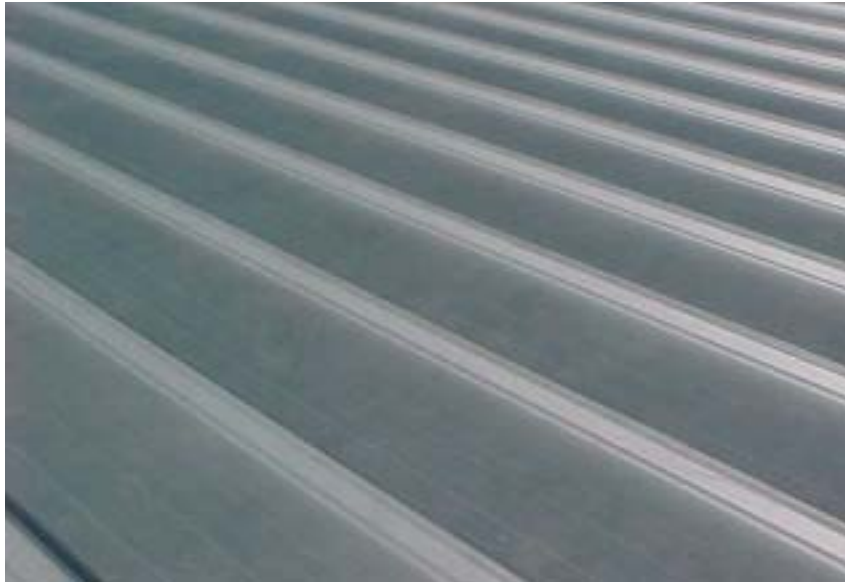


RIGHT FROM THE START

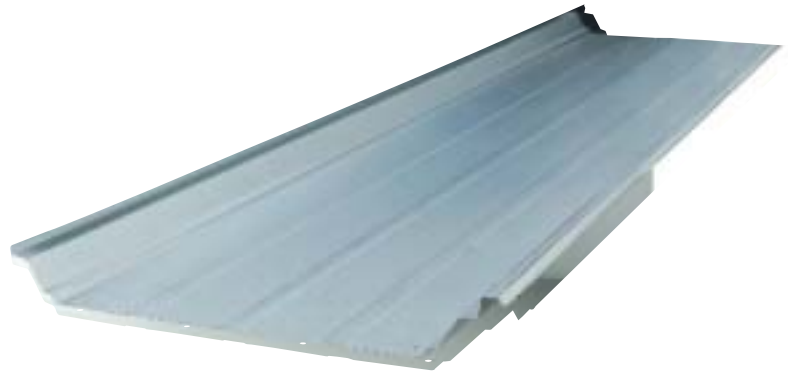
**NUCOR "CFR"™
ROOF SYSTEMS**

NUCOR
BUILDING SYSTEMS





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NUCOR BUILDING SYSTEMS

Nucor Building Systems is a division of Nucor Corporation, a Fortune 500 company, producing steel and steel products. Nucor Corporation is well known for its ability to manufacture high quality products at very competitive prices. These attributes apply equally to Nucor Building Systems. Other divisions of Nucor Corporation include Nucor Steel, Vulcraft, Nucor Cold Finish, Nucor Yamato, and Nucor Fastener. Nucor Building Systems is a complete building systems manufacturing company and one of the most flexible and diverse manufacturers in operation today. Our manufacturing facilities are located in:

Waterloo, Indiana
Swansea, South Carolina
Terrell, Texas

THE "CFR"™ SYSTEM: FOUNDATION OF PERFORMANCE

Nucor Building Systems' "CFR"™ Standing Seam Roof System presents the building owner with a high quality, economical alternative to other roofing systems. The system is designed to meet the demanding needs of today's building market. The foundation of the "CFR"™ system is based on the critical need for the roof to satisfy four basic principles:

- Weathertightness**....."CFR"™ is a weathertight system!*
- Strength** "CFR"™ is safe and satisfies code and uplift requirements!
- Erector friendliness** "CFR"™ is flexible and easy to install!
- Cost effectiveness** "CFR"™ is an economical roofing solution!

The Nucor "CFR"™ system is a functional roof specifically designed for low slopes. Our roof has been extensively tested to ensure the highest level of performance for weathertightness as well as structural integrity. The panels have been tested and approved by Factory Mutual® and Underwriters Laboratories® for wind uplift as well as hail and fire resistance. The flexible options offer a number of cost effective design solutions.

Due to a process of continuous improvement, all information contained herein is subject to change without notice.
*Refer to the weathertightness warranty for specific performance criteria.



FEATURES AND BENEFITS

The Nucor “CFR”™ system is a raised seam metal roof which is designed to “float” to accommodate thermal expansion and contraction. This is accomplished with concealed sliding clips which allow for up to 3” of expansion and contraction. The panel sidelap has factory applied mastic and can be completely erected without the use of electric seaming machines. Nucor offers a hand-operated crimping tool for the “Roll Lock”™ installation option. Other features of the Nucor “CFR”™ system include the following:



High performance panel finish: The standard finish for Nucor “CFR”™ is Galvalume®. A high quality painted finish is also available at an additional cost.

Non-handed system: Nucor “CFR”™ is designed to allow the installer to erect the roof in either direction, providing flexibility to choose the most efficient starting points on the roof. Additionally, in most cases the installer has the option to install either the roof or wall system first.

Flexible seaming options: The roof can be completely installed without the use of electric seaming machines. An electric machine is available for use after roof installation when required due to high uplift conditions or specified criteria, but the seamer does not have to be ran as the panels are installed. In all cases the roof is installed and crimped leaving the electric seaming to be accomplished safely and efficiently as one of the last steps of construction.

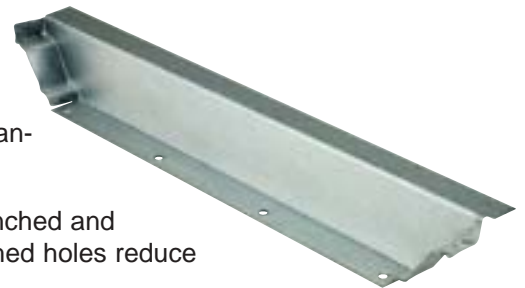
Wide range of insulation options: Nucor “CFR”™ is designed to work with a variety of insulation systems including fiberglass batt, rigid board, and rigid board with the use of a liner decking. This offers the builder and owner flexibility when choosing the best system to meet the functional needs of the building. It is recommended that some type of insulation be used with all “CFR”™ roof systems to prevent wind flutter or damage due to the effects of condensation.



Mastic in compression: The mastic is placed in complete compression at all locations. A heavy, aluminum cinch strap is used at panel endlaps to eliminate panel buckling and costly roof leaks. The use of the cinch straps also greatly reduces the number of fasteners required at endlaps.

Fasteners outside the building envelope: At the eave and ridge locations, fasteners are uniquely placed outside the building envelope, greatly reducing the chance for water penetration into the roof system.

Patented panel splice detail: Panel splices have been designed with a patented system to occur away from the purlin or joist so that normal tolerance found in construction will not hinder installation of the system. The continuous endlap design provides continuity as well as reduced handling of panels during installation.



Factory punched and notched: Nucor “CFR”™ panels are factory punched and notched to aid the installer in providing a weathertight fit. The pre-punched holes reduce debris on the roof and promote erector efficiency.

Solid seam design: Our seam profile is intentionally “stout” to provide flexibility in the field as well as a positive lock by the electric seamer, when the seamer is required. This all but eliminates the possibility of the seamer malfunctioning and damaging the seam as can occur with older “Pittsburgh-style” seams.

Galvalume® is a registered trademark of BIEC International, Inc.

UL® is a registered trademark of Underwriters Laboratories, Inc.

FM® is a registered trademark of Factory Mutual, Inc.

APPLICATION AND GUIDELINES

Diaphragm The Nucor "CFR"[™] system, because it is designed as a floating system, cannot be solely relied upon as a diaphragm for resisting lateral load forces or providing lateral stability to roof structural members. Due consideration for this must be addressed by the project engineer of record or system designed when "CFR"[™] is used in conjunction with other structural systems. 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 Nucor Building Systems.

Roof Top Units Roof top units and roof penetrations should be kept to a minimum and be clearly identified on the Nucor order documents including size, location and weight. See the Nucor Product and Engineering CD information for specific information concerning framing and flashing options.

