orientation. The panel erection sequence must always be started from the low eave corner working toward the high eave or ridge. The full panel run from eave to high eave or ridge must be installed before the next panel run can be started.

In the case of a building with a roof step, the lower level panels must be installed before the upper level panels. Install six lower panels ahead of the upper panels.

10.3 WALL RAKE ANGLE ATTACHMENT

Start Wall Rake Angle (**MAR01**) flush with the edge of the eave member (long leg vertical) as shown below. Place long leg of angle $\frac{1}{4}$ " away from Steel Line and attach to each secondary support member with (1) **H1020** for purlins or (1) **H1070** joists. Fastener placement not to exceed 1" from Steel Line.



10.0 PREPARATION FOR ROOF PANEL INSTALLATION

10.4 EAVE PLATE

Refer to the erection drawing roof line trim details for the required **eave plate part number**.

The eave plate provides a solid attachment surface for the low eave end of the roof panel.

The eave plate must be installed before the roof insulation is placed over the roof secondary members.

Before installing the eave plate, check that the eave secondary members are in straight alignment from rake to rake and that the building is square.

Install the starting and finishing ends of the eave plates flush with the outer face of the rake angle.

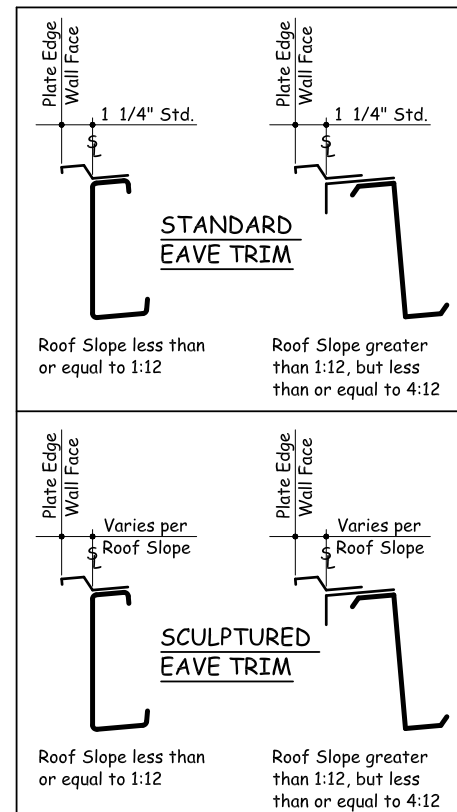
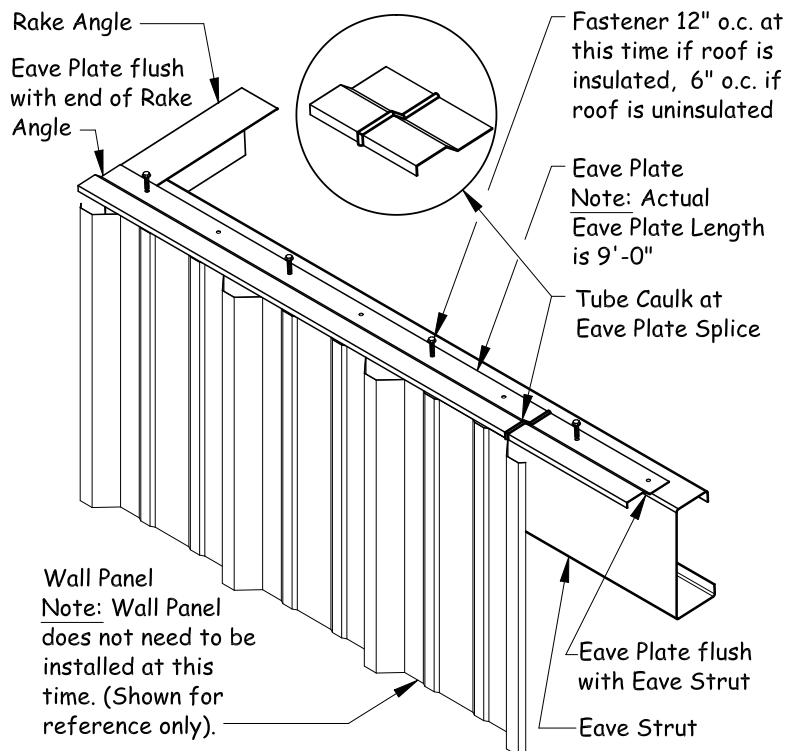
Place the eave plate at the edge of the eave secondary member. The top leg of the eave plate will extend past the low eave steel line flush with the outside face of the wall panel as shown in the illustration below.

Butt eave plates together at splices and seal with polyurethane tube caulk (H3152).

Fasten at factory punched holes with **H1020 screws** at 12" o/c. The open holes left will be filled when the insulation is installed.

If no insulation is required, install all eave plate fasteners at this time.

See the erection drawings for sculptured eave trim installation instructions.



10.0

PREPARATION FOR ROOF PANEL INSTALLATION

10.5 RAKE CLIP PRE-DRILLING DETAIL

Prior to installing the roof insulation and the roof insulation pan (if required) the purlins/joists will need to be pre-drilled for the rake clips. **The pre-drilling of the rake clip holes will make the installation of the rake angle and rake clips much easier**, after the insulation is in place. If building is insulated, do not install the rake clips at this time. If building is un-insulated, pre-drilling is not required, and the rake angle and rake clips can be installed at this time. See following instructions for either condition.

IMPORTANT NOTE: THE RAKE CLIP IS TO BE PLACED ON TOP OF THE INSULATION. NOT DOING SO MAY CAUSE PROBLEMS WITH CONDENSATION LATER ON.

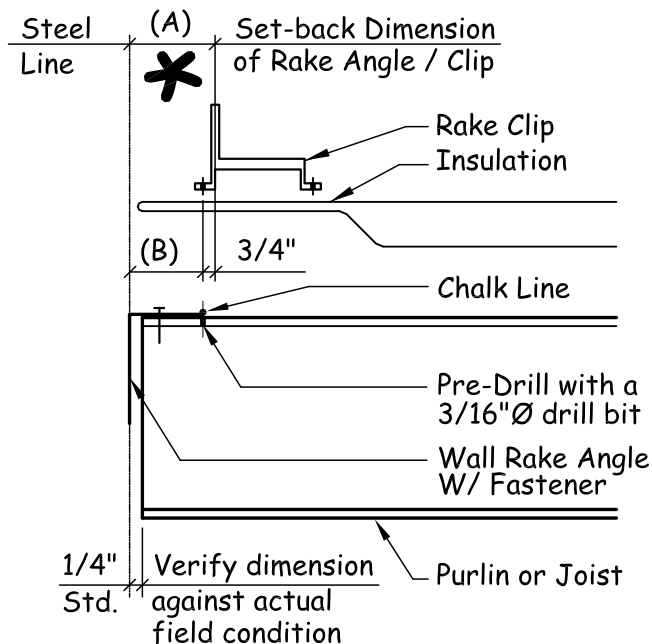
If the building is insulated, follow these pre-drilling instructions. Refer to the erection drawings and get the specific rake clip (*)

setback dimension (A). Subtract $3/4"$ from dimension (A) to find dimension (B). The answer (B) is the dimension from the endwall steel line to the pre-drilled hole ($A - 3/4" = B$). Now set a chalk line from the ridge purlin/joist to the eave purlin/joist using the (B) dimension. Snap the chalk line. Drill a hole centered on each purlin/joist along the chalk line using a $3/16"$ diameter drill bit.

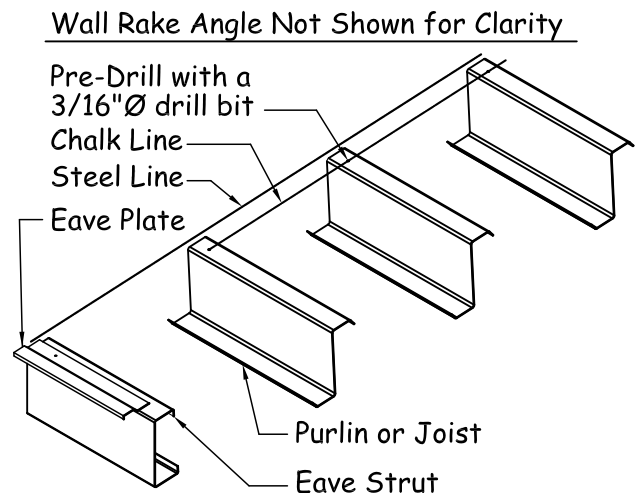
If the building is un-insulated, follow above steps establishing a chalk line but omitting the pre-drilling.

Refer to section 10.8 for proper rake angle & rake clip installation instructions.

IMPORTANT NOTE: RAKE ANGLE POSITION IS CRITICAL, AS IT ESTABLISHES ROOF POSITION AND ALIGNMENT.

PRE-DRILL DETAIL

* See Erection Drawings for this dimension

ISOMETRIC VIEW

10.0 PREPARATION FOR ROOF PANEL INSTALLATION

10.6 INSULATION

Install the insulation pan (optional, refer to erection drawing ridge detail to see if your project requires insulation pan) at the ridge prior to any insulation installation.

Insulation pan part numbers: **(IPA01) at purlins, (IPB01) at joists.**

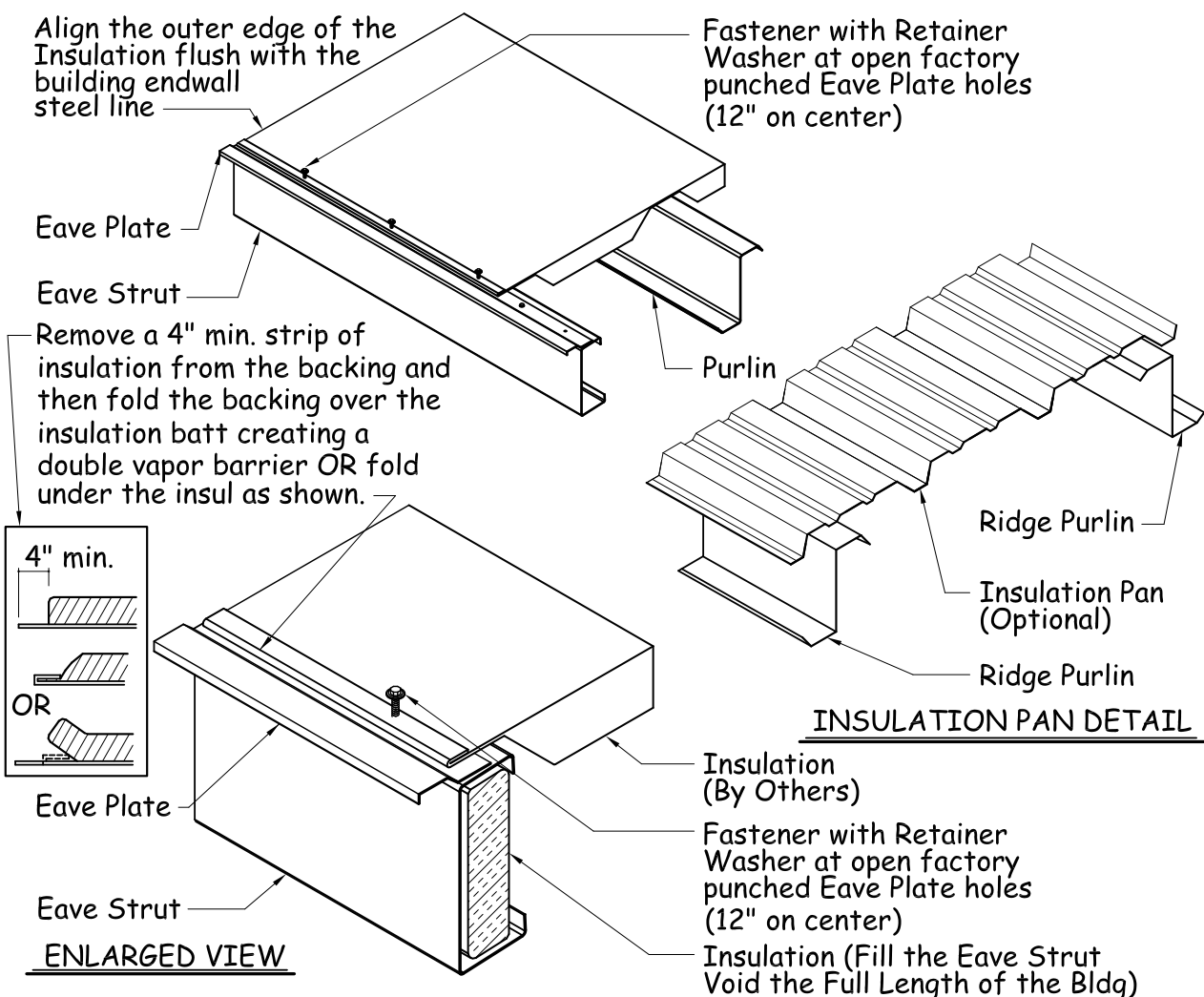
Align the edge of the insulation with the building steel lines at both the rake and eave.

Pull the insulation toward the ridge/high eave so as to create a smooth appearance of the insulation backing, but not too tight to compromise the thermal performance.

Consult the insulation manufacturer for proper seaming and taping methods. At the high side/ridge use **(H1020) screws** with **insulation retainer washers (H2200)** at 12" o/c.

At the low eave, remove a 4" min. strip of insulation from the backing leaving the strip of backing exposed. Fold this strip of backing over the insulation batt creating a double vapor barrier **OR** fold under the insulation as shown.

Fasten the insulation to the lower leg of the eave plate using **(H1020) screws** and **retainer washers (H2200)** in the open factory punched eave plate holes. Also fill the void in the eave strut the full length of the building.



10.0 PREPARATION FOR ROOF PANEL INSTALLATION

10.7 PROPER MASTIC INSTALLATION PROCEDURES

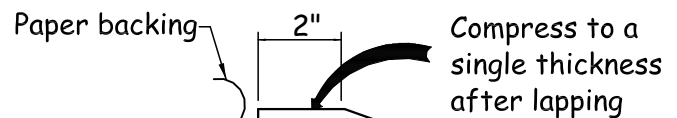
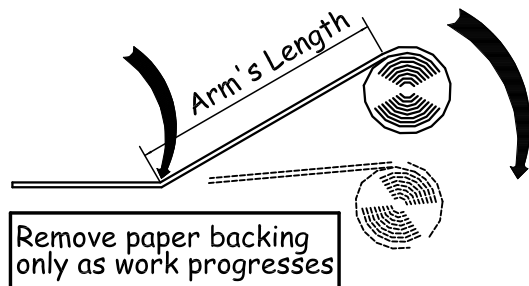
Apply mastic only to clean, dry surfaces.

Roll mastic out to arm length. Press the mastic firmly in place making sure it is tightly formed to all bends.

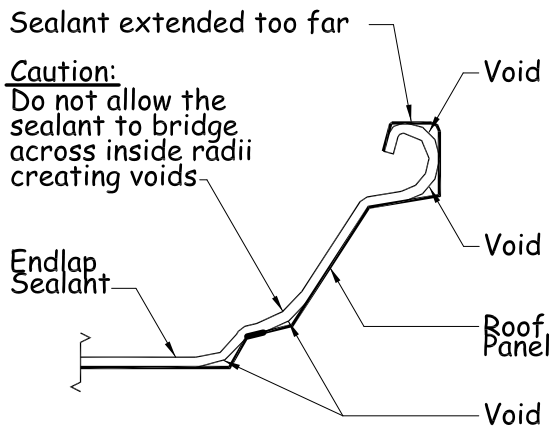
Remove paper backing only when ready to install top component.

Splice mastic with a 2" lap. Press lapped pieces of mastic firmly together to form a single thickness.

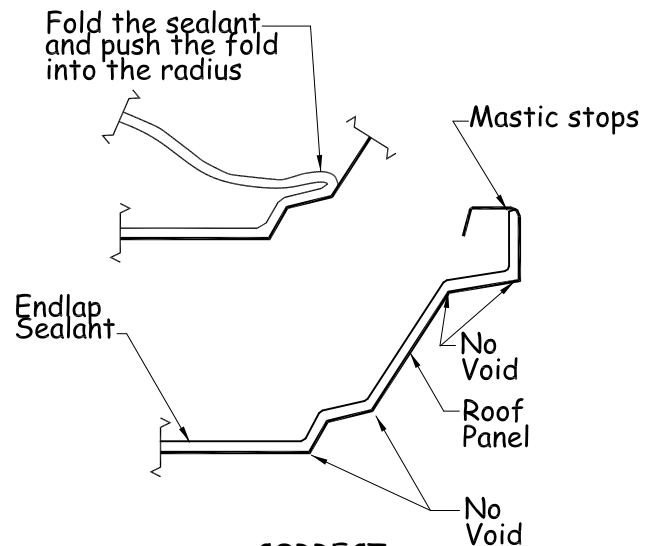
DO NOT STRETCH MASTIC ACROSS CORNERS. THIS WILL DECREASE THE THICKNESS WHERE IT IS NEEDED THE MOST, AND MAY NOT PERFORM AS DESIGNED.



MASTIC LAP



INCORRECT



CORRECT

10.0

PREPARATION FOR ROOF PANEL INSTALLATION

10.8 RAKE CLIP AND RAKE ANGLE INSTALLATION

SETTING OF RAKE ANGLE POSTION IS CRITICAL, AS IT WILL ESTABLISH ROOF POSITION AND ALIGNMENT.

Slide the rake clips on to the **rake angle (MAR02)** prior to installing the angle. This assembly method allows the rake angle to move with the thermal expansion and contraction of the roof panel.

Rake clip part numbers: **(H2041)** at short clips, **(H2051)** at tall clips. Refer to the erection drawing details for your projects' clip type.

Place the clips and the angle over the insulation.

At the eave plate, place a 3" long piece of **1 1/2" mastic (H3001)** on top of the eave plate, in the area of the rake angle.

Before placing the rake angle on the mastic, extend the angle to the proper (**) overhang dimension (refer to the low eave details on the erection drawings for this dimension). **NOTE:** At

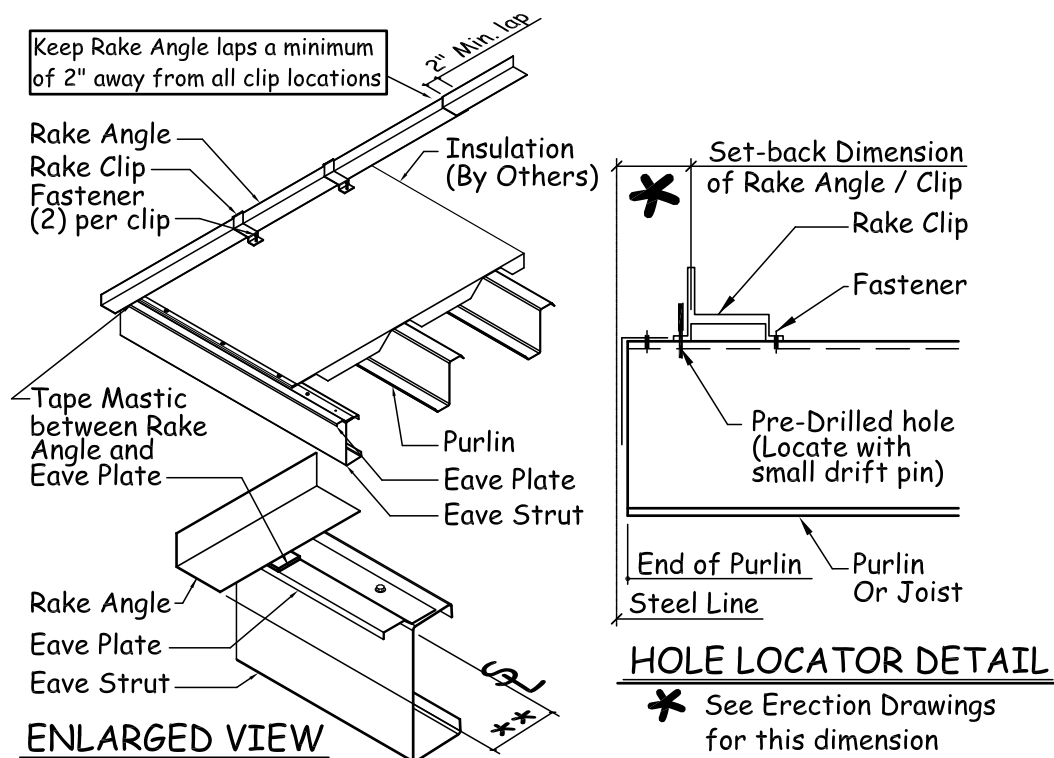
a sculptured eave condition, the rake angle stops flush with the edge of the eave plate.

Use a small drift pin to locate the pre-drilled clip hole. While holding the rake clip in place with the drift pin, fasten the clip in the opposite clip hole with (1) fastener: **(H1020)** at purlins, **(H1070)** at joists.

Remove the drift pin and fasten with the same type fastener in the remaining clip hole as described in the previous step. **(NOTE: (2) SCREWS ARE REQUIRED AT EVERY CLIP LOCATION).** Do not cut the insulation around the clip locations.

If the building does not have insulation, then align the rake angle clip hole with the snapped chalk line and fasten with (2) screws per clip: **(H1020)** at purlins, **(H1070)** at joists.

Rake angles are to be spliced with a minimum 2" lap. Fasten lap with (1) fastener **(H1020)**. Keep the rake angle laps a minimum of 2" away from any rake any clip. The rake angle must not be fastened into the rake angle clip, as this will not allow the roof to expand and contract properly.



10.0 PREPARATION FOR ROOF PANEL INSTALLATION

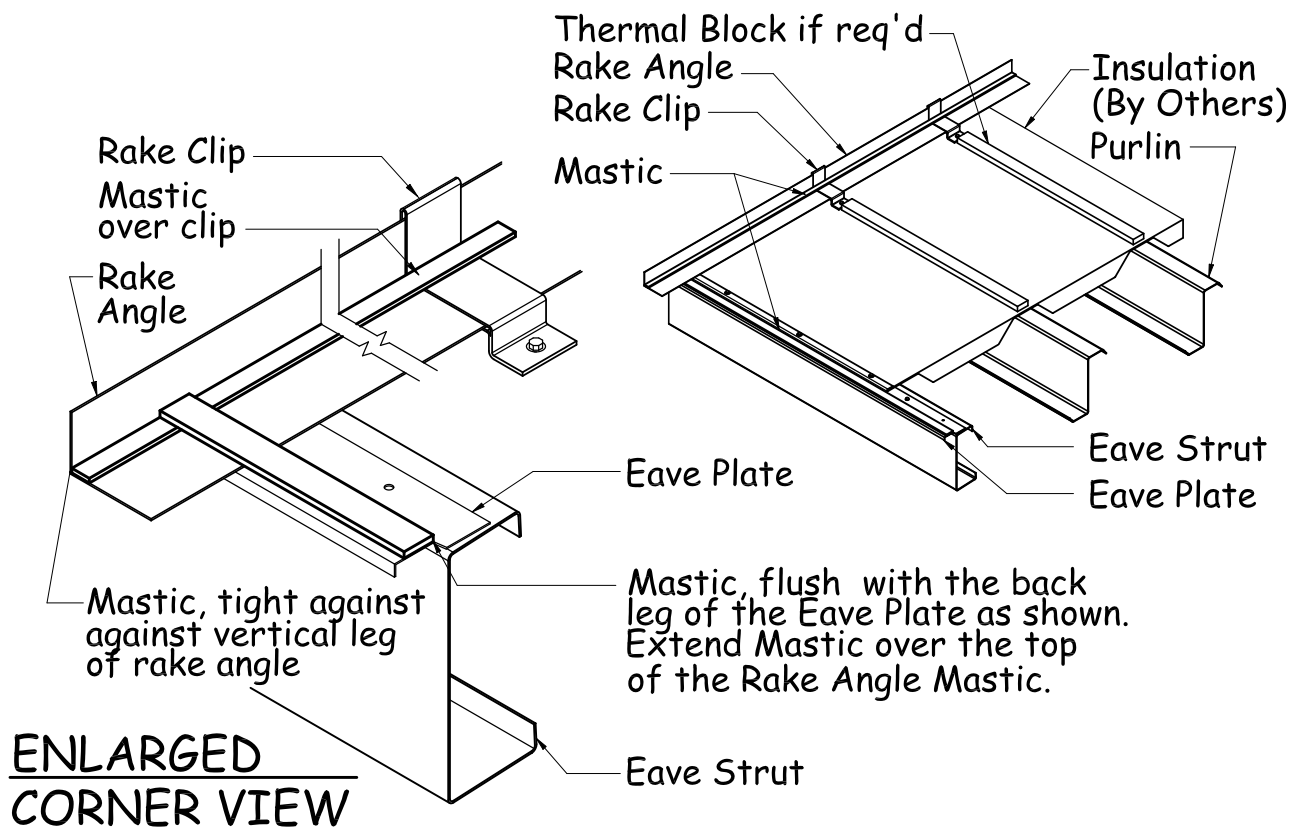
10.9 RAKE ANGLE AND EAVE PLATE MASTIC PLACEMENT

Once the rake angle is in place, apply a continuous run of **3/4" mastic (H3000)** the full length of the bottom leg. At the clip locations, the mastic should run over the top of the clips.

THE MASTIC MUST BE TIGHT AGAINST THE VERTICAL LEG OF THE RAKE ANGLE.

Properly lap the mastic as described in section **10.7**, removing only enough of the paper backing to make the lap.

Apply a continuous run of **1 1/2" mastic (H3001)** the full length of the top leg of the eave plate. **NOTE: The mastic must be held flush with the up-slope edge of the top leg of the eave plate (see below).** Do not remove the paper backing until the panels are installed, and then remove only enough for each panel run. This will help the mastic from becoming contaminated.



10.0 PREPARATION FOR ROOF PANEL INSTALLATION

10.10 THERMAL BLOCKS

Thermal blocks are used only with tall panel clips.

Position the thermal block (**H3300**) on top of the insulation over each purlin line before installing the roof panels.

Place the thermal block tight against the rake angle and the next panel clip. Thereafter, the blocks will be placed between panel clips.

10.11 EPS FOAM SPACER

EPS Foam Spacer is used only with short panel clips on buildings without insulation.

EPS Foam Spacer (**H3310**) is provided in 50' rolls and is placed on top of the purlin leg before installing the panel clips.

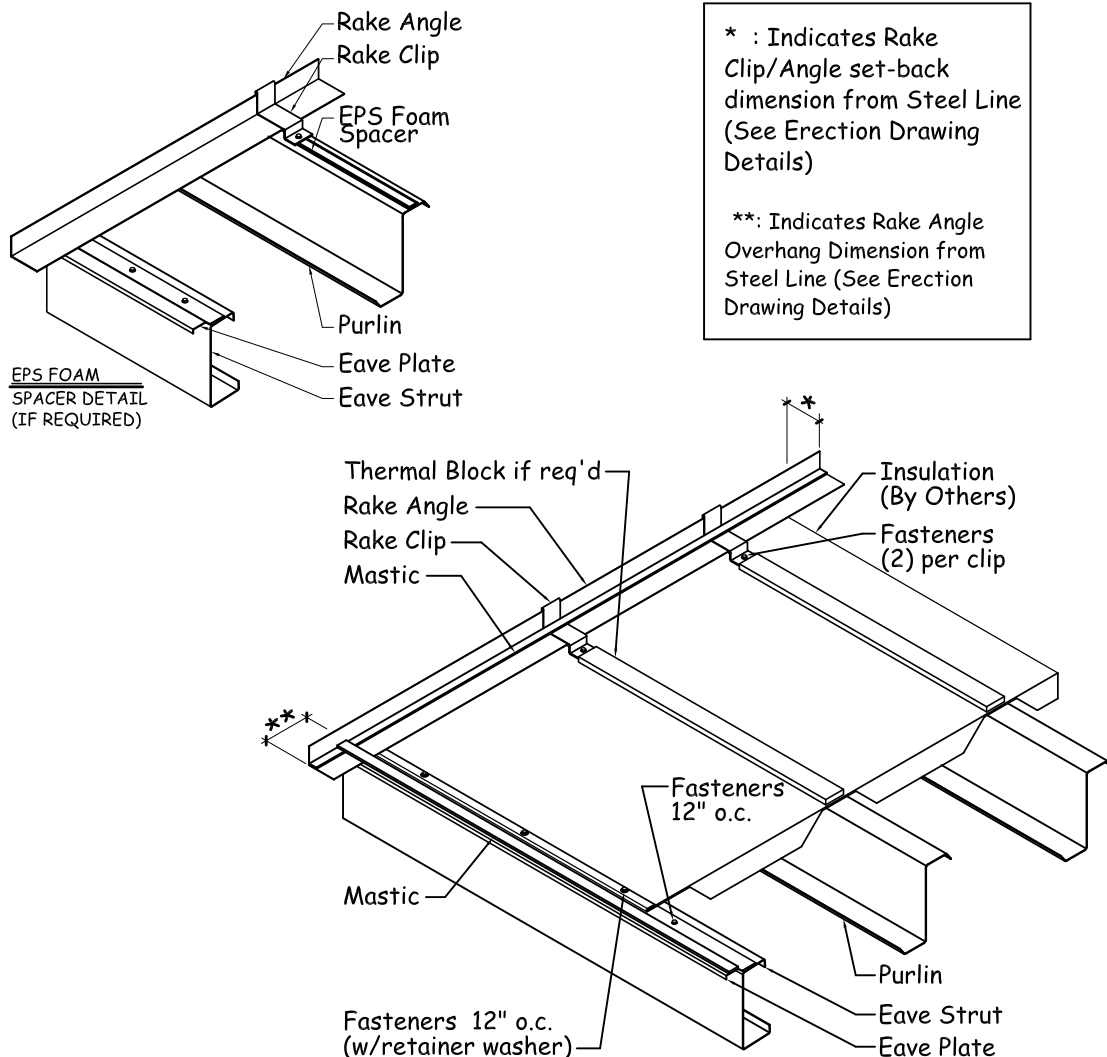
EPS Foam Spacer has an adhesive backing. Remove the protective paper before rolling it out.