Standard Finishes The standard finish for Nucor "CFR"[™] is Galvalume[®]. A high-performance painted finish is also available. Consult your local Nucor Building Systems plant for specifics. (Accessories including gutter brackets, cinch straps, end dams, and rib covers are provided in an unpainted finish.) If desired, accessories can be field painted to match the roof. Paint can typically be acquired locally, and is not provided by Nucor Building Systems.

SYSTEM WARRANTIES *(hard copies available upon request)*

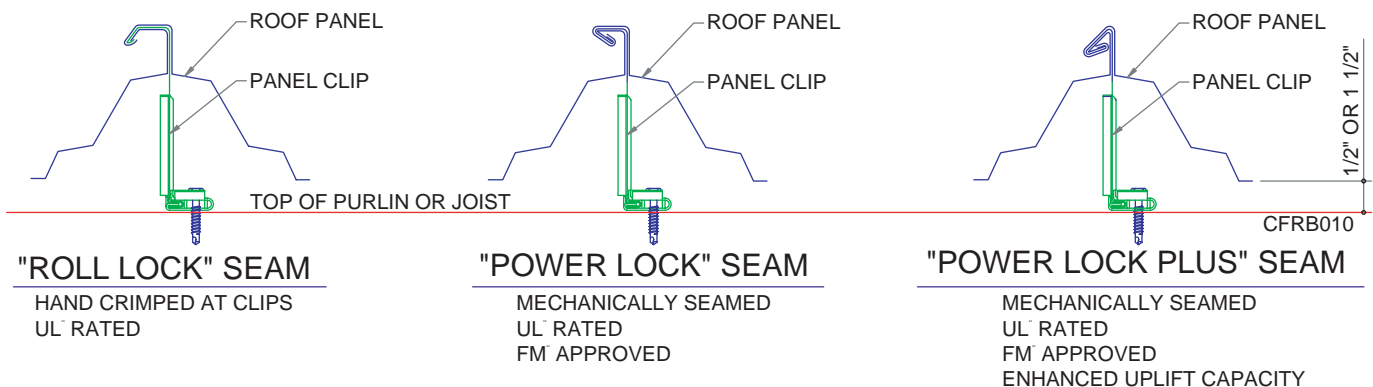
20 Year Galvalume[®] Finish Warranty (standard)

10 & 20 Year Paint Finish Warranty (standard)

10 Year Weathertightness Warranty (optional)

20 Year Weathertightness Warranty (optional)

FLEXIBLE SEAMING OPTIONS



PRODUCT SPECIFICATIONS

- Standard 24" width
- 3" nominal height
- Standard 24 gage Galvalume®, 50,000 psi steel
(Siliconized Polyester and Kynar painted is available as an option)
- Minimum roof slope: 1/4:12
(Slopes greater than 4:12 may require special flashing details)
- Custom lengths 6'-0" to 55'-0"
- Designed for use with fiberglass batt or rigid board insulation
- Panels rated for UL90® and Factory Mutual® uplift approval
- Factory applied mastic in panel sidelap
- Standard roof line trim and flashing to be 26 gage

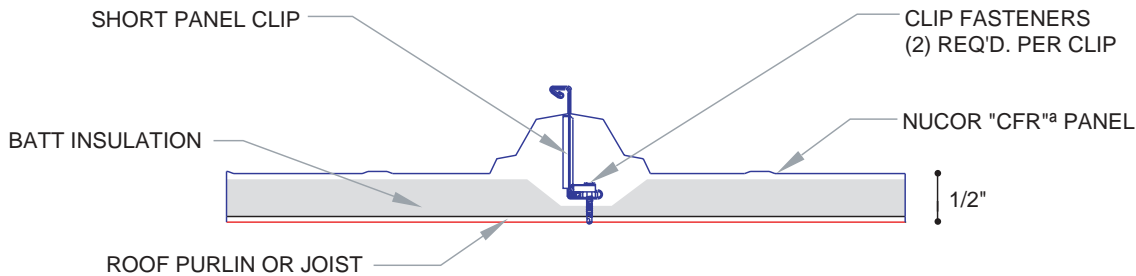


PERFORMANCE AND TESTING SUMMARY

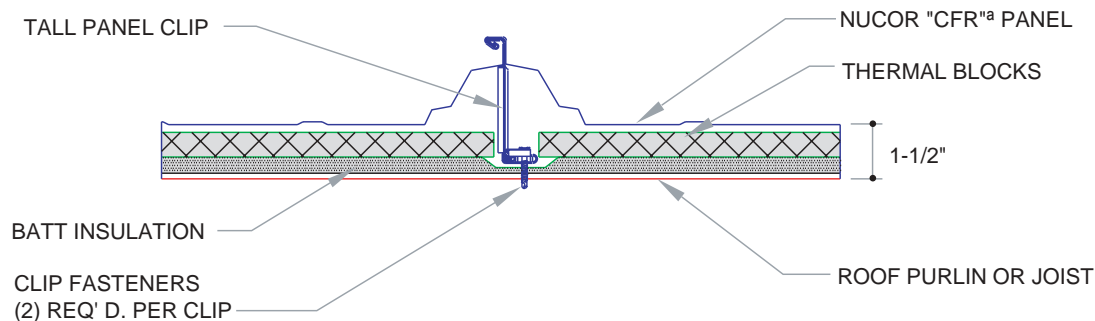
<u>Classification</u>	<u>Panel gage</u>	<u>Secondary</u>	<u>Spacing</u>	<u>Seam Option</u>
Factory Mutual I-60	24 gage	Purlins or Joists	5'-0"	"Power Lock"™
Factory Mutual I-90	24 gage	Purlins or Joists	4'-0"	"Power Lock"™
UL90®, Listing #552	24 gage	Purlins or Joists	5'-0"	"Roll Lock"™

- ASTM E-1592 Uplift Testing
- AISI Purlin Stability Base Testing
- ASTM E1680 Air Infiltration
- ASTM E1646 Water Infiltration

CLIP AND INSULATION SYSTEM OPTIONS



NUCOR "CFR"^a PANEL WITH SHORT CLIP



NUCOR "CFR"^a PANEL WITH TALL CLIP & THERMAL BLOCKS

Insulation Nucor Building Systems recommends that insulation be used in all "CFR"TM roof applications to avoid problems with condensation forming. Insulation also provides a buffer between the purlins and the "CFR"TM roof to reduce noise and possible damage due to metal-to-metal contact. Insulation requirements are as follows:

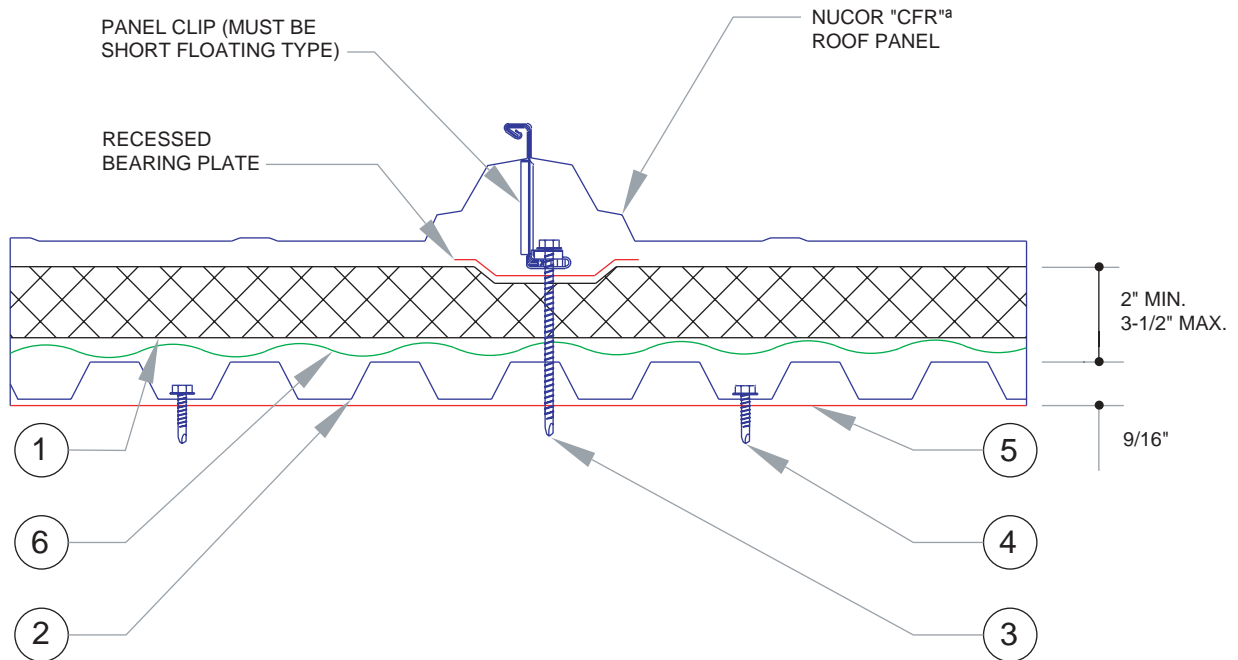
Short Clips: 2" to 4" of insulation compressing to 1/2" over roof purlins. (EPS foam spacers are available for limited use in non-insulated areas.)

Tall Clips: 2" to 6" of insulation compressing to 1/2" thickness under thermal block at roof purlin locations. Thermal blocks are required when tall clips are used.

Clip Applications Fixed or floating roof clips may be used as follows:

Roof Structural Type	Panel Run \leq 120'-0"	Panel Run \geq 120'-0"
Purlins	Fixed Clip	Floating Clip
Joists	Floating Clip	Floating Clip

COMPOSITE "CFR"™



- ①. **Rigid Insulation** (Insulation not by Nucor) Insulation must be field coped at all backup plates (ridge, high side, and endlaps). This will allow the roof to float & prevent stress at endlaps. Rigid insulation thickness = 2" minimum and 3-1/2" maximum.
- ②. **Liner Decking** .6C 28 gage painted white. Liner deck is fabricated in accordance with SDI specifications and tolerances. Nucor does not offer warranties on liner decking.
- ③. **Clip Fastener** (2) required per clip; the fastener **must** engage roof structural members. Self-drilling fastener without washer is utilized. **NOTE: Nucor recommends the liner decking and roof structural members to be pre-drilled for the clip fasteners to help avoid fastener drill point breakage.**
- ④. **Deck Fastener** Standard fasteners are self-drilling fasteners without washers. Puddle welds are an available option for joists only. Weld or screw pattern spacing shall be as follows unless specified differently by design:
 - 12" o.c. at intermediate supports
 - 6" o.c. at endlaps
 - 30" o.c. at sidelaps
- ⑤. **UL90® Rated System Member Spacing**
 - Maximum purlin spacing shall be 5'-0".
 - Maximum joist spacing shall be 5'-0".
- ⑥. **Vapor Barrier** Vapor barrier is required in all composite "CFR"™ applications to avoid condensation. Vapor barrier is not provided by Nucor Building Systems.

"CFR"™ TRANSLUCENT PANEL



- No through-fasteners; this is a fully adhered system
- UL90® approved without cumbersome reinforcing channels and framing
- Shipped pre-assembled for easy installation
- Endlap splices are pre-punched for easy and proper installation
- Weathertight system

Technical Specifications:

Property	ASTM Standard	Value
Tensile Strength	D-638	22,000 psi
Tensile Modulus	D-638	1.33 x 10 ⁶ psi
Flexural Strength	D-790	25,000 psi
Flexural Modulus	D-790	1.1 x 10 ⁶ psi
Compressive Strength	D-695	26,000 psi
Barcol Hardness	D-2583	45 – 50
Uniform Building Code Class	Std. 52-4	CC2
Burning Rate	D-635	< 2" / minute
R Factor with Film Coefficients	N/A	0.9 to 1.1

IMPORTANT!!!
NEVER WALK, STEP, OR STAND ON A
TRANSLUCENT PANEL. INJURY OR DEATH
COULD RESULT.

**20 YEAR MATERIAL WARRANTY
FOR GALVALUME[®] ROOF PANELS**

Nucor Building Systems warrants to its Purchaser and to the original Owner that Nucor Building Systems Galvalume[®] Roof Panels if used in the construction of a building erected within the United States, will not rupture, fail structurally, or perforate within a period of twenty (20) years after shipment from the Nucor Building Systems plant due to exposure to normal atmospheric conditions:

This warranty DOES NOT APPLY to roof panels exposed at any time to corrosive or aggressive atmospheric conditions, including but not limited to:

1. Areas subject to salt water (marine atmospheres) or to constant spraying of either salt or fresh water.
2. Areas subject to fallout or exposure to corrosive chemicals, fumes, ash, cement dust or animal waste.
3. Areas subject to water run-off from lead or copper flashings or areas in contact with lead or copper.
4. Conditions or circumstances where corrosive fumes or condensates are generated or released inside the building.
5. Areas where panels were not stored or installed per Nucor specifications.

This Warranty DOES NOT apply in the event of:

- A. Mechanical, chemical, or other damage sustained by the roof panels during shipment, storage, erection, or after erection.
- B. Failure to provide free drainage of water, including internal condensation, from overlaps and all other surfaces of the panels.
- C. Failure to remove debris from overlaps and all other surfaces of the panels.
- D. Damage caused to the metallic coating of the panels by improper scouring or cleaning procedures.
- E. Deterioration of the panels caused by contact with green or wet lumber.
- F. Presence of damp insulation or other corrosive materials in contact with or close proximity to the panels.
- G. Failure to use appropriate fasteners as specified in the Nucor Building Systems Erection Manual for all roof panel connections.
- H. Damage caused to metallic coating due to falling objects including hail and/or wind-borne debris.
- I. Failure of panels applied to slopes which are flatter than 1/4:12.
- J. Settling or heaving of the building foundation.

Additionally, insulation systems must be as defined in Nucor standard documents. Uninsulated roof areas are excluded from this warranty. Improper use of cutting blades or hot saws that expose the panels to debris shall void the warranty. Product life may be diminished by water runoff from existing structures, condensation unit runoff, or pipes and the like that introduce irritants to the panels.

GALVALUME[®] IS A TRADEMARK OF BIEC INTERNATIONAL

NUCOR PROJECT#

NUCOR PROJECT NAME

PURCHASER

ORIGINAL OWNER

Sales Service Manager

20 yr. Galv.

NUCOR BUILDING SYSTEMS

THE FOREGOING WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

The foregoing warranty applies only to roof panels that remain in place at the site of the original construction and which have been stored and erected in strict accordance with all applicable Nucor Building Systems instructions and drawings. The foregoing warranty is extended solely to the original Purchaser and to the Original Owner of the building on which the roof panels are erected, and is not transferable or assignable.

In the event of the failure of the panels to conform to the foregoing warranty within twenty (20) years from the date of shipment of the panels from Nucor's plant, Nucor must be notified in writing within thirty (30) days of discovery of such failure and given an adequate identification of the panels involved in the claim, including date of installation, invoice number and date of shipment. No corrective action shall be taken without Nucor Building Systems first having been afforded reasonable opportunity to examine the failure and to approve the method of corrective action taken. Failure to give such notice shall void Nucor's responsibility to the project.

PURCHASER'S OR ORIGINAL OWNER'S EXCLUSIVE REMEDY AGAINST NUCOR BUILDING SYSTEMS, AND NUCOR BUILDING SYSTEM'S SOLE OBLIGATION, FOR ANY AND ALL CLAIMS, WHETHER FOR BREACH OF CONTRACT, WARRANTY, TORT (INCLUDING NEGLIGENCE), OR OTHERWISE, SHALL BE LIMITED TO REPAIRING DEFECTIVE PANELS, OR AT NUCOR BUILDING SYSTEMS' SOLE OPTION, TO FURNISH F.O.B. NUCOR BUILDING SYSTEMS' PLANT SUFFICIENT REPLACEMENT PANELS FOR THE DEFECTIVE PANELS.