In the absence of insulation, the EPS Foam Spacer will reduce noise and vibration caused by the wind. It may also help reduce damage caused by metal to metal contact.

10.12 FINAL PRE-PANEL INSTALLATION DETAIL

Before installing any roof panels, refer to the erection drawing roof sheeting plan and roof details to see if there are any other special requirements.

Make sure that the eave plate is fastened to the eave member at **6" o/c** with (**H1020**) screws.



11.0 EAVE START PANEL INSTALLATION**11.0 EAVE START PANEL
INSTALLATION****11.1 PANEL SECTION, DESCRIPTION, AND
NOMENCLATURE**

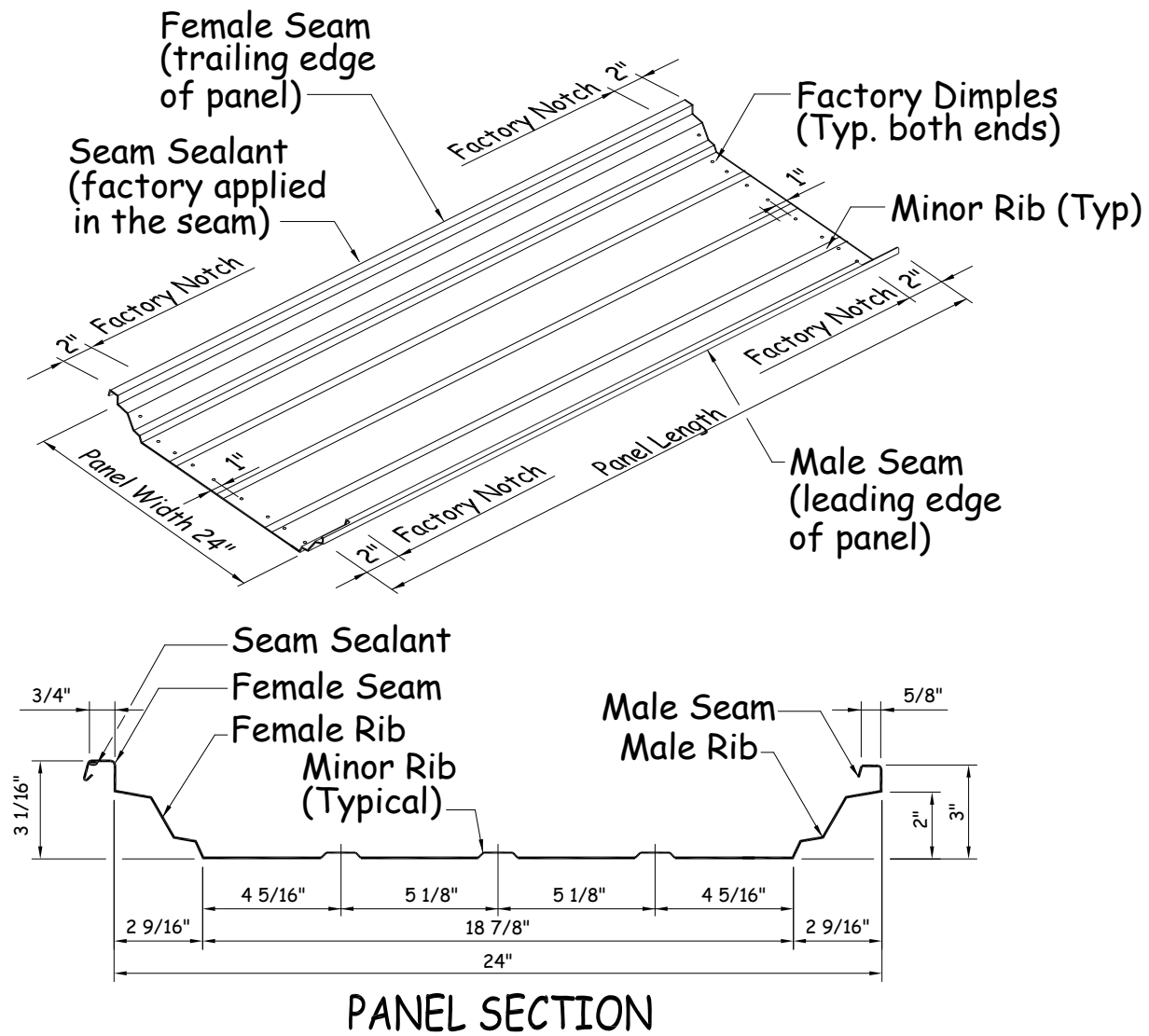
Throughout this manual the references to the panel will be made using the terms in the illustration below.

The Nucor CFR™ Roof panel is designed so it can be installed in either direction (left-to-right)

or (right-to-left). Check the erection drawings and job conditions to determine if the roof must be installed in a specific direction.

The leading edge of the roof panel is the edge toward the installation direction. On the Nucor CFR™ Roof panel, the male seam is always the leading edge.

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



11.0 EAVE START PANEL INSTALLATION

11.2 INSTALLING THE EAVE START PANEL

The roof panel eave overhang dimension is critical as it establishes the location of end laps and ridge cap attachment points. **The edge of the roof panel extends 5 1/4" beyond the low eave steel line as standard**, unless another dimension is specified on the erection drawings. **Check the low eave detail on the erection drawings before installing any roof panels.**

Refer to the erection drawing rake details to determine the required start panel width. **Field cut the start panel to the proper width.**

If insulation thermal blocks are required, check that they are installed directly over the roof secondary members. Thermal blocks are not required at the eave secondary member.

Remove the paper backing on the 1 1/2" **eave plate tape mastic (H3001)**, as needed, to place the start panel.

Align eave starter panel flush with end of rake angle and tight against its vertical leg.

NOTE: Once the panel has contacted the mastic, it cannot be moved. Be sure the start panel is properly positioned before seating.

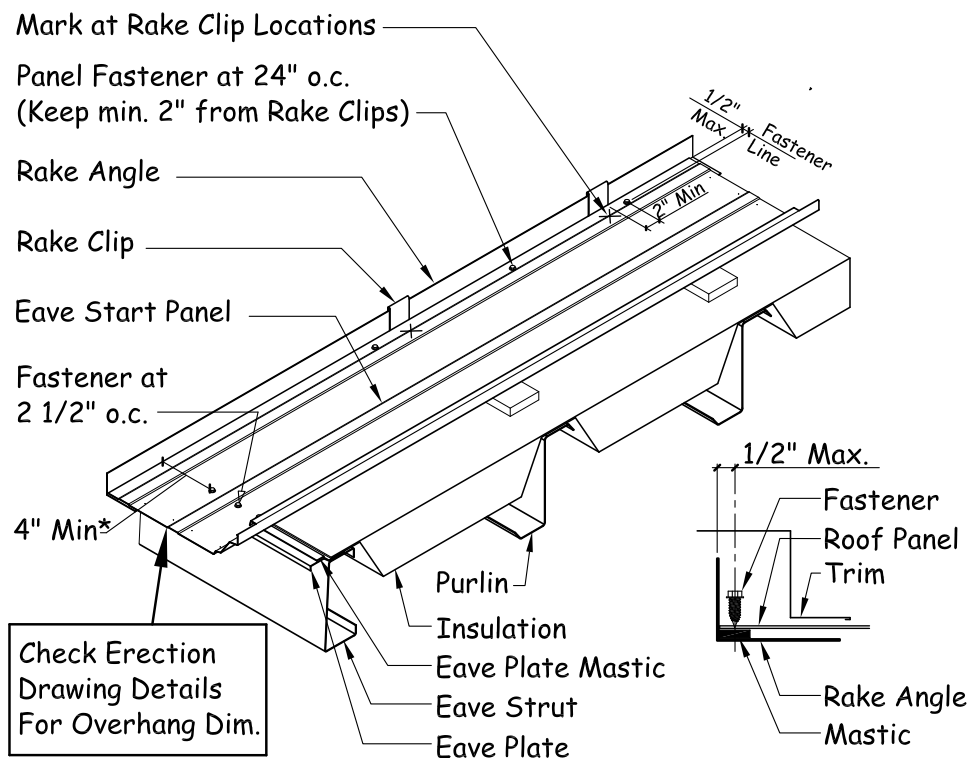
Fasten the start panel to the rake angle at 24" o/c with **H1020 self-drilling screws**. **NOTE: The fastener line cannot exceed 1/2" from the vertical leg of the rake angle** to avoid trim interference.

To ensure proper roof expansion and contraction, **keep the fasteners a minimum of 2" away from the edge of the rake clips**. Mark the start/finish panels at rake clip locations to avoid putting trim fasteners into rake clips.

The rake angle **must not** be fastened into the rake angle clip, as this **will not** allow the roof to expand and contract properly.

Fasten the start panel to the eave plate at 2 1/2" o/c with **(H1030)** fasteners.

* Keep first low eave fastener a minimum of 4" away from back of rake angle. This will prevent later interference with the roof line trim.



11.0 EAVE START PANEL INSTALLATION

11.3 INSTALLING THE LOW EAVE VOID CLOSURE

Prepare the **void closure (H2630)** by applying the **8" pre-cut mastic (H3640)** along the $\frac{1}{2}$ " of the top surface. **Do not cover up the fastener hole in the void closure at this time.** Note that the mastic extends approximately $\frac{1}{4}$ " to $\frac{1}{2}$ " beyond the edge of the closure.

Peel the protective paper away from the mastic.

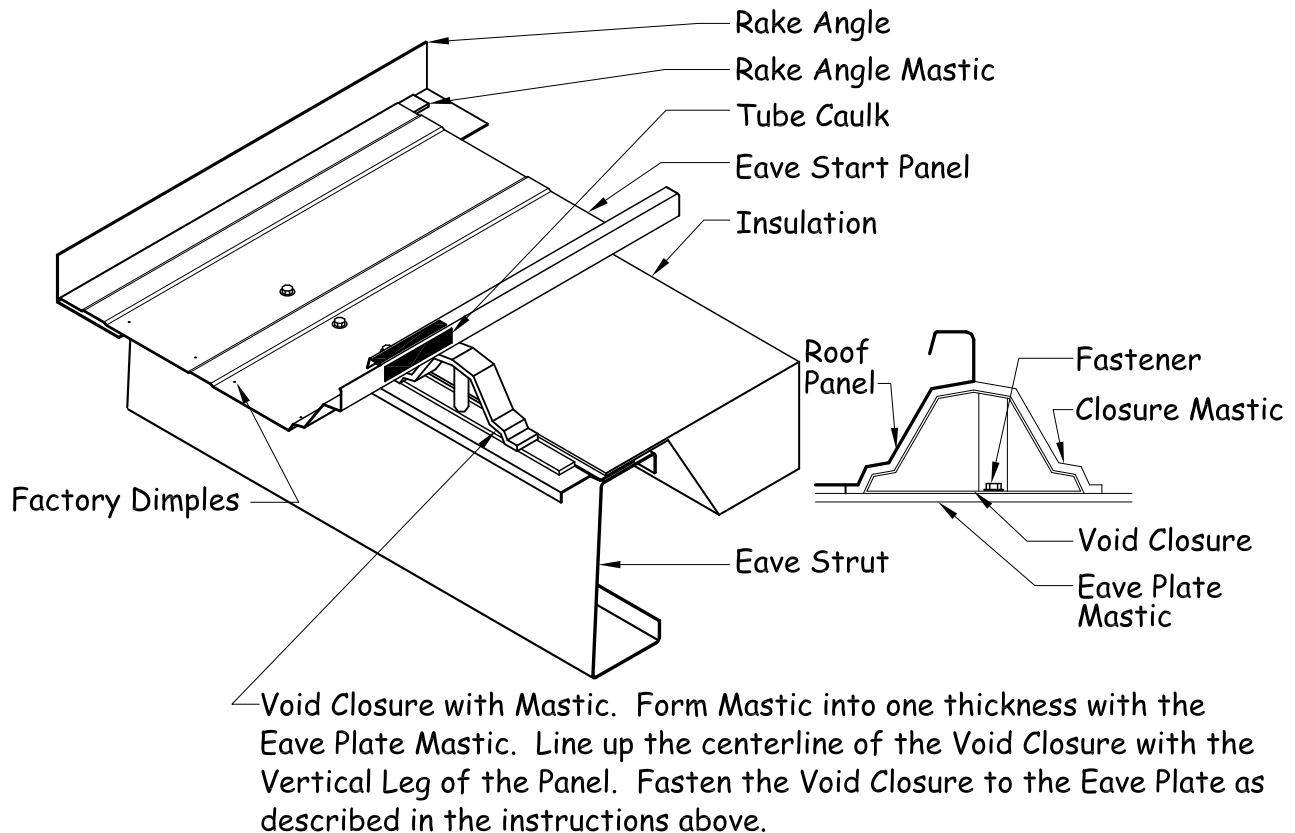
Pick up the corner of the roof panel and place the closure into the panel corrugation and on top of the eave mastic.

Check that the void closure is centered to the roof panel edge.

Fasten the closure to the eave plate with one fastener (**H1030**).

At this time apply the mastic to the remainder of the void closure, again extending it so that it extends approximately $\frac{1}{4}$ " to $\frac{1}{2}$ " beyond the edge of the closure.

Before installing the next panel, place butyl tube caulk (**H3151**) on panel rib as shown below.



11.0 EAVE START PANEL INSTALLATION

11.4 INSTALLING THE LEADING EDGE PANEL CLIPS

Install roof panel clips to the leading edge of the roof panel, at each roof secondary structural member. **NOTE:** Panel clips are not required at the eave.

Roof panel clip types (refer to the erection drawing details for your projects' clip type):

- **SHORT FIXED (H2500)**
- **SHORT SLIDING (H2520)**
- **TALL FIXED (H2510)**
- **TALL SLIDING (H2530)**

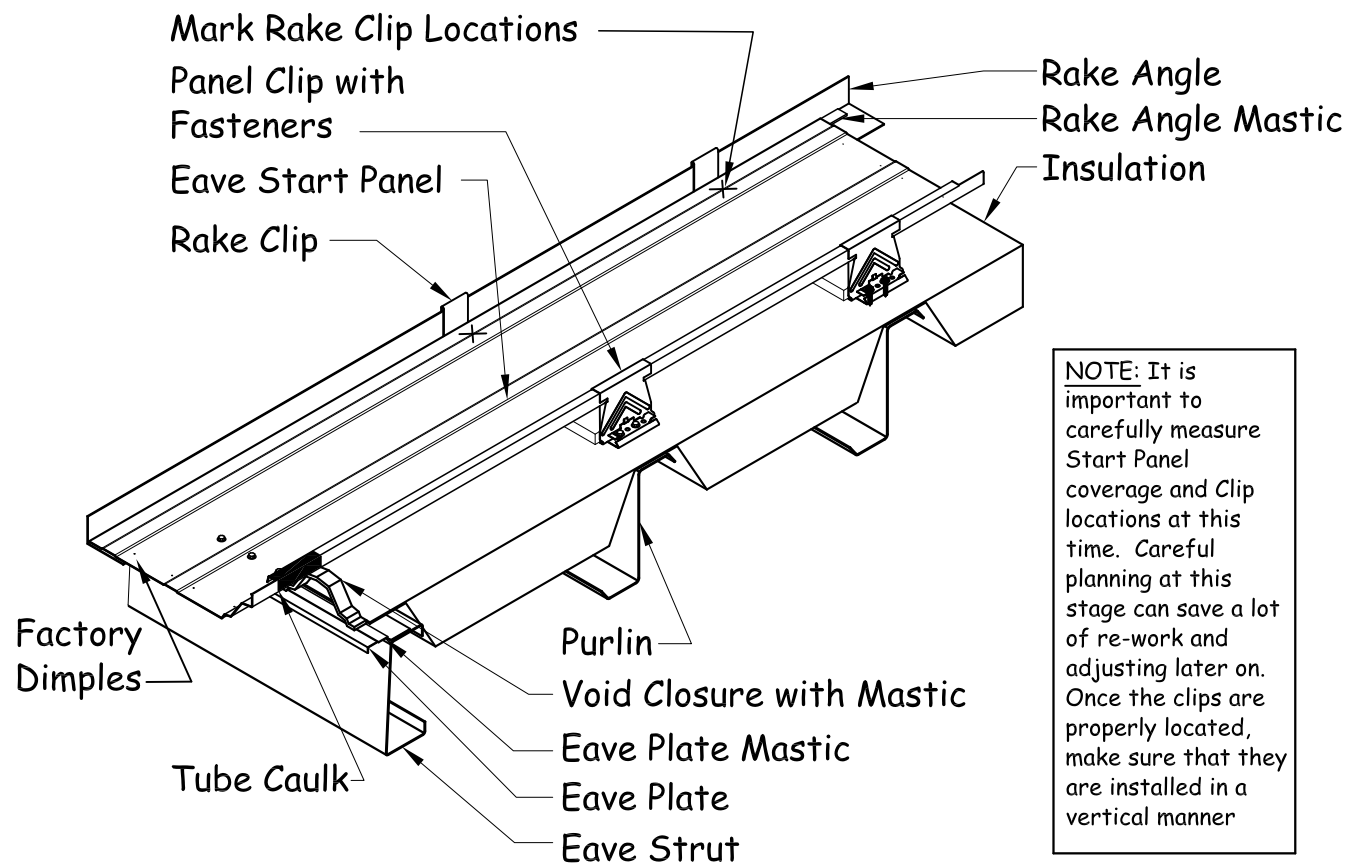
To install the clips, tilt the clip so that the tab can be hooked over the edge of the roof panel male seam, then rotate the clip down into the vertical

position. Position the clip base so that the clip fasteners can be installed through the holes in the base and into the roof secondary member.

When fiberglass insulation is used, the panel clips sit on top of the insulation and the insulation is compressed between the clip base and top of the roof secondary member. In all cases, determine required insulation assembly and the relationship of the panel clips to the insulation.

Specific panel clip details are shown on the following page.

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



11.0 EAVE START PANEL INSTALLATION

11.5 TYPICAL PANEL CLIP ATTACHMENT DETAILS

Panel clips are available as floating clips or fixed clips and are available in either tall or short heights. Refer to the erection drawings to determine the type of clip required for each roof condition.

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

Check that the clip base is vertical and that the base is set square and firmly over the roof secondary member.

NBS' standard clip fasteners are designed to fasten to a steel structural member of .060" minimum thickness (16 Ga.). A minimum of **two fasteners** are required to engage the structural member at **every** panel clip location. In certain instances, **three fasteners** may be required per clip. See the final set of erection drawings for your specific clip fastener requirements.

Required fastener pullout values are dependent upon project location, size, building code, and loading. Consult Nucor Engineering for project-dependent fastener specifications.

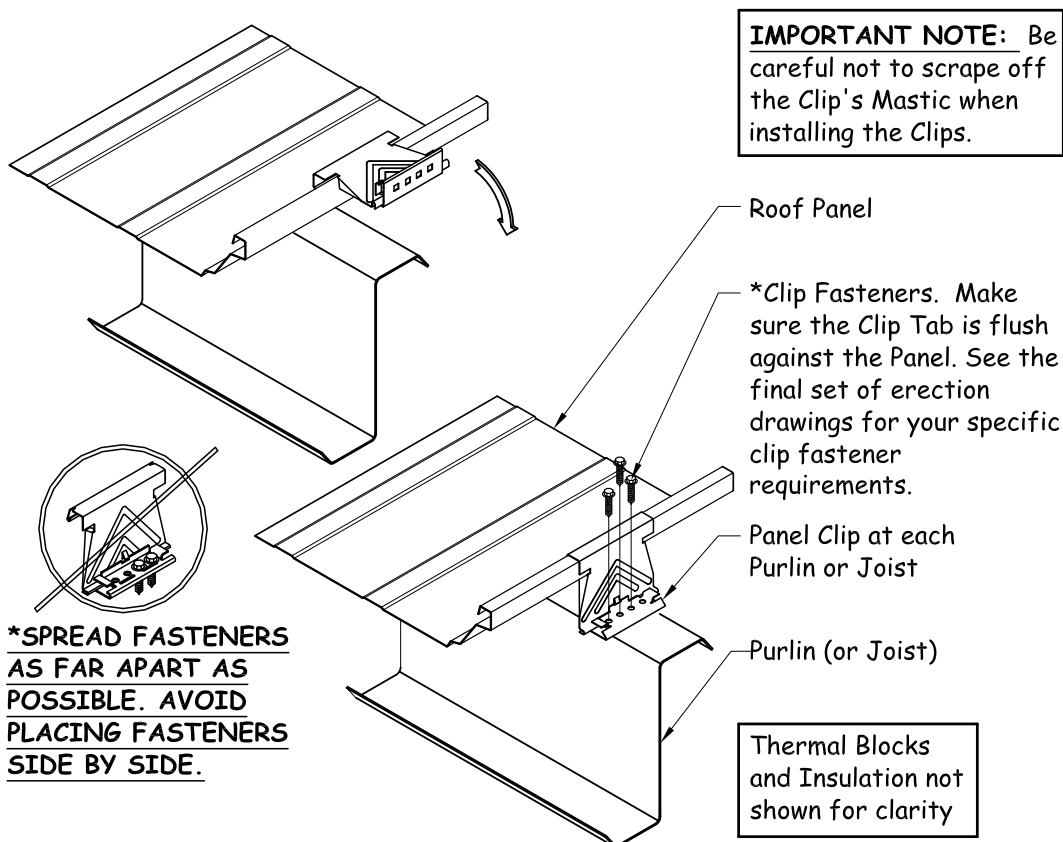
Use **(H1020)** at purlins, **(H1070)** at joists. (At lapped or nested purlins, pre-drilling may be required)

Spread clip fasteners as far apart as possible. Avoid placing fasteners side by side.

Check fasteners to see if they are securely engaged into the roof secondary member.

CAUTION: DO NOT SCRAPE OFF THE CLIP'S MASTIC WHEN ASSEMBLING THE ROOF PANEL. IF SCRAPED OFF, REPLACE WITH BUTYL TUBE CAULK. (H3151)

Do not over-drive screws! Over-driving can strip the threads and/or damage the sealing washer. Use screw gun with torque control set to function properly for the combination of fastener size, hole size and material thickness.



11.0 EAVE START PANEL INSTALLATION

11.6 INSTALLATION OF THE BACK-UP PLATE AT THE EAVE START PANEL

Before installing the back-up plate, make sure that the panel overhang dimension at the up-slope end of the panel is correct. Refer to the detail below and the erection drawing details.

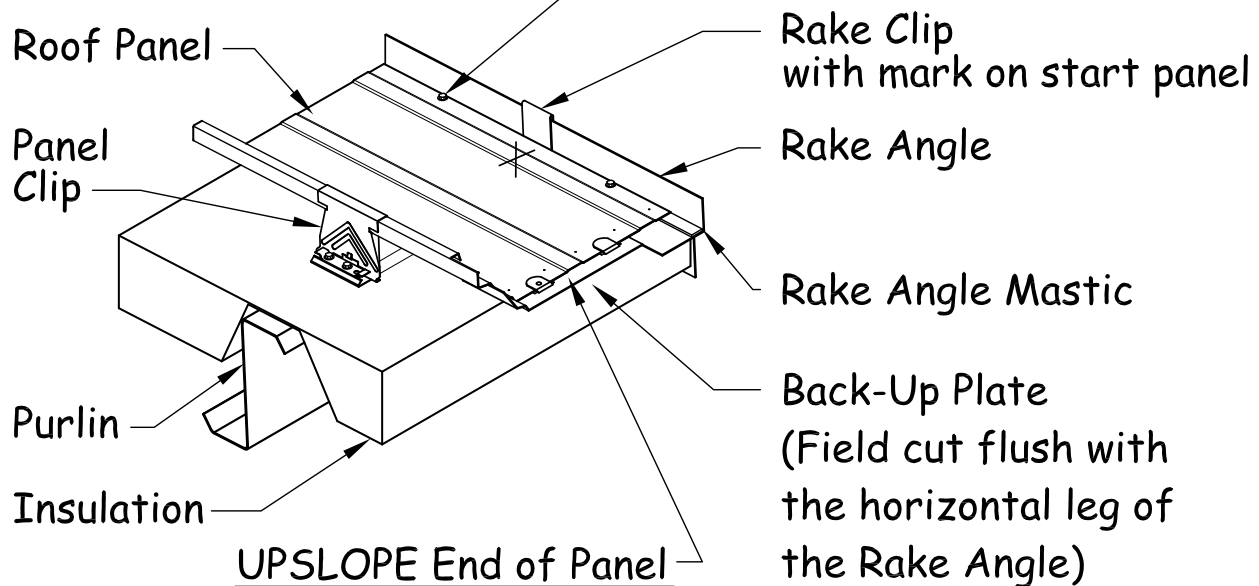
At the start panel, a **back-up plate (H2650)** must be field cut to the proper width. To determine this width, **measure the flat of the start panel and subtract 3"**. The back-up plate

should fit tight up against the **horizontal** leg of the rake angle.

Slide the back-up plate onto the end of the start panel, aligning with the panel corrugation. If there are no tabs left on the back-up plate after field cutting to width, drill and fasten with (2) **pop rivets (H1100)**, up-slope from the panel dimples.

With tall clips and thermal blocks, verify the back-up plate is on top of the thermal block and block is located directly over secondary member.

Panel Fasteners at 24" o.c.
(Keep min. 2" from Rake Clips)



12.0

INTERMEDIATE START PANEL INSTALLATION

**12.0 INTERMEDIATE START
PANEL INSTALLATION****12.1 INSTALLATION OF INTERMEDIATE
START PANEL 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 (H3650)**, the roof panel surface must be wiped clean and dry.

Prior to installing the tape mastic and caulk, mark lower panel at **2"** and **4"** from end of panel. **(DO NOT USE A PENCIL)**

Slide cut **back-up plate (H2650)** on to the lower panel, aligning with the panel corrugation.

Apply **27" pre-cut tape mastic (H3650)** at the **2" mark**, start mastic in corner of male rib as shown. Check that the ends of the mastic stop at the top of the roof panel vertical leg. Tape mastic will not cover the factory dimples.

THE UPSLOPE EDGE OF THE MASTIC WILL BE EVEN WITH THE NOTCH IN THE PANEL. MASTIC MUST FORM TIGHTLY TO ALL BENDS.

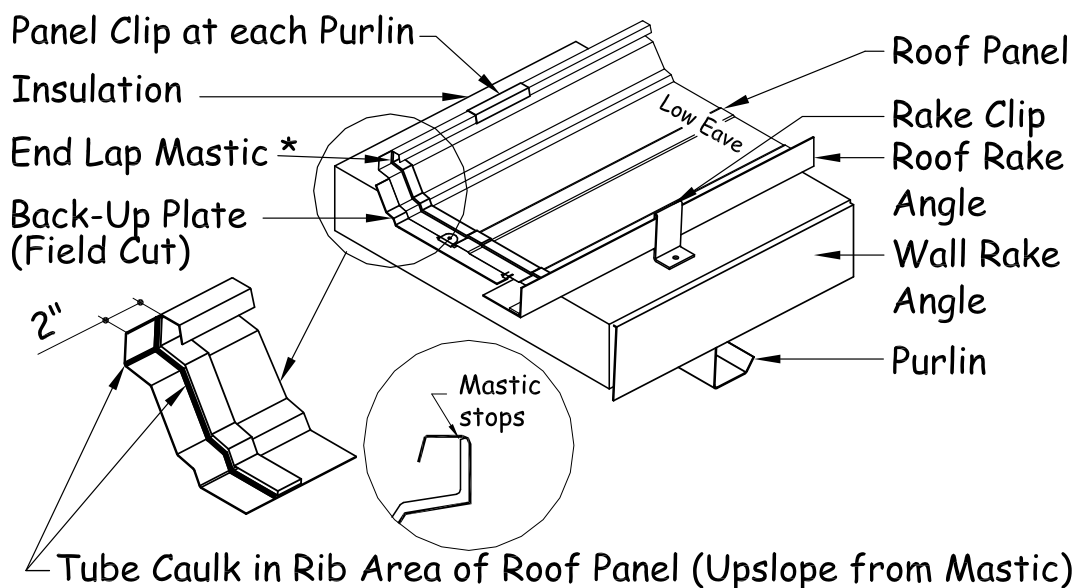
For more end lap information see the complete panel end lap instructions in **Sections 13.6-13.7**

IMPORTANT: Excess mastic in the roof panel seams will cause difficult panel assembly. The mastic's protective paper helps to retain the mastic's shape during installation and protect 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.