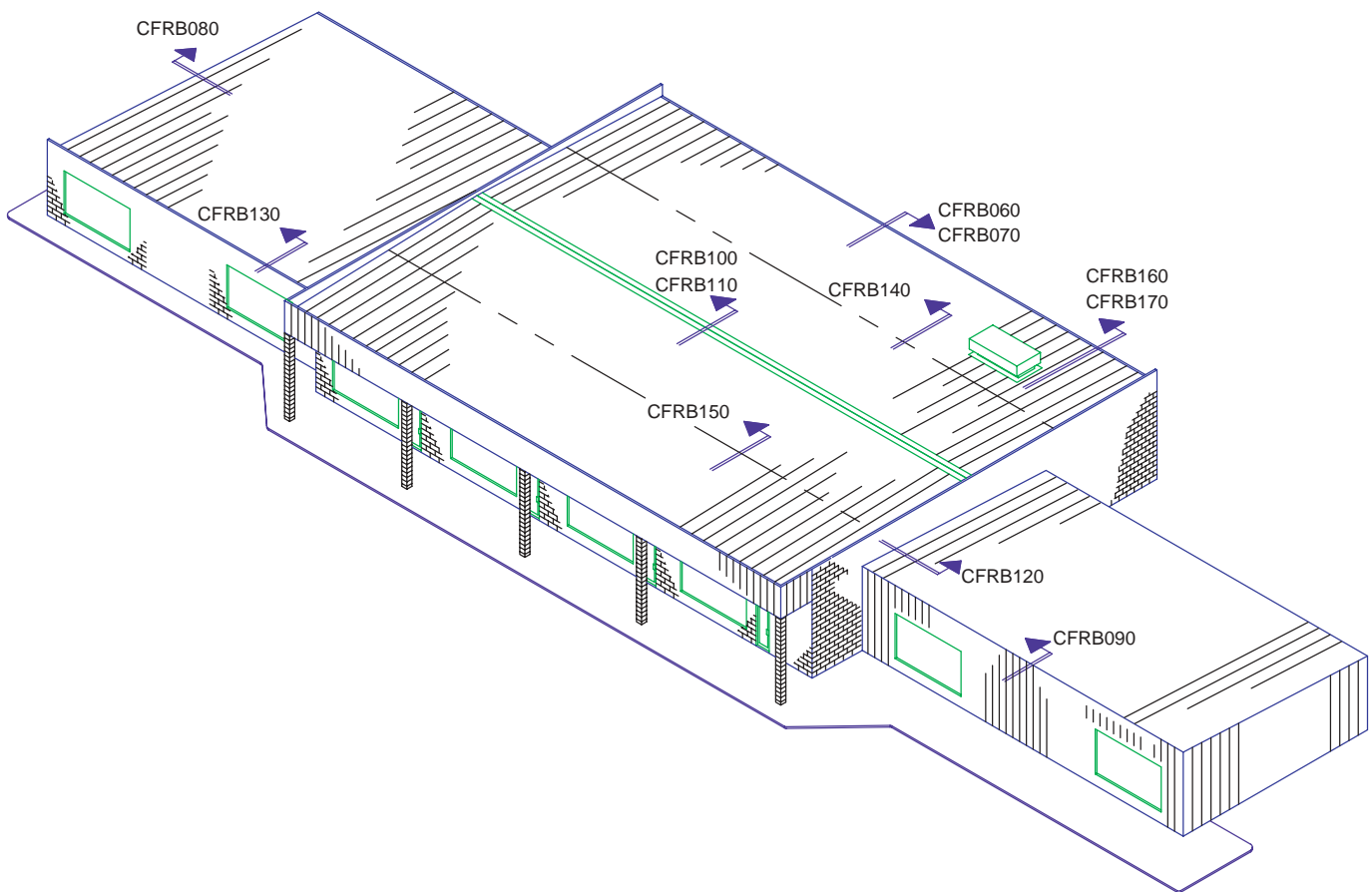
Nucor Building Systems shall not in any event be liable for the cost of labor to replace any defective panels, nor shall Nucor Building Systems have any liability for incidental or consequential damages.

Nucor shall not have any obligation under any warranty or guarantee until all bills for material, installation and erection of said building and component thereof and labor and other work performed by the Purchaser have been paid in full by the Owner.

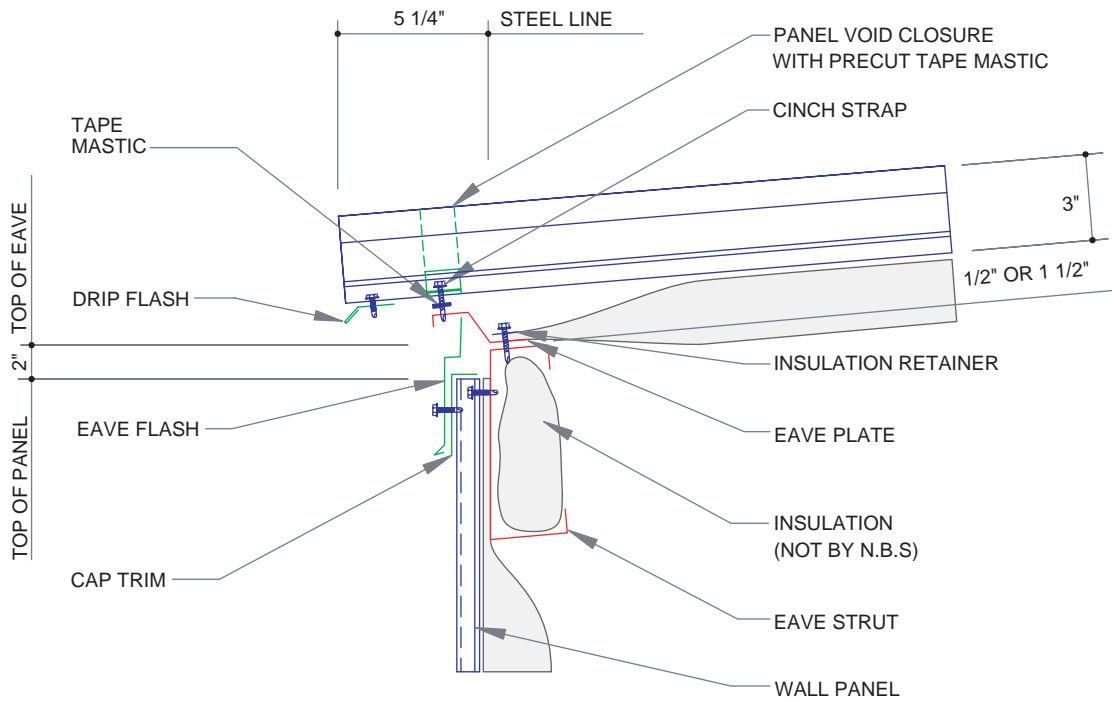
Builder has certified that Nucor panels were stored and installed in accordance with Nucor instructions. In the event Panels were not stored and installed in accordance with Nucor instructions, the Builder and/or those responsible for installation assume all liabilities to the Owner.

Nucor "CFR"™ Roof Details

(Refer to the following pages for standard details.)

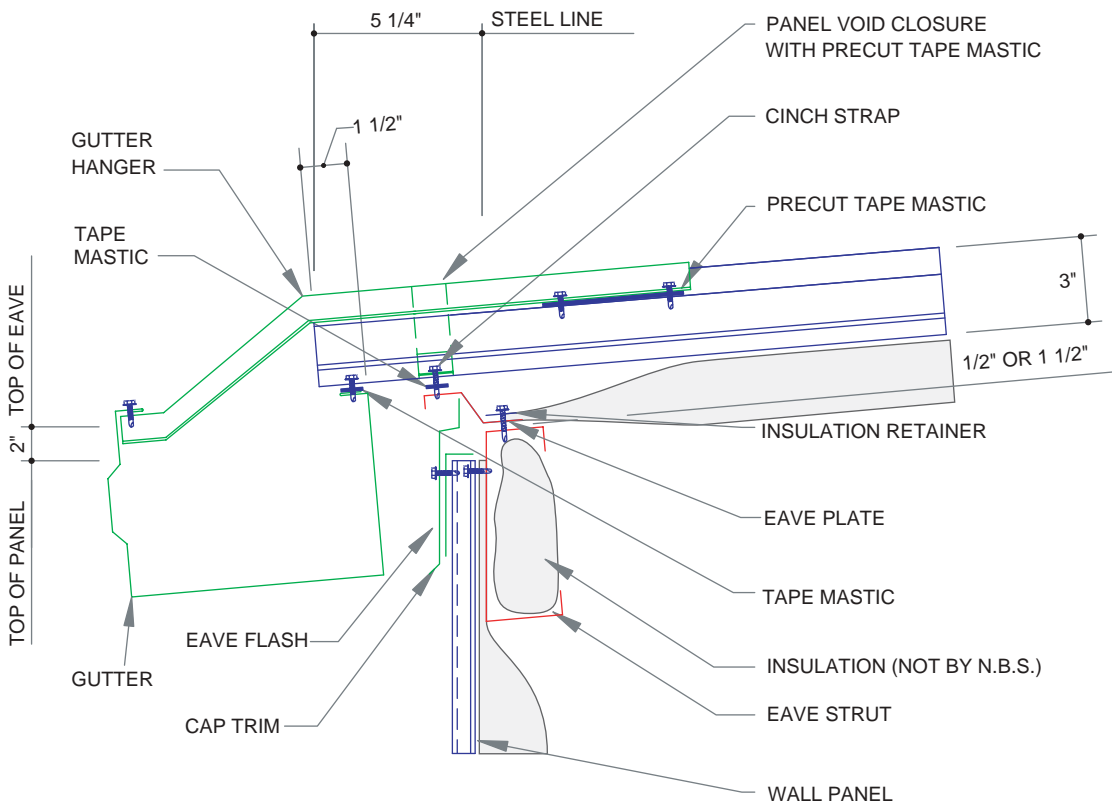


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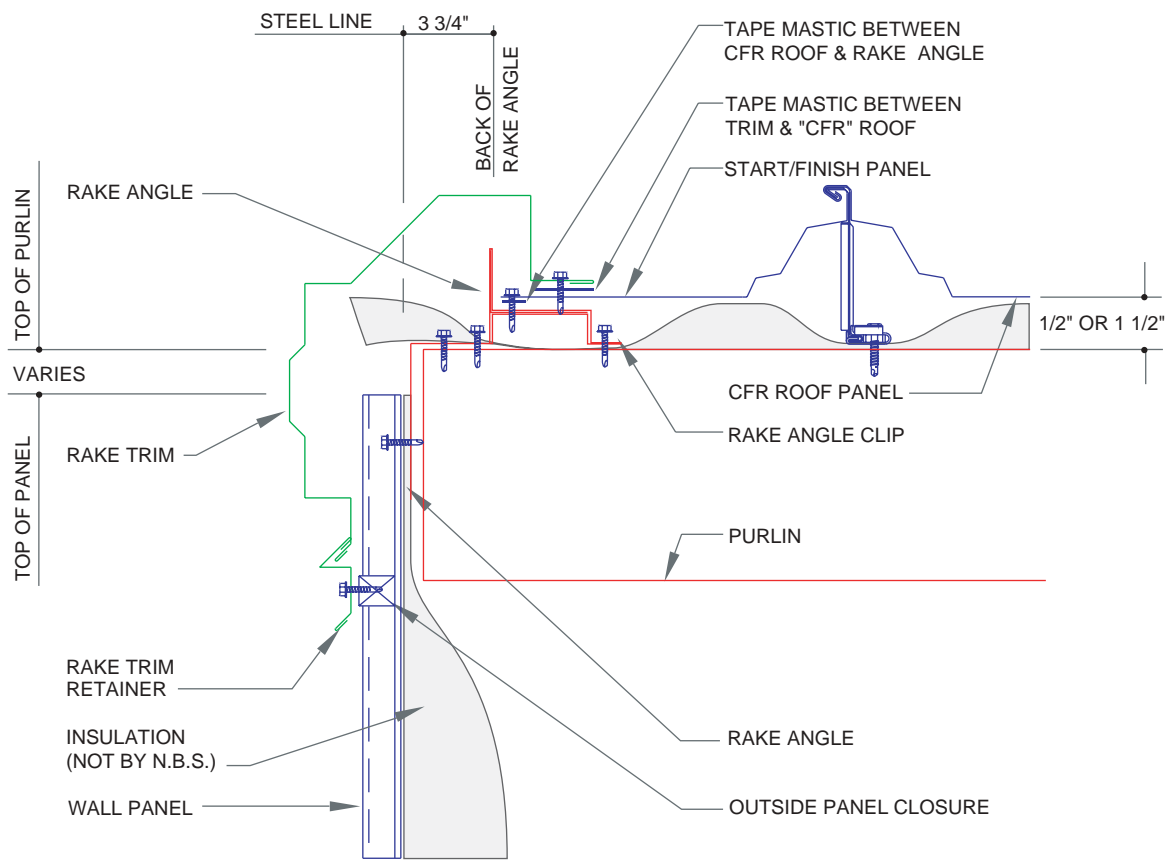
SIMPLE EAVE DETAIL