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

Apply a bead of **butyl caulk (H3151)** in the rib area of the panel. The caulk should be adjacent to and up-slope of the mastic.

★ End Lap Mastic, (Edge of Mastic 2" from end of panel). (Also extend the Mastic all the way to the vertical leg of the Rake Angle).



12.0

INTERMEDIATE START PANEL INSTALLATION

12.2 ALIGNMENT OF THE INTERMEDIATE START PANEL

Wipe dry and clean the underside of the up-slope panel.

Mark a line on lower panel **4"** from the panel end.

Align up-slope panel with 4" lap dimension mark. Remove the protective paper from the end lap mastic.

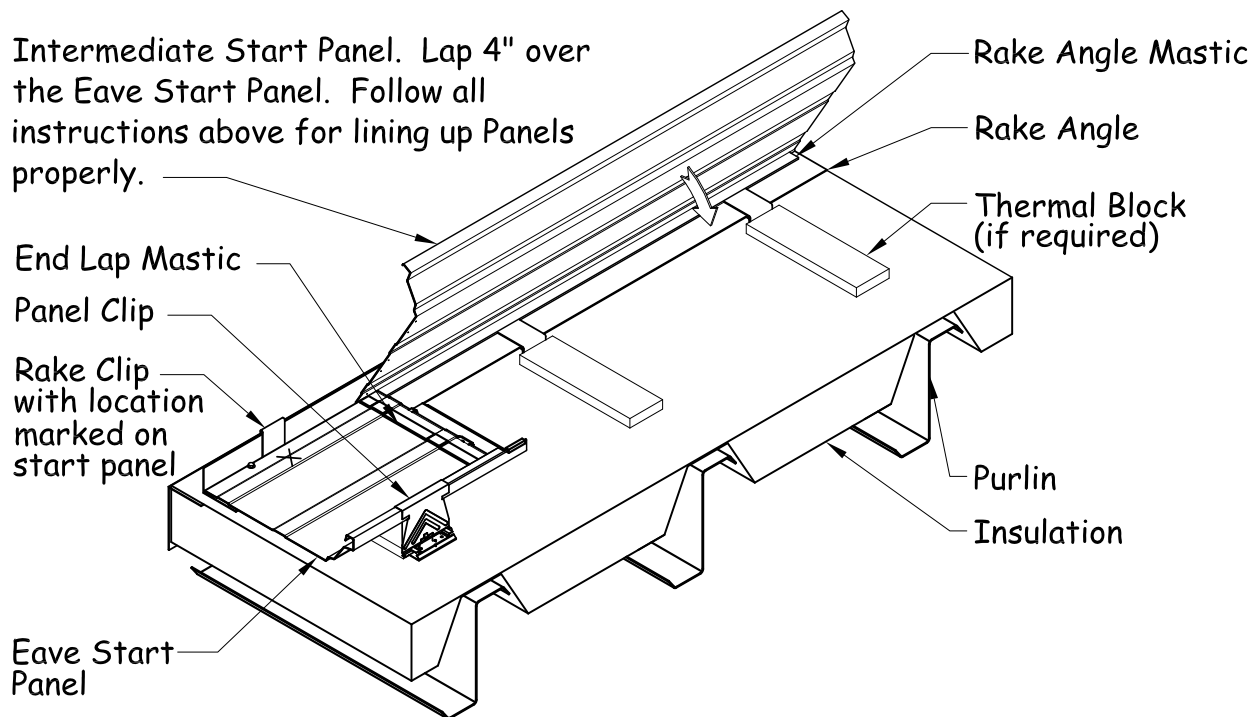
Lower the up-slope panel onto the down-slope panel. Bow out the end of the lower panel to pop the upper panel into place. This will allow the

upper panel to nest better into the down-slope panel.

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

Check that the up-slope panel correctly laps over the **end lap mastic (H3650)**.

Intermediate Start Panel. Lap 4" over the Eave Start Panel. Follow all instructions above for lining up Panels properly.



12.0

INTERMEDIATE START PANEL INSTALLATION

12.3 **FASTENING OF THE INTERMEDIATE START PANEL**

Fasten with self-drilling **screws (H1030)** at the factory dimpled locations. Start at the middle of the panel, alternating fasteners outward toward the high rib and the rake angle.

Check that the fasteners have penetrated **through** the mastic and are securely engaged into the back-up plate.

Fasten the intermediate start panel to the rake angle at 24" o/c with self-drilling **fasteners**

(H1020). This fastener line cannot exceed $\frac{1}{2}$ " from the **vertical** leg of the rake angle. Also keep these fasteners a minimum of 2" away from the edge of any rake clip location, to allow for proper expansion and contraction of the roof system.

* Keep first end lap fastener a minimum of 4" away from back of rake angle. This will prevent later interference with the roof line trim.

Install the roof clips as described in section 11.4.

NOTE:

Thermal Blocks not shown for Clarity

Fastener at each dimple*

Rake Angle

Rake Clip Mark Locations

Panel Fastener at 24" o.c.
(Keep min. 2" from rake clips)

Panel Clip

Roof Panel

4" Lap

Insulation

Purlin

Low Eave

NO GAP

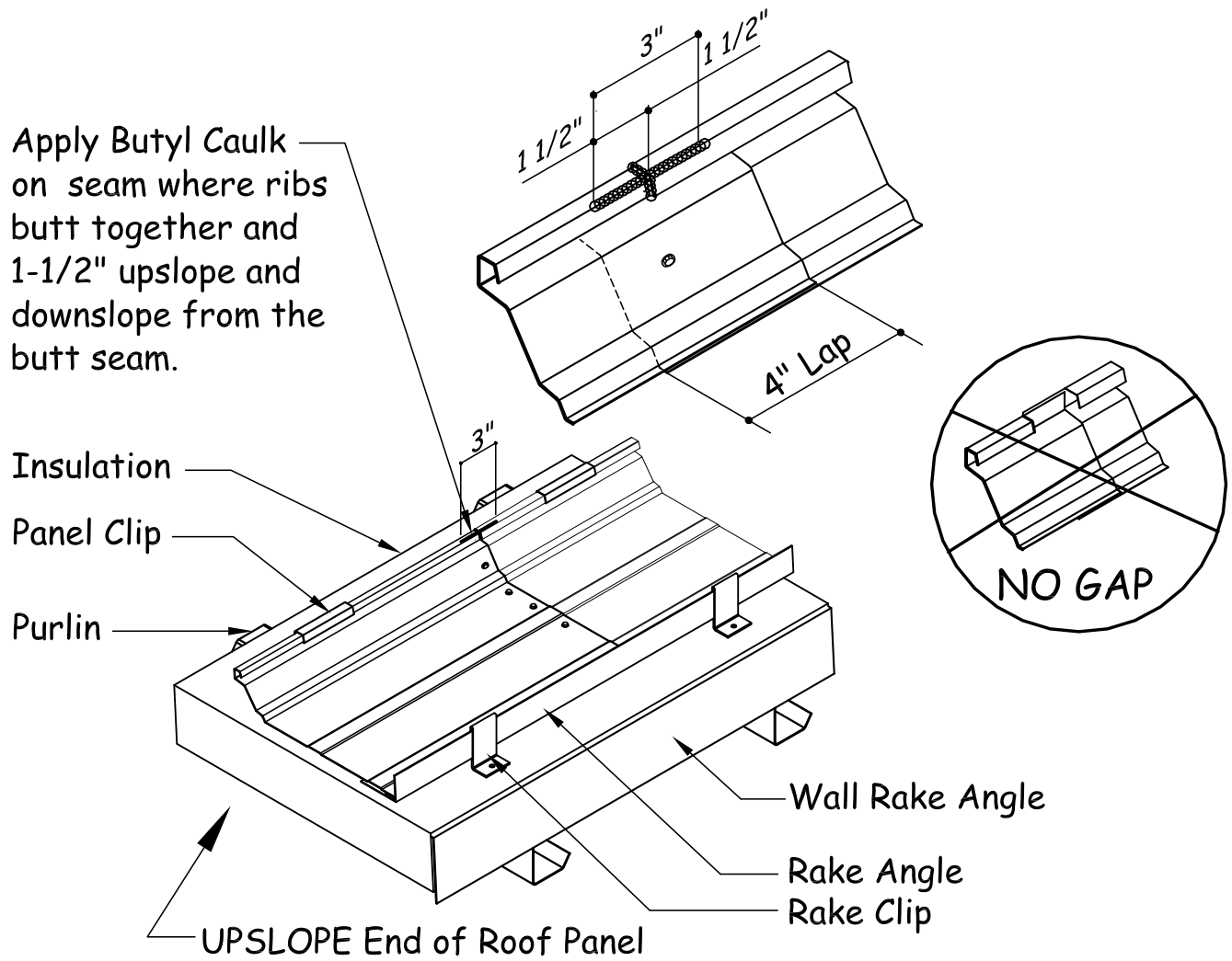
12.0

INTERMEDIATE START PANEL INSTALLATION

12.4 END LAP RIB BUTYL CAULK

The end lap butyl caulk must be correctly applied before the next panel run can be installed.

Apply Butyl Caulk (H3151) to the leading male ribs as shown below, along the butt area of the rib, and 1 1/2" up and down slope from the butt seam as shown.



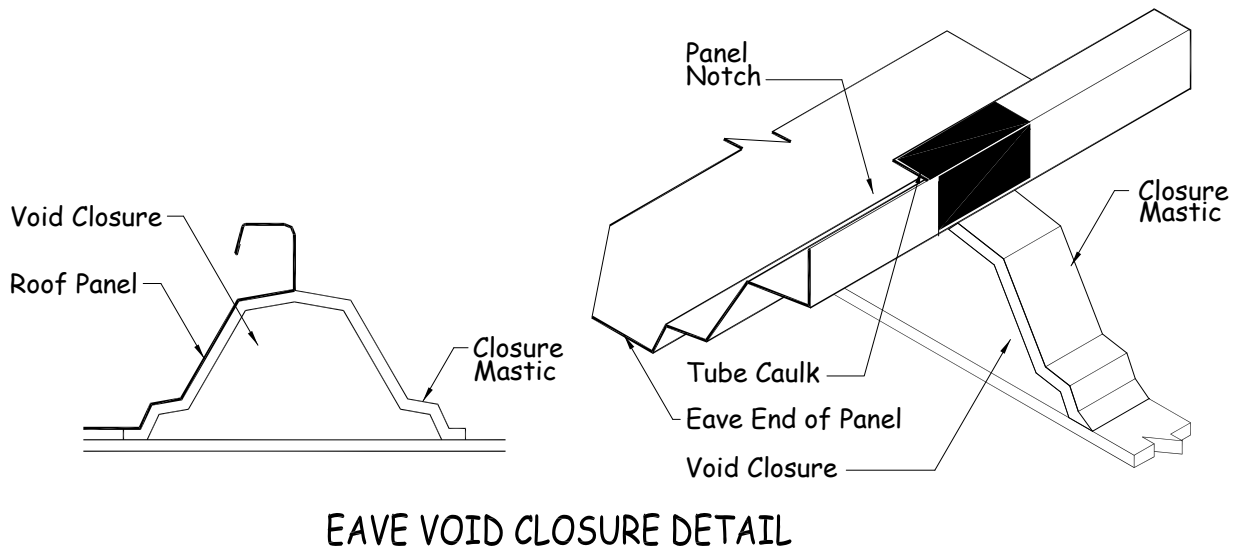
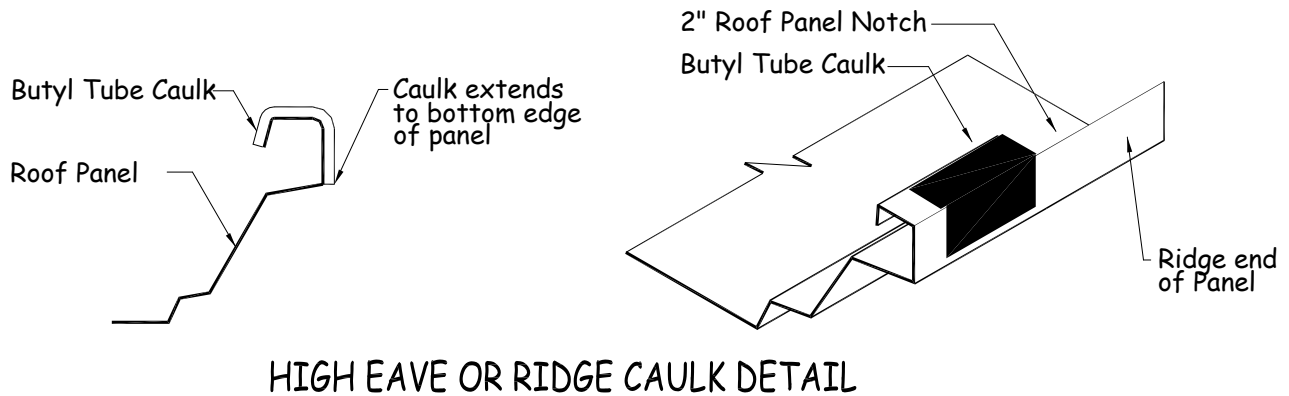
12.0

INTERMEDIATE START PANEL INSTALLATION

12.5 EAVE AND RIDGE/HIGH EAVE BUTYL TUBE CAULK INSTALLATION

AT THE EAVE, Apply butyl tube caulk (H3151) from the void closure to the panel notch along the seam of the panel as shown. The void closure mastic will lap onto the eave plate mastic by approximately $\frac{1}{4}$ " to $\frac{1}{2}$ " on each end. Compress these two mastics into one thickness.

AT THE RIDGE/HIGH EAVE, Apply butyl tube caulk (H3151), on top and side of panel as shown



13.0 FULL PANEL RUN INSTALLATION

13.0 FULL PANEL RUN INSTALLATION

13.1 PANEL SIDE LAP ASSEMBLY

It is easier to hook the roof panel seams together if the roof panel is first tilted up to the "vertical" position as shown in Step 1 below.

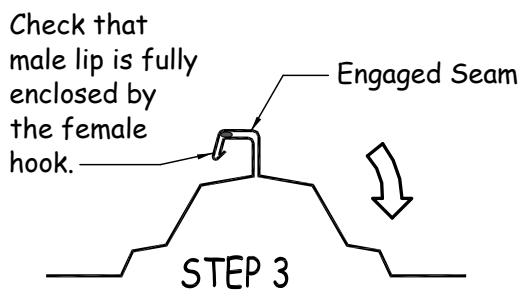
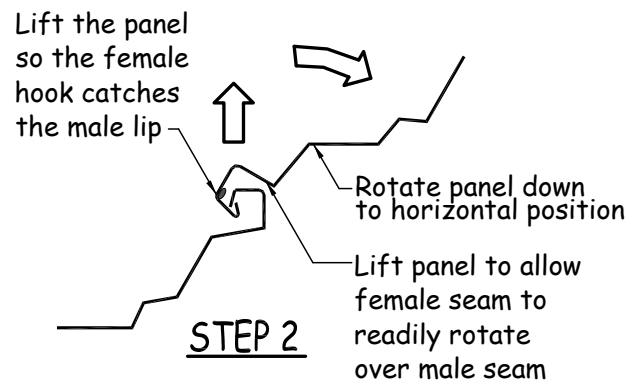
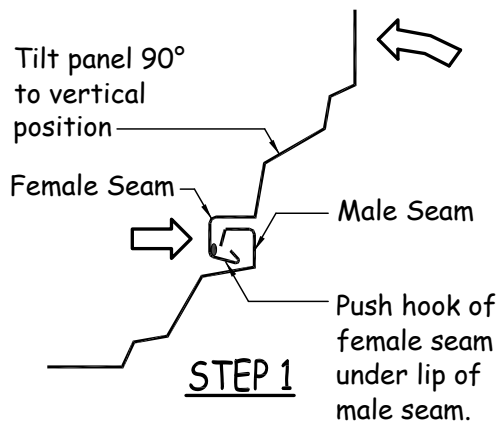
With the roof panel in the vertical position, align its seams to slide under the male seam of the previous roof panel.

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

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

Check that the factory installed side lap mastic is in the correct position without voids or interruptions and is not damaged, wet or otherwise contaminated. Replace missing side lap mastic with butyl tube caulk supplied with job prior to installing panels.

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



CAUTION:

Do not scrape off the seam sealant during the side lap assembly process.

13.0 FULL PANEL RUN INSTALLATION

13.2 ALTERNATE METHOD OF PRE-DRILLING FOR FULL PANEL MODULARITY

NOTE: This is a suggested, alternate method of aiding the erector on panel modularity. Can be used in conjunction with NBS modularity clamps. (Shown on the next page)

Panel Clip Layout:

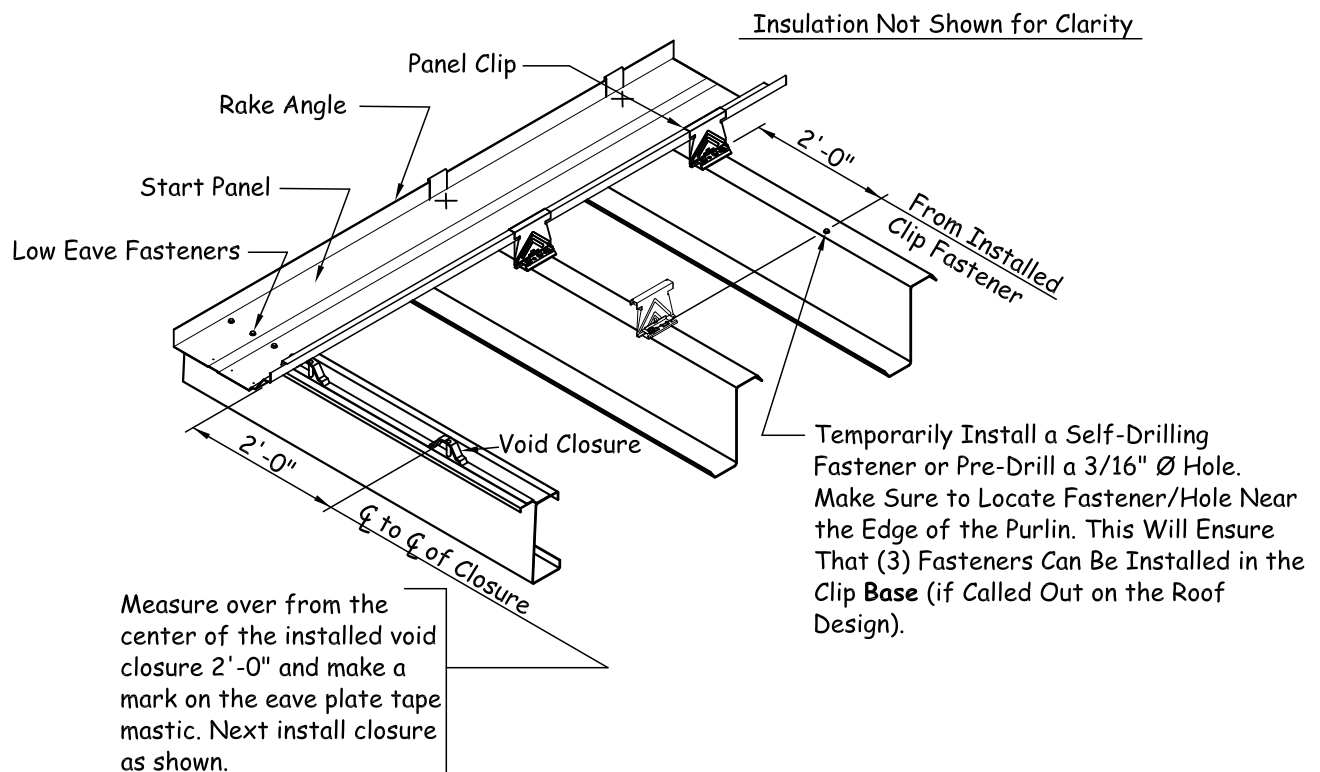
After the start panel and clips have been installed, measure from the center of the clip base fasteners, at each panel endlap and ridge/high purlin, and put a mark at 2'-0" (erector can add more locations if needed). Then temporarily install (1) H1020 (purlin)/H1070 (joist) fastener **OR** pre-drill with a 3/16" Dia bit on the edge of the purlin (as shown below). As the roof installation progress's, remove fastener

and install clip with required fasteners. Repeat this method on each panel run.

Void Closure Layout:

On the start panel low eave, measure from the center of the installed void closure over 2'-0" and make a mark on the eave plate mastic. Next center the void closure on the mark and fasten with (1) H1030. Repeat this method on each panel run.

IMPORTANT: By placing the fastener on the edge of the purlin, will ensure proper fastener spacing and/or room to add (3) fasteners if called out on the roof design.



PRE-DRILLING DETAIL

13.0 FULL PANEL RUN INSTALLATION

13.3 PANEL MODULARITY

Maintaining panel modularity is EXTREMELY IMPORTANT, as the panels may shrink or grow.

Use a **Modularity Tool** (supplied) at the **low eave** and at **every panel clip location during** roof installation.

Check the panel modularity every four to five panel runs by measuring from a fixed plumb line (possibly the endwall steel line) over the completed panel runs.

Measurements should be taken at the **ridge**, at **end laps**, at the **low eave**, and at **random clip locations** on long panel runs. The dimensions

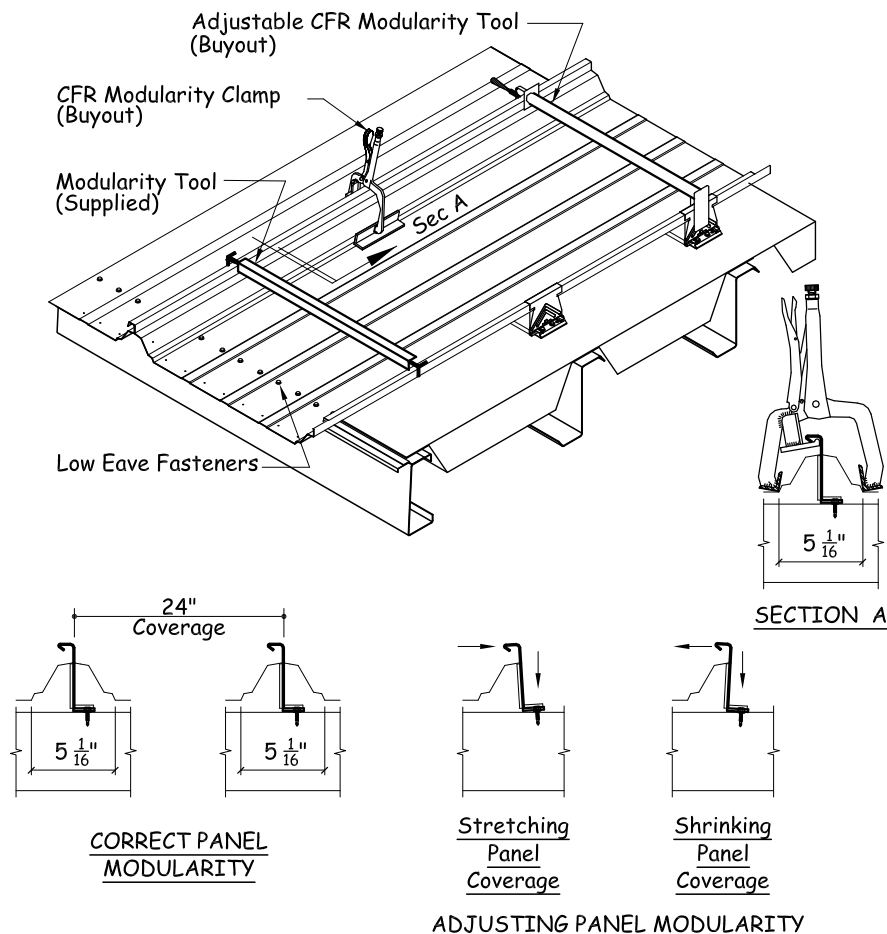
at these locations (as well as any other point along the panel run) should be the same.

13.4 ADJUSTING PANEL MODULARITY

Eave fastener placement is critical, as this helps control proper modularity.

Modularity can be adjusted at each purlin line by slightly tilting the panel clip. If panel modularity *cannot* be achieved by tilting the clip, then the use of the CFR Modularity Clamp **H7100 (Buy-out)** OR Adjustable CFR TMModularity Tool **H9510 (buy-out)** may help. However, **DO NOT ADJUST THE PANEL WIDTH BY MORE THAN $\pm 1/8"$ ON ANY PANEL AREA.**

Adjustments may be required to several panel runs as work progress's to get back on proper module.



13.0 FULL PANEL RUN INSTALLATION

13.5 INSTALLING THE FIRST FULL PANEL RUN, STARTING AT THE LOW EAVE

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

If required, place the insulation thermal blocks on top of the insulation, directly over the roof secondary member.

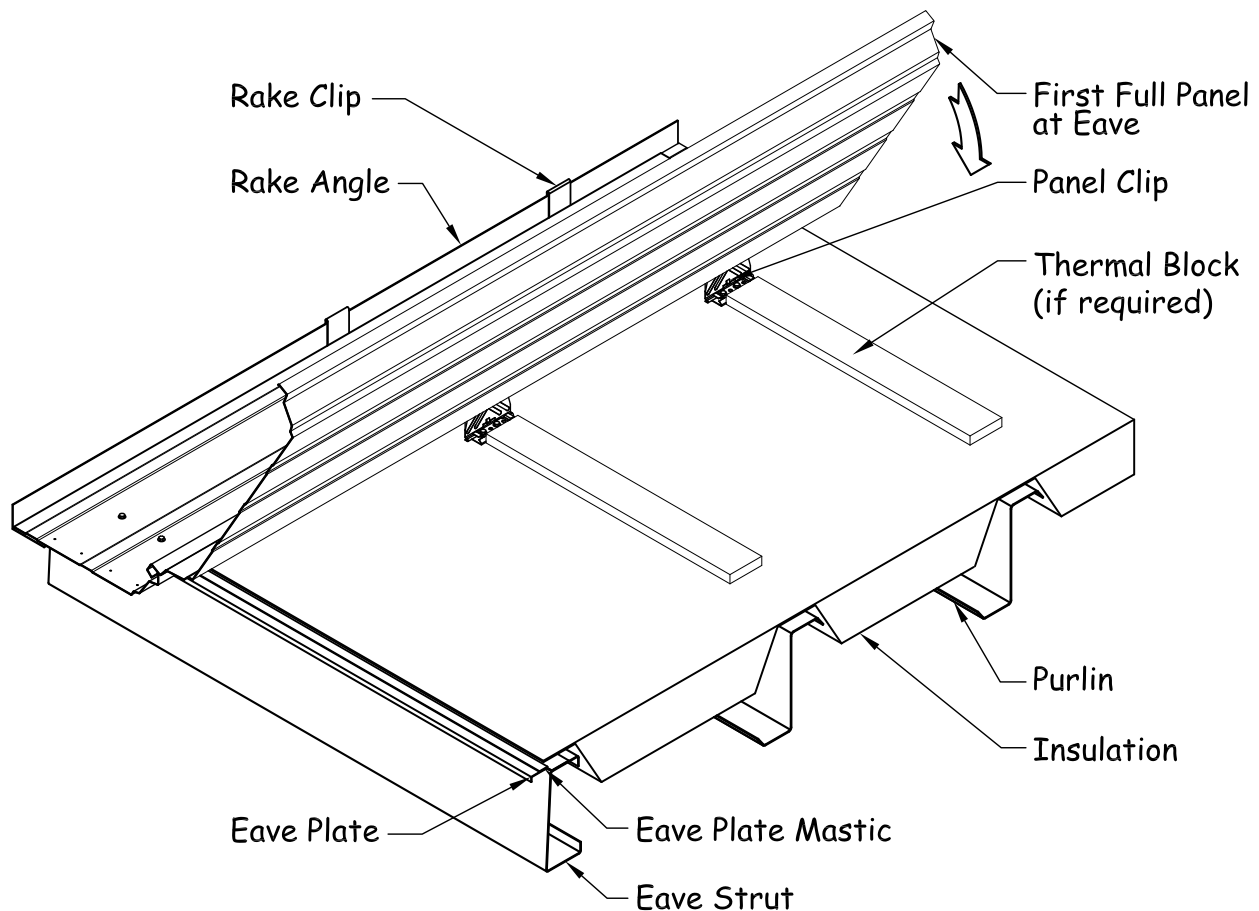
Position the tailing edge of the roof panel over the leading edge of the previously installed roof panel.

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

NOTE: An alternative method to install the back-up plate (**H2650**) is to slide it onto the panel as panel is being rolled into place. The **standard** method is outlined in sections **13-6-13.7**.

Specific roof panel side lap details are shown on the following page.

Fasten the first full panel to the eave plate with **(8) (H1030)** fasteners in the panel pan (approximately 2 1/2" o.c.) Use factory dimples at panel end for spacing but do not install fastener through the dimples at this time.



13.0 FULL PANEL RUN INSTALLATION

13.6 INSTALLING THE LEADING EDGE CLIPS AT THE FULL PANEL AT EAVE

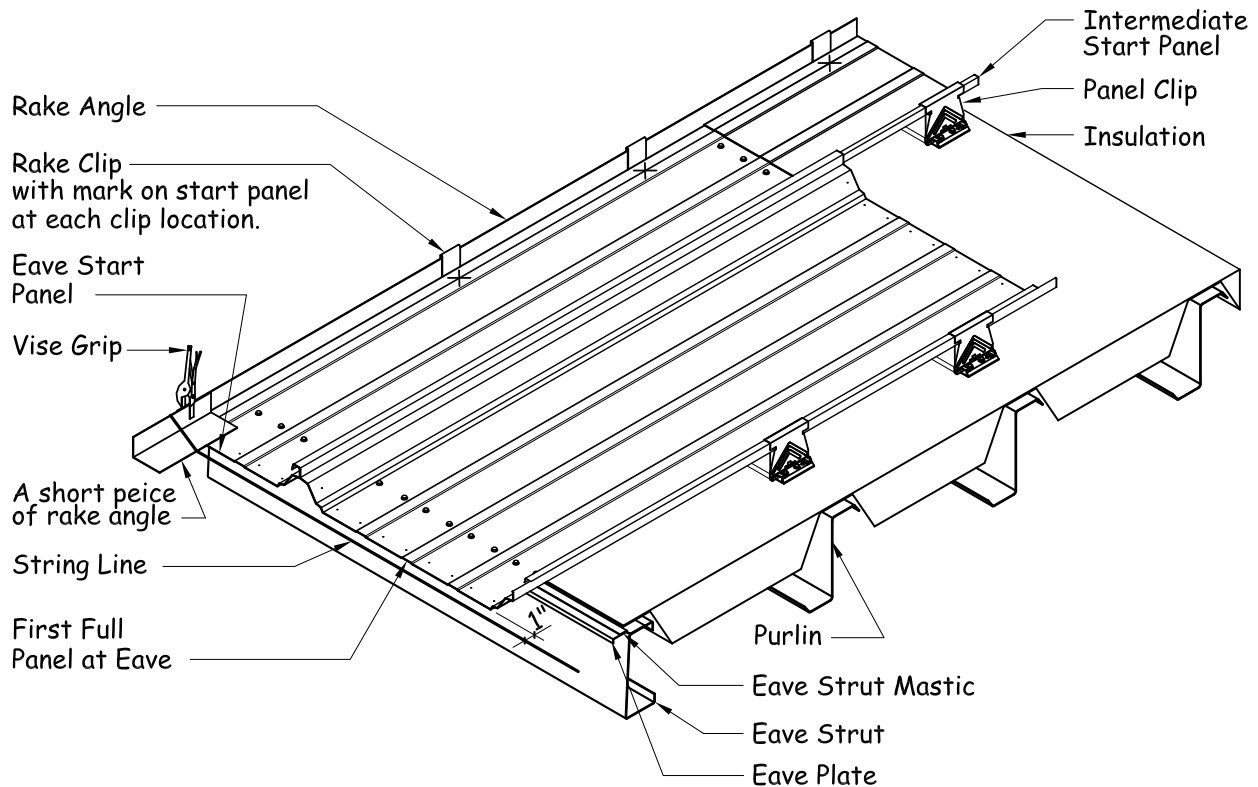
Before the up-slope full panel can be installed, the clips at the leading edge of the down slope full panel must be installed. This **MUST** be done in order to be able to hold panel modularity and so that the end lap detail will assemble correctly.

Follow the instructions as shown in previous sections 11.4 and 11.5 for clip installation.

NOTE: At a purlin lap, pre-drill clip fastener locations with 3/16" Ø drill bit. (As Needed)

To help hold the correct panel overhang dimension at the eave, install a string line 1" past the end of the panels. To do this, clamp a short piece of rake angle to the already installed rake angle using a pair of vise grips. (As shown below) When installing panel runs, measure back the 1" to properly locate the end of the panels.

It is **important** to carefully measure panel coverage and clip locations at this time. Careful measuring and planning at this stage can save a lot of adjusting and re-work later. Once the clips are properly located, make sure that they are installed in a vertical manner.



IMPORTANT NOTE: HAND CRIMPING & MOTORIZED PANEL SEAMING

As the roof installation progresses, it is necessary to hand crimp and or mechanically seam the previous full panel run. Seaming options differ per project. Refer to the erection drawings for specific seam requirements. Then review the details in sections 10.2, 12.3, and 17.4 of the Seaming Manual (the seaming manual is included with the seaming kit).

As a minimum, the roof should be hand crimped into a Nucor Roll Lock Seam™ at the low eave, end lap, high eave, and every clip location at the end of each workday. Failure to do so may result in panels coming off of the roof due to high winds.

13.0 FULL PANEL RUN INSTALLATION

13.7 END LAP PREPARATION DETAIL AT FULL PANEL

The proper placing of the end lap mastic is **critical** to the weather-tightness of the roof end laps.

The following detail shows the correct sequence for the end lap preparation.

Wipe dry and clean the underside of the up-slope panel & the top of the lower panel.

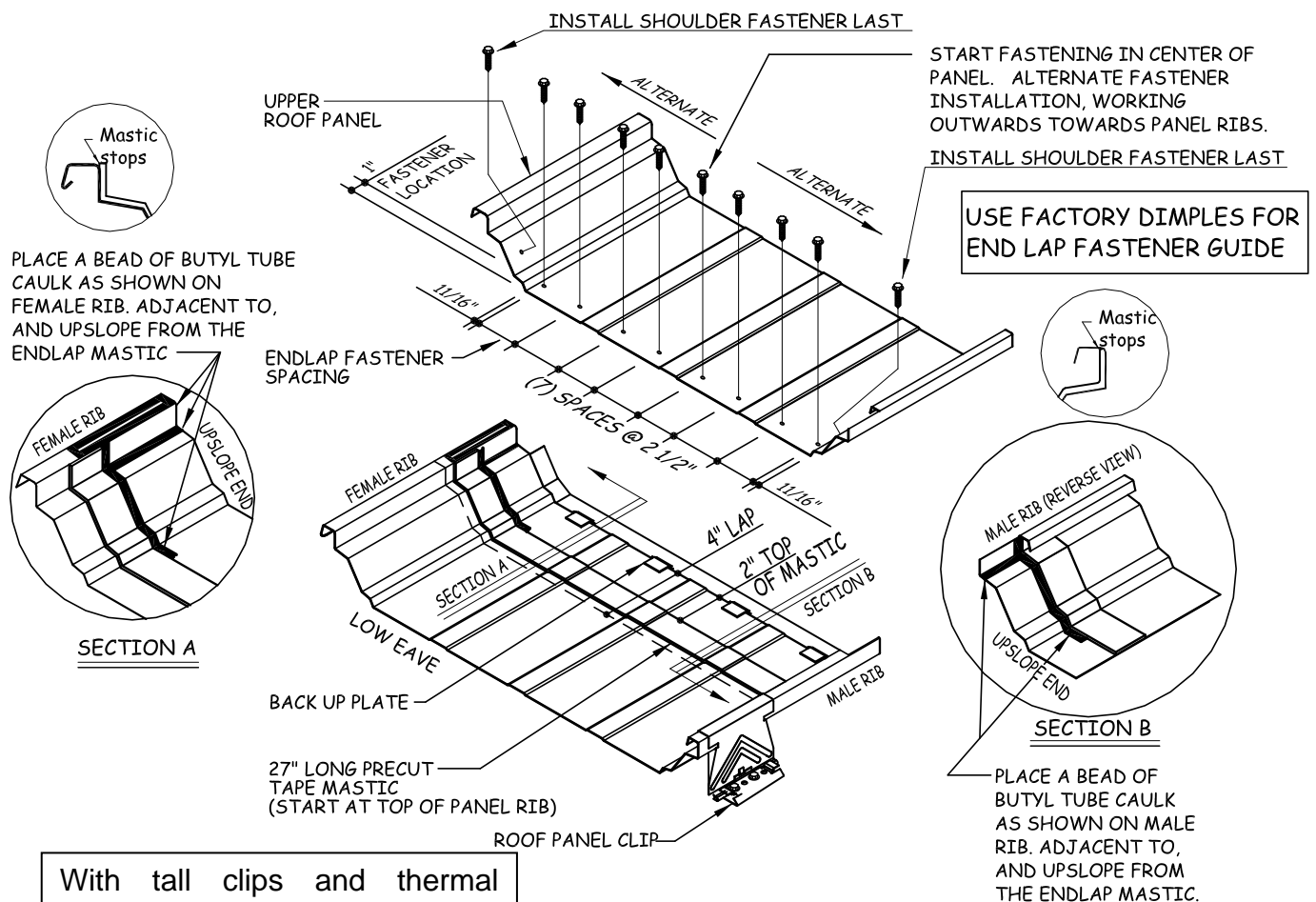
Prior to installing the tape mastic and caulk, mark lower panel at **2"** and **4"** from end of panel. (**DO NOT USE A PENCIL**)

Slide the **back-up plate (H2650)** on to the lower panel, aligning with the panel corrugation.

Apply **27" pre-cut tape mastic (H3650)** at the **2"** mark, start mastic in corner of male rib as shown. Tape mastic should end at top of female rib as shown. Tape mastic will not cover the factory dimples.

Next, apply a bead of **butyl tube caulk (H3151)** in the rib area of the panel (at both the male and female ribs). The caulk should be adjacent to and up-slope from the tape mastic as shown.

Leave paper on tape mastic until you are ready to install upper panel.



With tall clips and thermal blocks, verify the back-up plate is on top of the thermal block and block is located directly over secondary member.

SEE NEXT PAGE FOR MORE ASSEMBLY INSTRUCTIONS

13.0 FULL PANEL RUN INSTALLATION

13.8 END LAP ASSEMBLY DETAIL AT FULL PANEL

After all tape mastic and caulk is in place, hook upper panel onto previous panel, aligning panel along the 4" mark on lower panel.

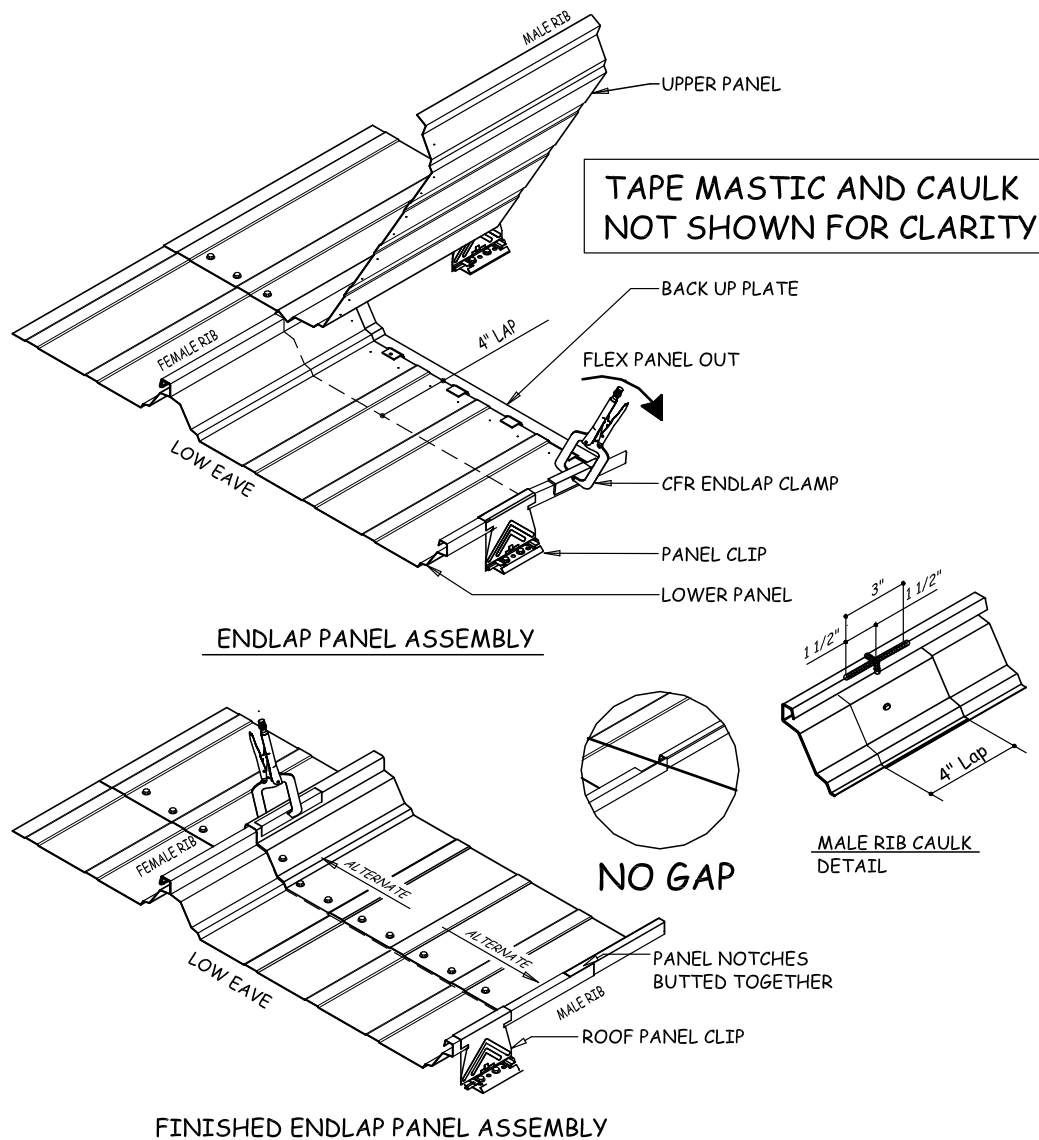
Use CFR Endlap Clamp (H7200) to flex lower panel out while tucking the upper panel into the male notch (See Below). Remove CFR Clamp (H7200) from male rib and clamp onto the completed female rib.

Start fastening at the center of the endlap, alternating fastener pattern outward. Install (10) H1030 self-drilling fasteners at the factory

dimpled locations. Install shoulder fasteners last. Remove CFR Clamp (H7200) for use on next panel endlap.

NOTE: The notch for the upper panel should butt against the notch in the lower panel as shown. (NO GAP)

Prior to installing the next lower panel, caulk male leg endlap panel notch with butyl tube caulk (H3151) as shown below. Repeat on endlaps as roof panels are erected.



13.0 FULL PANEL RUN INSTALLATION

13.9 END DAM INSTALLATION

BEFORE INSTALLING ANY MORE FULL PANEL RUNS, THE END DAM IN THE PREVIOUS PANEL RUN MUST BE INSTALLED. THIS IS A CRITICAL STEP IN HOLDING PANEL MODULARITY, AND TO AVOID SIGNIFICANT FIELD WORK LATER ON. AS WORK PROGRESS'S, INSTALL END DAMS IN THE PREVIOUS PANEL RUN.

The adjoining panel must also be field notched 2" as shown in the detail below to allow the end dams to fit properly.

Before installing the end dam, the back-up plate must be installed. Slide the **back-up plate (H2650)** onto the end of the roof panel, aligning the back-up plate with the panel corrugation.

NOTE:

In the case of interference at the High Eave/ridge end of the panel (parapet wall, existing gutter etc.) slide the **back-up plate (H2650)** onto the panel *prior* to laying the panel into place.

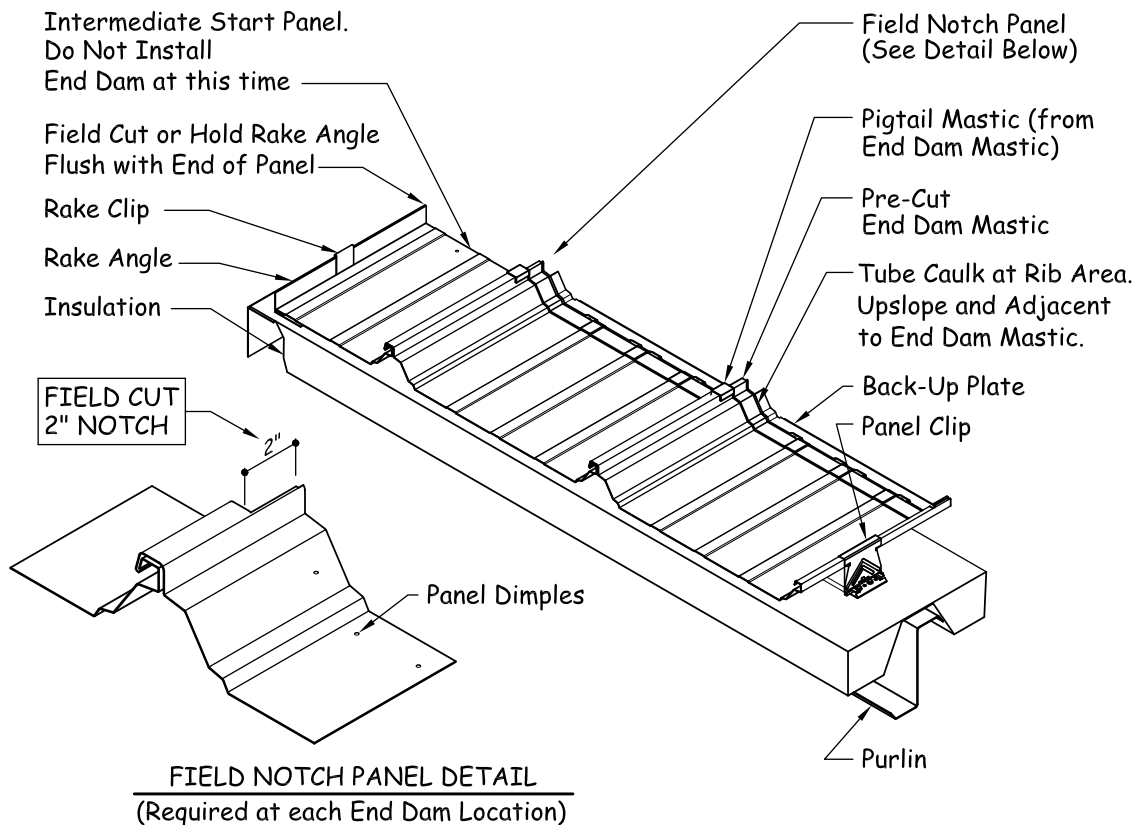
NOTE: Hand crimp the upper part of the panel into a Roll Lock seam *prior* to installing the tape mastic and end dam.

Before installing the end dam mastic, the roof panel surface must be wiped clean and dry. Install a strip of **27" pre-cut mastic (H3650)** as shown in the detail below.

Place tape mastic $\frac{1}{2}$ " down-slope from the end of the panel. Tape mastic will cover the factory dimples.

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

NOTE: The end dams at the start and finish panels **ONLY** will be installed after the rake trim is installed. **Do not** install the "start" and "finish" end dams at this time. All full panel run end dams must be installed as the roof is put down.



End Dam tape mastic and caulk placement on next page

13.0 FULL PANEL RUN INSTALLATION

13.10 END DAM MASTIC DETAILS

THE CORRECT INSTALLATION OF THE END DAM MASTIC IS CRITICAL TO THE WEATHER-TIGHTNESS PERFORMANCE OF THE ROOF SYSTEM.

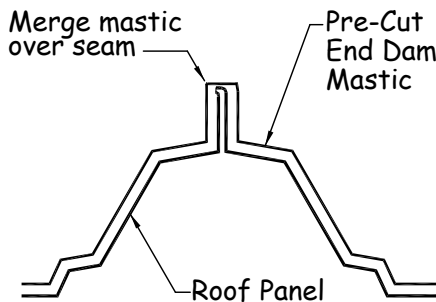
BE SURE TO VERIFY THAT THE MASTIC IS INSTALLED AS SHOWN BELOW BEFORE INSTALLING THE END DAMS.

Prior to installing the end dam mastic, hand crimp panel into a Roll Lock Crimp.

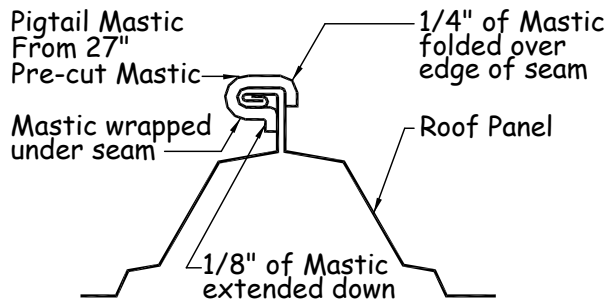
Cut a strip of **pigtail mastic** from the **27" pre-cut mastic (H3650)** and install as shown in the detail below.

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

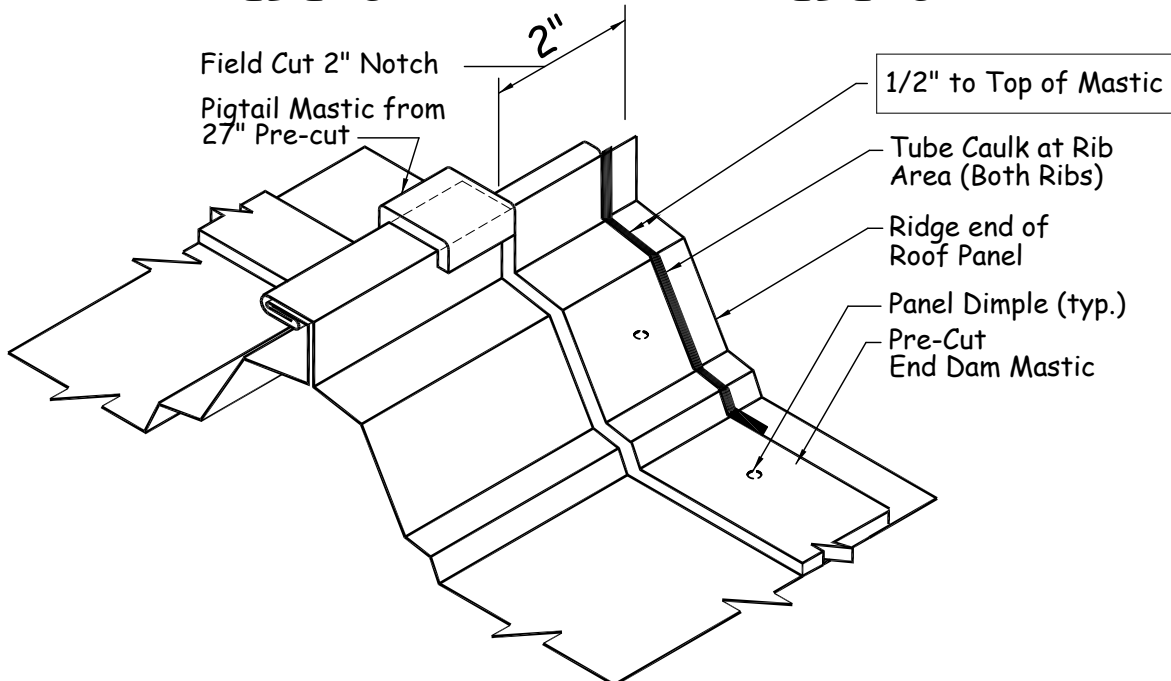
Install a bead of **butyl tube caulk (H3151)** in the rib area of the panel (at both ribs) as shown in the detail below. The caulk should be adjacent to, and up-slope of the mastic.



**END DAM MASTIC
AT PANEL END**



**PIGTAIL MASTIC
AT PANEL END**



13.0 FULL PANEL RUN INSTALLATION

13.11 END DAM INSTALLATION

Wipe dry and clean the underside of the surface of the **end dam (H2600)** flanges.

Remove the protective paper from the **end dam mastic (H3650)**.

Position the end dam so the top flange is turned down-slope and the bottom flange is up-slope, position the bottom flange **directly** over the end dam mastic. Uniformly press the **end dam (H2600)** down into the **end dam mastic (H3650)**. To assure adhesion use clamp(s) to hold the assembly together while installing the fasteners. Make sure that the vertical face of the end dam is at the **2"** notch as shown.

Install **(7) H1020 self-drilling fasteners**, starting from the center of the end dam, alternating fastener pattern towards the outside of end dam, as shown below. Install shoulder fasteners last.

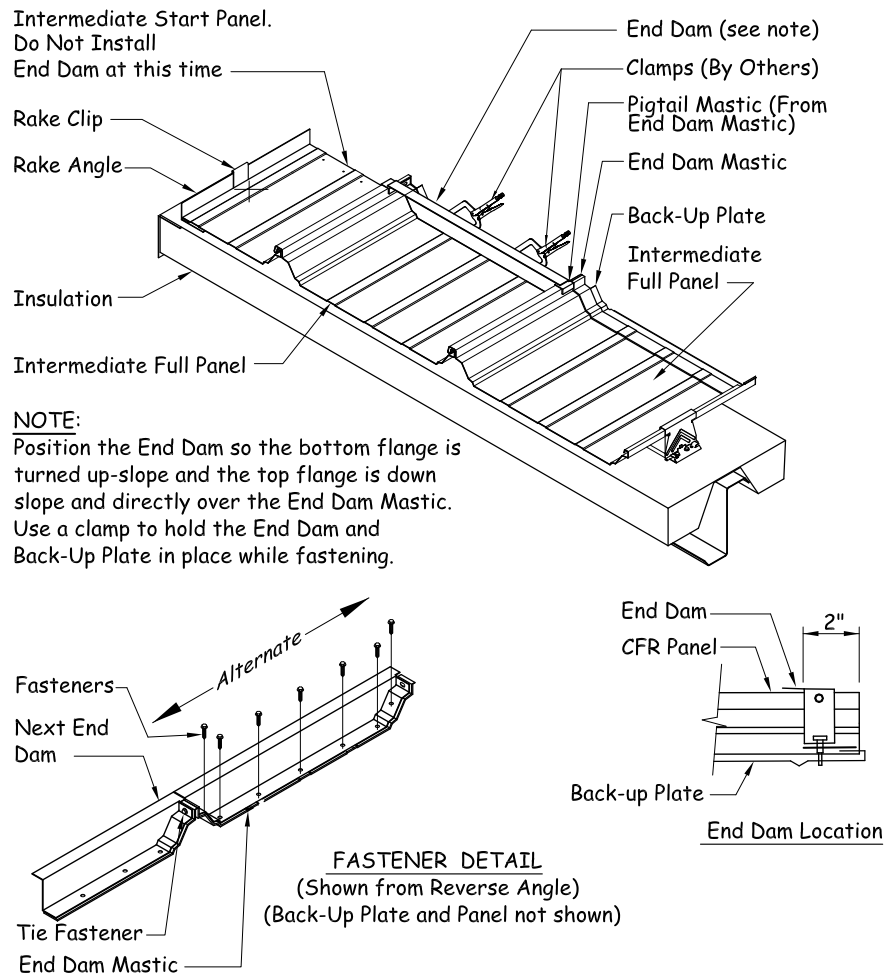
Check that the fasteners penetrate through the tape mastic and are securely engaged into the **back-up plate (H2650)**.

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

After the next end dam is installed, add **(1) H1020 self-drilling tie fastener** through the hole at the top of the end dam, through the roof panel seam and into the opposite end dam.

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

IMPORTANT: Be careful not to displace or damage the mastic while installing the end dam. Over-tightening this fastener will squeeze the roof panel side lap assembly together and effect the roof panel coverage width. Carefully tighten the fastener only as necessary to maintain the correct panel width.



13.0 FULL PANEL RUN INSTALLATION

13.12 INSTALLING END DAMS AT THE START AND FINISH PANELS.

The instructions for installing the end dams at the start and finish panel runs are the same as the full panel runs with the exception of having to field cut an end dam to fit properly. However, this step is not to be done until the rake trim has been installed. Refer to section 16.9 and/or 16.13.

HAND CRIMPING / MOTORIZED PANEL SEAMING

As the roof installation progresses, it is necessary to hand crimp and/ or mechanically seam the previous full panel run. Seaming options differ per project. Refer to the erection drawings for specific seam requirements. Then review the details in sections 10.2, 12.3, and 17.4 of the Seaming Manual (the seaming manual is included with the seaming kit).