CFRB060



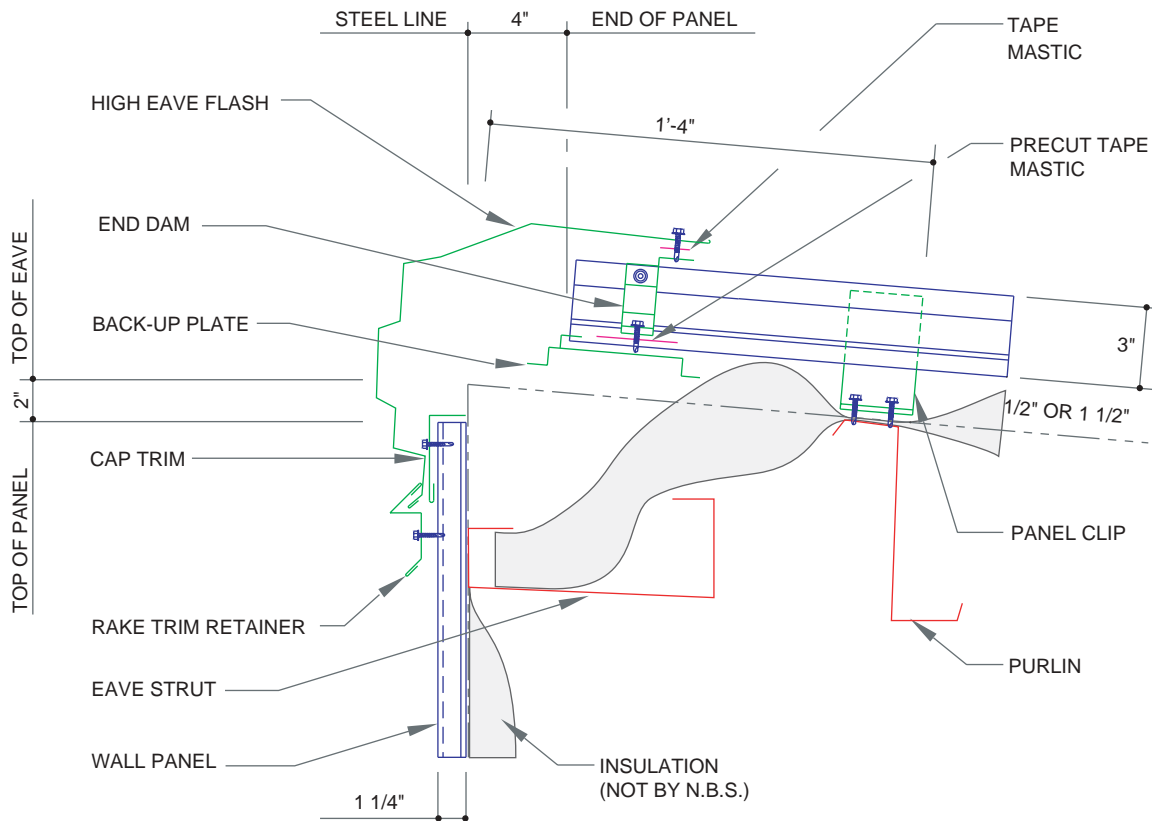
EAVE GUTTER DETAIL

CFRB070



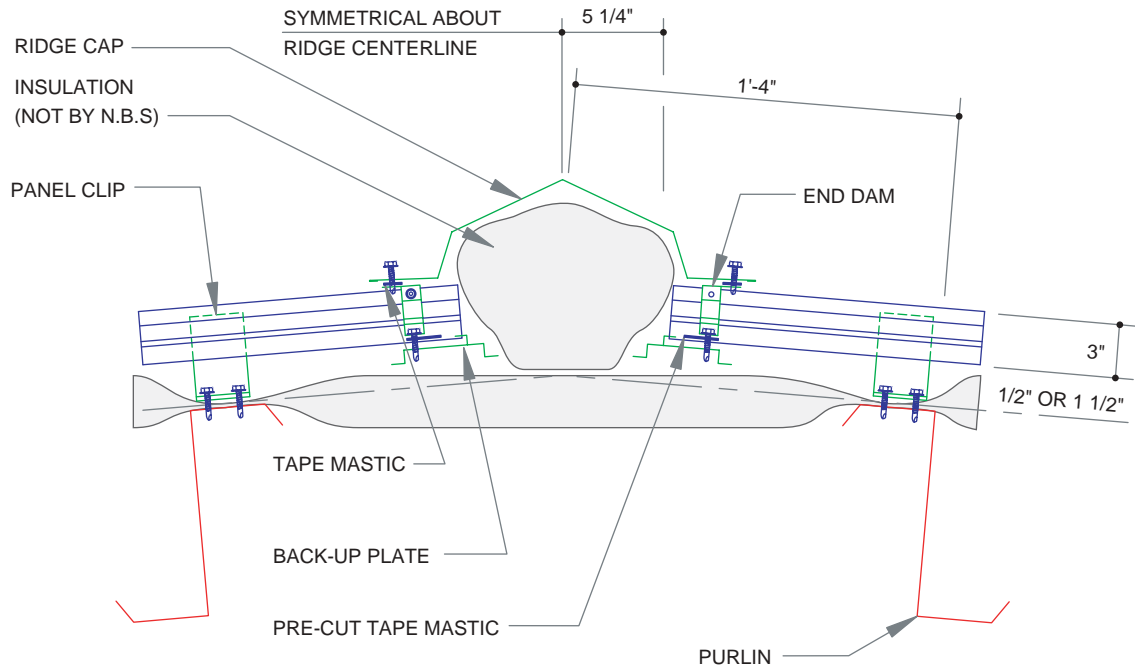
SCULPTURED RAKE DETAIL

CFRB080



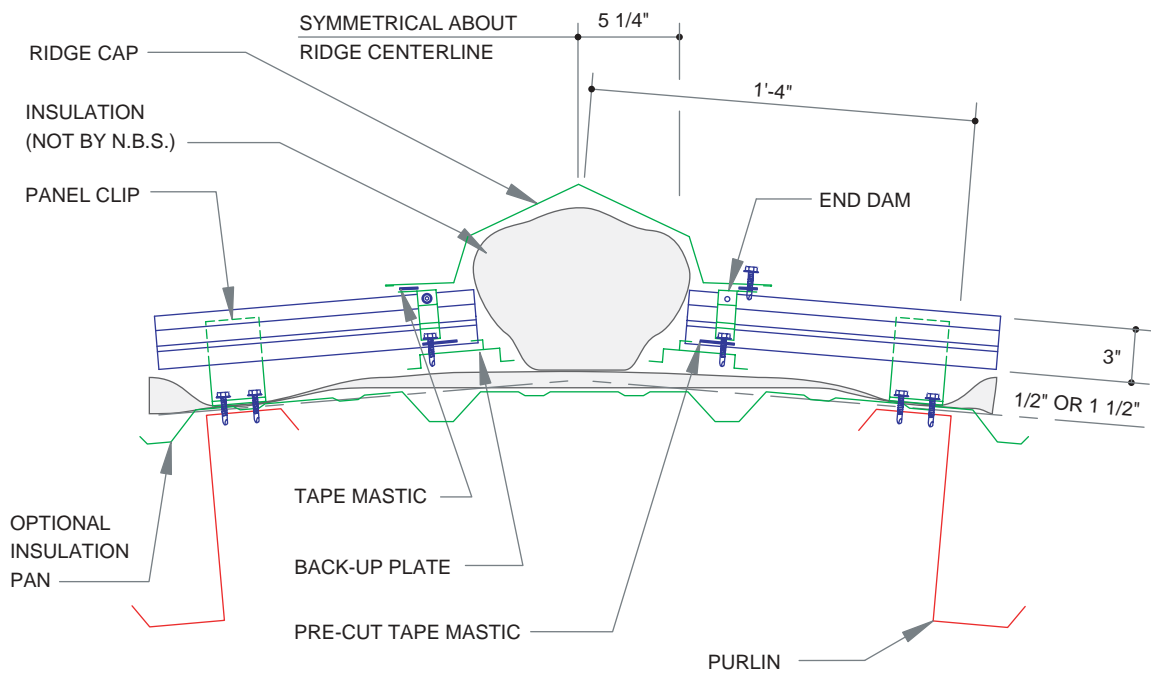
HIGH EAVE DETAIL

CFRB090



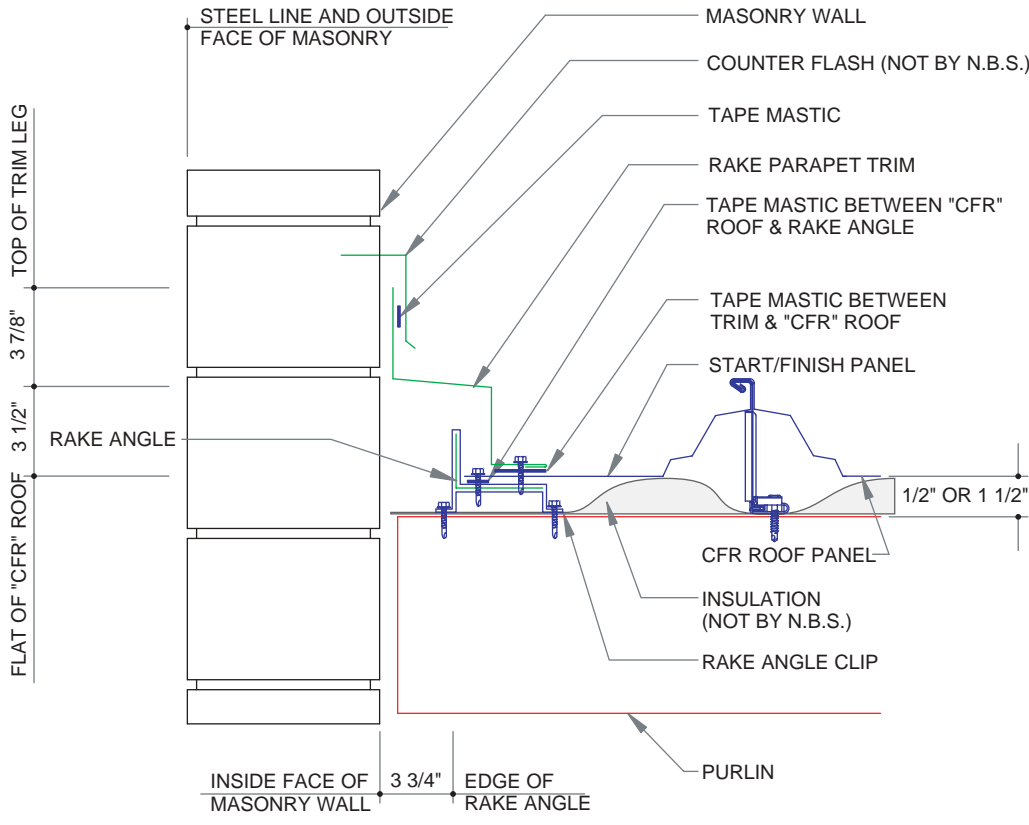
RIDGE DETAIL (STANDARD)

CFRB100



RIDGE DETAIL (OPTIONAL)