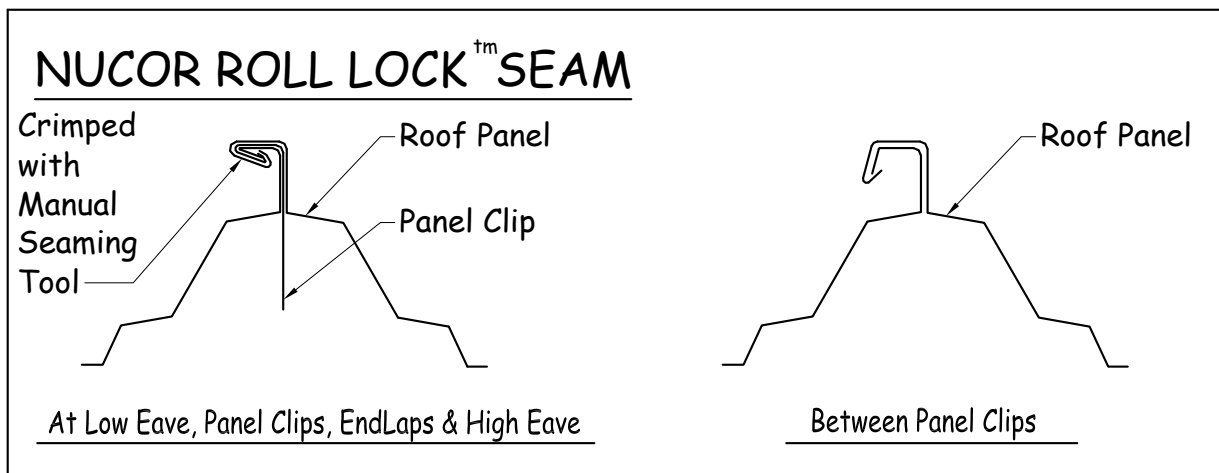
NOTE:

As a minimum, the roof should be hand crimped into a Nucor Roll Lock Seam™ at the low eave, end lap, high eave, and every clip location at the end of each workday. Failure to do so may result in panels coming off of the roof due to high winds.

13.13 INSTALLING THE FINISH PANEL RUN

The installation instructions and details at the finish panel run are the **same** as the start panel run.

Follow the instructions as outlined in sections 10, 11, & 12. Field cutting of the finish panel to the correct width is required.



14.0 PREPARATION FOR ROOF LINE TRIM INSTALLATION**14.0 PREPARATION FOR ROOF LINE TRIM INSTALLATION****14.1 PREPARATION FOR TRIM INSTALLATION**

BEFORE PROCEEDING WITH THE ROOF LINE TRIM INSTALLATION, WALK THE ROOF PAYING PARTICULAR ATTENTION TO THE FOLLOWING AREAS.:

All panel splices are straight, and fasteners properly installed.

All end dams are in place and properly fastened, including the fastener through the panel rib.

All end dams are the same height.

Any gaps between panel and end dam have been properly filled with caulk.

All void closures are in place and properly fastened and aligned.

Any gaps between panel and void closure have been properly filled with caulk.

All metal shavings and debris have been removed from the roof.

All perimeter fasteners are in place and properly tightened. The rubber washer should be visible all around the fastener.

14.2 GENERAL

Begin installing trim at the back of the building working toward the front. This will "hide" the trim laps from direct view.

When lapping **rake trim** and **rake parapet trim**, the upper piece should overlap the lower piece. This will help prevent water from entering into the building through the lap.

Gutter/Rake trim (bird stop) must be installed prior to the installation of the low eave trim. See **section 16** for proper installation details.

Some field cutting, trimming, and bending is required. **Extreme care must be taken while performing any fieldwork so as to produce an attractive, weather-tight condition.**

Refer to your project erection drawings and the following pages for trim part numbers.

NOTE: Polyurethane tube caulk (**H3152**) is used at all trim laps **except at the ridge cap**. The ridge cap utilizes the butyl tube caulk (**H3151**). It is important that the correct caulk be used. Careful attention to the details is a must.

A **CFR check list** is provided at the end of this manual for punching out the roof.

14.0

PREPARATION FOR ROOF LINE TRIM INSTALLATION

GENERAL (CONTINUED)

This section is broken down into individual trim conditions. Not all of these conditions may apply to your project. Refer to the erection drawing roof sheeting plan(s) and the roof line trim details to identify the conditions your project requires.

If there are discrepancies between this manual and the erection drawings, the erection drawings will take precedence. It is a good idea to compare the erection drawing details against this manual before trim installation begins.

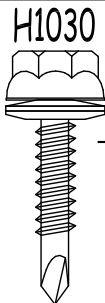
Refer to the following pages for standard roof line trim profiles for assistance in the correct

selection and identification of roof line trim parts. For proper fit-up, sealing and fastening, and to help ensure the roof assembly's weather-tightness, structural capability, durability and appearance, the correct parts must be used. **DO NOT** use parts other than those specified in this manual or on the erection drawings without consulting Nucor.

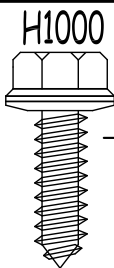
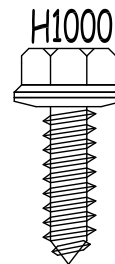
Before installing any roof line trim, the wall panel (or whatever wall material is being used) must be erected.

STRIP A FASTENER?

FASTENER REPLACEMENT CHART



IF YOU STRIPPED THIS FASTENER
REPLACE IT WITH THIS ONE.



IF YOU STRIPPED THIS FASTENER THEN THE
END LAP MUST BE DISASSEMBLED AND THE
BACK-UP PLATE MUST BE REPLACED.

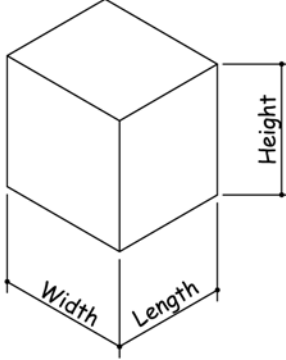
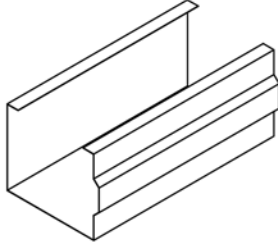
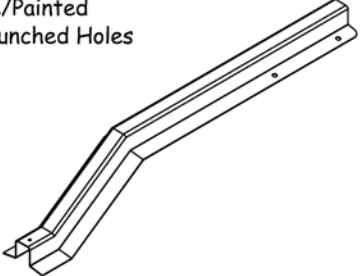
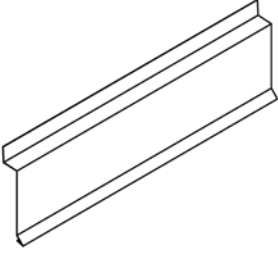
15.0

PREPARATION FOR ROOF LINE TRIM INSTALLATION

15.0 STANDARD ROOF LINE TRIM PARTS**15.1 GENERAL**

This section is intended to show you diagrams of the trim parts that are used in this section of the manual. These parts cover the standard conditions. The erection drawing details will cover the special conditions.

It is a good idea to check the erection drawing details against the details in this section. If there are discrepancies, the erection drawings will take precedence

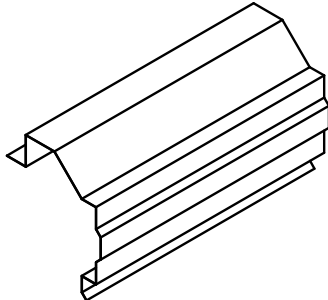
<p>DIMENSION INFORMATION</p> <p>The detail at right shows how the standard parts are dimensioned. Note that the dimensions given are nominal. Some parts do not have all 3 (length, width, height) dimensions given, as they may not be relevant.</p> 	<p>GUTTER</p> <p>26 Gauge Steel Painted</p>  <p>Length = 10'-1," 20'-2" Width = 8 1/8" Height = 7"</p> <p>Part No. GTA01=10'-1" GTA02=20'-2"</p>
<p>GUTTER BRACKET</p> <p>22 Gauge Steel Galvalume/Painted Factory Punched Holes</p>  <p>Length = 20" Width = 3" Height = 4"</p> <p>Part No. H2640</p>	<p>LOW EAVE TRIM</p> <p>26 Gauge Steel Painted</p>  <p>Length = 10'-2" Width = 1 1/2" Height = 7"</p> <p>Part No. LEA01</p>

15.0

PREPARATION FOR ROOF LINE TRIM INSTALLATION

SCULPTURED RAKE TRIM

26 Gauge Steel
Painted

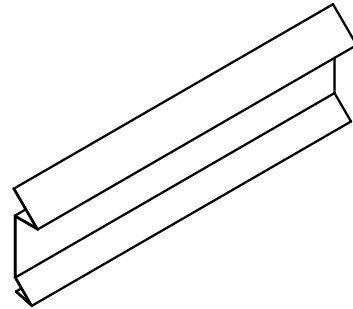


Length = 10'-1", 20'-2"
Width = 9 3/8"
Height = 12"

Part No.
RTA01 - 10'-1"
RTA02 - 20'-2"

RAKE RETAINER TRIM

26 Gauge Steel
Painted

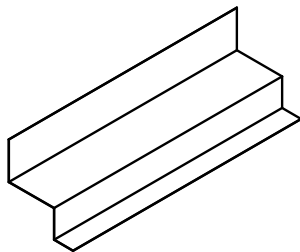


Length = 10'-1"
Width = 3/4"
Height = 2 1/2"

Part No. RRA01

RAKE PARAPET TRIM

26 Gauge Galvalume (Std.)
Painted Available

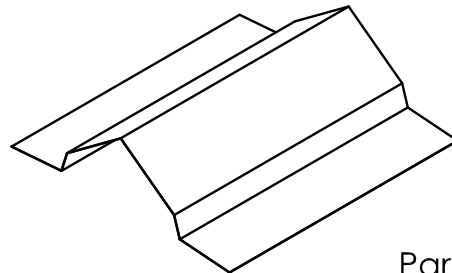


Length = 10'-1"
Width = 6 3/4"
Height = 6 3/4"

Part No. RPA01

RIDGE CAP

26 Gauge Galvalume (Std.)
Painted Available

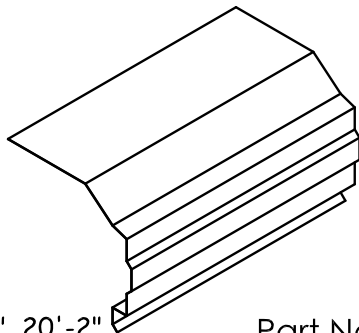


Length = 10'-1", 20'-2"
Width = 22 3/4"
Height = 11"

Part No.
Varies with roof
slope, see
erection dwgs

SCULPTURED HIGH EAVE TRIM

26 Gauge Steel
Painted

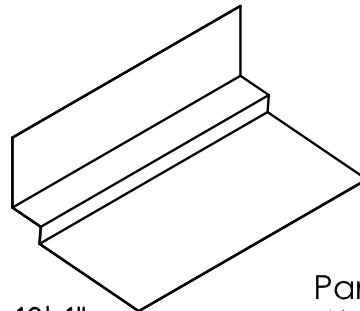


Length = 10'-1", 20'-2"
Width = 12 1/2"
Height = 12"

Part No.
HEB01 - 10'-1"
HEB02 - 20'-2"

HIGH EAVE PARAPET TRIM

26 Gauge Galvalume (Std.)
Painted Available



Length = 10'-1"
Width = 11 1/2"
Height = 8"

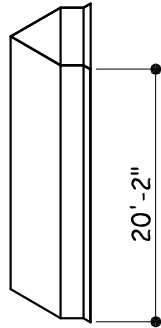
Part No. HP_01
Varies with roof
slope, see
erection dwgs

15.0

PREPARATION FOR ROOF LINE TRIM INSTALLATION

WALL OUTSIDE CORNER TRIM

26 Gauge Steel
Painted

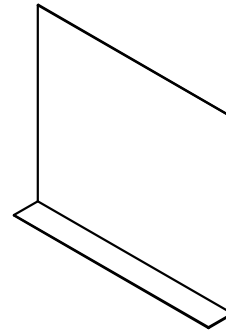


Length = 20'-2"
Width = 7 1/2"
Height = 7 1/2"

Part No. OCA01

GUTTER/RAKE TRIM

26 Gauge Steel
Painted

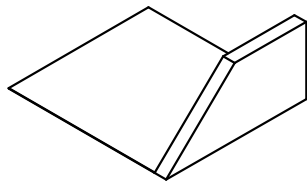


Length = 8"
Width = 1"
Height = 7"

Part No. GRA01

RAKE END CAP - LEFT

26 Gauge Steel
Painted

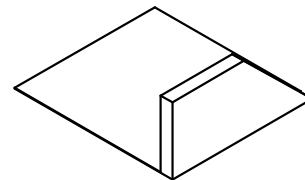


Length = 6"
Width = 6"
Height = 2 3/4"

Part No. RCA01

RAKE END CAP - RIGHT

26 Gauge Steel
Painted

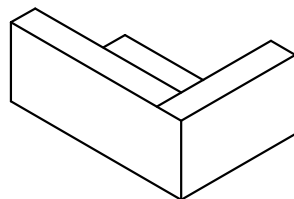


Length = 6"
Width = 6"
Height = 2 3/4"

Part No. RCA02

RAKE PARAPET END CAP - LEFT

26 Gauge Steel
Painted

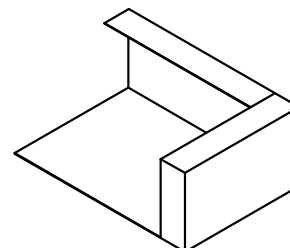


Length = 4 3/4"
Width = 7"
Height = 2 3/4"

Part No. RCB01

RAKE PARAPET END CAP - RIGHT

26 Gauge Steel
Painted



Length = 4 3/4"
Width = 7"
Height = 2 3/4"

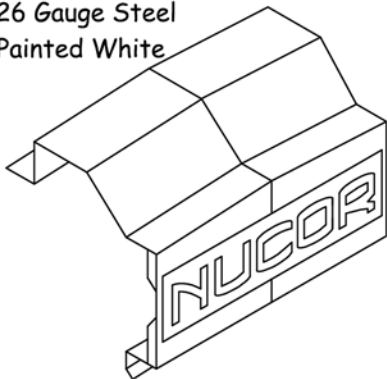
Part No. RCB02

15.0

PREPARATION FOR ROOF LINE TRIM INSTALLATION

PEAK BOX

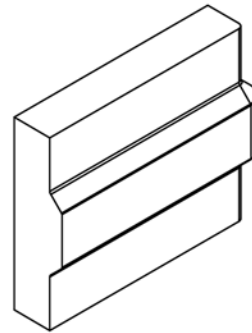
26 Gauge Steel
Painted White



Part No.
SEE ROOF TRIM
INSTALLATION
SECTION FOR
PART NUMBERS

CORNER CAP

26 Gauge Steel
Painted

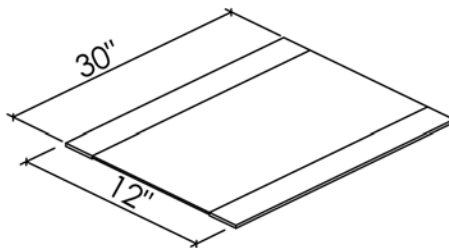


Length = 8"
Width = 1"
Height = 7"

Part No. H4000

PEAK TRANSITION (RAKE PARAPET)

Expandable Edged Flash

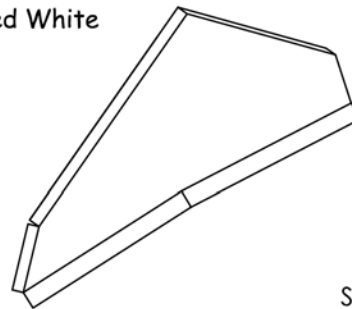


Length = 30"
Width = 12"
Material = Grey TPE

Part No.
RPT30

PEAK PLATE TRANSITION (RIDGE)

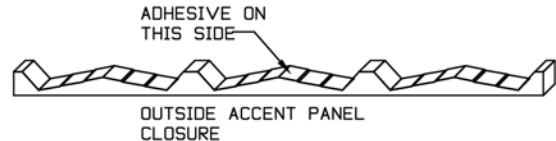
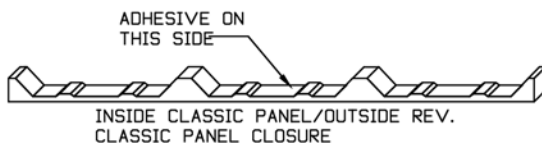
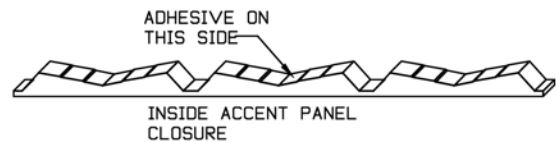
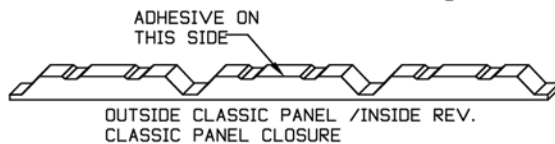
26 Gauge Steel
Painted White



Part No.
SEE ROOF TRIM
INSTALLATION
SECTION FOR
PART NUMBERS

OPTIONAL FOAM WALL PANEL CLOSURES

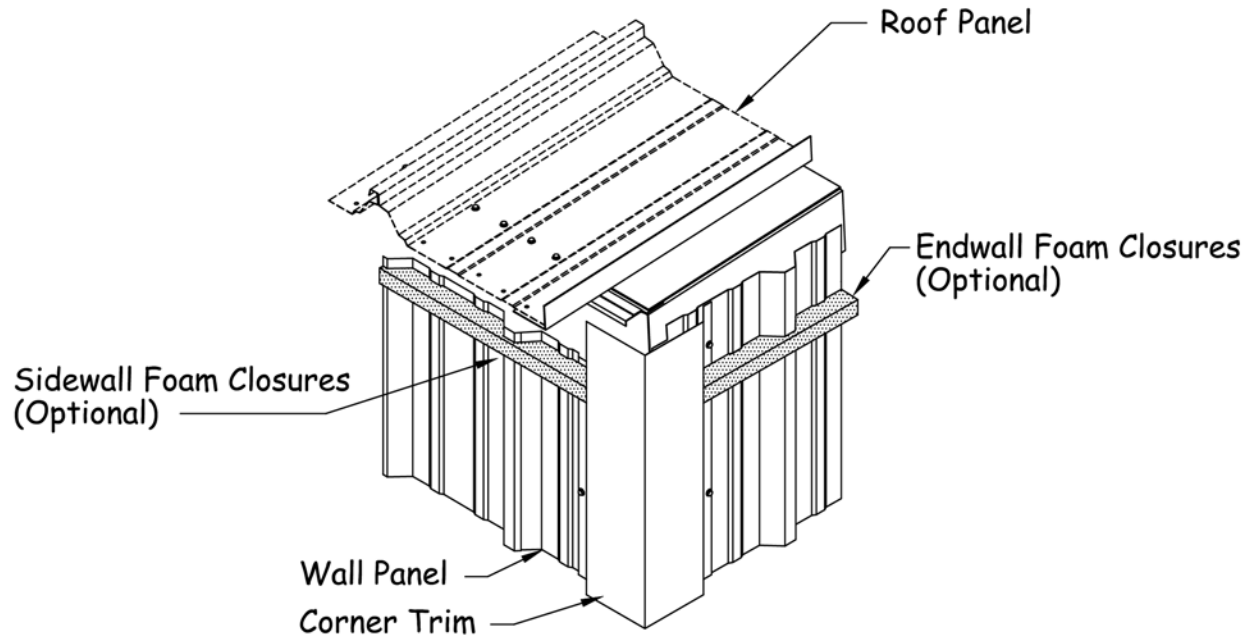
OPTIONAL STRAIGHT AND BEVELED FOAM CLOSURES ARE AVAILABLE IN THESE PROFILES. Beveled Closures are available from 2:12 to 9:12 roof slope. (See Construction Drawing Set for more Info & Part Marks)



16.0 ROOF LINE TRIM INSTALLATION

16.1 WALL PANEL/TRIM FOAM CLOSURES

Per the order contract, your job could have foam wall panel closures. Prior to installing any roof line trims, review the construction drawing set for your job's panel closure requirements, part marks & locations.



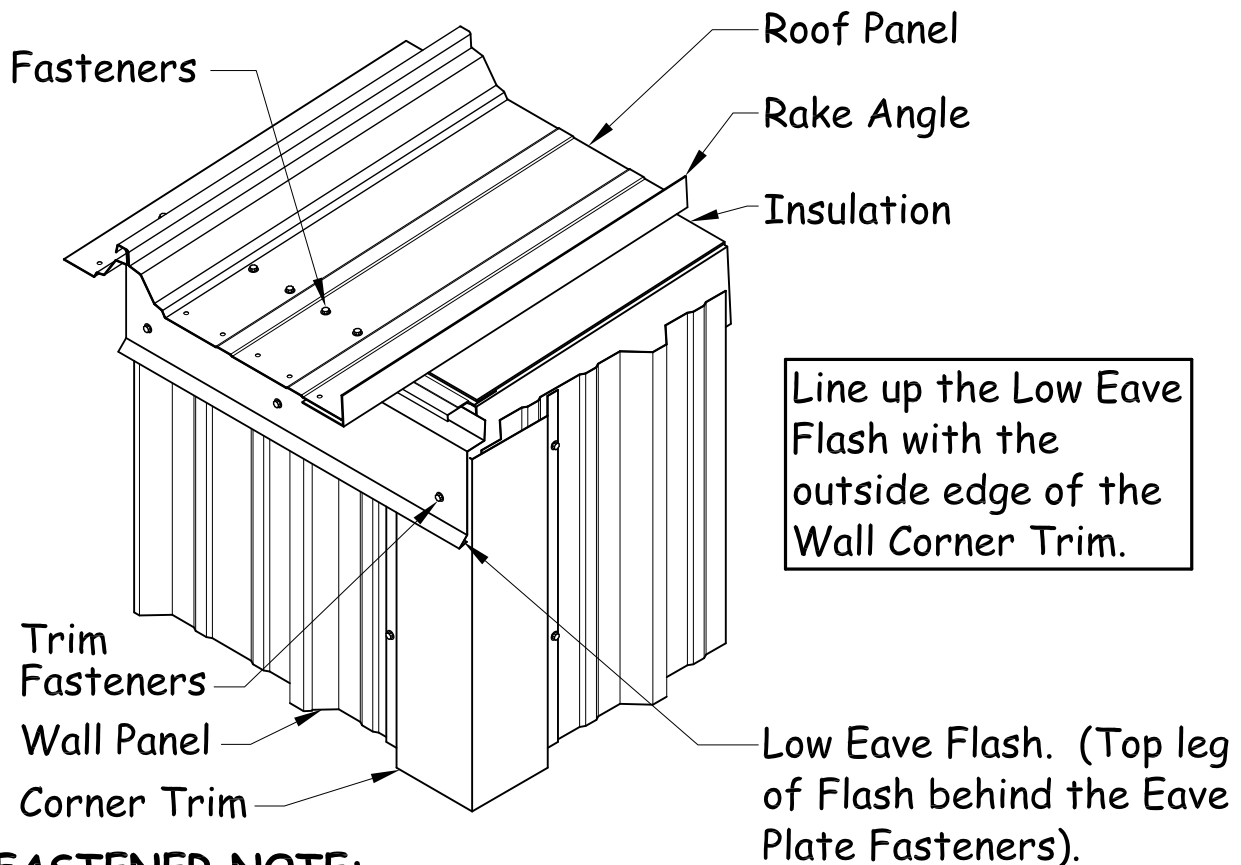
WALL PANEL CLOSURE NOTE:

See Construction Drawing set for your Specific Wall Panel Closure Requirements, Part Marks & Locations.

16.0 ROOF LINE TRIM INSTALLATION**16.2 LOW EAVE FLASH**

Align the edge of the **low eave flash (LEA01)** with the edge of the wall corner trim and position the top leg of the trim **behind** the eave plate fasteners. Fasten at ends and at 12" o/c with **(H1060/H1061)** trim colored self-drilling screws.

See the following page for low eave trim lap detail.

**FASTENER NOTE:**

Attach the Low Eave Flash with Fasteners 12" on center.
See next page for Trim Lap Details.

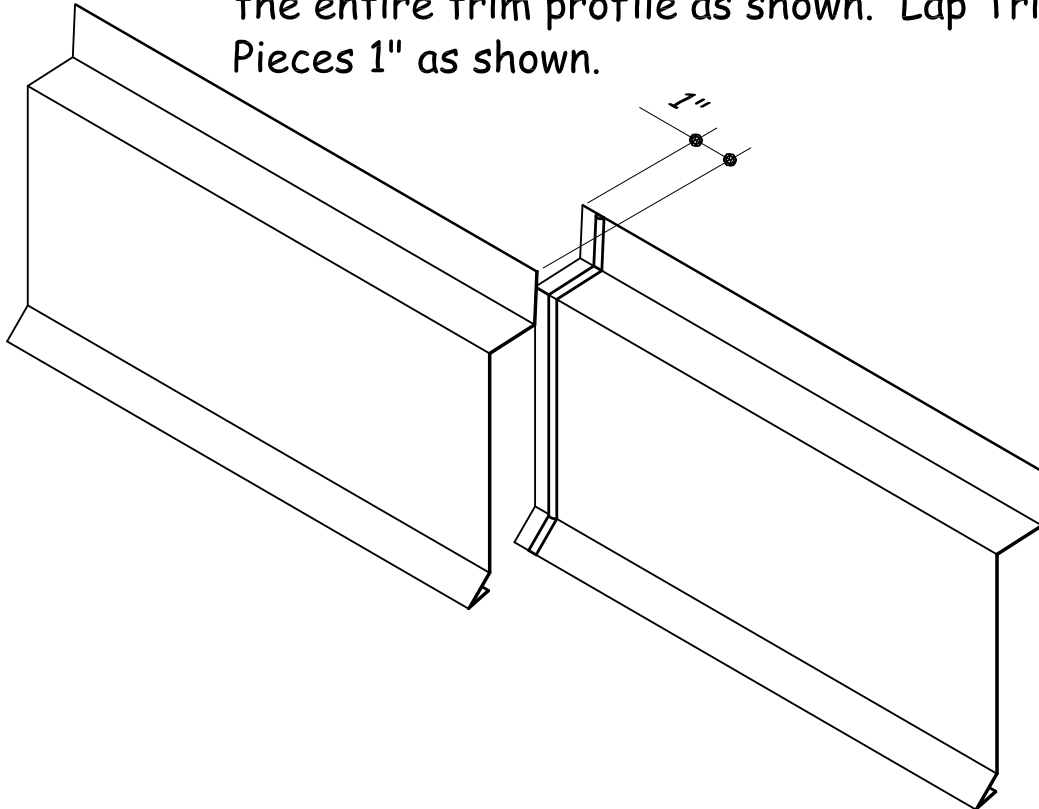
16.0 ROOF LINE TRIM INSTALLATION**16.3 LOW EAVE FLASH LAP DETAIL**

Lap the low eave trim 1", sealing with polyurethane tube caulk (H3152) as shown in

the detail below. Fasten with (1) trim colored self-drilling screw (H1060/H1061).

LOW EAVE FLASH:

Apply a continuous bead of Tube Caulk along the entire trim profile as shown. Lap Trim Pieces 1" as shown.



16.0 ROOF LINE TRIM INSTALLATION

16.4 LOW EAVE STANDARD GUTTER

Establish a string line 6 3/8" beyond the low eave edge of the roof panel to aid in proper gutter bracket alignment.

Apply 8" **pre-cut mastic (H3640)** to the end of the bracket directly under the pre-punched holes.

NOTE: Before the gutter bracket can be installed, the panel seam at the low eave must be hand crimped. Place the **gutter bracket (H2640)** on the roof panel, holding the low eave end at the string line established in step 1. **Gutter brackets are required at each panel rib (2'-0 on center).**

Fasten the gutter bracket with (2) gutter bracket colored self-drilling **screws (H1050)**.

Apply 1/2" **tape mastic (H3010)** to the back lip of the gutter and fasten to the roof panel with (4) roof colored self-drilling **screws (H1050)**, utilizing 4 of the 8 factory panel dimples. Fastener spacing starting with the first dimple

from the panel corrugation is: 11/16", 5", 7 1/2" 5", 11/16". (See Detail below)

NOTE: Clamping the gutter to the roof panel will allow for easier installation.

• GUTTER PART NUMBERS

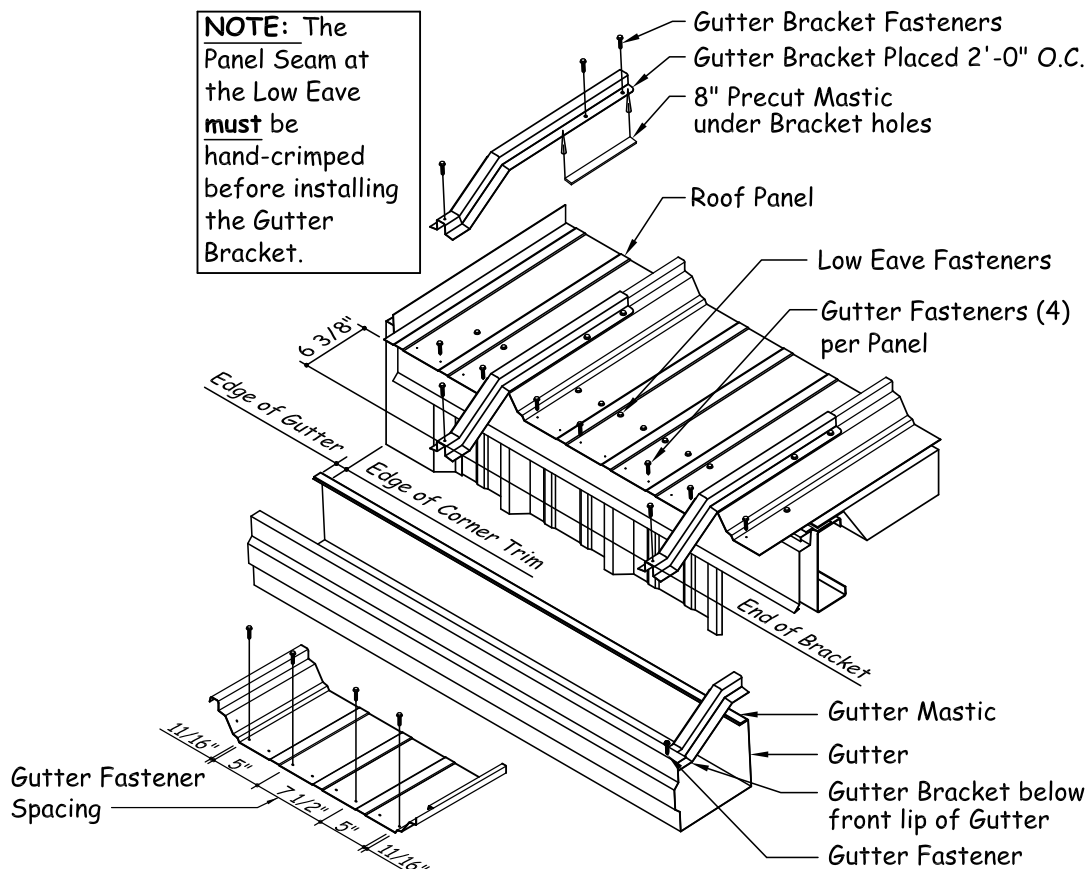
- **GTA01 x 10'-1"**
- **GTA02 x 20'-2"**

If the endwall is a standard rake trim condition, the gutter should extend 1" beyond the edge of the wall corner trim.

If the endwall is a rake parapet trim condition, the gutter should be held back 1/2" from the face of the parapet wall.

Attach the front of the gutter to the gutter bracket with (1) gutter colored self-drilling **screw (H1050)**.

NOTE: THE GUTTER BRACKET SHOULD BE UNDER THE LIP OF THE GUTTER.



16.0 ROOF LINE TRIM INSTALLATION

16.5 GUTTER LAP DETAIL

Lap gutter 1", sealing with a continuous bead of **polyurethane tube caulk (H3152)** to the end of the adjoining piece. Fasten with (10) **pop rivets (H1100)**.

16.6 GUTTER END CAPS

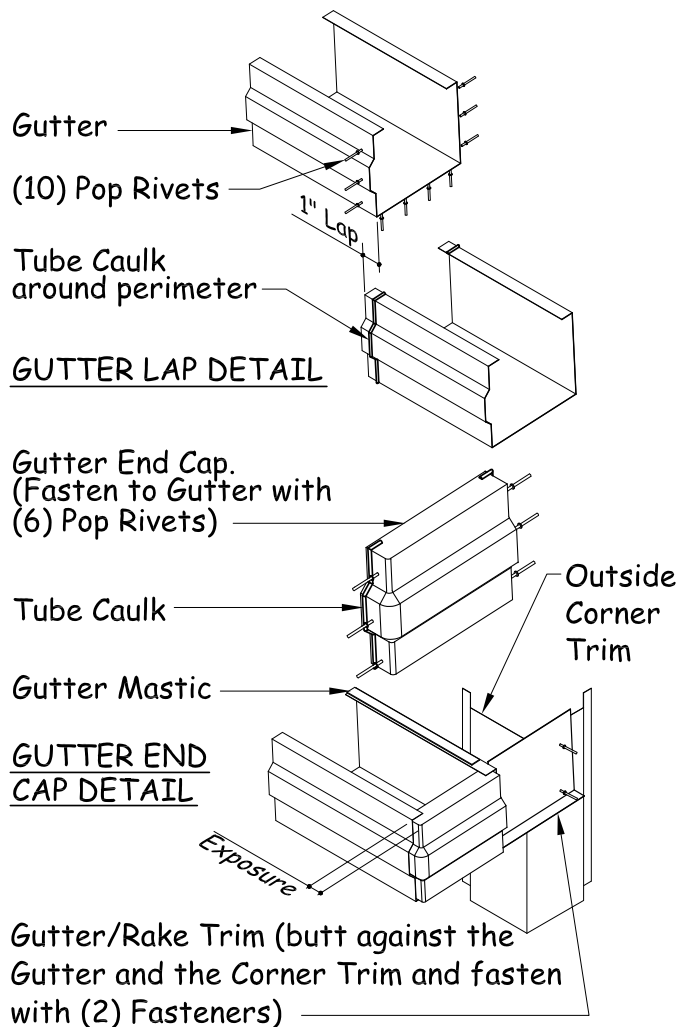
Apply a continuous bead of **polyurethane tube caulk (H3152)** around three sides of the **gutter end cap (H4000)**, close to the inside edge of the cap.

Insert the cap into the gutter leaving ½" of the cap exposed on all sides.

Fasten with **pop rivets (H1100)** at the front and back only. (6) total rivets required per cap.

Fasten the **gutter/rake trim (GRA01)** to the wall corner trim with (2) trim-colored self-drilling **screws (H1050)**. Hold the trim piece tight to the back of and flush with the bottom of the gutter.

After the **gutter end cap (H4000)** has been installed, apply a continuous bead of **polyurethane tube caulk (H3152)** around the inside bends of the cap.



16.0 ROOF LINE TRIM INSTALLATION

16.7 PREPARATION FOR STANDARD RAKE TRIM INSTALLATION

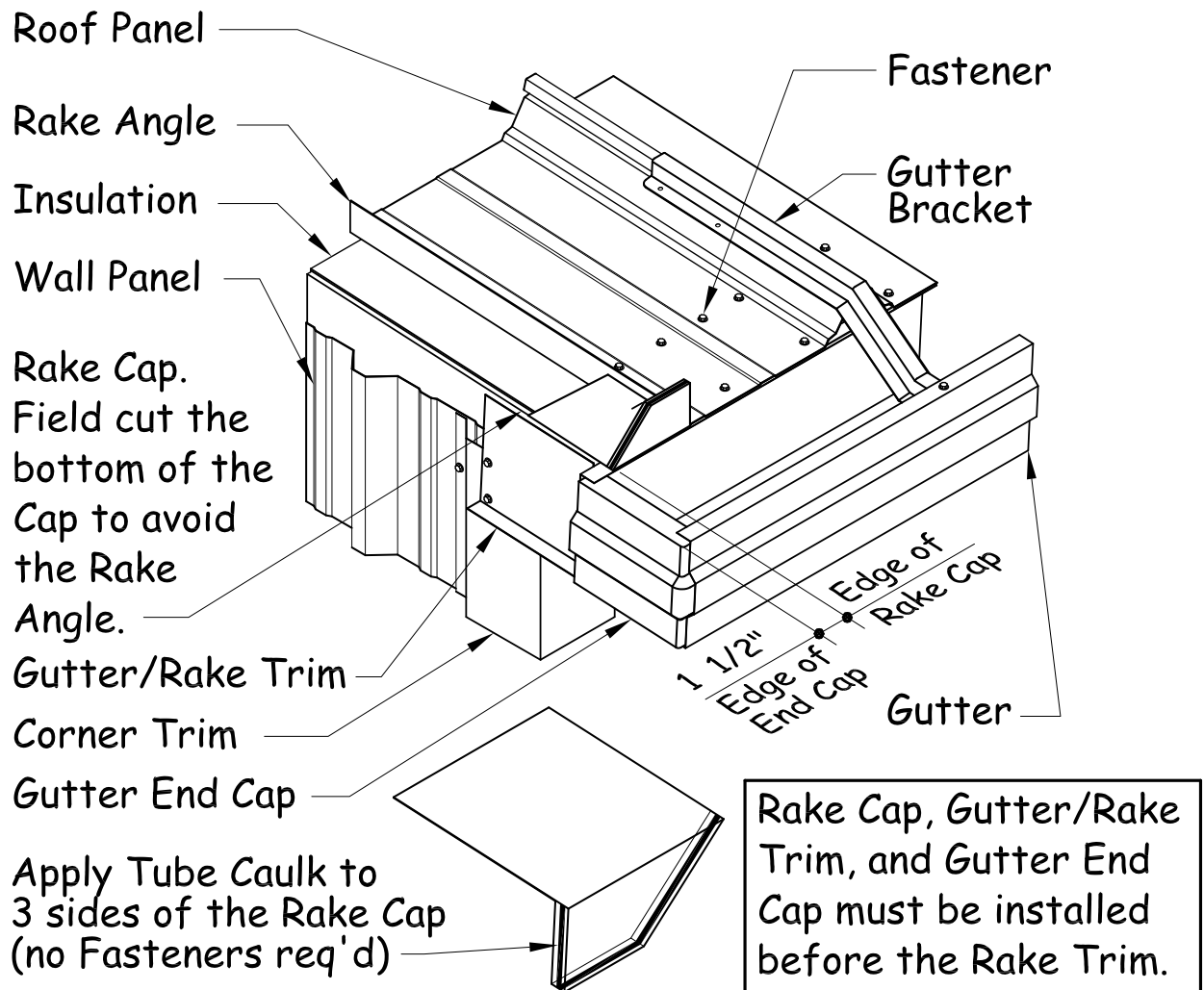
Before installing the standard rake trim, the rake cap must be installed. Follow the directions below for the rake cap installation.

Apply **polyurethane tube caulk (H3152)** to (3) sides of the **rake cap** and place it on the end of the panel $1\frac{1}{2}$ " from the edge of the gutter end cap. No fasteners are required for the rake cap. Field cope flat of rake cap as required.

RAKE CAP PART NUMBERS

- RCA01 (LEFT)
- RCA02 (RIGHT)

Before proceeding with the standard rake trim installation, make sure that the **gutter end cap (H4000)**, **gutter/rake trim (GRA01)**, and **rake cap (RCA__)** have been installed in accordance with the instructions in **section 16.5**.



16.0 ROOF LINE TRIM INSTALLATION

16.8 STANDARD RAKE TRIM INSTALLATION AT BUILDING WITH GUTTER

STOP!!! If your building has gutter, proceed with the instructions on this page. If your building does not have gutter, go to section 16.11.

RAKE TRIM PART NUMBERS

- RTA01 x 10'-1"
- RTA02 x 20'-2"

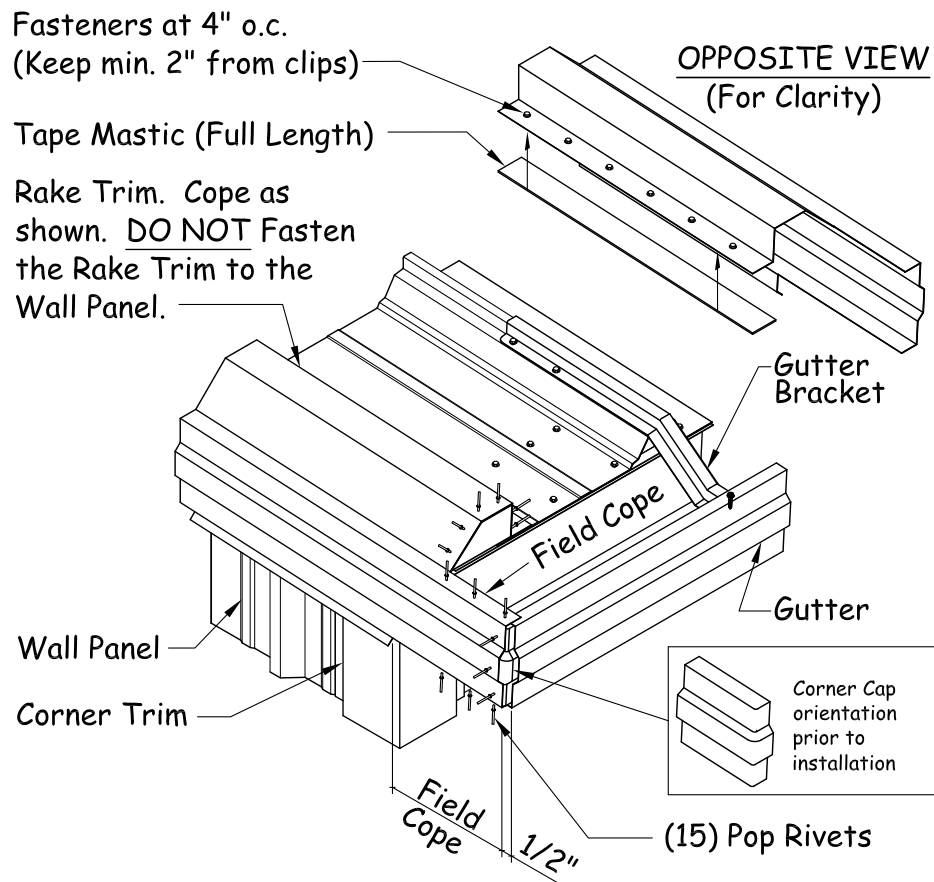
All parts must be positioned properly before touching the mastic to the roof panel. Mastic cannot be reused.

Apply continuous 2 ¼" tape mastic (H3020) to the bottom of the horizontal leg of the rake trim (the leg that attaches to the roof panel).

Position the rake flash so that the low eave end is held ½" short of the outside face of the gutter.

Always start the rake trim installation at the low eave working toward the high eave or ridge. Fasten the rake trim to the roof panel with trim colored self-drilling screws (H1030) at 4" o/c. (Care must be taken to ensure that these fasteners are kept a minimum of 2" away from the rake clip locations in order to allow proper expansion and contraction of the roof system. Go to section 16.9 & 16.13 for rake trim termination details at the ridge/ high eave. See section 16.10 for rake retainer trim installation.

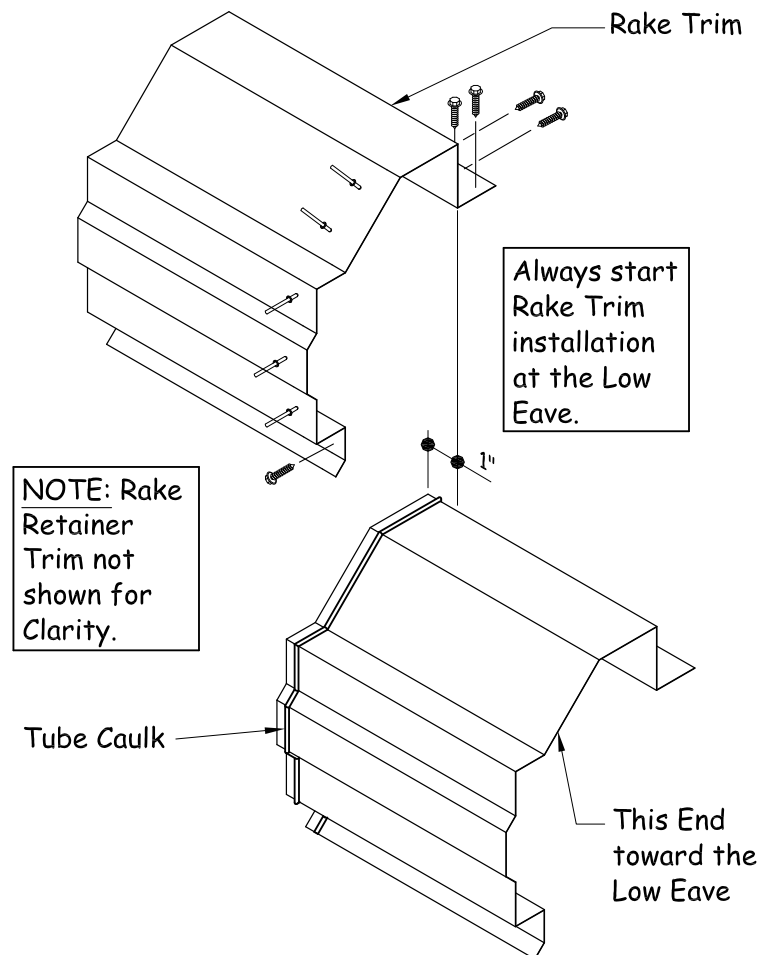
Cope the upper portion of the rake trim flush with the end of the roof panel. Cope the bottom vertical leg of the rake trim flush with the outside edge of the wall corner trim. Fasten the rake trim to the end caps using (15) pop rivets (H1100).



16.0 ROOF LINE TRIM INSTALLATION**16.9 RAKE TRIM LAP DETAIL**

Lap the rake trim 1", sealing with a continuous bead of **polyurethane caulk (H3152)** to the end of the adjoining piece. Fasten with (5) trim colored self-drilling **screws (H1050)** and (5) **pop rivets (H1100)**.

Do not attach the rake trim to the wall panel (or whatever wall material is being utilized). Go to the rake retainer trim installation instructions in section **16.10**.



16.0 ROOF LINE TRIM INSTALLATION

16.10 STANDARD RAKE TRIM TERMINATION AT RIDGE

If your building has a **ridge**, extend the standard rake trim flush with the end of the roof panel. **If your building is a single slope, go to section 16.17.**

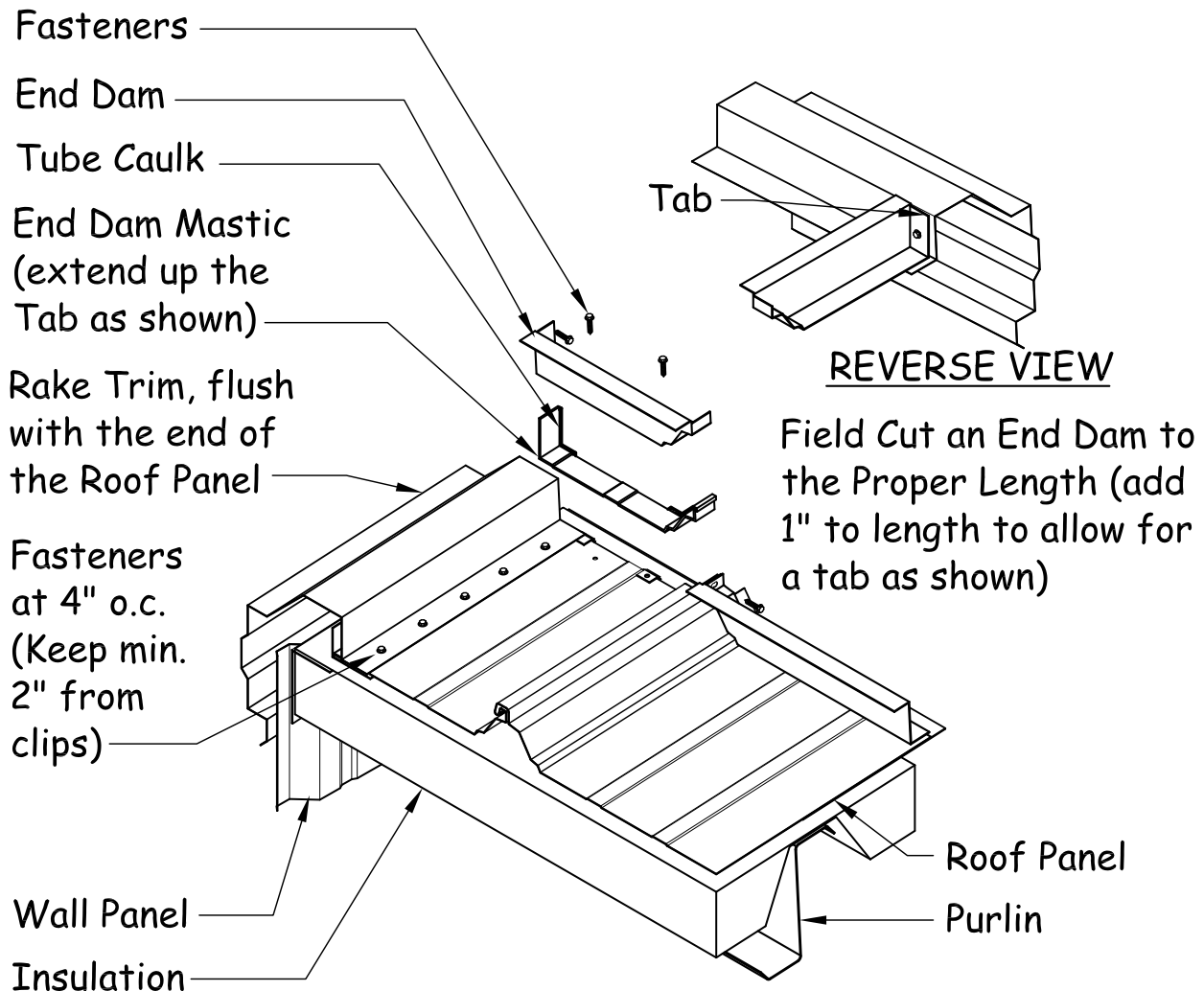
Field cut an **end dam (H2600)** to fit between the rake trim and the panel rib. Add an additional **1"** to the end dam length to allow for a tab to attach the end dam to the rake trim.

Apply part of a piece of **27" pre-cut tape mastic (H3650)** to the roof panel **$\frac{1}{2}$ "** down to **top of tape mastic**. Be sure that the mastic forms tightly

to all bends. The mastic must also extend up the rake trim between the tab in the end dam and the rake trim.

Apply a bead of **butyl tube caulk (H3151)** in the rib area of the panel and along the back leg of the rake trim. The caulk should be adjacent to and up-slope from the tape mastic.

Fasten the end dam at pre-punched holes with self-drilling **H1020 screws**. Fasten the tab to the rake trim with (1) self-drilling **H1020 screw**. If applicable, install (1) **H1020 self-drilling tie fastener** through the hole at the top of the end dam.



16.0 ROOF LINE TRIM INSTALLATION

16.11 RAKE RETAINER TRIM INSTALLATION

The rake retainer trim allows the standard rake trim to float with the expansion and contraction of the roof system. Proper positioning of the rake retainer trim will allow the standard rake trim to function as designed.

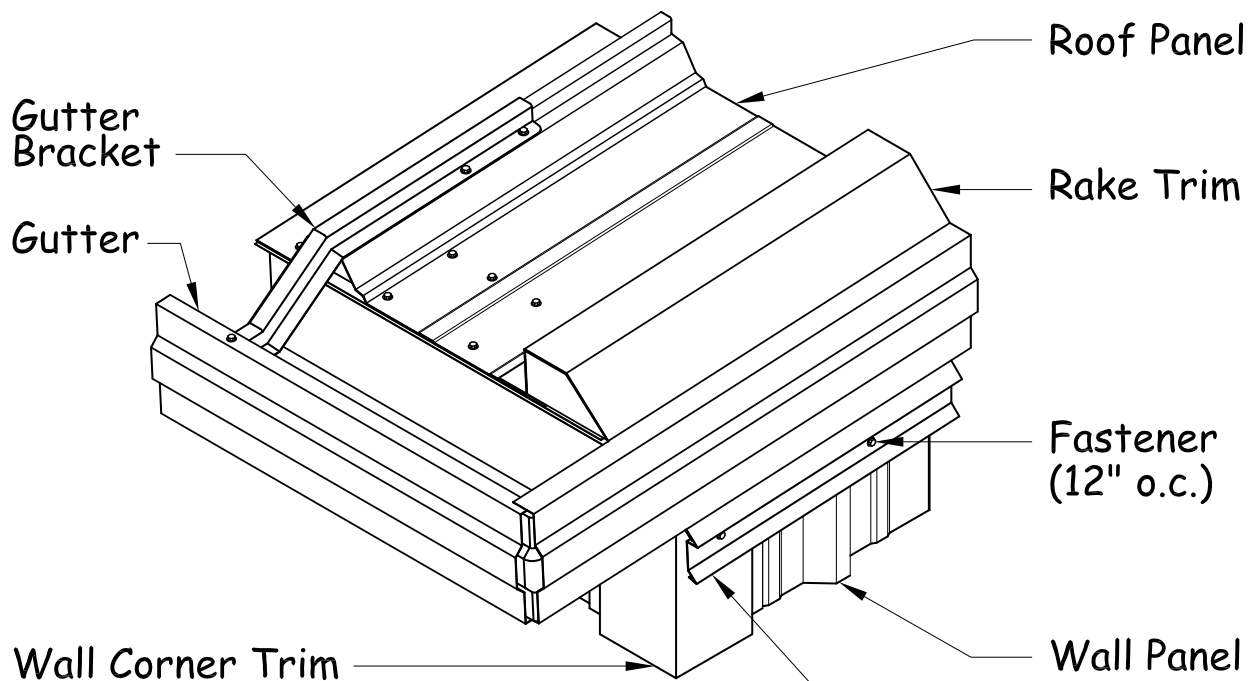
Position the rake retainer trim over the drip edge on the standard rake flash, aligning the low eave

end flush with the outside face of the wall corner trim. Fasten the rake retainer trim to the wall panel with trim colored self-drilling **screws (H1060/H1061)** at ends and at 12" o/c

Do not lap the rake retainer trim. The ends should be butted together.

RAKE RETAINER LAP NOTES:

Butt Rake Retainer together, **DO NOT LAP**. At a Gable Building, extend the rake retainer all the way to the ridge. At a Single Slope Building, extend Rake Retainer to the outside edge of the Wall Corner Trim.



Rake Retainer: Hold flush with the outside face of the Wall Corner Trim as shown

16.0 ROOF LINE TRIM INSTALLATION

16.12 STANDARD RAKE TRIM INSTALLATION AT BUILDING WITHOUT GUTTER

- **RAKE TRIM PART NUMBERS**
- RTA01 x 10'-1" RTA02 x 20'-2"

All parts must be positioned properly before touching the mastic to the roof panel. Mastic cannot be reused!

Before installing the rake trim, the **rake cap (RCA__)** must be installed and the **gutter end cap (H4000)** prepped. For the rake cap, apply **polyurethane tube caulk (H3152)** to the top surfaces only and place it on the edge of the panel 1 1/2" from the edge of the gutter end cap (no fasteners required). Field cope the flat of the rake cap as required. Prep the gutter end cap by placing the **eave/rake cap (ERA01)** onto the back of the cap and fasten with (6) **pop rivets (H1100)** as shown below.

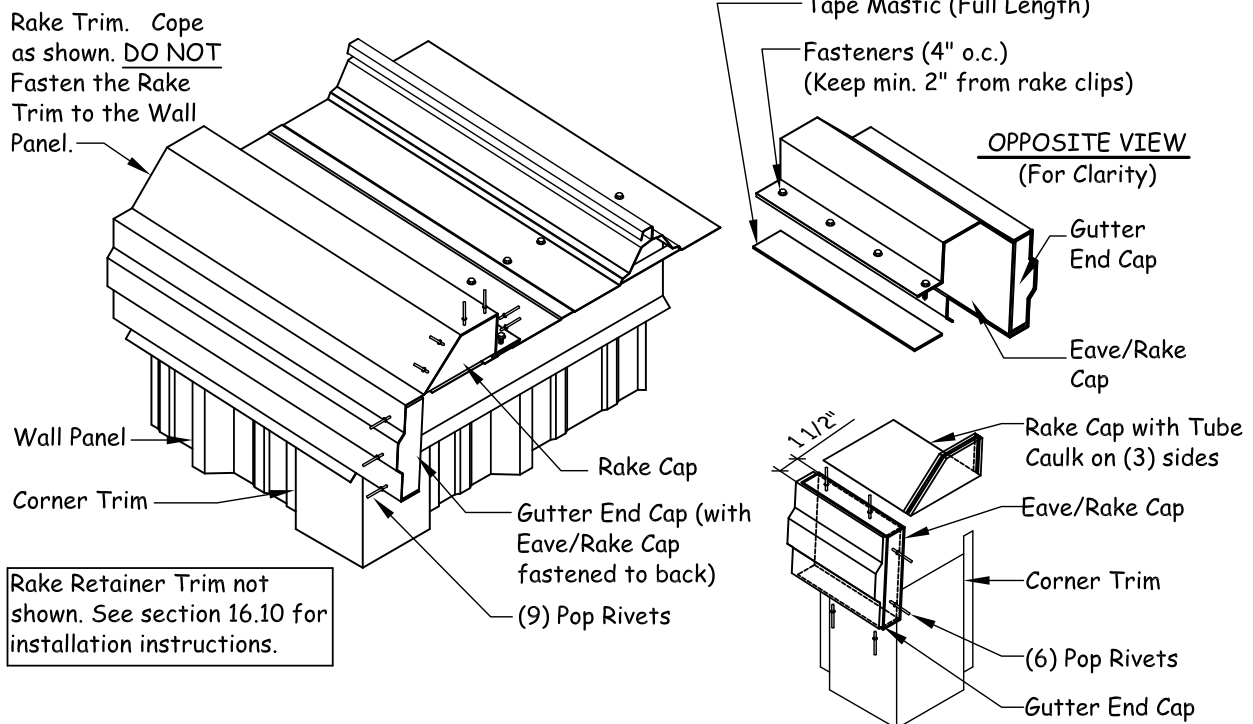
Apply continuous **2 1/4" tape mastic (H3020)** to the bottom of the horizontal leg of the rake trim (the leg that attaches to the roof panel).