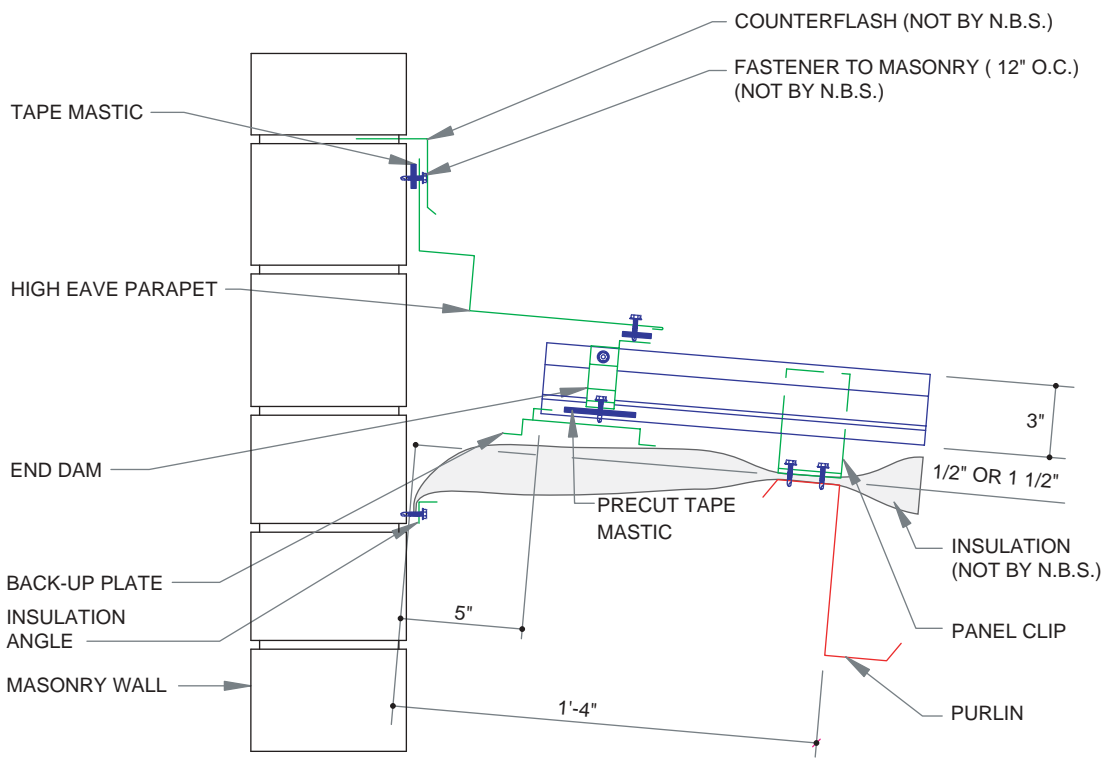
CFRB110



RAKE PARAPET DETAIL

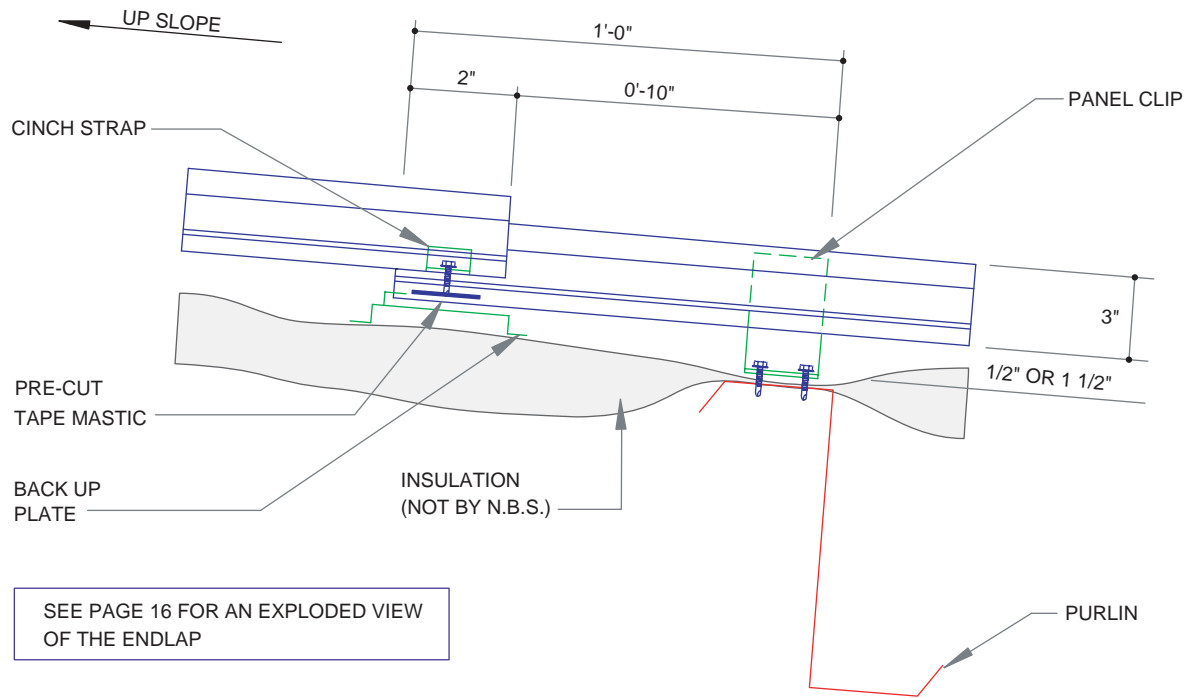
CFRB120

DO NOT FASTEN RAKE PARAPET TRIM TO MASONRY WALL



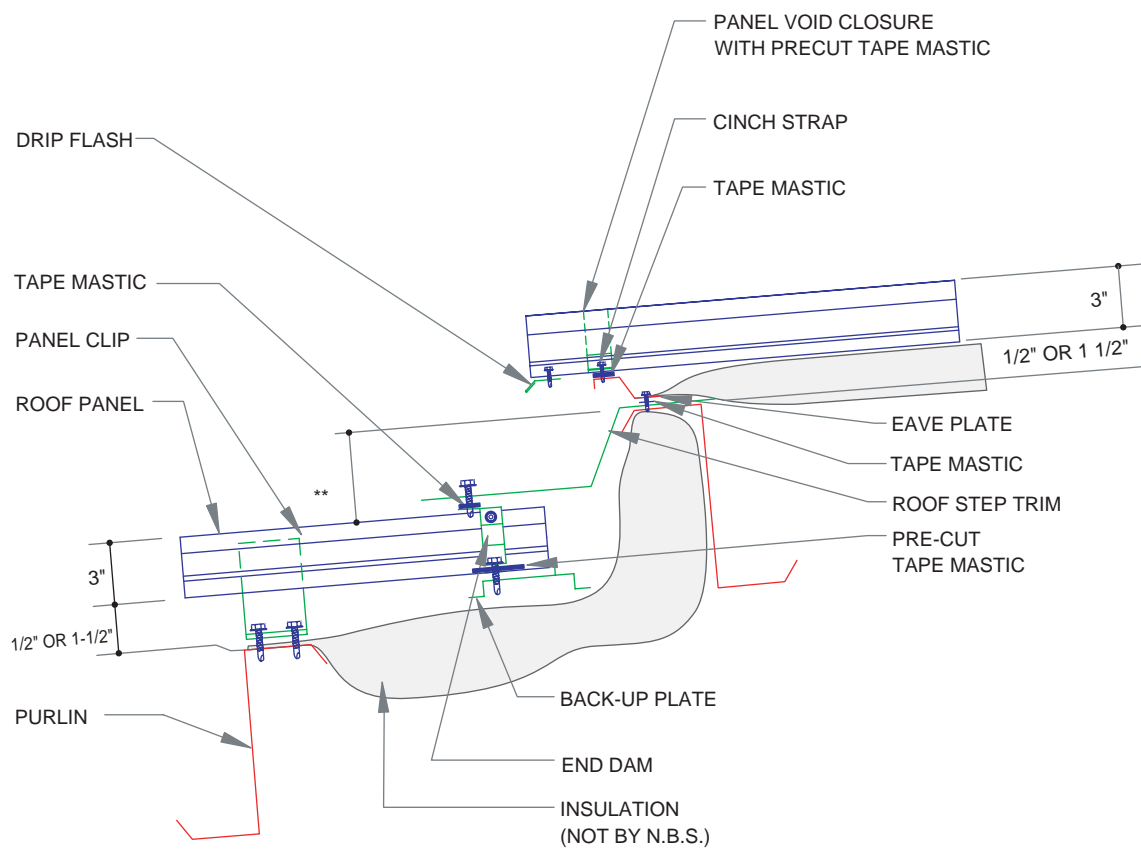
PARAPET HIGH EAVE DETAIL

CFRB130



PANEL SPLICE

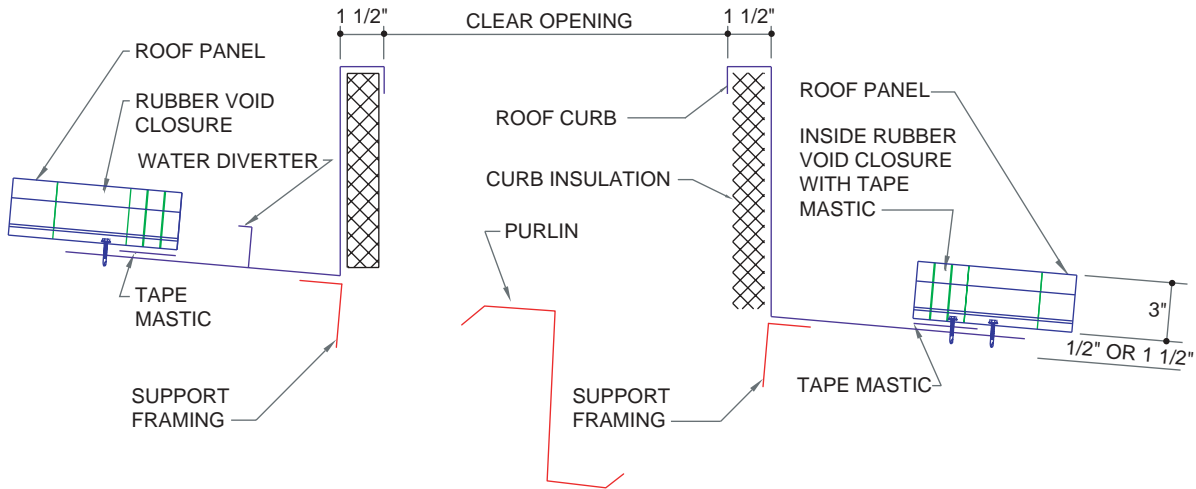
CFRB140



ROOF STEP EXPANSION JOINT

CFRB150

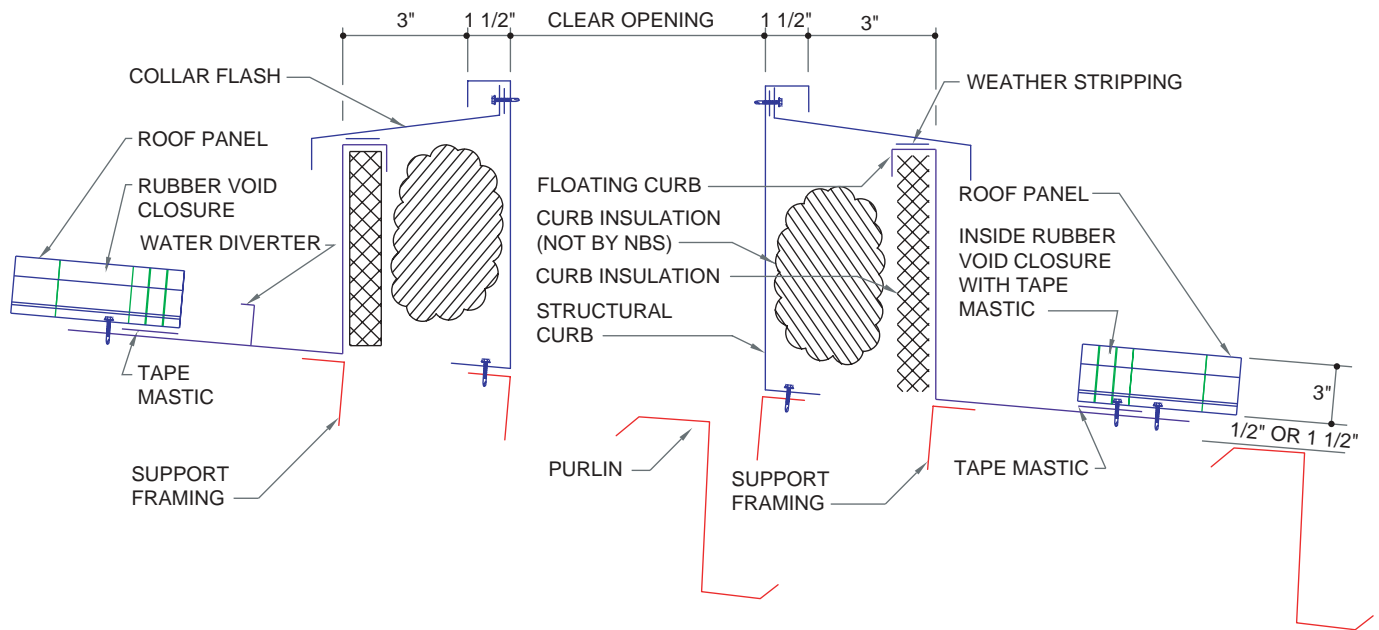
** 4 1/2" IF LOWER ROOF PLANE PANEL HAS TALL CLIPS
 5 1/2" IF LOWER ROOF PLANE PANEL HAS SHORT CLIPS
 DIMENSIONS DO NOT APPLY TO COMPOSITE ROOF SYSTEMS



SINGLE ROOF CURB

CFRB160

FOR RTU'S LESS THAN 300# WITH SLIDING PANEL CLIPS



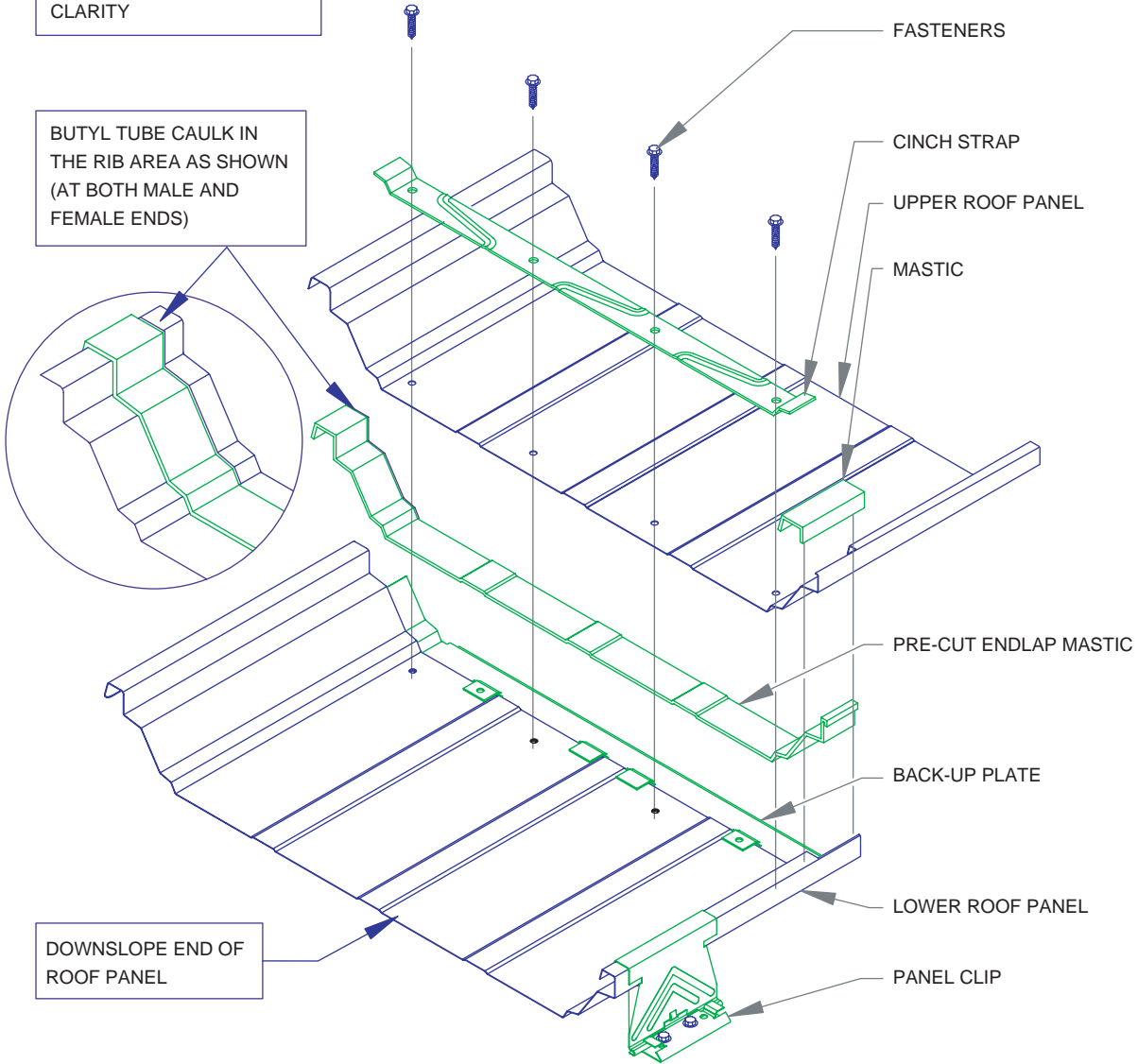