Extend the low eave end of the rake trim flush with the low eave end of the roof panel. Fasten the rake trim to the roof panel with trim colored self-drilling **screws (H1030)** at 4" o/c. Fasten the rake trim to the **rake cap** with (6) **pop rivets (H1100)**. Cope the bottom vertical leg of the rake trim flush with the outside face of the wall corner trim.

For the installation of the prepped **gutter end cap (H4000)**, apply **polyurethane tube caulk (H3152)** to the outside perimeter (as shown below) and place it inside the rake trim with the flat edge of the gutter end cap flush with the end of the rake trim. Fasten the rake trim to the gutter end cap with (3) **pop rivets (H1100)**.

Go to section **16.9 & 16.13** for rake trim termination details at the ridge/ high eave.

Do not attach the rake trim to the wall panel (or whatever wall material is being utilized). Go to the rake retainer trim installation instructions in section **16.10**.



16.0 ROOF LINE TRIM INSTALLATION

16.13 RAKE PARAPET TRIM INSTALLATION

If your building has gutter, hold the gutter back $\frac{1}{2}$ " short of the inside face of the parapet wall.

Apply **polyurethane tube caulk (H3152)** around three sides of the **gutter end cap (H4000)** and install in the gutter. Leave $\frac{1}{2}$ " of the end cap exposed at the end of the gutter. Fasten with (10) **pop rivets (H1100)**.

Apply continuous **2 $\frac{1}{4}$ " tape mastic (H3020)** to the bottom of the horizontal leg of the **rake parapet trim (RPA01)** (the leg that attaches to the roof panel).

All parts must be positioned properly before touching the mastic to the roof panel. Mastic cannot be reused!

Fasten the rake parapet trim to the roof panel with trim colored self-drilling **screws (H1030)** at 4" o/c

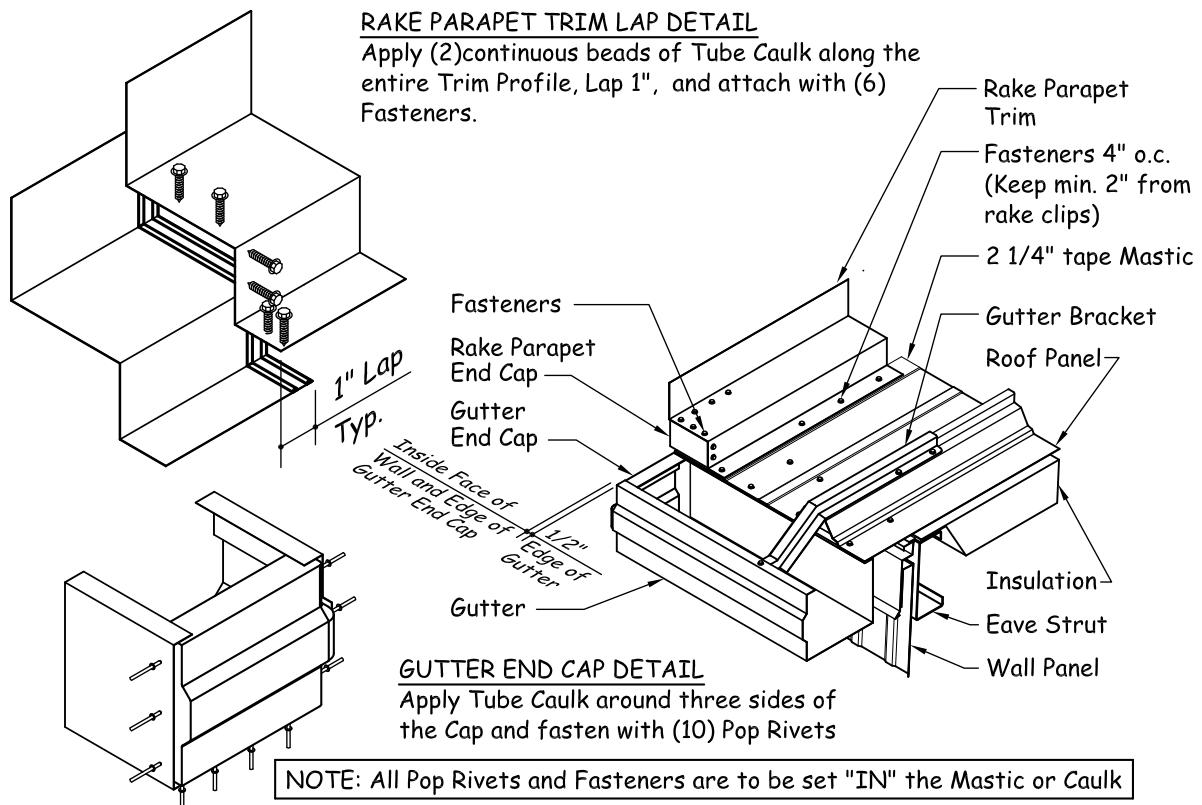
Apply **polyurethane tube caulk (H3152)** around the perimeter of the **rake parapet cap** and slide into place. Fasten with (9) self-drilling **screws (H1050)**.

- **RAKE PARAPET CAP PART NO.'S**
- **RCB01 – (LEFT)**
- **RCB02 – (RIGHT)**

Lap the rake parapet trim 1", sealing with (2) continuous beads of **polyurethane caulk (H3152)** to the end of the adjoining piece. Fasten with (6) trim colored **H1050 screws**.

If your building does not have gutter, these same instructions above apply. However, you will not need the **gutter end cap (H4000)**.

For rake parapet trim termination details at the ridge or high eave refer to section **16.13**.



16.0 ROOF LINE TRIM INSTALLATION

16.14 STANDARD RAKE PARAPET TRIM TERMINATION AT HIGH EAVE OR RIDGE

If your building has a **ridge**, extend the rake parapet trim flush with the end of the roof panel.

If your building is a **single slope**, extend the rake parapet trim flush with the inside face of the high eave parapet wall.

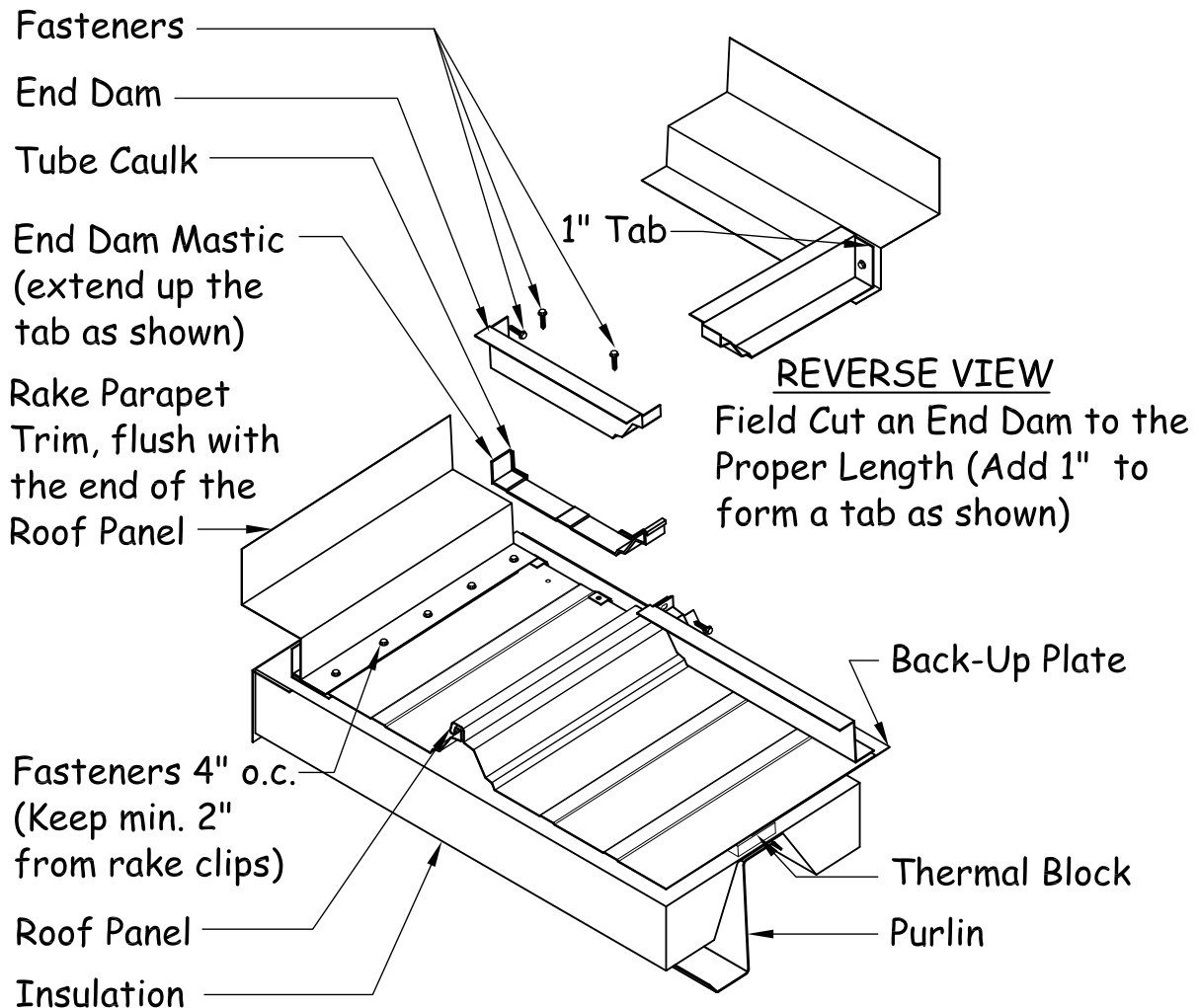
Field cut an **end dam (H2600)** to fit between the rake parapet trim and the panel rib. Add 1" to form a tab to attach the end dam to the rake parapet trim.

Apply part of a piece of **27" pre-cut tape mastic (H3650)** to the roof panel $\frac{1}{2}$ " down to **top** of

tape mastic. Be sure that the mastic forms tightly to all bends. The mastic must also extend up the rake parapet trim between the tab in the end dam and the rake parapet trim.

Apply a bead of **butyl tube caulk (H3151)** in the rib area of the panel and along the back leg of the rake trim. The caulk should be adjacent to and up-slope from the tape mastic.

Fasten the end dam at pre-punched holes with self-drilling **H1020 screws**. Fasten the tab to the rake trim with (1) self-drilling **H1020 screw**. If applicable, install (1) **H1020 self-drilling tie fastener** through the hole at the top of the end dam.



16.0 ROOF LINE TRIM INSTALLATION

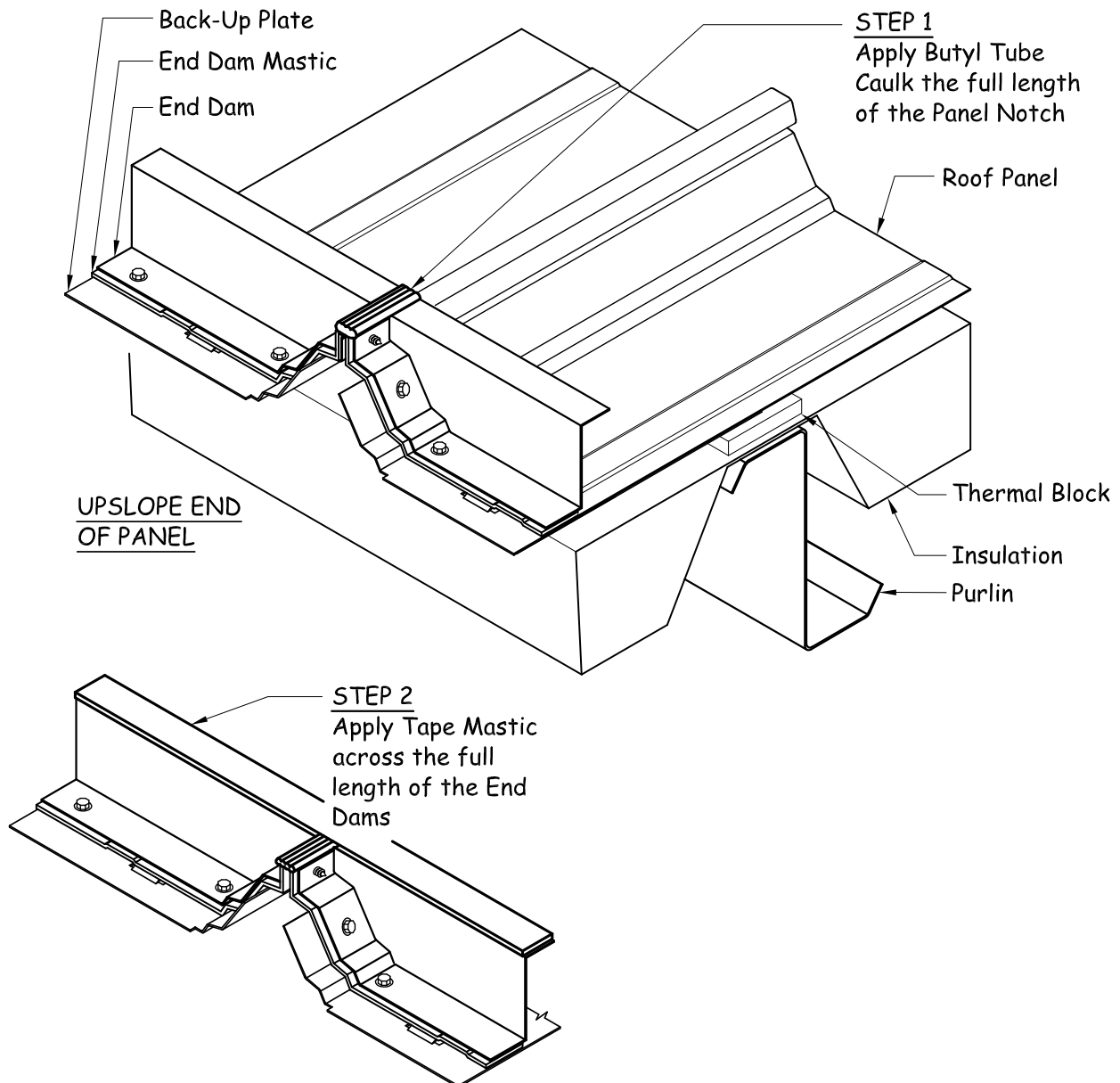
16.15 PREPARATION FOR HIGH EAVE OR RIDGE TRIM INSTALLATION

Before installing the sculptured high eave trim, high eave parapet trims, or ridge cap, apply sealant as shown in the details below.

Apply **butyl tube caulk (H3151)** to the full length of the panel notch and where they are

butted together at the panel seam. (Fill any gaps where the end dams intersect).

Apply **1 1/2" tape mastic (H3001)** continuously across the end dams the full length of the roof (peeling back the protective paper only as work progresses).



16.0 ROOF LINE TRIM INSTALLATION

16.16 RAKE PARAPET TRIM AT HIGH EAVE PARAPET TRIM INSTALLATION

Apply 1 1/2" **tape mastic (H3001)** continuously across the top of the end dams. Remove paper backing only as work progresses (see section 16.14). **NOTE: FIELD MITERING IS REQUIRED BEFORE INSTALLING THE HIGH EAVE PARAPET TRIM.**

HIGH EAVE PARAPET TRIM PART NO'S

HP_01 (**Note:** The third digit of the part number varies with the roof slope. Refer to the erection drawing details for exact part number.

Scribe a line 4" in from the end of the high eave parapet trim. Make a "through" cut at all bends to form tabs "A", "B", "C", and "D" as shown below. Bend tabs as shown below.

Apply **polyurethane tube caulk (H3152)** around the perimeter of all tabs and place the high eave parapet trim over the end dams and fasten with (5) trim-colored self-drilling **screws (H1050)** at each end dam.

The trim must be properly positioned before touching the mastic. Mastic cannot be reused.

Fasten the high eave parapet trim to the rake parapet trim with (3) trim-colored self-drilling **screws (H1050)**. Fasten tab "D" to tab "C" with (1) self-drilling **screw (H1050)**.

Refer to the erection drawing details for the high eave parapet trim attachment to the wall.

FIELD BEND 4" TABS

Tab "D"
Tab "C"
Tab "A"

Tab "B"

SEE NEXT PAGE FOR LAP DETAIL

High Eave Parapet Trim with (5) Fasteners per End Dam.
Attach to Rake Parapet Trim with 3 Fasteners as shown.
Attach Tab "D" to Tab "C" with (1) Fastener as shown.

Rake Parapet Trim

Fasteners 4" o.c.
(Keep min. 2" from rake clips)

Insulation

End Dam Mastic

End Dam

Back-Up Plate

Roof Panel

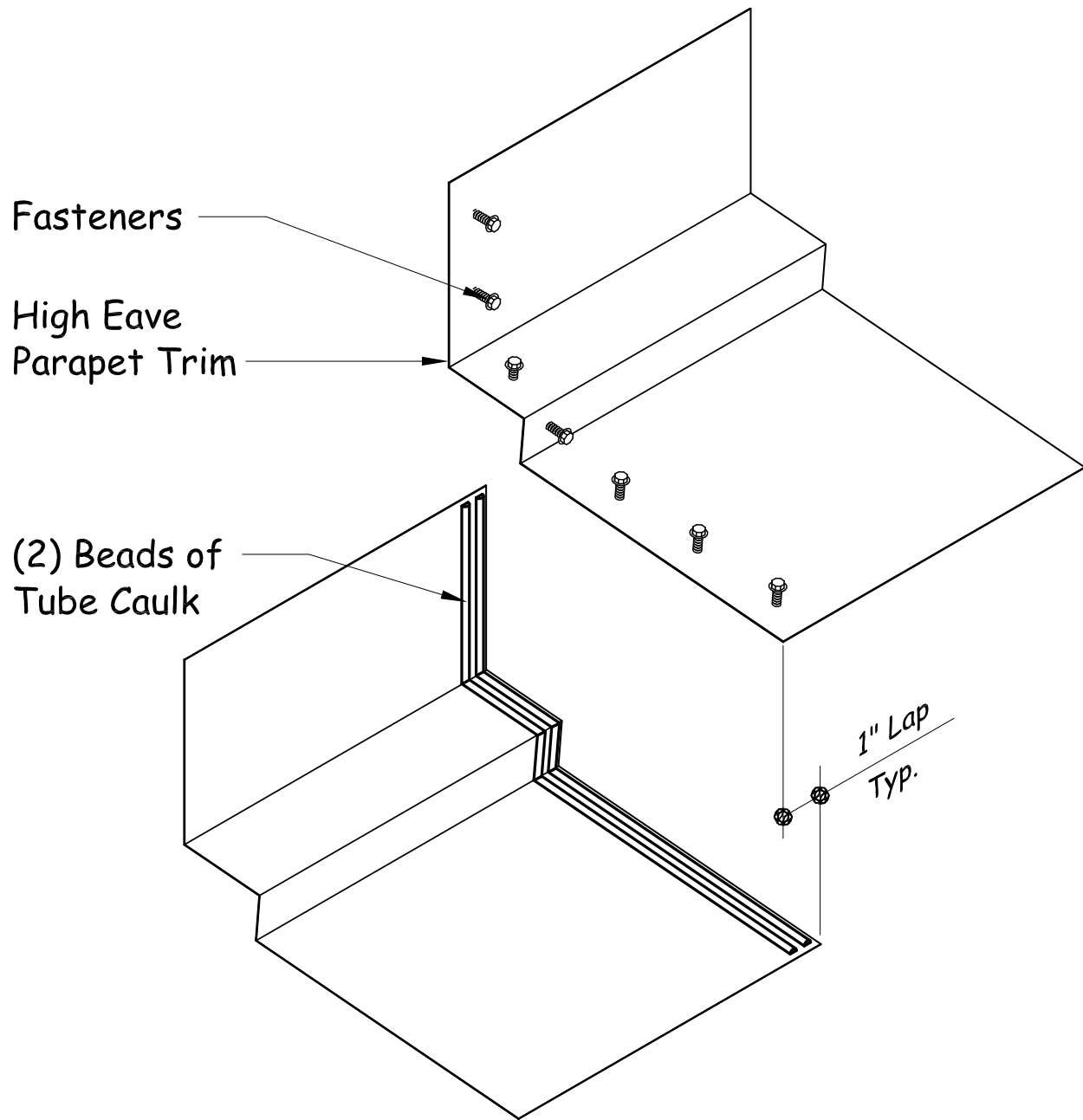
Thermal Block

Purlin

16.0 ROOF LINE TRIM INSTALLATION**16.17 HIGH EAVE PARAPET TRIM LAP
DETAIL**

To lap high eave parapet trim, apply (2) continuous beads of polyurethane tube caulk (H3152) to the end of the installed piece of trim.

Position the adjoining piece on top of the caulk, lap 1", and fasten with (7) trim-colored self-drilling screws (H1050).



16.0 ROOF LINE TRIM INSTALLATION

16.18 RAKE TRIM PREPARATION FOR SCULPTURED HIGH EAVE TRIM INSTALLATION

If your building is a **single slope**, extend the rake trim **1"** past the outside face of the wall corner trim. Field cope the vertical leg of the rake trim flush to the outside face of the wall corner trim.

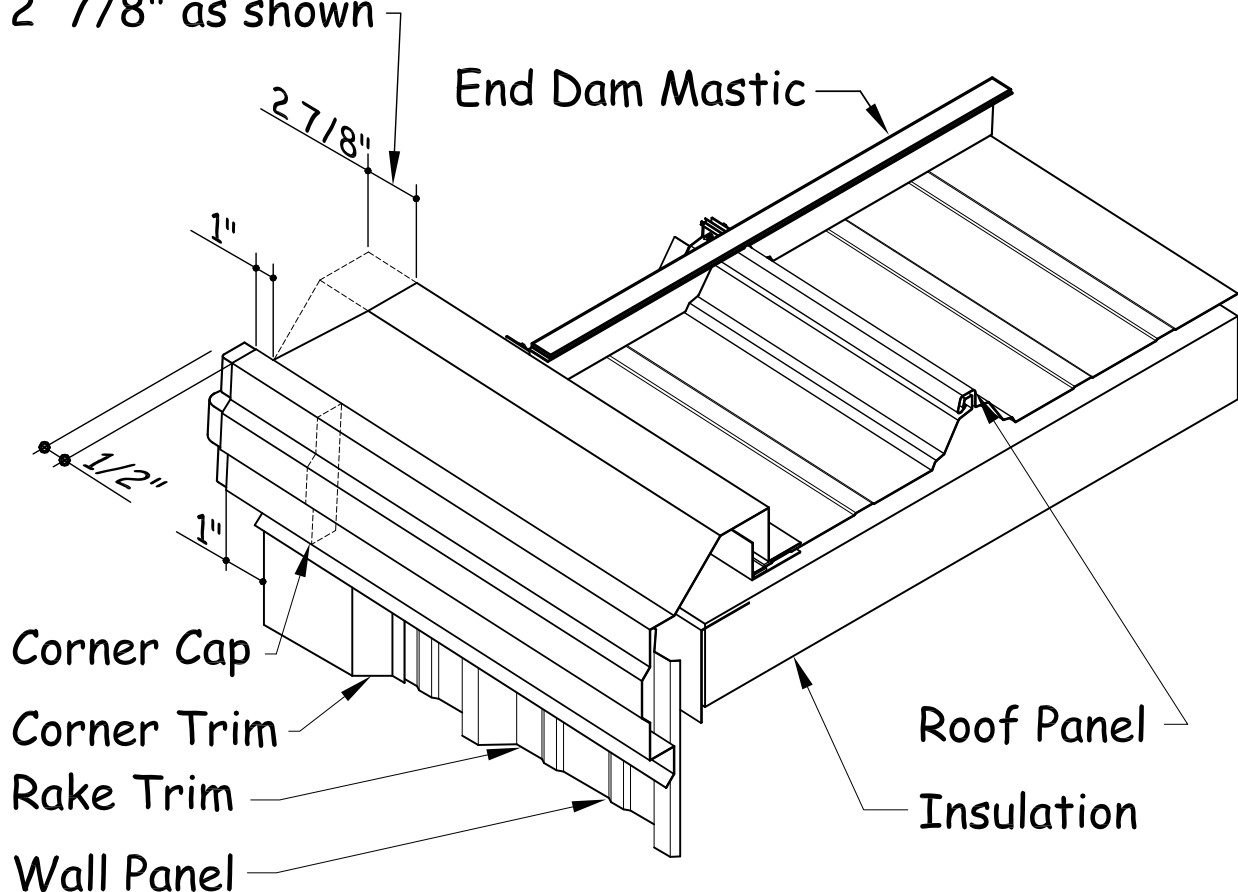
Field cope the upper section of the rake trim back **1"** as shown. Additionally, cope the "sloped" face of the rake trim back **2 7/8"** at an angle to match **2 7/8"** coped top and back leg. Before installing the high eave trim, apply

polyurethane tube caulk (H3152) around the perimeter of the **corner cap (H4000)**. Slide the cap into the end of the standard rake trim, leaving **1/2"** exposed as shown below.

Apply **1 1/2"** **tape mastic (H3001)** continuously across the end dams. Remove paper backing only as work progresses.

Also see section 16.14 for additional mastic details at the end dams.

Cope Upper Portion
of Rake Trim back
2 7/8" as shown



16.0 ROOF LINE TRIM INSTALLATION

16.19 SCULPTURED HIGH EAVE TRIM INSTALLATION

Lay the **high eave trim** over the end dams and fasten with (5) trim-colored self-drilling **screws (H1050)**. **NOTE:** The high eave parapet trim must be properly positioned before touching the mastic. Remove the paper backing only as work progresses.

SCULPTURED HIGH EAVE TRIM PART NO'S

- HEB01 x 10'-1"
- HEB02 x 20'-2"

Field cope the high eave trim similar to the rake trim except do not cut the sloped face. Instead, fold the sloped face over the sloped face of the rake trim. Caulk all around with **polyurethane tube caulk (H3152)** and fasten with (3) **pop rivets (H1100)**.

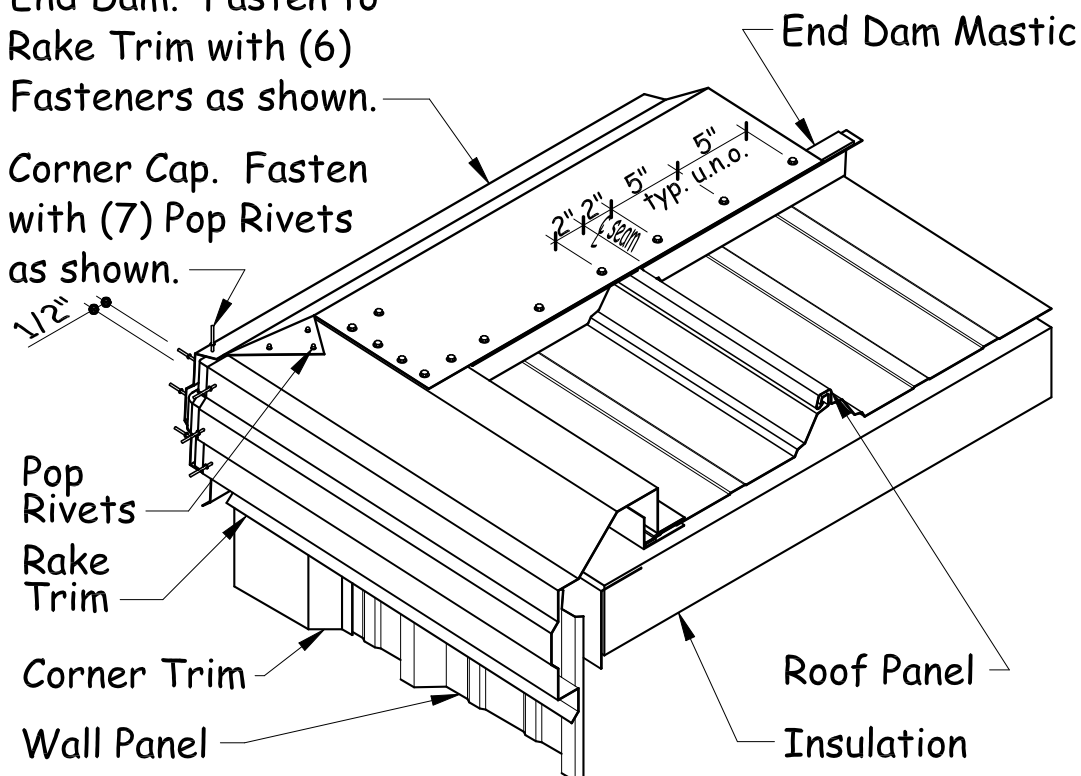
Fasten the high eave trim and the rake trim to the corner cap with (7) **pop rivets (H1100)**. Fasten the top leg of the high eave trim with (6) trim-colored self-drilling **screws (H1050)**.