DOUBLE ROOF CURB

CFRB170

FOR RTU'S > 300# & < 1200# WITH SLIDING PANEL CLIPS

INSULATION AND THERMAL
BLOCKS NOT SHOWN FOR
CLARITY

BUTYL TUBE CAULK IN
THE RIB AREA AS SHOWN
(AT BOTH MALE AND
FEMALE ENDS)

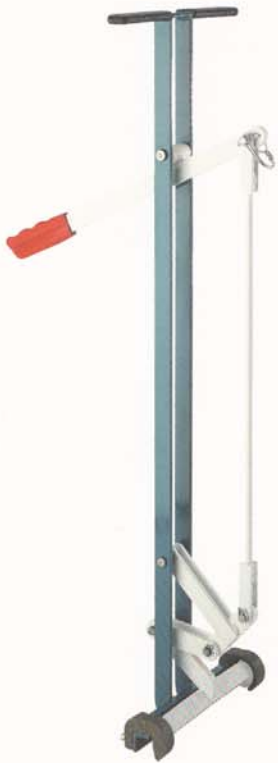


EXPLODED ENDLAP DETAIL

CFRB180



Right
From
The
Start...



- The Nucor “CFR”™ Panel is taken directly from our production line and field tested for **weathertightness!**
- Nucor’s precision components are time tested for **durability and performance!**
- Nucor’s design details are field tested for **long term dependability!**





NUCOR

BUILDING SYSTEMS

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