NOTE:

Field bend the top leg of the High Eave trim over the sloped leg of the Rake Trim and attach with (3) Pop Rivets.

High Eave Trim with (5) Fasteners per End Dam. Fasten to Rake Trim with (6) Fasteners as shown.

Corner Cap. Fasten with (7) Pop Rivets as shown.

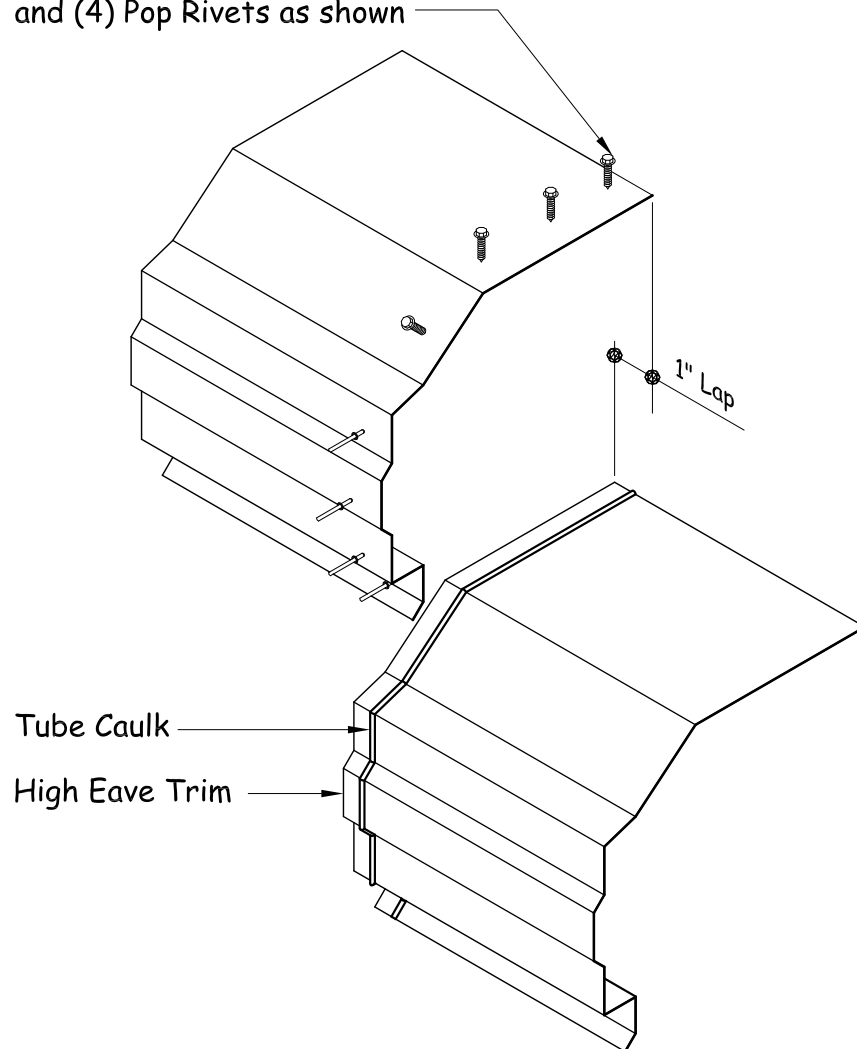


16.0 ROOF LINE TRIM INSTALLATION**16.20 HIGH EAVE TRIM LAP DETAIL**

Lap the high eave trim by applying a continuous bead of **polyurethane tube caulk (H3152)** to

the end of the adjoining trim piece and lap 1". Fasten with (4) trim-colored self-drilling **screws (H1050)** and (4) **pop rivets (H1100)**.

Lap 1" and attach with (4) Fasteners
and (4) Pop Rivets as shown



16.0 ROOF LINE TRIM INSTALLATION

16.21 METAL PEAK BOX AND PEAK PLATE PREPERATION

ERECTOR NOTE:

Prior to installing the first or last piece of ridge cap, the Peak Box and Peak Plate need to be installed.

PEAK BOX:

Start by field cutting the back leg of the peak box off as shown below. Next apply a continuous bead of **polyurethane tube caulk (H3152)** on the underside of the Peak Box where it comes in contact with the rake trims. Apply **polyurethane tube caulk (H3152)** to any gaps on the underside of the peak box in the mitered area.

PEAK PLATE:

Start by applying a continuous strip of $\frac{3}{4}$ " tape mastic (**H3000**) to the top of the four tabs and

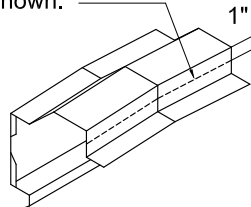
the *underside* of the sloped tab as shown. Next place the Peak Plate inside of the ridge cap and fasten with **(6)** Trim colored **H1050** fasteners.

PEAK BOX AND PEAK PLATE PART NUMBERS

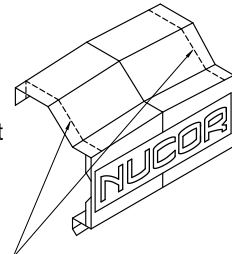
Roof Slope	Peak Box	Peak Plate
.5:12	MPB50	MPP50
1:12	MPB01	MPP01
2:12	MPB02	MPP02
3:12	MPB03	MPP03
4:12	MPB04	MPP04
5:12	MPB05	MPP05
6:12	MPB06	MPP06

PEAK BOX PREPARATION

Measure down 1" and field cut the lower portion of peak box off as shown.

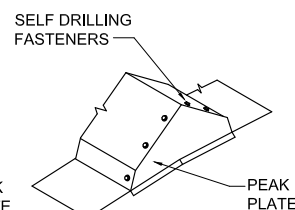
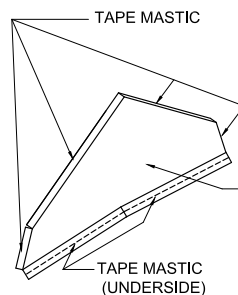


Apply a continuous bead of Tube Caulk on the underside of the Peak Box at all areas where it comes in contact with the Rake Trim.



PEAK PLATE PREPARATION

Apply Tape Mastic continuously on the four tabs and on the underside of the sloped tab as shown.



16.0 ROOF LINE TRIM INSTALLATION

16.22 METAL PEAK BOX & PEAK PLATE INSTALLATION AT STANDARD RAKE TRIM

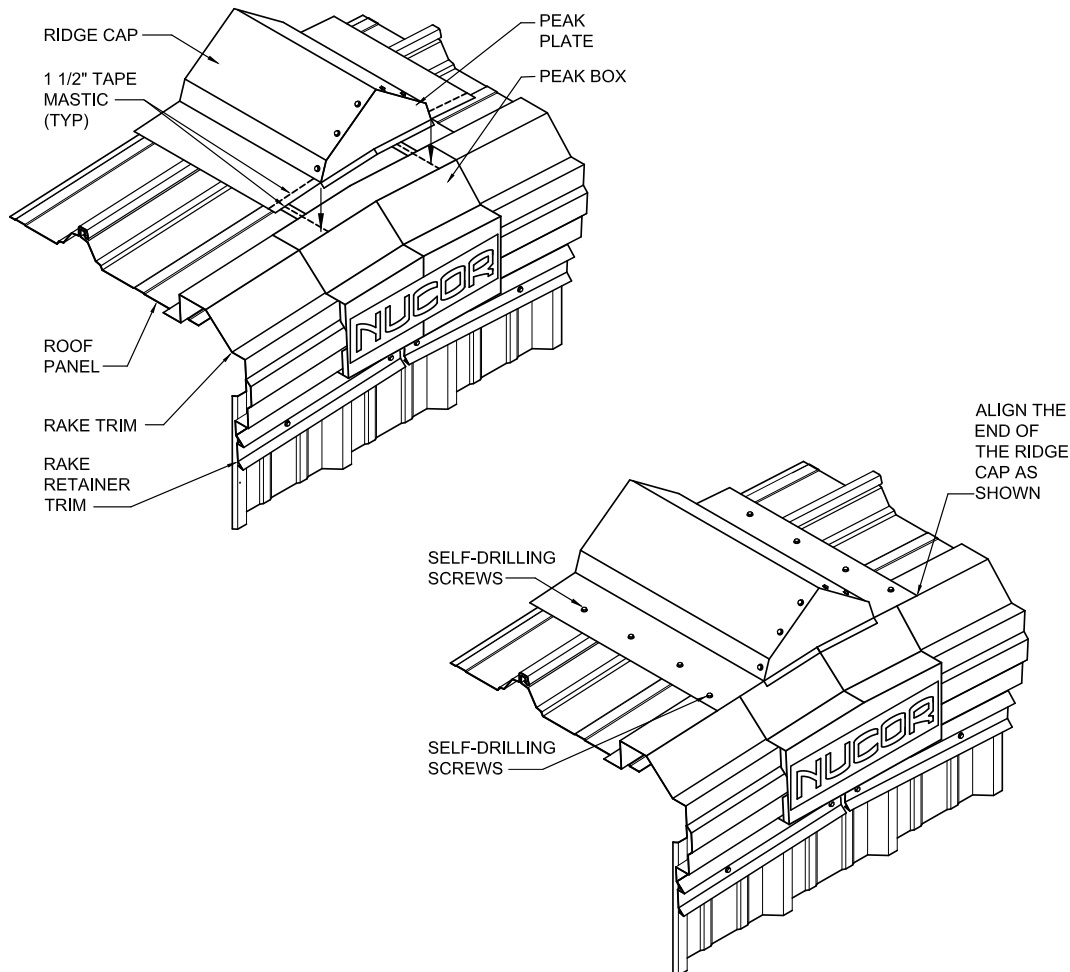
Center the prepared Peak Box over the ridge. Once centered, push the peak box down and over the rake trims. Make sure the back lip of the peak box is between the end dam and the rake trim. To achieve this you may need to back out the fastener on the end dam tab and then re-install. Finish installing the rake retainer trim over the peak box.

Install continuous **1 1/2" tape mastic (H3001)** along the top of the end dams on both sides of the ridge. Remove the paper backing only as work progresses.

After the Peak Box is in place, extend the **1 1/2" tape mastic (H3001)** from the end dams to the sloped face to the Peak Box. Next, install short pieces of **1 1/2" tape mastic (H3001)** to the flat portion of the ridge cap (as shown).

Center the prepared section of Ridge Cap over the end dams and fasten with (5) ridge cap colored self-drilling screws (**H1050**) per panel width. (2" from each rib and 5" o/c in between). Be sure that the edge of the ridge cap is flush with the sloped face.

Fasten the Ridge Cap to the rake trim using self-drilling **H1050** screws. **DO NOT PLACE ANY FASTENERS IN THE PEAK BOX.** Doing so will not allow the rake trim to "float" with the expansion and contraction of the roof system.



16.0 ROOF LINE TRIM INSTALLATION

16.23 RIDGE CAP INSTALLATION WITH METAL PEAK BOX

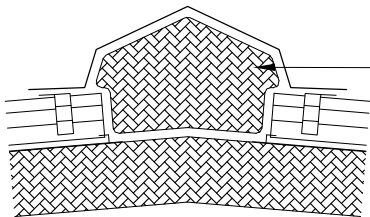
Install continuous **1 1/2" tape mastic (H3001)** along the top of the end dams on both sides of the ridge. Remove the paper backing only as work progresses.

Start the ridge cap flush with the sloped edge of the rake trim as shown in the detail below.

Ridge cap must be properly positioned before touching the mastic. **Mastic cannot be reused.**

Center the ridge cap over the end dams and fasten with (5) ridge cap colored self-drilling screws (**H1050**) per panel width. (2" from each rib and 5" o/c in between).

Refer to the next page for ridge cap lap details.



NOTE: Fill Ridge Cap void with Insulation

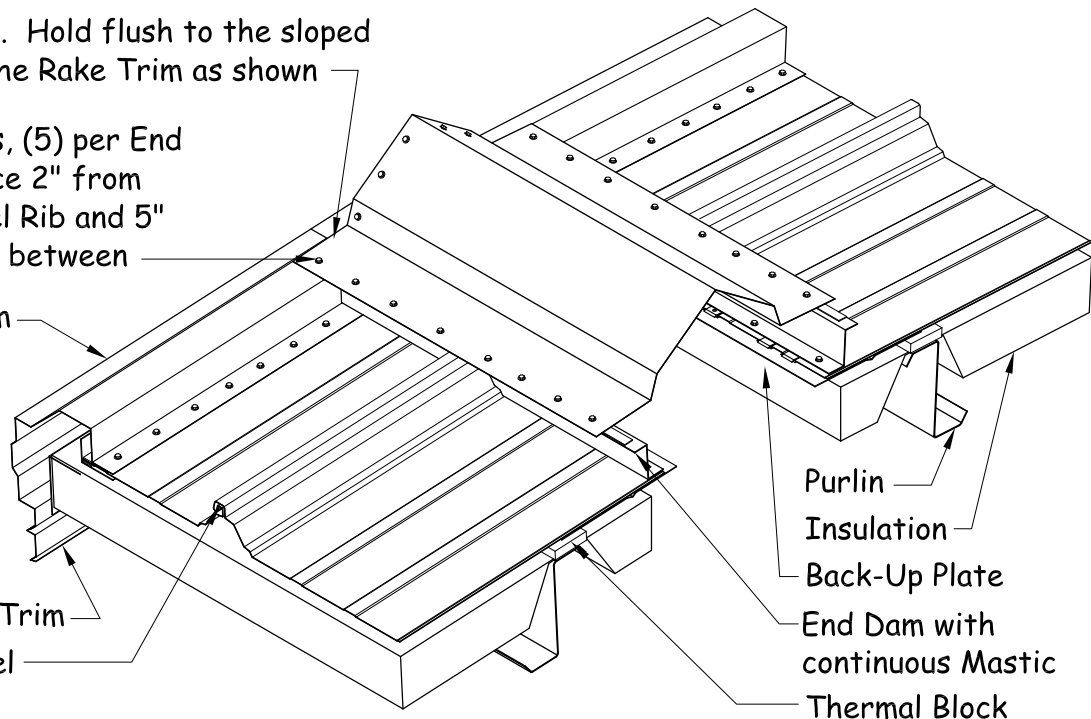
Ridge Cap. Hold flush to the sloped edge of the Rake Trim as shown

Fasteners, (5) per End Dam. Place 2" from each Panel Rib and 5" on center between

Rake Trim

Rake Retainer Trim

Roof Panel



Purlin

Insulation

Back-Up Plate

End Dam with

continuous Mastic

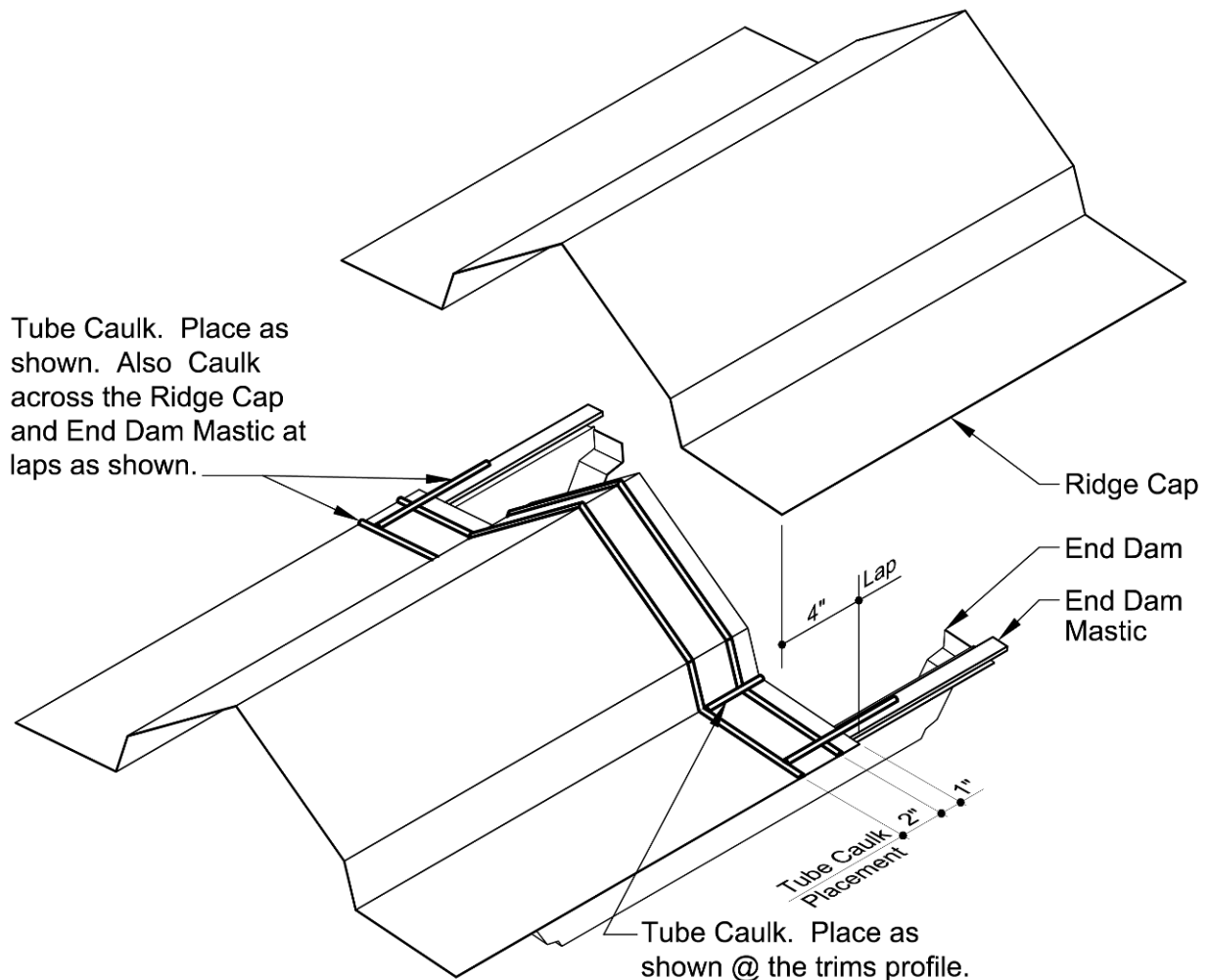
Thermal Block

16.0 ROOF LINE TRIM INSTALLATION**16.24 RIDGE CAP LAP DETAILS**

IMPORTANT NOTE: DO NOT LAP THE RIDGE CAP AT A PANEL RIB.

DO NOT USE FASTENERS AT RIDGE CAP LAPS. DOING SO WILL NOT ALLOW THE RIDGE CAP TO EXPAND AND CONTRACT AS DESIGNED.

Ridge cap is to be lapped 4", utilizing (2) beads of **BUTYL tube caulk (H3151)**. Also apply the tube caulk to the tape mastic as shown.



16.0 ROOF LINE TRIM INSTALLATION

16.25 PEAK TRANSITION INSTALLATION AT RAKE PARAPET TRIM

Start by running the **rake parapet angle (MAP01)** to the centerline of ridge. (Low Slope)

On higher slope buildings, run parapet angle past ridge and cope bottom leg so that there is not a large gap on the back of the rake angle.

If your building has a **ridge**, extend the **rake parapet trim (RPA01)** flush with the end of the roof panel.

If your building is a **single slope**, stop the **rake parapet trim (RPA01)** flush with the inside face of the parapet wall.

Start the ridge cap flush with the face of the rake trim as shown in the detail below.

Center the ridge cap over the end dams and fasten with (5) ridge cap colored self-drilling screws (**H1050**) per panel width. (2" from each rib and 5" o/c in between).

Ridge cap must be properly positioned before touching the mastic. **Mastic cannot be reused.**

To install the **Expandable Edged Flash, (RPT30)** apply 2 1/4" **tape mastic (H3020)** to rake parapet trim as shown. Next, apply generous bead of **polyurethane tube caulk**

(**H3152**) to the corners rake parapet trim. Form the flexible membrane piece to shape of the parapet trim & ridge cap, center the over the ridge cap. Next, push Exp Edged Flash tight into corners and form a bellows in the center of the flash as shown. Fasten with (14) trim-colored **self-drilling screws (H1050)**. **Do not fasten into the parapet trim.**

Next, take short pieces of jamb trim (**JTA**) and place on each side of the Exp Edged Flash. Fasten into the rake angle with **one** trim-colored **self-drilling screw (H1050)** as shown. Take a piece of head trim (**HTA**) and field tab into jamb trim (**JTA**). Fasten with trim-colored **self-drilling screws (H1050)**. Caulk the perimeter of the **Exp Edged Flash (RPT30)** with **H3152 poly tube caulk**.

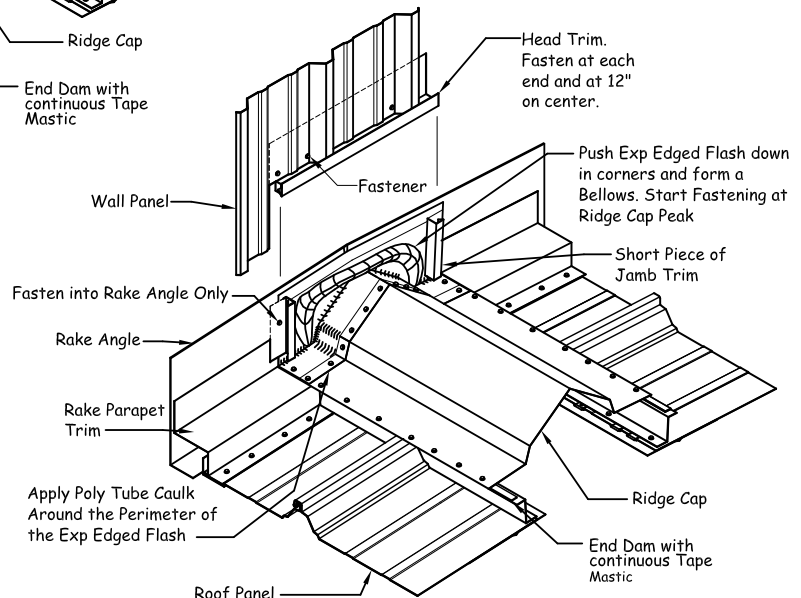
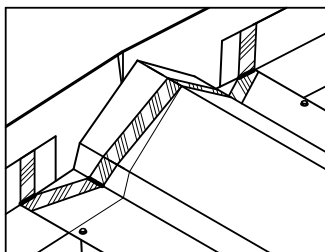
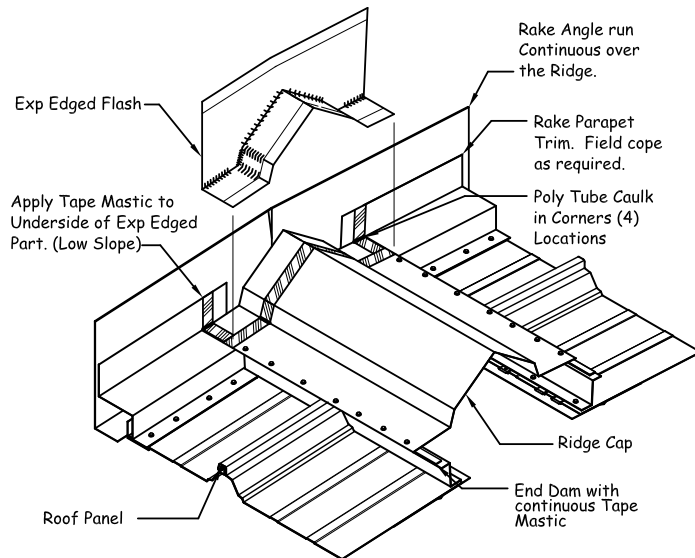
NOTES:

On higher slope buildings, taper mastic back from high point of ridge cap as shown. Taper expandable edged flash over top of tape mastic as well.

Fasteners into masonry and counter flash by others.

Field work rake parapet trims to ensure weather tightness as required on ALL buildings.

Transition trims **not** supplied on buildings greater than **6:12**.



17.0 CFR CHECKLIST**17.0 CFR CHECKLIST**

The following checklist is intended to assist the builder and/or erector in troubleshooting and punching out the **NUCOR CFR™ ROOF SYSTEM**. This list is not intended to serve as a certification of the roof system, because many details such as mastic installation are impossible to inspect after the roof has been erected. However, in conjunction with continuous quality control measures during the erection process, this list should help insure a safe, weather-tight roof system.

Nucor recommends that detailed notes be taken during the inspection and punching out of the roof. The erector or the actual person doing the work should have access to these notes. Do not place pencil markings on the galvalume panels, because pencil lead will cause rusting and will void your galvalume warranty. Instead, consider using clothes pins attached to the seam of the panel to point out problem/unfinished areas. These work well, do not create a mess, and can be seen from across the roof.

CFR ROOF DETAIL COMPLIANCE LIST**LOW EAVE CONDITION**

- Y N** Is the first bend in the eave plate aligned with the edge of the roof member?
- Y N** Does the eave plate extend all the way to the endwall steel line?
- Y N** Is the eave plate fastened at 6" on center?
- Y N** Is mastic applied continuous along the top of the eave plate?
- Y N** Has butyl tube caulk been installed on the low eave panel rib prior to next panel installation?
- Y N** Is the insulation visible at the eave plate (from the outside)? (If so, this is not correct.)
- Y N** Is the fastener installed through the void closure to hold it in place?
- Y N** Is the space around and above the void closure properly sealed with mastic and tube caulk?
- Y N** Are the gutter brackets installed at 2'-0" on center?
- Y N** Are there (8) fasteners installed into the flat of the panel at the low eave?

RAKE CONDITION

- Y N** If the building has insulation, are the rake angle clips installed over the top of the insulation?
- Y N** Are the rake trim fasteners installed through rake clips? (If so, this is not correct.)
- Y N** Are the rake trim fasteners located 2" to either side of the rake clips? (To allow roof to float properly.)
- Y N** Are the rake trim fasteners installed at 4" on center?

ENDLAP CONDITION

- Y N** Is the endlap mastic placed 2" down slope from the upper of the lower panel at an endlap?
- Y N** Are the panel ends lapped 4" at an endlap?
- Y N** Does the endlap have a back-up plate with all (4) tabs engaged?
- Y N** Has the endlap tube caulk been properly placed in the panel notch?
- Y N** Has tube caulk been applied to the panel upslope of the tape mastic?
- Y N** Are the back-up plates properly engaged by the fasteners?
- Y N** Are there any stripped or missing fasteners at the panel endlaps?
- Y N** Are all oversized fasteners properly tightened?
- Y N** Are there (10) fasteners installed at the endlap?

17.0 CFR CHECKLIST

PANEL SIDELAP CONDITION

- Y N Are all panel sidelaps properly hooked?
- Y N Can you see insulation or paper tabs protruding from sidelaps? (If so, this is not correct.)
- Y N When two fasteners per panel clip are required, are they spread out as far as possible?
Avoid placing fasteners side by side.
- Y N Has all the roof seams been hand crimped into a Nucor Roll Lock™ Seam? (as a **minimum**)
- Y N Are the FINAL seam type(s) utilized and completed per design(Roll Lock, Nucor Vise Lock®, Nucor Vise Lock 360®)?

RIDGE OR HIGH EAVE CONDITION

- Y N Has butyl tube caulk been installed on highside panel before next panel has been installed?
- Y N Is the end dam mastic placed **1/2"** down slope from the upper end of the panel?
- Y N Is the pig-tail mastic in place over the panel notch at the ridge/high eave?
(Before end dam installation)
- Y N Is female panel seam field notched at the end dam?
- Y N Were the end dams installed as the roof was erected for proper coverage and alignment?
- Y N Was mastic installed on top of end dam and over the top of butyl tube caulk?

Is the ridge cap installed properly including:

- Y N Was caulk applied at the ridge cap end laps?
- Y N Is there (5) fasteners used to install the ridge cap to each end dam?
- Y N Do not install fasteners at the ridge cap end laps?

GENERAL CONDITION

- Y N Are the roof panel runs installed straight?
- Y N Are there any damaged panels installed?
- Y N Are perimeter clips installed? (If required)
- Y N Are the panel clips attached to the purlins or bar joists with 2 fasteners?
(Sometimes 3 are required) **Avoid placing fasteners side by side.**
- Y N Have all pencil lead and markings been cleaned from the panels?
- Y N Have all metal shavings, dirt, etc., been cleaned from the roof?
- Y N Are HVAC units drained into gutter with PVC?
- Y N Has the roof curb framing/flashing been installed properly?
- Y N Has treated lumber been avoided as a means of supporting piping & other roof accessories?
- Y N Have the downspouts been properly spaced according to the erection instructions?
- Y N Are the downspout openings in the gutter cut to the proper size to allow for adequate water drainage?
- Y N If the CFR is being installed over a non-Nucor structure, has the Engineer of Record reviewed the purlins for adequate bracing?
- Y N Have lead, iron or copper pipes been coated or painted to protect against corrosion with galvalume?
- Y N If required, are wall panel to trim, foam panel closures installed at the proper locations? (Low Eave, Ridge/High eave, Rake/Rake Parapets etc.)